

Birtle Transmission Project

Construction Environmental Protection Plan

Prepared by Manitoba Hydro

Transmission Planning & Design Division

Licensing & Environmental Assessment

June 2020

This page was left intentionally blank.

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 impacts
- continually improving our Environmental Management System
- meeting compliance obligations
- considering the interests and recognizing the knowledge of our interested parties who may be affected by our actions
- reviewing our environmental objectives and targets regularly 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 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.

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.

This page was left intentionally blank.

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
FINAL 1.0	APPROVED VERSION PUBLISHED			2020_0610

This page was left intentionally blank.

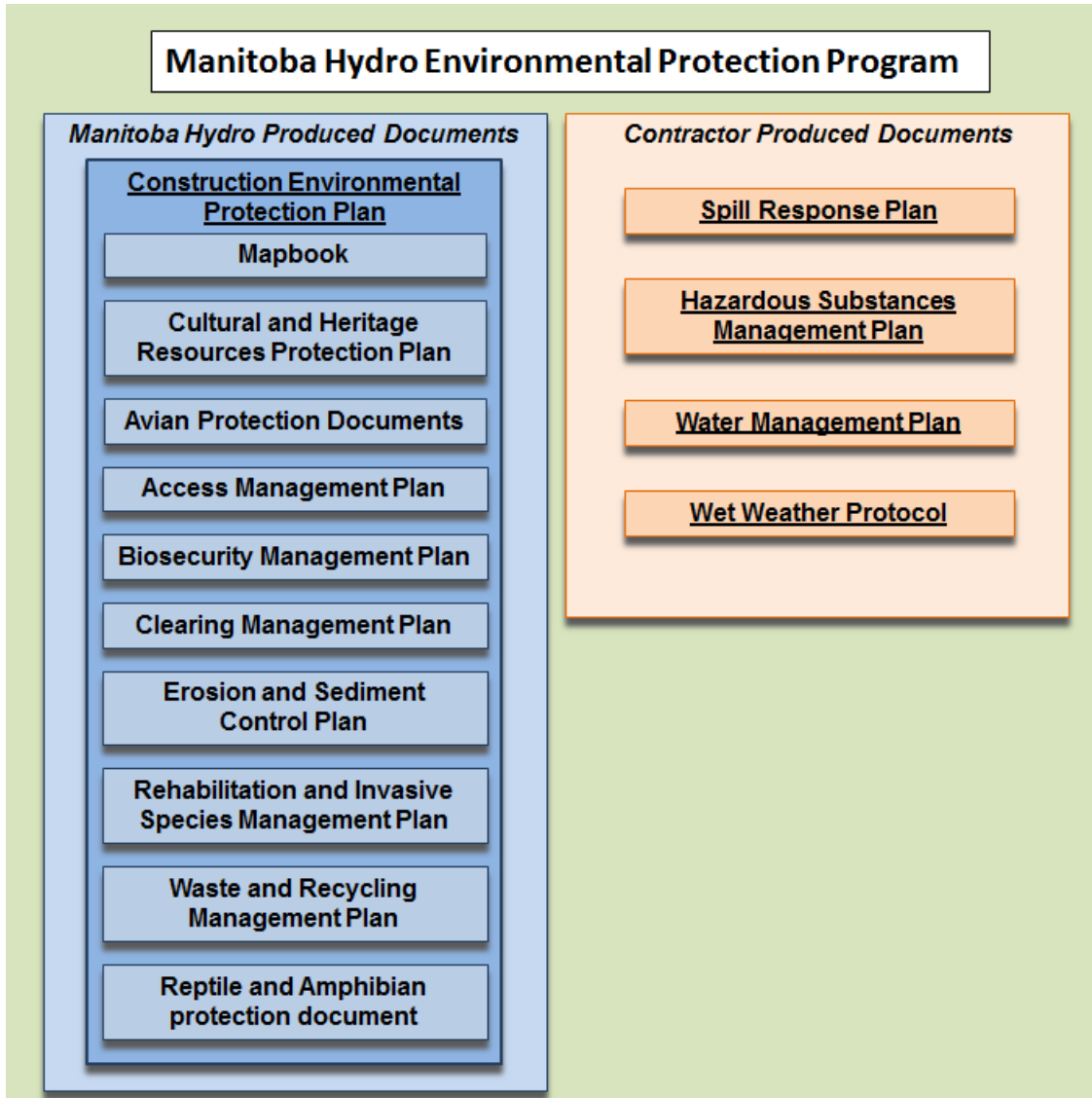


Figure 1: Diagram of environmental protection documents

This page was left intentionally blank.

Table of contents

1.0	Introduction.....	1-1
1.1	Document amendment process	1-3
1.2	Overview.....	1-4
1.3	Roles, responsibilities and reporting	1-4
1.3.1	Environmental protection	1-11
1.3.2	Documentation and Reporting	1-11
1.3.3	Environmental representative(s) / supervisor(s)	1-12
1.3.4	Environmental improvement orders.....	1-12
1.3.5	Environmental stop work order	1-13
1.4	Environmental protection information management system	1-14
1.5	Regulatory requirements.....	1-15
2.0	Environmental considerations.....	2-1
2.1	Timing windows.....	2-1
2.1.1	Wildlife	2-1
2.1.2	Fish	2-1
2.2	Setbacks and buffers.....	2-2
2.2.1	Flagging and signage standards.....	2-2
2.2.1.1	Flagging.....	2-2
2.2.1.2	Signage.....	2-4
2.3	Riparian management.....	2-5
2.3.1	Riparian buffers.....	2-5
2.3.1.1	Machine free zones	2-6
2.3.2	Riparian mitigation	2-1
2.4	Wildlife and habitat.....	2-1
2.4.1	Birds and habitat.....	2-1
2.4.2	Reptiles / amphibians	2-2
2.4.3	Mammals.....	2-2

This page was left intentionally blank.

2.5	Species of concern.....	2-2
2.5.1	Species of concern discovery during pre-project construction	2-3
2.5.2	Species of concern discovery during project construction.....	2-3
2.6	Agricultural biosecurity.....	2-3
2.7	Soils and terrain	2-4
2.7.1	Soils.....	2-4
2.7.2	Encountering unexpected contamination	2-4
2.8	Cultural and heritage resources	2-5
2.9	Access	2-5
3.0	Orientation and awareness	3-6
3.1	Pre-job meeting (environmental component).....	3-6
3.2	Contractor start-up meeting.....	3-7
3.3	Weekly progress meetings	3-7
3.4	Daily job planning meetings	3-7
4.0	Contractor-developed environmental management plan.....	4-1
5.0	Environmental mitigation requirements	5-1
5.1	General mitigation requirements	5-1
5.2	General mitigation tables.....	5-3
6.0	References.....	6-59

This page was left intentionally blank.

Appendices

Appendix A: Contact list

Appendix B: Environmental licences, approvals and permits

Appendix C: Timing windows

Appendix D: Buffers and setbacks

Appendix E: Avian protection documents

Appendix F: Reptile and Amphibian protection document

Appendix G: Species of Concern contingency measures

Appendix H: Biosecurity Management Plan

Appendix I: Erosion and Sediment Control Plan

Appendix J: Saturated/Thawed Soils Operating Guidelines

Appendix K: Guidance for contaminated soils or groundwater identification and disposal

Appendix L: Cultural and Heritage Resources Protection Plan

Appendix M: Access Management Plan

Appendix N: Environmental pre-work orientation record

Appendix O: Contractor developed plans

Appendix P: Rehabilitation and invasive species management plan

Appendix Q: Waste and Recycling Management Plan

Appendix R: Clearing Management Plan

This page was left intentionally blank.

List of tables

	Page
Table 1: Environmental roles and responsibilities of personnel during the construction phase.....	1-5
Table 2: Riparian buffer and machine free zone distances based on slope.....	2-5

List of figures

	Page
Figure 1: Diagram of environmental protection documents	4
Figure 2: Document amendment process.....	1-3
Figure 3: Environmental communication reporting structure	1-14
Figure 4: Examples of approved flagging tape used in delineating ESS.....	2-3
Figure 5: Buffer establishment for geometry types	2-4
Figure 6: Examples of access and signage	2-5
Figure 7: Example of zones in a riparian buffer	2-1

List of maps

	Page
Map 1: Overview map of the Birtle transmission project.....	1-2

This page was left intentionally blank.

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 Birtle 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.

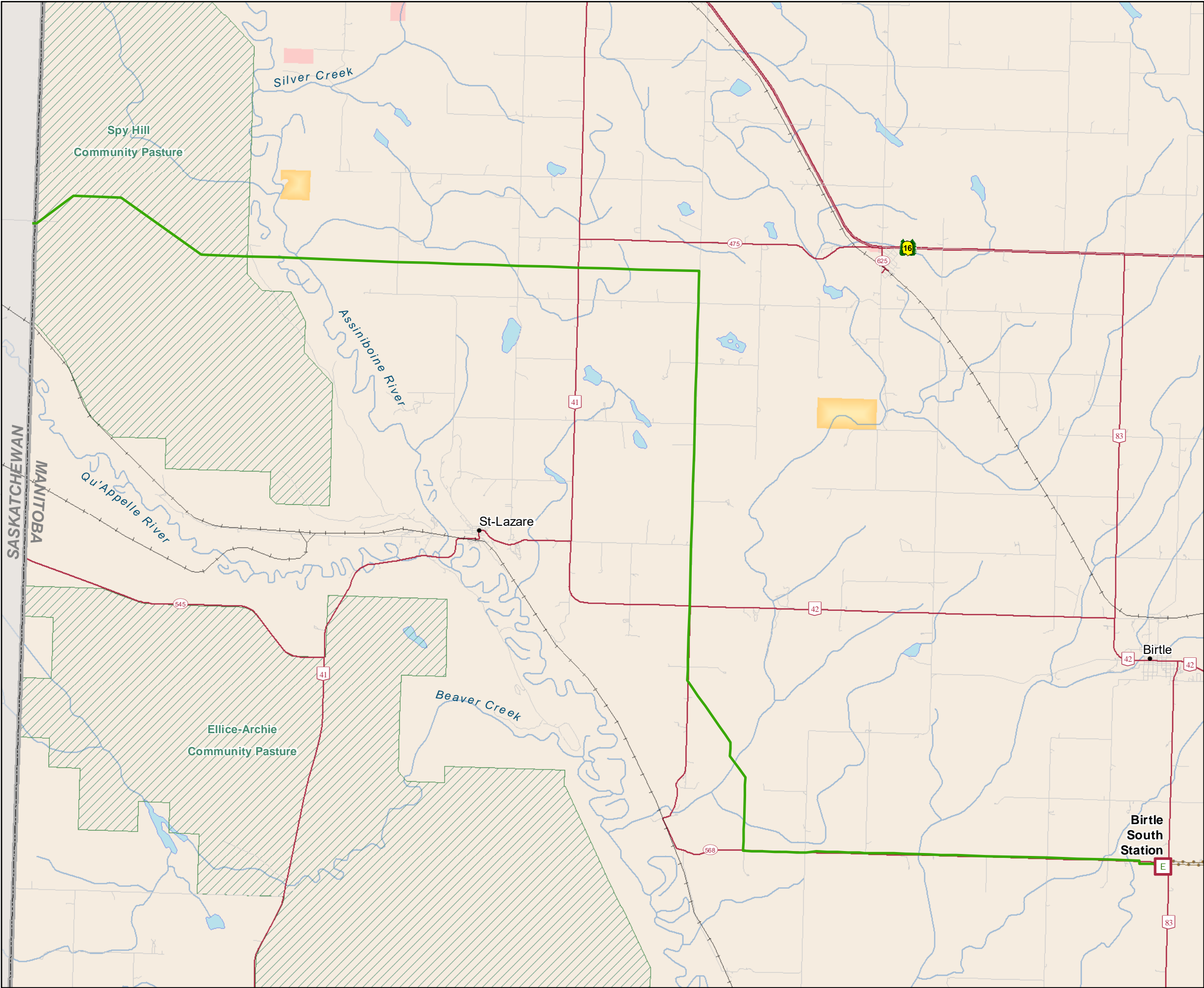
This CEnvPP provides guidance for the implementation of environmental protection measures for the Project. The direction and guidance provided in this CEnvPP document applies to all lands related to the project both private land and crown land.

The Birtle Transmission line (B71T) will be approximately 46 km in length, a 230 kV AC transmission line designed to meet the needs of a power sale agreement with SaskPower (Map 1). The Project in-service date is anticipated to be in April 2021.

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 guidance on the implementation of 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 Officer/Inspector.

This page was left intentionally blank.

\\gsd\da\T\lea1\GIS\Orientis\PRJ_EPIMS\Managed\Plans\EA\BTP\Environment\Protection\Plan\BTP_Overview_MH_20190322.mxd



Birtle Transmission Project

Project Infrastructure

- Birtle South Station
- Final Preferred Route

Infrastructure

- Existing 500kV Transmission Line
- Existing 230kV Transmission Line

Map Tile Index - 1:5,000

Landbase

- Community
- Railway
- Yellowhead Highway
- Provincial Highway
- Provincial Road
- First Nation Lands
- Wildlife Management Area
- Community Pasture
- Provincial Boundary

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: March 22, 2019



0 2 Kilometres
0 1 2 Miles

1:100,000

Overview Map

1.1 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 due to the ongoing adaptive management process to improve environmental protection measures. In addition, Manitoba Hydro's Licensing and Environmental Assessment department must approve all field decisions and/or changes to a procedure outlined in the CEnvPP. Should an amendment be required, it will be communicated to Manitoba Sustainable Development (SD) through the Environmental Approvals Branch to determine approval requirements. Figure 2 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.

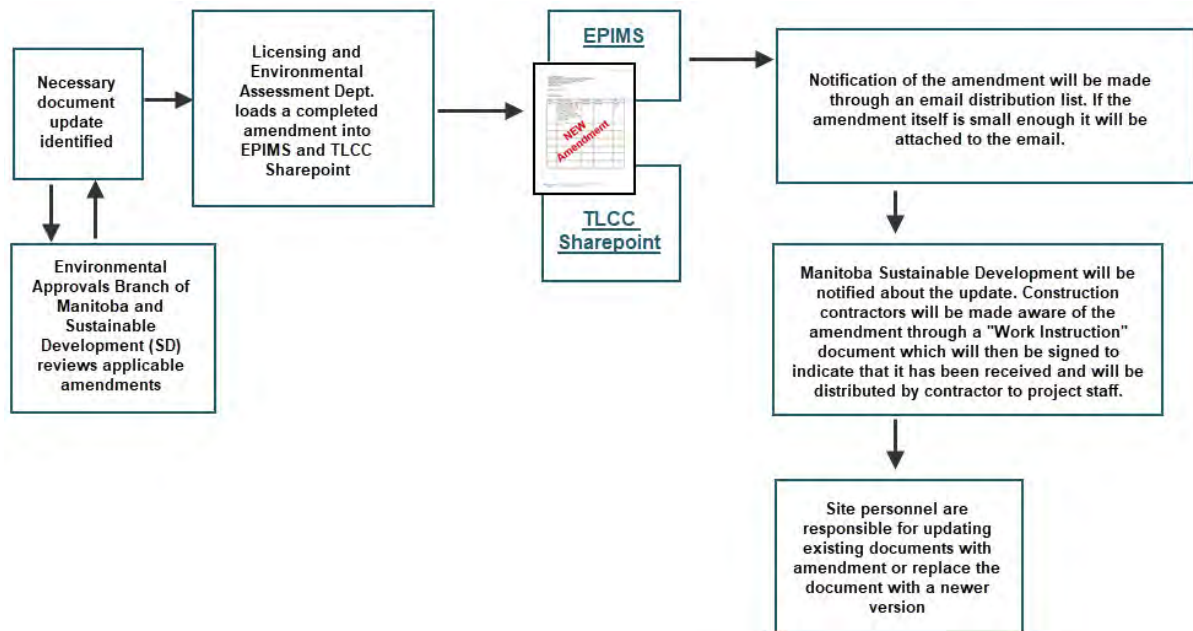


Figure 2: Document amendment process

1.2 Overview

Part of Manitoba Hydro's commitment to environmental protection includes a comprehensive Environmental Protection Program. This program includes the development of a CEnvPP specific to the Project. The CEnvPP provide general and specific environmental protection information for project components and is intended for use by construction contractors and environmental staff.

Environmentally sensitive sites (ESS) may be identified for the Project. ESS are locations, features, areas, activities or facilities that were identified during the environmental assessment to be ecologically, socially, economically, culturally or spiritually important or sensitive to disturbance and require protection during construction of the project. The determination of ESS has included the consideration of Indigenous traditional knowledge. Manitoba Hydro will continue to engage with stakeholders and indigenous communities in efforts to continually update this plan with sensitive sites and current knowledge as it is shared.

Map sheets may be developed for the Project, if such sites are discovered during preconstruction surveys or during construction, to present the location and spatial extent of ESS. Each map will have corresponding tabular summary information including ESS feature information and relevant mitigation measures to address the potential environmental effects at each ESS site.

1.3 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. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 3. A contact list for key staff involved in supporting this CEnvPP is found in Appendix A.

Table 1: Environmental roles and responsibilities of personnel during the construction phase

Role	Key responsibilities
MH project engineer (TLCC)	<ul style="list-style-type: none"> • Monitor quality control issues on the project. • Issues environmental improvement and stop work orders to Contractor as required for non-compliance issues • Participates with Senior Environmental Assessment Officer (LEA) in Manitoba Sustainable Development Regional Integrated Resource Management Team meetings. • Responds to Environmental Non-Compliance Advisements with plan of action to correct non-compliances
MH senior environmental assessment officer (LEA)	<ul style="list-style-type: none"> • Provides advice and guidance on environmental protection matters • Monitors inspection reports and monitoring information, and prepares annual report as per regulatory requirements • Issues environmental improvement and stop work orders as required for non-compliance issues • Participates in Contractor Environmental Pre-Job Orientation and Contractor Environmental Representative Pre-job Meeting • Liaises with Manitoba Sustainable Development, Environmental Approvals Branch

Role	Key responsibilities
MH environmental specialist (LEA)	<ul style="list-style-type: none"> • Assists MH Environmental Officer in developing solutions for environmental issues with the Construction Supervisor and the Contractor. • Assist Project Engineer in responding to Environmental Non-Compliance Advisements from LEA with plan of action to correct non-compliances. • Prepare and advise on issuance of Environmental Stop Work Orders and Environmental Improvement Orders • Responsible for tracking all construction related landowner commitments and customer complaint and reported on in the monthly environment construction progress report • Prepare Commitment and Complaint Review Package for the MH Field Engineers • Responsible for compiling and tracking construction related commitment and customer complaints • Manages MH and Contractor spill response, clean-up, testing, follow-up and reporting • Support MH Field Engineers in obtaining permits for quarries, MI and RM culvert and distribution crossings. • Obtain from contractor any permits and approvals including private landowner agreements (i.e. marshalling yards, camps) and load into MH Permit Tracking system • Review contractor documentation that is required to be submitted as per environmental protection and management plans, pass on any action items to Environmental Officer and MH Field Engineer- ie. Biosecurity report (records of cleaning) Spill and clean up reports, environmental inspection reports and ensure loaded into EPIMS • Participates in Contractor Environmental Pre-Job Orientation and Contractor Environmental Representative Pre-job Meeting

Role	Key responsibilities
MH environmental officer (LEA)	<ul style="list-style-type: none"> • The Environmental Officer reports to the Senior Environmental Assessment Officer and provides advice and guidance to the Construction Supervisor/Field Engineer • Manages Environmental Inspectors in the field • Provides support and guidance in developing solutions for environmental issues on-site with the Construction Supervisor/Field Engineer and the Contractor and where applicable with the input from the Senior Environmental Assessment Officer • Provide in-field landowner liaison support • Provides support and guidance to the Contractor regarding CEnvPP • Participates in Contractor Environmental Representative Pre-job Meeting and in Contractor Environmental Pre-Job Orientation • Assists the Contractor's Environmental Representative in ensuring that all necessary information is covered in the Contractors pre-job employee orientation and record is kept. • Provides advice and guidance to the Construction Supervisor for non-compliance situations, environmental incidents and emergencies. • Conducts site inspections regularly and ensures that reports containing information on activities carried out as well as effectiveness of actions and outstanding issues are submitted to Environmental Protection Information Management System • Prescribes follow-up mitigation measures and ensures that they are implemented. • Confirms that all ESS sites are correctly identified, delineated and flagged/marked by the Construction Contractor in the field • Monitors the project for compliance of the CEnvPP, Environmental License and other environmental regulatory requirements • Responsible for ongoing compliance monitoring of project activities to ensure consistent implementation of the CEnvPP and accurate reporting into the Environmental Protection Information Management System • Liaises with regional regulatory authorities and other regulatory authorities where required or applicable • Develop environmental inspection training material

Role	Key responsibilities
MH Field Engineer (TLCC)	<ul style="list-style-type: none"> • Monitor, track and prepare report on construction progress; • Issue Work Instructions , Variations and Non-Conformance Reports as required • Assist in chairing progress meetings • Review and provide comments on Contractors reports, plans, schedules etc. • Ensure compliance of all contractual requirements • Responds to Environmental Non-Compliance Advisements with plan of action to correct non-compliances • Obtain permits for quarries, MI and RM culvert and distribution crossings. • Participate in MMTP Monitoring Committee Field Tours on request
MH construction supervisor(s) (TLCC)	<ul style="list-style-type: none"> • Supervise construction inspectors • Coordinate with survey staff, environmental staff, and community liaison. • Provide MH site safety orientation to all MH/Consultant staff. • Arrange safety orientations with the Contractor for MH/Consultant staff/visitors. • Responsible for implementation of all construction related landowner commitments • Responsible for rectifying construction related Customer Complaints • Conduct regular site visits to identify any issues related to construction, safety and environment • Facilitates construction contractors implementation of remedial actions or responses to non-conformance situations or incidents are implemented as required • Assists in responding to Environmental Non-Compliance Advisements with plan of action to correct non-compliances • Works with the MH environmental specialist(s), Senior Environmental Assessment Officer and Environmental Officer/Inspector to ensure implementation of environmental protection measure

Role	Key responsibilities
Construction Inspectors / Engineering Technicians (TLCC)	<ul style="list-style-type: none"> • Review all drawings and understand the technical specifications for the assigned work. • Ensure the contractor is performing the work as per the drawings and technical specifications, and Environmental Protection Plans. • Monitor and report daily construction progress • Report any safety, environment, quality, material, design and any other construction related concerns to the construction supervisor and field engineer • Work collaboratively with Environmental Officer/Inspector to identify ESS site, ensure all ESS sites are correctly delineated and flagged/marked in the field locations and ensure that prescribed mitigation is being implemented and meeting regulatory requirements.
Construction contractor(s) (project manager / construction supervisor)	<ul style="list-style-type: none"> • 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 and environmental officer / inspector • 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 and environmental officer / inspector • Responsible for other permits as outlined in the “Environmental Licences, approvals and permits” table (In Appendix B). • Responsible for providing an Annual Environmental Report summarizing work activities and events as they pertain to environmental protection compliance.

Role	Key responsibilities
Construction contractor's staff	<ul style="list-style-type: none"> • 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 and environmental officer / inspector. • 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 and environmental officer / inspector.
Construction contractor's environmental representative	<ul style="list-style-type: none"> • Must possess a post secondary education in an environmental or resource management discipline with minimum of 2 years relevant experience. • Responsible for implementation, coordination and verification of pre-project employee environmental orientation. • Ensures that the contractor employees adhere to all aspects of the CEnvPP. • Provides information and advice to the construction contractor employees on environmental protection matters. • Responsible for implementation of the emergency response and hazardous materials plans, and other related topics. • Liaises with MH environmental officer / inspector and MH field safety officers. • Delineate and flag/sign all environmentally sensitive sites as identified in CEnvPP in the field as per flagging and signage standards. • Identify, delineate and flag or mark all access, ROW and other applicable boundaries in the field. • Identify any previously unknown ESS to MH environmental officer / inspector

1.3.1 Environmental protection

Manitoba Hydro will provide copies of all available permits, licences, approvals and authorizations obtained for the Project to the contractor. Prior to commencing associated work 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 EPIMS.

The contractor will comply with the CEnvPP 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 environmental 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

1.3.2 Documentation and Reporting

There is a requirement for the Contractor to provide reports and documentation to Manitoba Hydro in an acceptable digital format. Manitoba Hydro during Pre-Job Orientation will provide a list of all reporting and documentation submission requirements, timelines for submission, acceptable digital formats, and method of transmittal. (e.g. EPIMS, Aconex, Project Sharepoint Site, email, FTP). Examples of reports and documents that may be required for the project are listed below (not an exhaustive list):

- Weekly Environmental Monitoring Reports
- Spill reports
- Bird Survey forms

- Amphibian Survey forms
- Landowner permission forms
- Biosecurity forms (more information provided in management plan)
- Timber scaling records and copies of load slips (more information provided in management plan)
- Copies of all permits and approvals acquired by the contractor
- Copies of any contractor developed plans such as emergency response and hazardous materials plans
- Environmentally related incident reports

1.3.3 Environmental representative(s) / supervisor(s)

Before commencing the on-site work, the contractor shall identify its dedicated on-site representative(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 representative(s) / supervisor(s) shall be fully conversant with:

- Contractor's environmental practices and policies
- All applicable environmental legislation
- The mitigation measures outlined in the CEnvPP

The contractor will ensure a sufficient number of Environmental Representatives are in place to fulfill the commitments of the Project's Environmental Protection and Management Plans, and any associated licence conditions associated with the Project. Manitoba Hydro and the Contractor will jointly determine the resources required through criteria composed of a variety of factors including construction schedules, number of sub-contractors, division of construction segments, phase of construction, season, and the nature of the licence conditions.

1.3.4 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 as well as all individuals cc'd on the transmittal document
- If applicable, provide a copy of the report to the employee(s) involved
- Review the contravention with all employees at a regular weekly meeting and post in a prominent place at or near the worksite

1.3.5 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 at a worksite, 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 worksite 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.

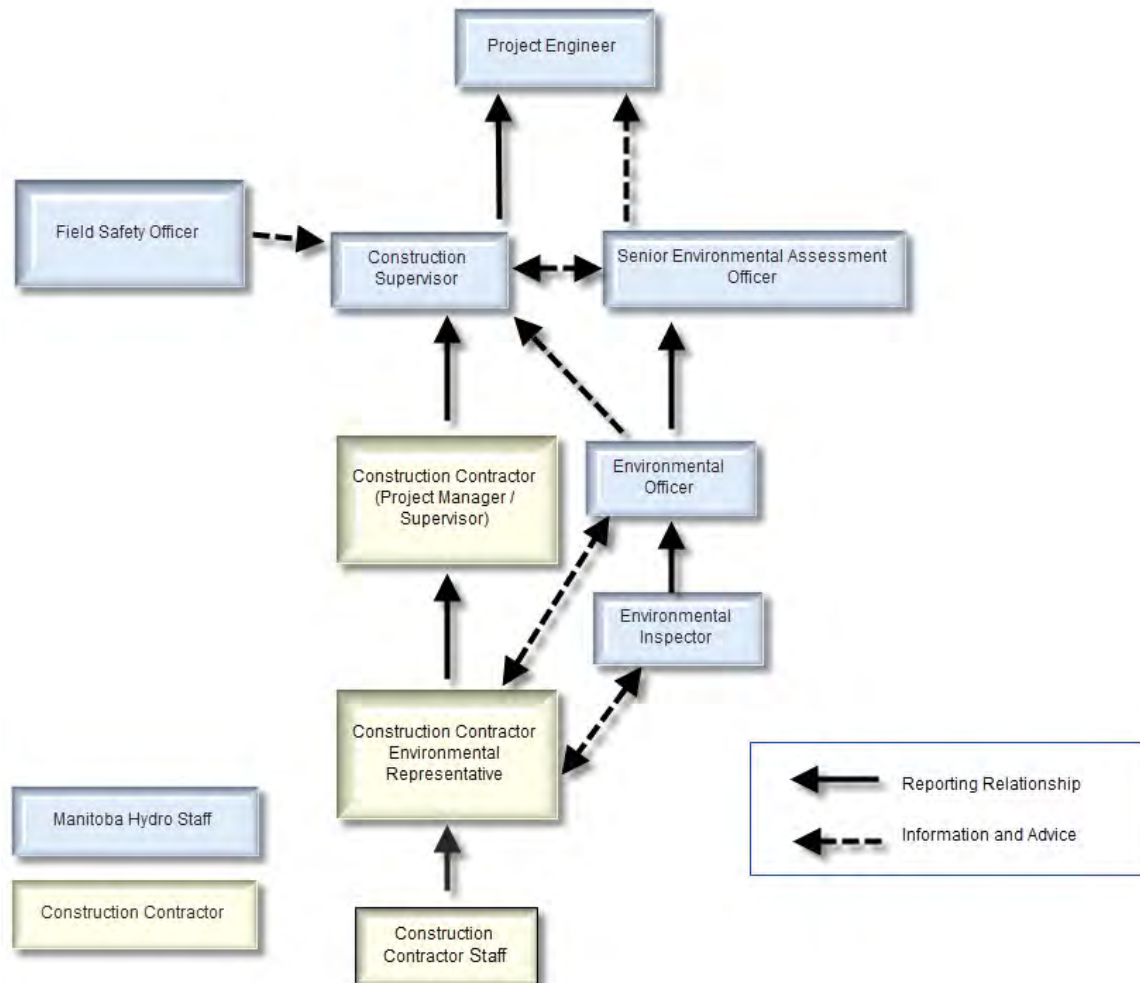


Figure 3: Environmental communication reporting structure

1.4 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.

1.5 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 B: Environmental licences, approvals and permits and EPIMS.

This page was left intentionally blank.

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 Project environmental impact statement 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 and other important locations requiring specific protection (e.g., resource use, access).

2.1 Timing windows

2.1.1 Wildlife

Appendix C 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 C 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.

2.1.2 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

- 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 least risk to fish and fish habitat. Appendix C contains general timing windows to avoid during construction.

2.2 Setbacks and buffers

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

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 the senior environmental assessment officer.

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

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

2.2.1 Flagging and signage standards

Clear identification of ESS locations and applicable buffers in the field is an important part of successful environmental protection implementation. Establishing consistent use of signage and flagging tape across the project is important to reduce confusion and for the clear identification of Environmentally Sensitive Sites (ESS) and travel routes.

2.2.1.1 Flagging

A system of standardized flagging colors have been established to reduce the potential for confusion during construction where there are multiple or overlapping areas are being identified. This color pattern used to identify categories is found below.

Yellow/Black-

Heritage (Archaeological, Cultural or Historic importance)

Orange/Black-

Access routes (Intersections with trails etc),

Land Use (Conservation, Crown Land Encumbrance, Recreation, Residential)

Resource Use (Agriculture, Food/Medicinal, Forestry, Hunting/Fishing, Trapping)

Pink/Black-

Ecosystem (Habitat, Research or Species of concern, Invasive Species, Traditional Use)

Soils and Terrain (Erosion, Terrain)

Wildlife (Birds and Habitat, Mammals and Habitat, Reptiles/Amphibians and Habitat)

Blue/White-

Water (Water Crossings, Wetlands, Ground Water)

A Cross hatched flagging has been chosen as it is distinct from other flagging present during construction. No Machine Zone flagging is also used for water crossings.

Figure 4 shows the currently approved patterns and colors.



Figure 4: Examples of approved flagging tape used in delineating ESS

Flagging Instructions

Consistency in flagging procedure is important to its effectiveness. The goal of flagging is to clearly indicate the boundary of an Environmentally Sensitive Site (ESS) that requires a modification to construction activities in relation to the surrounding area. When identifying an area, flagging tape (color determined by categories above) will be tied to wooden staking and/or sturdy trees or shrubs that won't be cleared

during construction activities. Flagging spacing will be decided on a site by site basis and will take into account, density of flagging already present in the area, the size of the area being flagged (smaller area requires higher number of flags) and the density of vegetation or topography present. The primary concern would be to apply flagging at a frequency that would make the line of separation obvious to construction crews.

Flagging a buffer

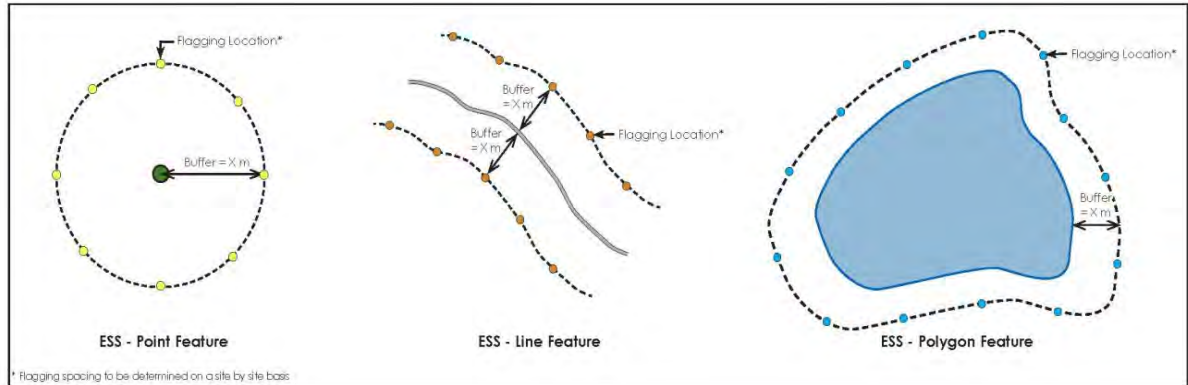


Figure 5: Buffer establishment for geometry types

Environmentally Sensitive Site mitigation often involves establishing a buffer of a certain size around a location so that activities are modified in that location :

Point- A Buffer is established by measuring out from the center of that point to form a perimeter buffer. (measured as a radius).

Line-When buffering a line feature, the buffer is measured from the edge of the feature that the line indicates (on both sides).

Polygon- The buffer of an area is established by measuring out from the features edge creating a perimeter buffer, similar to a point buffer.

2.2.1.2 Signage

Signage can be used in conjunction with flagging. Identification of vegetation clearing types, access or bypass trails as well as identification of ESS can be accomplished through the use of signage. Access signs are orange with black lettering, Bypass signs are yellow with black lettering and ESS signs are reflective white with black lettering. Signs will be a minimum of 12 inches by 12 inches.



Figure 6: Examples of access and signage

2.3 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.

2.3.1 Riparian buffers

Riparian buffers (as shown in Table 2) are applied to riparian habitats, which include, streams, rivers, lakes and wetlands 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 than 50% site investigation and prescription by the Manitoba Hydro Environmental Officer is required.

The riparian buffer is composed of two zones: a management zone (variable width based on Table 2) that allows equipment to conduct low ground disturbance clearing and a minimum 7m machine free zone which only allows reaching into zone with equipment but not entering the zone except at trail crossing (Figure 7).

Table 2: Riparian buffer and machine free zone distances based on slope

Slope of Land Entering Waterway (%)	Width of Machine Free Zone (m)	Width of Riparian Buffer (m)
10	7	30
20	10	40
30	15	55
40	20	70
50	25	85

2.3.1.1 Machine free zones

Machine free zones are work areas where restricted activities such as low ground disturbance clearing (i.e hand cutting or feller buncher) are permitted by reaching into zone with equipment but not entering the zone. Where applicable, site specific buffers/setbacks are prescribed in specific mitigation measures for each feature. Due to differences in topography and other site specific factors the Manitoba Hydro Environmental Officer retains the ability to adjust the width of the Machine Free Zone- to not less than 7m, when required.

Setbacks, riparian buffers and machine free zone distances from sensitive water features are provided in Appendix D. 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 7). Setbacks (if required) are measured from the tree line or from a defined riparian boundary as delineated by an aquatic specialist.

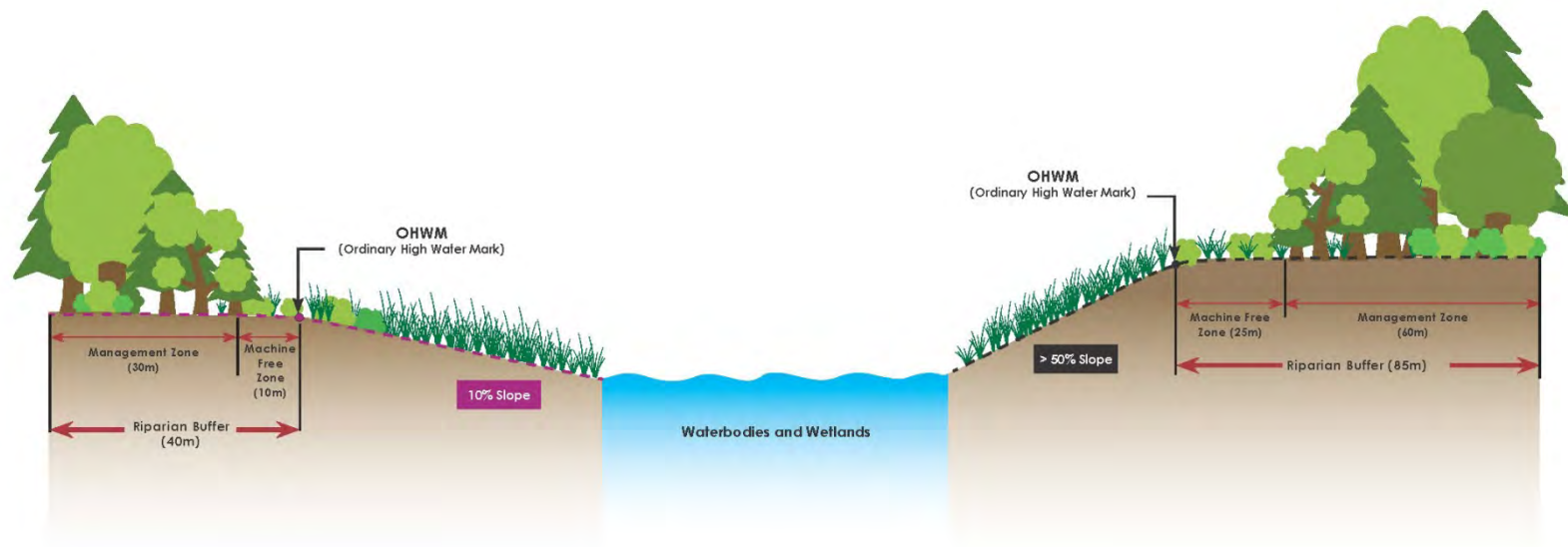


Figure 7: Example of zones in a riparian buffer

2.3.2 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 water 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.

2.4 Wildlife and habitat

2.4.1 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. The location of these bird diverter installations will be provided through design specifications and engineering drawings.

Should construction activities be required during breeding bird timing windows (see timing windows Appendix C) please refer to the general mitigation approach for reducing risk to nesting birds found as Appendix E. This decision tree will help to apply the appropriate approach and direct mitigation measures found in Appendix E. These appendices prescribe levels of disturbance, the breeding bird timing windows, nest sweep and reporting procedures as well as buffer guidelines 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.

2.4.2 Reptiles / amphibians

Areas where reptiles and amphibians, such as garter snakes, 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 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, minimal 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.

Should construction activities be required during the breeding season (see timing windows Appendix C) please refer to the general mitigation approach for reptiles and amphibians in Appendix F. This appendix describes potential habitat, visual encounter surveys and mitigation measures.

2.4.3 Mammals

Large-bodied mammals, such as white-tailed deer 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 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.

2.5 Species of concern

Species of concern can include rare vascular plants, rare non-vascular plants, rare wildlife species, and rare ecological communities. Additional mitigation measures may

be developed by the Environmental Officer/Inspector in consultation with a qualified biologist and, when necessary, the appropriate regulatory authority.

2.5.1 Species of concern discovery during pre-project construction

Species of conservation concern that are discovered during pre-project studies along the route have been assessed by an environmental specialist and appropriate mitigation measures have been outlined in the Part 2 CEnvPP mapbook. In the event that rare plants or wildlife species are discovered during future studies along the transmission line refer to the “Species of Concern contingency measures” document found in the Appendix G. Further information regarding the discovery of bird nests can be found in Appendix E-3.

2.5.2 Species of concern discovery during project construction

In the event that rare plants, wildlife species or rare ecological communities are identified or suspected along the construction right-of-way during construction (*e.g.*, during survey activities, prior to clearing and construction). Suspend work immediately in the vicinity of any newly discovered species of concern and follow the measures outlined in “Species of Concern contingency measures” document found in the Appendix G. Further information regarding the discovery of bird nests can be found in Appendix E-3.

2.6 Agricultural biosecurity

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 through the execution of the Biosecurity Management Plan found in Appendix H.

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 policy is to ensure that Manitoba Hydro staff and contractors take necessary precautions to protect the health and sustainability of the agricultural sector.

The Biosecurity Management Plan 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 and disinfection necessary to reduce the likelihood of transport of invasive species, pests or disease.

2.7 Soils and terrain

2.7.1 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), 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. For soil protection measures refer to the Erosion and Sediment Control Plan (Appendix I). 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.

The risk to soils is highest with saturated soil conditions, should this situation arise during construction refer to Saturated/Thawed Soils Operating Guidelines (Appendix J). Existing access routes are planned to be utilized wherever possible to avoid disturbing new areas.

2.7.2 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 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.

See “Guidance for contaminated soils or groundwater identification and disposal” found in Appendix K for more information.

2.8 Cultural and heritage resources

Archaeological sites, or sites where historic and pre-historic artefacts of human activity are found, are sensitive to ground disturbance from construction activities, such as clearing and excavation. Artefacts 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; Appendix L) is part of the Environmental Protection Program. 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 construction of the project.

2.9 Access

In conjunction with mitigation measures, a standalone document, an Access Management Plan (Appendix M), 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 Orientation and awareness

3.1 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 MH Environmental Officer/Inspector). Upon completion of the meeting, all individuals present at the orientation, both Manitoba Hydro and the contractor representatives, will sign the environmental pre-work orientation record form found as Appendix N.

The environmental portion of this meeting will include the following:

- A review of Manitoba Hydro's environmental principles and key 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 CEnvPP

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.

3.2 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.

3.3 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.

3.4 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 include a review of environmental requirements of the planned work and the applicable environmental precautions. All job planning meetings, including the environmental content, shall be documented by the contractor.

4.0 Contractor-developed environmental management plan

Construction contractors will be required to develop environmental management plans as part of the Environmental Protection Program for this project component.

The contractor shall be responsible to develop and implement specific plans for its work as described in Figure 1. These plans will be included as Appendix O when approved by the senior environmental assessment officer.

This page was left intentionally blank.

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.

5.1 General mitigation requirements

Construction considerations required for all Project areas are considered general mitigation and are applicable to all construction areas.

NOTE: Site specific mitigation measures found in mapbooks will override the general mitigation measures found below.

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 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/sediment control, hazardous substances, petroleum products and soil contamination.

5.2 General mitigation tables

Access roads and trails (PC-1)	5-5
Agricultural areas (EC-1) [If applicable]	5-7
Aircraft use (EI-1) [If applicable]	5-8
Blasting and exploding (PA-1)	5-8
Borrow pits and quarries (PC-2)	5-10
Built-up and populated areas (EC-2) [If applicable]	5-12
Clearing (PA-3)	5-13
Concrete wash water and waste (EI-13)	5-15
Construction camps (PC-3) [If applicable]	5-17
Construction matting (PA-11)	5-19
Demobilizing and cleaning up (PA-4)	5-20
Directional drilling (PA-12)	5-20
Draining (PA-5)	5-23
Drilling (PA-6)	5-24
Emergency response (EI-2)	5-25
Erosion and sediment control (EI-3)	5-27
Fish protection (EC-3)	5-28
Grading (PA-7)	5-29
Groundwater (EC-4)	5-31
Grubbing (PA-8)	5-31
Hazardous materials (EI-4)	5-32
Heritage resources (EC-5)	5-35
Management measures (MM)	5-36
Marshaling yards (PC-5) [If applicable]	5-38
Petroleum products (EI-5)	5-41
Potable water (EI-11)	5-45
Rehabilitating and re-vegetation (PA-9)	5-45
Rights-of-way (PC-8)	5-46
Soil contamination (EI-7)	5-48
Stripping (PA-10)	5-49
Transmission towers and conductors (PC-10)	5-50
Vehicle and equipment maintenance (EI-9)	5-51
Waste management (EI-10)	5-52

This page was left intentionally blank.

Wastewater (EI-12).....	5-52
Water crossings (PC-9).....	5-53
Wetlands (EC-8).....	5-55
Wildlife protection (EC-9)	5-56

This page was left intentionally blank.

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 (In Appendix P).
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 constructed and operated in accordance with contract specifications.
PC-1.05	Access roads and trails will be provided with erosion and sediment control measures in accordance with the Erosion and Sediment Control Plan (In Appendix I).
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 Low-ground pressure tires to minimize rutting and limit damage and compaction to surface soils. If wet conditions exist the use of construction matting/temporary bridge is also permitted.
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) will be obtained.

Access roads and trails (PC-1)	
ID	Mitigation
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-1.18	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 (In Appendix P).
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 (MI) roadways (Provincial Roads or Provincial Trunk Highways) will require a permit from MI. All constructed access points onto municipal roads will require a permit from the Rural Municipality.
PC-1.25	Heavy equipment will not be allowed access to MI roadways without the appropriate protection and permits.
PC-1.26	Access roads and trails that use or cross MI 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 and associated debris within an MIT right of way will need to be removed seasonally and once the project is completed.
PC-1.28	All works undertaken within the MI right-of-way (ROW) will adhere to the MI traffic control policies.

Access roads and trails (PC-1)	
ID	Mitigation
PC-1.30	Required travel off existing roads will be minimized and restricted to previously designated and approved routes.
PC-1.31	The contractor is required to install and maintain access road signage indicating road or trail number as per signage standards.
PC-1.32	If a prospective access road or trail is located off easement and on private land, a private land agreement must be submitted to MH for approval prior to any access use occurring

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 (In Appendix P), prior to returning them to agricultural use.
EC-1.04	Erosion and sediment control measures will be established in accordance with the Erosion and Sediment Control Plan (In Appendix I) 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

Agricultural areas (EC-1) [If applicable]	
ID	Mitigation
	designated and approved routes.
EC-1.08	Vehicle and equipment 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 Management Plan 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 <i>Water Rights Act</i> . 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 Manitoba Hydro project engineer 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.

Blasting and exploding (PA-1)	
ID	Mitigation
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-1.04	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 <i>Explosives Act</i> and <i>Transportation of Dangerous Goods Act</i> and provincial regulations stated in <i>The Workplace Safety and Health Act</i> .
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.

Blasting and exploding (PA-1)	
ID	Mitigation
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	Decommissioning of 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 without approval from MH environmental officer.
PC-2.06	Drainage water from borrow pits and quarries will be diverted through vegetated areas, existing drainage ditch(es) or employ a means of sediment control prior to entering a waterbody.
PC-	Erosion and sediment controls will be put in place in accordance with the Erosion and Sediment Control Plan (In Appendix I) before borrow pit

Borrow pits and quarries (PC-2)	
ID	Mitigation
2.07	excavation commences, when required as determined by the MH Environmental Officer/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-2.15	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 Rehabilitation and Invasive Species Management Plan (In Appendix P).
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 (In Appendix P).
PC-2.18	Worked out borrow pits and granular quarries will be left with a slope no steeper than 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.

Borrow pits and quarries (PC-2)	
ID	Mitigation
PC-2.26	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-2.27	As marshalling yards, borrow sources, temporary work spaces, work camps are identified or route changes required, additional heritage monitoring activities may be required to be conducted prior to approval.

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 by applicable noise bylaws.
EC-2.04	All stockpiles shall be maintained as to minimize dust associated with fine soils prone to wind erosion (i.e. covering with tarp/poly, maintain wetted surface).
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.

Clearing (PA-3)	
ID	Mitigation
PA-3.01	Riparian buffers shall be a minimum of 30 m 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, or within the high-water mark of wetlands or waterbodies
PA-3.10	Clearing is allowed only within the reduced risk time period for wildlife illustrated in Appendix C. If clearing within the sensitive time period for wildlife, further mitigation and approvals would be required.
PA-3.11	Clearing within environmentally sensitive sites, 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.

Clearing (PA-3)	
ID	Mitigation
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 and/or flagging.
PA-3.16	In locations where grubbing and vegetation stripping is not required, 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 "V" or "K-G" type blades, feller-bunchers, mulcher, chipper and other means approved by the MH environmental officer / inspector.
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-3.20	Slash piles will be placed at least 15 m from forest stands.
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.
PA-3.22	If extreme wet weather or insufficient frost conditions results in soil damage from rutting refer to the sediment and erosion control plan as well as the saturated/thawed soils operating guidelines
PA-3.23	Trees containing active nests and areas where active animal dens or

Clearing (PA-3)	
ID	Mitigation
	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-3.26	As per Clearing Management Plan (Appendix R), timber that is not salvaged will be chipped and/or mulched in accordance with timing windows, or permit conditions.
PA-3.28	If clearing is needed on a Manitoba Infrastructure (MI) roadway ROW, clearance must be obtained from MI in advance.
PA-3.29	When elm trees are removed the stump must be debarked to the soil line or stump must be ground or removed to flush or just below the soil line.
PA-3.30	All elm wood must be immediately disposed of onsite by chipping (<5cm) or transported to a designated elm disposal site.
PA-3.31	Storing elm wood firewood is prohibited under the <i>Dutch Elm Disease Act</i> .
PA-3.32	During mulching or chipping activities, debris must be directed away and not enter watercourses.

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

Concrete wash water and waste (EI-13)	
ID	Mitigation
	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 that has been 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 that has been 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 that has been used for wash out purposes and associated activities will be treated to meet the Manitoba Water Quality Standards, Objectives, and Guidelines (Tier 3; MWS 2011) for the protection of aquatic life for pH 6.5-9.0, prior to discharge into a watercourse.
EI-13.08	Cured concrete can be transported 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.

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, with regular removal to approved waste management facilities, will be used to manage food waste.
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 soil type, topography, land form type, wildlife habitat and other environmental factors.
PC-3.05	Crown land permits will be obtained by MH for construction camps as required.
PC-3.06	Erosion sediment control in accordance with the Erosion and Sediment Control Plan (In Appendix I) 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 Waste and Recycling Management plan (Appendix Q) by a licensed contractor and taken to licensed or approved disposal areas.
PC-	Problem wildlife will be reported immediately to the nearest Manitoba

Construction camps (PC-3) [If applicable]	
ID	Mitigation
3.11	Sustainable Development office.
PC-3.12	Propane tanks for camp use will be stored in dedicated, vehicle protected and 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 and chemical toilets.
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 MH Environmental Officer /Inspector will inspect rehabilitated construction camps in accordance with the Rehabilitation and Invasive Species Management 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 (In Appendix P).
PC-3.18	Waste and recyclables will be sorted, segregated and removed in accordance with the Waste and Recycling Management Plan (Appendix Q) to a licensed or approved waste management site and/or recycling facility.
PC-3.19	Food, greases and wastes will be stored in sealed, air-tight containers and managed as per PC-3.02.
PC-	If a prospective camp is to be located on private land, a private land agreement must be submitted to MH for approval prior to any setup

Construction camps (PC-3) [If applicable]	
ID	Mitigation
3.20	occurring
PC-3.21	As marshalling yards, borrow sources, temporary work spaces, work camps are identified or route changes required, additional heritage monitoring activities may be required to be conducted prior to approval.
PC-3.22	Burning of solid wastes including kitchen wastes will not be permitted.

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	In wetlands, three mats is the maximum number that can be stacked and used in one location.
PA-11.04	Follow the biosecurity management plan for cleaning, washing and disinfecting matting prior to moving it to a new project location.
PA-11.06	Matting should not impede or redirect natural drainage patterns or water courses.
PA-11.07	Mat removal will take place from the existing mat road, working in a backwards fashion (from work site to initial access point).
PA-11.08	When mat removal is complete all remaining matting debris will be cleaned, up and transported to an approved waste disposal facility

Construction matting (PA-11)	
ID	Mitigation
PA-11.09	Once matting removal is complete, any compaction of soils will have to be rehabilitated, as per the Rehabilitation and Invasive Species Management Plan (Appendix P)

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 will be decommissioned and rehabilitated as per the Access Management Plan.
PA-4.03	After demobilizing and clean-up, construction areas and sites will be assessed by the contractor for rehabilitation. Contractor prescriptions will be developed as per Rehabilitation and Invasive Species Management Plan and submitted for approval to MH.
PA-4.05	Petroleum product and other temporary hazardous material storage areas will be cleaned up, assessed, and if necessary, remediated in accordance with provincial guidelines.
PA-4.06	Water crossings, ditches and drains will be left free of obstructions so as not to impede water flow.

Directional drilling (PA-12)	
ID	Mitigation

Directional drilling (PA-12)	
ID	Mitigation
PA-12.01	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-12.02	When drilling takes place under a watercourse, the drill entry and exit points will be outside of the riparian buffer of that watercourse.
PA-12.03	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-12.04	Excess drilling mud, cuttings will be disposed of at an adequately sized disposal site located away from the water to prevent it from entering the watercourse.
PA-12.05	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-12.06	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-12.07	Stabilize any spoil materials to prevent them from entering the watercourse.
PA-12.08	Re-vegetate any disturbed native vegetation by seeding with native grass species and cover such areas with mulch to prevent erosion and to assist in seed germination. 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

Directional drilling (PA-12)	
ID	Mitigation
	erosion) and vegetated the following spring.
PA-12.09	Maintain effective sediment and erosion control measures in accordance with the Erosion and Sediment Control Plan (In Appendix I) until re-vegetation of disturbed areas is achieved.
PA-12.10	When obtaining water from fish bearing waterways all pump intakes will be screened according to the <i>Freshwater Intake End-of-Pipe Fish Screen Guideline</i> (DFO 1995).
PA-12.11	Water, to mix the drilling mud, shall be brought in from off site and stored in tanks at the entry locations or be withdrawn from local a watercourse.

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 <i>Manitoba Stream Crossing Guidelines</i> (DFO and MNR 1996) 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 and sediment control will be provided by the contractor in accordance with the Erosion and Sediment Control Plan (In Appendix I).
PA-5.06	Existing, natural drainage patterns and flows will be identified and maintained to the extent possible.
PA-5.14	Flows to Manitoba Infrastructure (MI) 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 MI roadway right-of-way will be managed through the Erosion and Sediment Control Plan (In Appendix I).

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-6.03	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 MH environmental officer / inspector and mitigation measures are implemented.
PA-6.07	Drilling will not be permitted within established buffer zones and setback distances from waterbodies unless approved in advance by MH environmental officer.
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.
PA-6.12	The contractor must submit a plan to MH, describing how surface water, drill flush, and excess waste grout will be controlled and disposed of,

Drilling (PA-6)	
ID	Mitigation
	including emergency response plans for working in groundwater environmentally sensitive sites for sealing/grouting artesian wells and pumping (if required) excess groundwater.

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.
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.
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.

Emergency response (EI-2)	
ID	Mitigation
EI-2.08	Orientation for contractor and Manitoba Hydro employees working in construction areas will include emergency response awareness.
EI-2.09	Contractor to conduct investigation for all provincially reportable spills and fires 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.
EI-2.11	Reasonable precautions will be taken to prevent fuel, lubricant, fluids or other products from being spilled during equipment operation, fueling 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 MH prior to construction, and updated annually.
EI-2.15	The hazardous materials incident report form will be completed when reporting a spill.
EI-2.16	Should a forest fire be caused by project activities, it must be reported to Manitoba Sustainable Development as soon as feasible
EI-2.17	Firefighting equipment required by legislation, guidelines, contract specifications and work permits will be kept on site and maintained in serviceable condition.

Erosion 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 and Sediment Control Plan (In Appendix I) to ensure proper functioning.
EI-3.02	Construction activities will be suspended during extreme wet weather events where erosion and sediment control measures are compromised.
EI-3.04	Erosion and sediment control installations will only be removed after disturbed areas are protected and sediments are disposed of in accordance with Erosion and Sediment Control Plan (In Appendix I).
EI-3.05	Erosion and sediment control measures will be left in place and maintained until either natural vegetation or permanent measures are established.
EI-3.06	Erosion and sediment control measures will be put in place in accordance with the Erosion and Sediment Control Plan (In Appendix I) prior to commencement of construction activities and will remain intact for the duration of the project.
EI-3.08	The contractor will be responsible for implementing the Erosion and Sediment Control Plan (In Appendix I) with procedures put in place prior to commencement of applicable construction activities.
EI-3.09	The contractor will be responsible for monitoring and if required modifying erosion and sediment control installations to ensure continued effectiveness.

Erosion and sediment control (EI-3)	
ID	Mitigation
EI-3.10	The contractor will communicate the requirement to follow the Erosion and Sediment Control Plan (In Appendix I) to all project staff and a copy will be made available at the project site.
EI-3.11	The MH Environmental Officer /Inspector will inspect erosion 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 will advise DFO of the situation.
EC-3.02	Disturbances to waterbodies, shorelines, riparian areas, etc. will be stabilized immediately to prevent erosion.
EC-3.03	Erosion and sediment control measures will be put in place in accordance with the Erosion and Sediment Control Plan (In Appendix I) 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	Prior to seeking authorization from Manitoba Sustainable Development (MSD) for removal of a Muskrat house, Beaver Dam or Lodge documentation of reasonable attempts to trap resident beavers/muskrat must be provided. Attempts to trap resident Beavers/muskkrats must be undertaken by a licensed trapper or person with a valid Wild Animal Kill

Fish protection (EC-3)	
ID	Mitigation
	Permit.
EC-3.06	Project personnel will be prohibited from fishing at project locations or along rights-of-way.
EC-3.07	When obtaining water from fish bearing waterways all pump intakes will be screened according to the <i>Freshwater Intake End-of-Pipe Fish Screen Guideline</i> (DFO 1995).
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
EC-3.09	In watercourses where mussel species of conservation concern are known to occur, watercourse crossings may occur by boat or barge, or during winter (i.e., under frozen conditions) to prevent mortality of the mussels.
EC-3.10	Muskrat house, Beaver Dam or Lodge removal requires consultation with and the Department of Fisheries and Oceans who may require additional authorizations. House, Dam or Lodge removal may require heavy equipment or explosives which would require an additional Work Permit from Sustainable Development when located on Crown Land.

Grading (PA-7)	
ID	Mitigation
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 (In Appendix P).

Grading (PA-7)	
ID	Mitigation
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 and sediment control measures will be put in place prior to grading in accordance with the Erosion and Sediment Control Plan (In Appendix I).

Groundwater (EC-4)	
ID	Mitigation
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.
EC-4.04	The contractor must submit a plan to MH environmental officer describing how surface water, drill flush, and excess waste grout will be controlled and disposed of, including emergency response plans for working in groundwater environmentally sensitive sites for sealing/grouting artesian wells and pumping (if required) excess groundwater

Grubbing (PA-8)	
ID	Mitigation
PA-8.01	Construction areas containing soil with high silt content, artesian springs or areas of previous erosion will assessed by MH Environmental Officer/Inspector for additional erosion and sediment control measures.
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 unless approved by the MH environmental officer / inspector.

Grubbing (PA-8)	
ID	Mitigation
PA-8.06	Stockpiled materials from grubbing will not block natural drainage patterns.
PA-8.07	Unless required for the work, grubbing will be minimized to the extent possible.
PA-8.08	Erosion and sediment control measures will be put in place in accordance with the Erosion and Sediment Control Plan (In Appendix I) prior to grubbing.
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 (MI) right-of-way, clearance must be obtained from MI 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 MH environmental officer 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.

Hazardous materials (EI-4)	
ID	Mitigation
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-4.13	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 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-4.16	Hazardous waste materials will be segregated and stored by type in approved containers within a secondary containment system.
EI-4.17	Indoor storage of flammable and combustible substances will be in fire resistant and ventilated enclosed storage area or building in accordance with national codes and standards.

Hazardous materials (EI-4)	
ID	Mitigation
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.
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 legible and prominently displayed.
EI-4.24	The MH Environmental Officer /Inspector will make routine inspections of hazardous substance storage sites to confirm 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	Hazardous waste can be stored temporarily for no longer than 30 days before removal to a licensed or approved disposal site.
EI-4.28	Temporary hazardous material storage containers will be located on level ground and within a structure that is covered, preventing precipitation from entering the storage area or the secondary containment system.

Hazardous materials (EI-4)	
ID	Mitigation
EI-4.29	Water / snow that collects in secondary containment will be removed regularly and treated as hazardous waste.

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 the 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 MH. Construction activities will cease in the immediate vicinity until the project archaeologist is contacted and provides further instruction.

Heritage resources (EC-5)	
ID	Mitigation
EC-5.07	The Culture and Heritage Resource Protection Plan will be adhered to during preconstruction and construction activities.
EC-5.08	The MH Environmental Officer/Inspector will inspect borrow pits and other excavations for the presence of heritage resource materials.
EC-5.09	As marshalling yards, borrow sources, temporary work spaces, work camps are identified or route changes required, additional heritage monitoring activities may be required prior to approval.

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 applicable 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, prior to project start-up as per project Communication Plan.
MM-05	Manitoba Hydro will contact local municipal authorities prior to project

Management measures (MM)	
ID	Mitigation
	start-up as per project Communication Plan.
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 as per project Communication Plan.
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 and include discussion 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 project participants.
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	In areas of active construction the contractor must provide Manitoba Hydro representatives with full and unrestricted access to the ROW and all

Management measures (MM)	
ID	Mitigation
	project related work areas so that inspections can occur.
MM-17	The CEnvPP text and map book will available at active construction project sites.
MM-18	The contractor's environment officer is responsible for the delineation and flagging of all identified project environmentally sensitive sites as per CEnvPP.
MM-19	The contractor must submit all contractor developed environmental plans (Appendix O) to Manitoba Hydro before work on the project can commence, the plan(s) may be updated as required.
MM-20	Aside from service animals, pets are not permitted on active construction project sites.
MM-21	Affected private landowners and Crown land encumbrance holders will be notified in advance of the schedule for construction, operation and maintenance.
MM-22	Temporary work spaces are prohibited from being placed within ESS without written approval from Manitoba Hydro , exceptions may be subject to Sustainable Development approval

Marshaling yards (PC-5) [If applicable]	
(These measures may also apply to Fly yards, Temporary work spaces, Staging areas, Material placement areas etc.)	
ID	Mitigation
PC-5.01	Contractor employees responsible for receipt and distribution of hazardous substances will be trained in handling and transportation of dangerous

Marshaling yards (PC-5) [If applicable]	
(These measures may also apply to Fly yards, Temporary work spaces, Staging areas, Material placement areas etc.)	
ID	Mitigation
	goods, and WHMIS.
PC-5.02	Emergency Preparedness and Response Plan and procedures for marshaling yards will be developed.
PC-5.03	Erosion, sediment control and drainage management measures will be put in place in accordance with Erosion and Sediment Control Plan (In Appendix I).
PC-5.04	Fire breaks will be established a minimum of 6 m around marshaling 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 marshaling 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	Marshaling yards will be located based on criteria that consider soil type, topography, land form type, wildlife habitat and other environmental factors.
PC-5.09	Marshaling yards will be located in existing clearings or natural openings.
PC-5.10	Marshaling yards will be located, constructed, operated and decommissioned in accordance with contract specifications and in

Marshaling yards (PC-5) [If applicable]	
(These measures may also apply to Fly yards, Temporary work spaces, Staging areas, Material placement areas etc.)	
ID	Mitigation
	accordance with the Rehabilitation and Invasive Species Management Plan (In Appendix P).
PC-5.11	Once marshaling 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 marshaling yards in accordance with provincial legislation and guidelines.
PC-5.14	Spill control and clean-up equipment to be located at designated areas within marshaling yards.
PC-5.16	Vegetation control at marshaling yards will be in accordance with Rehabilitation and Invasive Species Management Plan (In Appendix P).
PC-5.17	Vehicle, machinery and equipment maintenance and repairs will be carried out in designated areas within marshaling 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.
PC-	The MH environmental specialist will inspect rehabilitated marshaling and

Marshaling yards (PC-5) [If applicable]	
(These measures may also apply to Fly yards, Temporary work spaces, Staging areas, Material placement areas etc.)	
ID	Mitigation
5.20	work storage areas in accordance with the Rehabilitation and Invasive Species Management Plan (In Appendix P) to assess the success of re-vegetation and to determine if additional rehabilitation is required.
PC-5.21	The contractor will assess lands required for marshaling yards, camps or petroleum storage, dispensing areas and hazardous materials storage areas for potential contamination following Canadian Standards Association Environmental Site Assessment (CSA Z768- 01) procedures.
PC-5.22	As marshalling yards, borrow sources, temporary work spaces, work camps are identified or route changes required, additional heritage monitoring activities may be required to be conducted prior to approval.

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 posted onsite.
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., double walled

Petroleum products (EI-5)	
ID	Mitigation
	bermed liner) 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	Fueling of equipment or portable storage tanks will be a minimum of 100 m from the ordinary high water mark of any waterbody unless approved by Manitoba Hydro Environmental Officer, additional mitigations measures will apply
EI-5.07	Fueling 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 precipitation events and the containment water disposed of as hazardous waste.
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-5.13	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

Petroleum products (EI-5)	
ID	Mitigation
	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 have adequate collision protection.
EI-5.17	Petroleum product storage will be located a minimum of 100 m from 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 marshaling 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. Accumulated precipitation 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 fueling operations.
EI-5.24	Spill control and clean-up equipment and materials will be available at all petroleum product storage and dispensing locations.
EI-5.26	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

Petroleum products (EI-5)	
ID	Mitigation
	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	Ignition sources (i.e. smoking) must be at least 7.5m from 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 meet ASTM or ISO or CSA or FMCSA (Federal Motor Carrier Safety Administration) certification.
EI-5.34	Drip containers will be placed beneath all tank nozzles when not in use and regularly monitored, any accumulation removed and appropriately disposed.
EI-5.35	Nozzles used for dispensing petroleum products will have their lever catches removed so that the operator will be present while product is being

Petroleum products (EI-5)	
ID	Mitigation
	dispensed.
EI-5.36	When a spill or release is identified, it shall be flagged off to prevent disruption of that area until clean up takes place.
EI-5.37	The contractor is responsible for reporting a spill to Manitoba Hydro of any quantity within 2 hours, with a written report due in 24 hours.
EI-5.38	In the case of an externally reportable spill, the contractor is required to contact an MH Environmental Officer /Inspector immediately

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-11.05	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 (In Appendix P).
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 and sediment control measures in accordance with the Erosion and Sediment Control Plan (In Appendix I) as required.
PA-9.05	Rehabilitation plans will include objectives for restoration of natural conditions, erosion and 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-	Access to transmission line rights-of-way will be closed, signed and/or

Rights-of-way (PC-8)	
ID	Mitigation
8.02	controlled in accordance with an Access Management Plan.
PC-8.03	Additional clearing outside established rights-of-way is subject to Manitoba Sustainable Development 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 to minimize rutting and erosion.
PC-8.06	Construction equipment will be wide-tracked or equipped with high flotation tires if there is a potential for rutting and/or 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 (In Appendix P).
PC-8.08	Environmentally sensitive sites, features and areas will be identified and flagged prior to clearing.
PC-8.09	In situations where the ROW is not completely frozen or dry, alternate products such as construction mats may be used as per contract specifications.
PC-8.10	Contractors are to develop wet weather protocols that provide for mitigation measures to be implemented when wet soil conditions exist (see wet soil section 2.7.1)
PC-8.11	Temporary work spaces are prohibited from being placed within ESS without written approval from Manitoba Hydro , exceptions may be subject to Sustainable Development approval

Soil contamination (EI-7)	
ID	Mitigation
EI-7.01	A closure report will be prepared for completed soil remediation projects in accordance with provincial guidelines.
EI-7.02	A remediation plan will be prepared by the contractor and submitted to MH environmental officer 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.
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-7.07	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 Manitoba Hydro approved remediation plan.
EI-7.10	The contractor will assess lands required for marshaling yards, camps or petroleum storage, dispensing areas and hazardous materials storage areas for potential contamination following Canadian Standards Association Environmental Site Assessment (CSA Z768- 01) procedures.
EI-7.11	The contractor will carry out a CSA Phase I Environmental Site Assessment (CSA Z768-01) at abandoned construction camps, marshaling yards, petroleum product storage, dispensing areas and hazardous materials storage areas if contamination is suspected by MH environmental officer. If required Phase II Environmental Site Assessment (CSA Z769-00) will be

Soil contamination (EI-7)	
ID	Mitigation
	conducted by contractor.
EI-7.12	The MH Environmental Officer/Inspector will inspect contaminated site assessment and remediation work regularly to confirm that environmental protection measures are implemented and effective.
EI-7.13	When a spill or release is identified, it shall be flagged off to prevent disruption of that area until clean up takes place.

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 and sediment control techniques in accordance with the Erosion and Sediment Control Plan (In Appendix I).
PA-10.02	Erosion and sediment control measures will be put in place prior to stripping in accordance with the Erosion and Sediment Control Plan (In Appendix I) as required.
PA-10.03	In areas of known salinity, excavated or stripped soil will be stored on liners or in designated areas where 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. When soils are backfilled, they are to be replaced in the same order from which they were removed.
PA-10.05	Stockpiled materials from stripping will not block natural drainage patterns.

Stripping (PA-10)	
ID	Mitigation
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, as described in the Rehabilitation and Invasive Species Management Plan (Appendix P), with low growth vegetation as soon as practical.
PC-10.02	During tower foundation excavation the A horizon soils (black or dark in color/organic layer) 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.

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 preventative measures such as spill 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, washing 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.
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 Waste and Recycling Management Plan is provided in Appendix Q.
EI-10.02	Animal-proof garbage containers with regular removal of food waste to approved waste management facility grounds will be used to manage food waste.
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-10.06	Waste materials will be collected and transported to a licensed or approved waste management facility in accordance with the Waste and Recycling Management Plan (Appendix Q).
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 Manitoba Sustainable Development. A copy of the hauler registration will be provided to MH upon request.
EI-12.02	Wastewater holding tanks will be installed as per provincial legislation and regulation and a minimum of 100 m from the ordinary high water mark of any waterbody.

Wastewater (EI-12)	
ID	Mitigation
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 licensed wastewater treatment facility.
EI-12.04	Sewage and grey water will be collected in holding tanks and chemical toilets.

Water 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 30 m 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 and equipment will not be permitted in designated machine-free zones except at designated crossings.
PC-9.04	Construction of stream crossings will follow the <i>Manitoba Stream Crossing Guidelines For The Protection of Fish and Fish Habitat</i> (DFO and MNR 1996).
PC-9.05	Ice bridges are to be constructed of clean water, ice and snow and snow fills are constructed of clean snow. Materials such as gravel, rock and loose woody material cannot be used. Crossings cannot impede water flow at any time of the year.

Water crossings (PC-9)	
ID	Mitigation
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 work or before 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 facilitate water flow 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.
PC-9.11	Fording should occur only after authorization from an MH environmental Officer/Inspector. 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. One-time fording will be timed to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows and will not be permitted to occur in areas that are known fish spawning sites.

Water crossings (PC-9)	
ID	Mitigation
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.
PC-9.13	In watercourses where mussel species of conservation concern are known to occur, watercourse crossings may occur by boat or barge, or during winter (i.e., under frozen conditions) to prevent mortality of the mussels.
PC-9.14	The contractor is responsible for having signage at each end of any ice bridges indicating the ice thickness and the date it was last measured.
PC-9.15	Cleared trees and woody debris will not be pushed into (or adjacent) to standing timber, or within the high-water mark of wetlands or waterbodies

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.

Wetlands (EC-8)	
ID	Mitigation
EC-8.04	Disturbance of wetlands will only be carried out under frozen ground conditions. If frozen ground conditions don't exist alternate mitigation measures such as construction matting may be used to minimize surface damage, rutting and erosion if approved by MH Environmental Officer/Inspector.
EC-8.05	Cleared trees and woody debris will not be pushed into (or adjacent) to standing timber, or within the high-water mark of wetlands or waterbodies

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, via MH.
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 activities are allowed only within the reduced risk time period as illustrated in Timing Windows Appendix. As construction activities can occur within the sensitive time period for wildlife, at identified sites further mitigation such as nest sweeps, set-backs/buffers and approvals would be required.
EC-9.06	Animal-proof garbage containers with regular removal of food waste to approved waste management facility will be used to manage food waste.
EC-9.07	Hunting and harvesting of wildlife by project staff will not be permitted

Wildlife protection (EC-9)	
ID	Mitigation
	while working on the project sites.
EC-9.09	If animal traps or bait sites are encountered within the project footprint they are to be removed for the safety of workers and construction equipment. If found on private land, the landowner will be contacted and have the materials returned to them. If found on Crown land the materials will be released to Manitoba Sustainable Development.
EC-9.10	Prior to seeking authorization from Manitoba Sustainable Development (MSD) for removal of a Muskrat house, Beaver Dam or Lodge documentation of reasonable attempts to trap resident beavers/muskrat must be provided. Attempts to trap resident Beavers/muskrats must be undertaken by a licensed trapper or person with a valid Wild Animal Kill Permit.
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, via MH.
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.

Wildlife protection (EC-9)	
ID	Mitigation
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.
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 via MH.
EC-9.24	In watercourses where mussel species of conservation concern are known to occur, watercourse crossings may occur by boat or barge, or during winter (i.e., under frozen conditions) to prevent mortality of the mussels.
EC-9.25	Muskrat house, Beaver Dam or Lodge removal requires consultation with and the Department of Fisheries and Oceans who may require additional authorizations. House, Dam or Lodge removal may require heavy equipment or explosives which would require an additional Work Permit from Sustainable Development when located on Crown Land.

6.0 References

DFO. 1995. Freshwater intake end-of-pipe fish screen guidelines. Department of Fisheries and Oceans. Published by: Communications Directorate, Department of Fisheries and Oceans, Ottawa, Ontario.

DFO and MNR. 1996. Manitoba stream crossing guidelines for the protection of fish and fish habitat. Fisheries and Oceans Canada and Manitoba Natural Resources.

MWS. 2011. Manitoba water quality standards, objectives and guidelines. Manitoba Water Stewardship Report 2011-01. Water Science and Management Branch, Manitoba Water Stewardship.

This page was left intentionally blank.

APPENDICES

This page was left intentionally blank.

Appendix A: Contact list

Contact	Name	Phone Number(s)
Construction contractor		
Contractor project manager		
Contractor field lead		
Contractor safety		
Environmental representative		
Manitoba Hydro		
Project engineer		
Construction supervisor		
Senior environmental assessment officer		
Environmental Officer/Inspector		
FSO: field safety officer		
Hazardous materials officer		
Area spill response coordinator		
Emergency response services		
Project archaeologist (primary contact)		
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		

This page was left intentionally blank.

Appendix B: Environmental licences, approvals and permits

List of Potential Approvals required for Construction		
Approval required (Applicable Legislation / Regulation)	Type of Approval needed	Responsibility
Environment Act Licence (Class 2)	Licence	LEA
Crown Lands Act (General Permit)	Permit	Property Dept.
Crown Lands Act (Work Permit)	Permit	LEA
Permit to burn wood (Wildfires Act) – outside of timing windows only	Permit	LEA
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
A permit from Manitoba Infrastructure 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		

This page was left intentionally blank.

CLIENT FILE NO.: 5950.00

January 14, 2020

James Matthewson
Manitoba Hydro
Licensing and Environmental Assessment
Transmission Planning and Design
360 Portage Ave (5)
Winnipeg, MB
R3C 0G8

Dear Mr. Matthewson:

Enclosed is **Environment Act Licence No. 3314**, issued to **Manitoba Hydro** for the construction, operation and decommissioning of the Development being a new 230-kV transmission line from the Birtle Station, located south of the community of Birtle, Manitoba to the Manitoba-Saskatchewan border, in accordance with the Environment Act Proposal dated January 30, 2018 and the alteration approved October 3, 2019.

In addition to the enclosed Licence requirements, please be informed that all other applicable federal, provincial and municipal regulations and by-laws must be complied with. A Notice of Alteration must be filed with the Director for approval prior to any alteration to the Development as licensed.

If you have any questions on this matter, please contact Peter Crocker, Environment Officer, at 204-726-6565 or Peter.Crocker@gov.mb.ca.

Pursuant to Section 27 of The Environment Act, this licensing decision may be appealed by any person who is affected by the issuance of this Licence to the Minister of Conservation and Climate within 30 days of the date of the Licence.

Sincerely,



Cordella Friesen
Director
The Environment Act

- c: Cordella Friesen/Peter Crocker: Environmental Compliance and Enforcement
Elise Dagdick: Environmental Approvals
Jennifer Barnes/Jonathan Wiens: Manitoba Hydro
Jack Dubois/Association of Manitoba Community Pastures
Public Registries

NOTE: Confirmation of receipt of this Licence No. 3314 (by the Licencee only) is required by the Director of Environmental Approvals. Please acknowledge receipt by signing in the space below and email a copy of this letter to Elise.Dagdick@gov.mb.ca by January 29, 2020.

On behalf of Manitoba Hydro

Date

LICENCE

Client File No.: 5950.00

Licence No. / Licence n°

3314

Issue Date / Date de délivrance

January 14, 2020

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 and decommissioning of the Development being a new 230-kV transmission line from the Birtle Station, located south of the community of Birtle, Manitoba to the Manitoba–Saskatchewan border, in accordance with the Environment Act Proposal dated January 30, 2018 (Proposal), the alteration approved October 3, 2019, and subject to the following specifications, limits, terms and conditions:

DEFINITIONS

In this Licence,

"affected area" means a geographical area, excluding the property of the Development;

"approved" means approved by the Director or an assigned Environment Officer in writing;

"culturally and environmentally sensitive sites" means locations, features, areas, activities or facilities along or immediately adjacent to the transmission line corridor and other components of the Development that are ecologically, socially, economically or culturally important and sensitive to disturbance by the Development;

"Development" means any project, industry, operation or activity, or any alteration or expansion of any project, industry, operation or activity which causes or is likely to cause

- a) the release of any pollutant into the environment, or

- b) an effect on any unique, rare, or endangered feature of the environment, or
- c) the creation of by-products, residual or waste products not regulated by The Dangerous Goods Handling and Transportation Act, or
- d) a substantial utilization or alteration of any natural resource in such a way as to pre-empt or interfere with the use or potential use of that resource for any other purpose, or
- e) a substantial utilization or alteration of any natural resource in such a way as to have an adverse impact on another resource, or
- f) the utilization of a technology that is concerned with resource utilization and that may induce environmental damage, or
- g) a significant effect on the environment or will likely lead to a further development which is likely to have a significant effect on the environment, or
- h) a significant effect on the social, economic, environmental health and cultural conditions that influence the lives of people or a community in so far as they are caused by environmental effects.

(The Environment Act E125)

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

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

"Environmental Approvals Branch" means the Environmental Approvals Branch of Manitoba Conservation and Climate, or any future branch responsible for issuing licences under The Environment Act;

"noise nuisance" means an unwanted sound, in an affected area, which is annoying, troublesome or disagreeable to a person:

- a) residing in an affected area;
- b) working in an affected area; or
- c) present at a location in an affected area which is normally open to members of the public;

if the unwanted sound:

- d) is the subject of at least 5 written complaints, received by the Director in a form satisfactory to the Director and within a 90-day period, from 5 different persons falling within clauses a), b) or c), who do not live in the same household; or
- e) is the subject of at least one written complaint, received by the Director in a form satisfactory to the Director, from a person falling within clauses a), b) or c) and the Director is of the opinion that if the unwanted sound had occurred in a more densely populated area there would have been at least 5 written complaints received within a 90-day period, from 5 different persons who do not live in the same household;

"pesticide" means any chemical or biological agent registered under the Pest Control Products Act of Canada and used or represented as a means for preventing, destroying, mitigating or controlling any pest;

"rehabilitation" means physical treatment of a disturbed site to reclaim its productive potential. This may include, but is not limited to: levelling the surface, establishing appropriate slopes to prevent erosion, loosening compacted surface soils to enable vegetation to root successfully, and revegetation to promote the development of the former species composition;

"transmission line right-of-way" means the corridor for the transmission line, as defined and described in the Proposal and/or any future alterations approved in accordance with section 14(2) of The Environment Act; and

"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 W65).

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.

Future Sampling

1. In addition to any of the limits, terms and conditions specified in this Licence, the Licencee shall, upon the request of the Director:
 - a) sample, monitor, analyze or investigate specific areas of concern regarding any segment, component or aspect of pollutant storage, containment, treatment, handling, disposal or emission systems, for such pollutants, ambient quality, aquatic toxicity, leachate characteristics and discharge or emission rates, and for such duration and at such frequencies as may be specified;
 - b) determine the environmental impact associated with the release of any pollutant 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 analytical procedures being used, bioassay data, flow rate measurements and such other information as may from time to time be requested.

Reporting Format

2. The Licencee shall submit all information required to be provided to the Director or Environment Officer under this Licence, in written and electronic format, 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 labeled with the Licence Number and Client File Number associated with this Licence.

Approvals and Permits

3. The Licencee shall, prior to construction on Crown land, apply for and obtain the appropriate land tenure allocations in accordance with the Crown Lands Act from the Real Estate Services Division of the Department of Central Services.
4. The Licencee shall, prior to construction of the Development on Crown Land, obtain a Crown Lands Work Permit from Manitoba Agriculture and Resource Development, Lands Branch, and comply with the conditions of the permit.

Notification

5. The Licencee shall notify the Environment Officer assigned enforcement of this Licence not less than two weeks prior to beginning construction of the Development. The notification shall include the intended starting date of construction and the name of the contractor responsible for the construction.
6. The Licencee shall, during construction of the Development, notify interested Indigenous communities when and where construction will be occurring.
7. The Licencee shall, prior to construction, provide a copy of this Licence to the contractor and subcontractor(s) involved in the Development.
8. The Licencee shall notify the assigned Environment Officer, no less than one week prior to the completion of construction of the Development, to allow for a final inspection.

Compliance

9. The Licencee shall adhere to the commitments made in the Proposal, supporting information filed in association with the Proposal, the plans submitted pursuant to this Licence, and any future alterations approved in accordance with section 14(2) of The Environment Act, during construction, operation and decommissioning of the Development.
10. 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.

11. The Licencee shall, prior to construction of the Development, arrange a meeting with the Manitoba Hydro construction project manager(s) and the assigned Environment Officer to review construction related matters.
12. The Licencee shall, during construction of the Development, submit monthly reports regarding construction, environmental protection, and emergency response issues to the assigned Environment Officer.
13. The Licencee shall at all times maintain a copy of this Licence at the Development or at the premises from which the Development's operations are managed.

SPECIFICATIONS, LIMITS, TERMS AND CONDITIONS

Environmental Protection Plan

14. The Licencee shall, prior to construction, submit a construction Environmental Protection Plan for approval of the Director of the Environmental Approvals Branch. The 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 and supporting information, during construction of the Development. The plan shall:
 - a) identify measures to minimize impacts to culturally and environmentally sensitive sites by implementing mitigation measures such as flagging of the area, buffers zones, selective clearing, construction matting, and non-chemical vegetation management; and
 - b) include specific sites that are identified by Indigenous communities for use for the exercise of Aboriginal rights-based activities in the vicinity of the project (such as plant harvesting, ceremonial practices, hunting, and trapping) as culturally and/or environmentally sensitive sites.

Grassland Mitigation, Recovery, and Offset

15. The Licencee shall install perch deterrents on transmission line towers within Spy Hill-Ellice Community Pasture during construction of the Development.
16. The Licencee shall enter into an agreement to provide a one-time \$150,000 contribution, to be held by the Manitoba Habitat Heritage Corporation, for use toward the capital costs of establishing a grassland habitat recovery program within the Spy Hill Ellice Community Pasture as developed by Manitoba Conservation and Climate, Manitoba Agriculture and Resource Development, and other relevant organizations.
17. The Licencee shall enter into an agreement with the Wildlife and Fisheries Branch of Agriculture and Resource Development and the Manitoba Habitat Heritage Corporation for an offset contribution for the impacts to grasslands associated with the Development. The

Licencee shall develop a grassland offset plan for impacts to grassland bird habitat in the Spy Hill-Ellice Community Pasture that includes a description of area impacted by the transmission line right-of-way, offset ratio, and mitigation measures to be implemented during construction in accordance with the values specified in Schedule A of this Licence. The offset contribution will be held by the Manitoba Habitat Heritage Corporation and may be used for securement of perpetual conservation agreements for grasslands on private land, or other mechanisms to be approved by the Director of the Environmental Approvals Branch in consultation with officials responsible for The Endangered Species and Ecosystems Act.

Invasive Species

18. The Licencee shall, during construction and operation of the Development, prevent the introduction and spread of foreign aquatic biota. Equipment shall be cleaned in accordance with the requirements of Manitoba Regulation 173/2015 respecting Aquatic Invasive Species, or any future amendment thereof.
19. The Licencee shall, prior to construction of the Development, submit a detailed biosecurity management plan for approval of the Director of the Environmental Approvals Branch. The plan shall describe measures to be implemented to control the spread of invasive species as well as the spread of soil borne diseases from field to field in agricultural areas during construction of the Development.

Culture and Heritage Resources

20. The Licencee shall, prior to construction, submit a Cultural and Heritage Resources Protection Plan for the Development for approval of the Director of the Environmental Approvals Branch.
21. The Licencee shall provide cultural awareness training for staff working in construction areas within the Development that is reflective of the Indigenous cultures in the area. The training shall include recognizing cultural sites and management of any resources encountered.
22. The Licencee shall employ Métis and First Nation monitors to be present during construction within the Spy Hill-Ellice Community Pasture where there is potential for the discovery of historic resources. The Licencee shall provide the necessary training to be a monitor for the identification of historic resources in relation to implementation the cultural and heritage resources plan.

Access Management

23. The Licencee shall, prior to construction of the transmission line component of the Development, submit an access management plan for approval of the Director of the Environmental Approvals Branch. The construction access management plan shall

include, but not be limited to, the anticipated types and locations of roads, trails, and water crossings required to access the Development for construction.

24. The Licencee shall install a fence to prevent access along the transmission line right-of-way into the Spy Hill-Ellice Community Pasture from the east.

Monitoring

25. The Licencee shall, prior to construction, submit a monitoring plan for the Development for the approval of the Director of the Environmental Approvals Branch. The plan shall describe the adaptive monitoring process, triggers, and actions for each monitoring program, and including proposed programs for:
 - a) monitoring of the effectiveness of perch deterrents deployed within Spy Hill-Ellice Community Pasture; and
 - b) monitoring for sharp-tailed grouse lek sites adjacent to the transmission line right-of-way within Spy Hill-Ellice Community Pasture.
26. The Licencee shall submit annual reports to the Director of the Environmental Approvals Branch, on the results of monitoring programs approved pursuant to Clause 25 of this Licence for the duration of the monitoring programs.
27. The Licencee shall provide the data from monitoring programs approved pursuant to Clause 25 of this Licence to the Wildlife and Fisheries Branch of Manitoba Agriculture and Resource Development.
28. The Licencee shall implement additional mitigation measures that are requested by the Director of the Environmental Approvals Branch to address unanticipated environmental effects of the Development identified by the monitoring programs approved pursuant to Clause 25 of this Licence.

Petroleum Storage and Handling

29. The Licencee shall locate fuel storage and equipment servicing areas established for the construction and operation of the Development a minimum distance of 100 metres from any waterbody, unless otherwise approved by an Environment Officer, and shall comply with the requirements of Manitoba Regulation 188/2001 respecting Storage and Handling of Petroleum Products and Allied Products, or any future amendment thereof.
30. The Licencee shall, during construction and operation 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 contaminating soil or entering any waterbody. Emergency spill kits for both land and in-water use shall be readily available on site during construction.

Hazardous Waste

31. The Licencee comply with the requirements of Manitoba Regulation 195/2001 respecting Hazardous Waste, or any future amendment thereof.

Noise Nuisance

32. The Licencee shall not cause or permit a noise nuisance to be created as a result of the construction, operation, or alteration of the Development, and shall take such steps as the Director may require to eliminate or mitigate a noise nuisance.

Erosion Control

33. The Licencee shall, during construction and operation of the Development, take all appropriate measures to prevent erosion and the deposition of sediment into any waterbody.

Spill Response

34. 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 the 24-hour environmental accident reporting line at 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.
35. The Licencee shall, following the reporting of an event pursuant to Clause 34:
- 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/or the Environment Officer; and
 - d) submit a report to the Director about the causes of breakdown and measures taken, within one week of the repairs being done.

Pesticide Application

36. The Licencee shall adhere to Pesticides Regulation 94/88 R, or any future amendment thereof, for the storage, handling and application of pesticides in conjunction with the Development.

Solid Waste Disposal

37. The Licencee shall dispose of all solid waste generated at the Development, which is not recycled, only to a waste disposal ground operating under the authority of a permit issued

pursuant to Manitoba Regulation 37/2016 respecting Waste Management Facilities or any future amendment thereof, or a Licence issued pursuant to The Environment Act.

Onsite Wastewater Disposal

38. The Licencee shall, during construction of the Development, dispose of all sewage and septage from on-site sanitary facilities in accordance with the Onsite Wastewater Management Systems Regulation 83/2003, or any future amendment thereof.

Vegetation Management

39. The Licencee shall, within six months of the completion of construction of the Development, submit for approval of the Director of the Environmental Approvals Branch, a plan for the management of vegetation along the transmission line right-of-way. The plan shall describe the methods to be used for vegetation control and for communication to the public and Indigenous communities during operation of the Development.

Decommissioning

40. The Licencee shall decommission temporary infrastructure associated with the Development on Crown land to the satisfaction of the assigned Environment Officer.
41. The Licencee shall, prior to decommissioning of the Development, submit for approval of the Director of the Environmental Approvals Branch, a decommissioning and rehabilitation plan for the Development.

Implementation of Plans

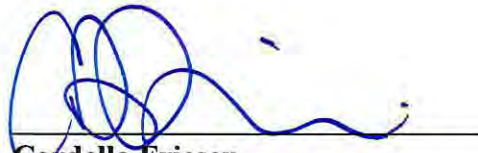
42. The Licencee shall implement the plans submitted and approved pursuant to this licence.

Respecting Alterations to the Development

43. The Licencee shall notify the Director and receive the approval of the Director for any alterations to the Development as licensed, prior to proceeding with such alterations.

REVIEW AND REVOCATION

- A. 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.
- B. 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.



Cordella Friesen
Director
The Environment Act

Schedule A

Offset Calculation:

An offset ratio of 4:1 is appropriate given the uniqueness of the habitat type and high densities of endangered grassland birds in the area.

Area of Influence	Offset Ratio	Area	Per Hectare Cost	Required Offset Contribution
New grassland edge created by project	Multiplier to achieve no net loss of grassland area and function	Area of Influence (13.6 HA) x offset multiplier	For grassland rehabilitation	Offset Contribution area x per hectare cost
13.6 HA	4:1	54.4 HA	\$17,500	\$952,000

This page was left intentionally blank.

Appendix C: Timing windows

Project Wildlife Reduced Risk Timing Windows																									
Species	Sensitivity	January		February		March		April		May		June		July		August		September		October		November		December	
Mammals	Denning Sites																								
Amphibians/Reptiles	Amphibian Bearing Wetland																								
Snakes	Hibernaculum																								
Bats	Hibernaculum																								
Birds	Breeding and Nesting																								
Fish	Spawning Areas																								

Reduced Risk to Wildlife

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

Examples of Mitigations that may be approved by Licensing and Environmental Assessment Department during Sensitive Time Period for Birds or Amphibians/Reptiles are found in Appendix E and M.

This page is intentionally left blank.

Appendix D: Buffers and setbacks

Feature	Activity	Non Frozen Ground Setback Distance ²	Frozen Ground Setback Distance ²	Vegetated Buffer Distance ³
Vegetation				
Plant Species at Risk	Tower Foundation Siting	100m	100m	
	Clearing And Construction	30m		30m
	Maintenance	30m		30m
	Access Trail	30m	30m	
Anthropogenic				
Heritage and Cultural	All	Varies	Varies	Varies
Amphibians				
Northern Leopard Frog (known breeding pond, watering site)	Tower Foundation Siting	30m	30m	
	Clearing And Construction	30m		30m
	Maintenance	30m		
	Access Trail	30m	30m	
Reptiles				
Garter Snake Hibernaculum	Tower Foundation Siting	200m	200m	
Landforms				
Wetlands	Clearing And Construction			30m
	Maintenance			30m
	Access Trail			30m
	Hazardous Material Handling/Storage	100m	100m	
	Soil Stockpiles	30m		30m
Sharp-tailed Grouse				
Lek site (dancing breeding site)	All	1000m ⁵	1000m ⁵	1000m ⁵
Mammals				
Mineral Licks	All	120m		120m
Occupied Mammal Dens ⁴ (Red fox, Gray fox, Coyote, Wolf, Bobcat, American badger, American marten, Fisher, Least weasel and Raccoon)	All	50m	50m	

This page is intentionally left blank.

¹ALL MEASUREMENTS ARE FROM EDGE OF FEATURE

²NO WORK ALLOWED WITHOUT MANITOBA HYDRO LICENSING AND ENVIRONMENTAL ASSESSMENT DEPARTMENT REVIEW AND APPROVAL, WHICH MAY BE SUBJECT TO REGULATORY APPROVAL.

³SHRUB AND HERBACEOUS VEGETATION RETAINED)

⁴BEAR/MAMMAL DEN SITES ARE HIGHLY VARIABLE AND MAY BE FOUND IN CAVES, CREVASSES, OVERTURNED TREES, OPEN GROUND NESTS, AND LOW-SWEEPING BRANCHES OF A CONIFEROUS TREE.

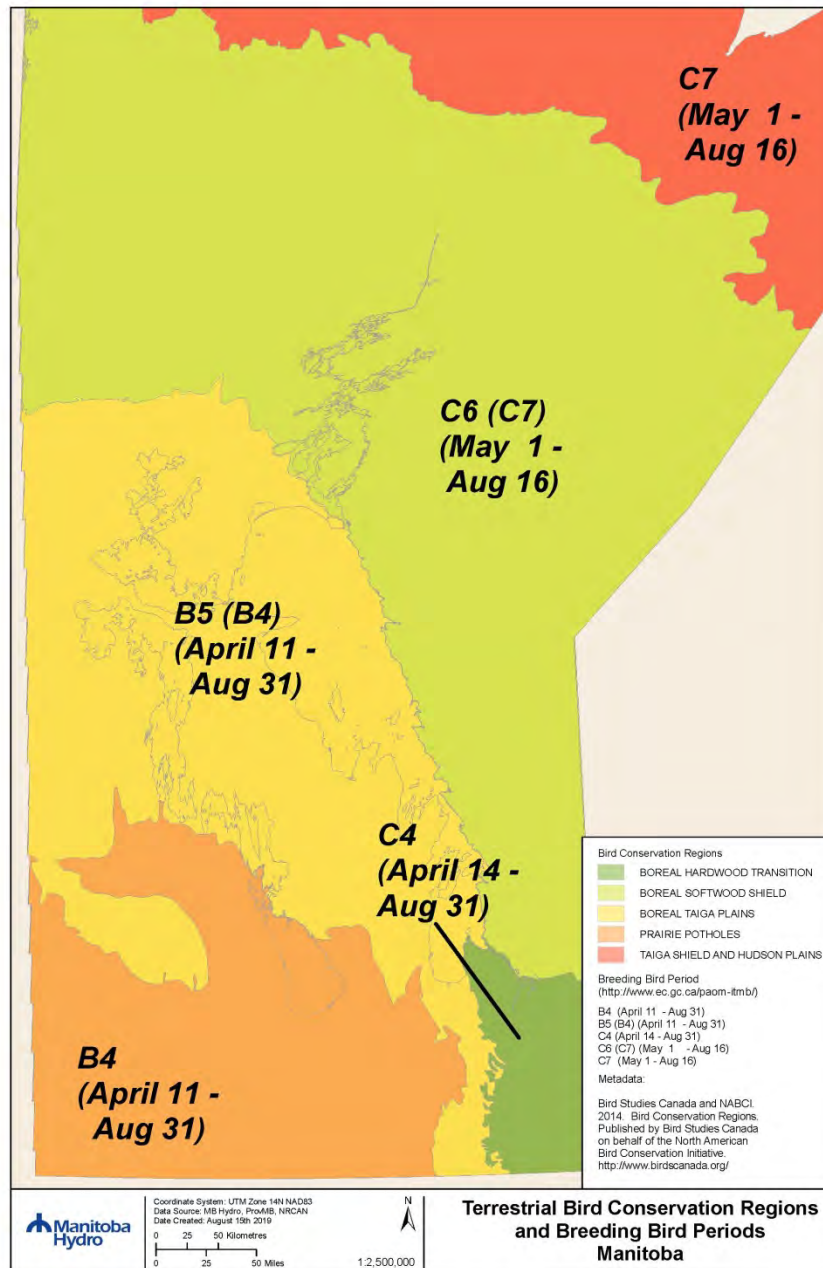
⁵DO NOT PLAN TO CARRY OUT CONSTRUCTION ACTIVITIES WITHIN THIS AREA BETWEEN MARCH 15 TO JUNE 1ST. L IF CONSTRUCTION ACTIVITY IS REQUIRED WITHIN THIS AREA BETWEEN APRIL 15 TO JUNE 1ST, CONTACT MANITOBA HYDRO ENVIRONMENTAL OFFICER TO DISCUSS POTENTIAL MITIGATION OPTIONS.

This page is intentionally left blank.

Appendix E: Avian protection documents

Appendix E-1: Terrestrial Bird Conservation Regions and Breeding Bird Seasons for Manitoba*

* Adapted from Environment and Climate Change. Dates should be considered as guidelines.



This page was left intentionally blank.

Appendix E-2: Determining Disturbance Level for Nesting Birds during Breeding Bird Season

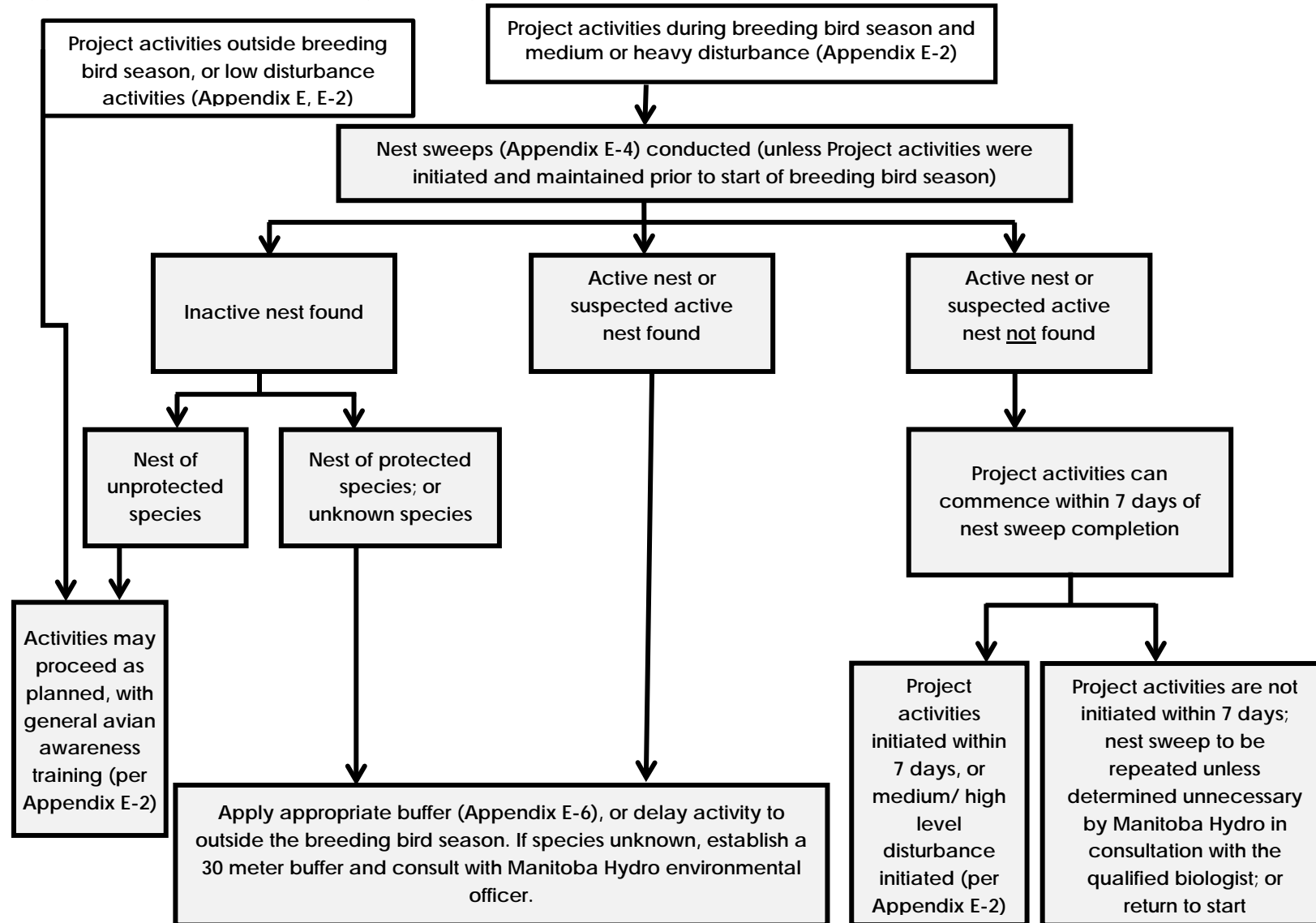
Activity (examples provided for guidance)	Disturbance Level	Training Required	General Mitigation
1 vehicle/equipment round trip (two passes) per 0.5 hour; Foot traffic, surveying; Spacer damper installation; Medium helicopter work at top of tower; Stringing (helicopter, pulling conductor); Inspection activities	Low	General Avian Awareness Training*	Operators and workers remain vigilant for any possible bird nesting activity, provide 5 m berth
2-5 vehicle/equipment round trip (two passes) per 0.5 hour; Any sustained activity for >1-4 hours over a 12 hour period within 100m of work site; Plumbing and tensioning guys; Tower hooking; Anchor pull testing; Clipping in conductor	Moderate	General Avian Awareness Training* and Consult a Manitoba Hydro Environmental Officer	General Mitigation Approach for Reducing Risk to Nesting Birds as per Appendix E-3 Nest sweep protocol as per Appendix E-4
>5 vehicle/equipment round trip (two passes) per 0.5 hour; Any sustained activity for >4 hours within 100m of work site; Vegetation clearing; Foundation installation; Stringing (implode sites, tensioner/puller sites); Tower assembly or installation; Road/trail construction	High		

*General Avian Awareness Training

General avian awareness training is to be provided by the Contractor to all crews and contractors conducting field work during the sensitive time period for birds identified in Timing Windows appendix. General avian awareness training involves basic introduction to bird biology, nesting characteristics, government regulations, and instruction on how to contact Manitoba Hydro Environmental officers, when specific questions arise.

This page was left intentionally blank.

Appendix E-3: General Mitigation Approach for Reducing Risk to Nesting Birds



Appendix E-4: 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. Nest sweeps are to be conducted on lands having potential to support bird nesting. Qualified¹ biologists employed / retained by the contractor are to complete nest sweeps no more than 7 days before disturbance activities. To complete a nest sweep the qualified biologist must:

1. 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.
2. In advance of any medium or heavy disturbance activity (Appendix E-2) walk the entire area, ensuring full coverage. Recommended spacing between parallel transects is approximately 10 m, but surveyors may reduce this spacing as necessary.
3. Walk slowly, observing from ground-level, to the tops of the trees.
4. 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.
5. 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) and the date.
6. If the bird species and the corresponding necessary buffer size cannot be readily determined, establish a temporary minimum 30 meter “no disturbance” buffer around the nest site.
7. Once the bird species has been determined, an appropriately sized “no disturbance” buffer must be setup around the nest location. Consult Appendix E-6 and select the most appropriate buffer or contact a Manitoba Hydro Environmental Officer.
8. Use flagging tape or appropriate signage to mark the required buffer around the nest location.
9. Enter each nest observation into the nesting bird collection form (Appendix E-5- MH will provide digital version in Excel format for submission) and include what actions were taken or what actions are recommended*.

¹ Qualified Biologist is someone who has at least one field season of demonstrated experience in nest sweeps or avian surveys with references, and a post-secondary degree/diploma in wildlife biology, resume to be supplied to Manitoba Hydro for review and approval 15 days prior to construction activities occurring within Sensitive time period for birds.

10. Continue nest sweep until the entire area scheduled for construction activity has been adequately searched.
11. Submit to MH an Excel spreadsheet that is continuously updated throughout the sensitive timing window with structures and/or areas that have had nest sweeps conducted and the expiration date for those sweeps.
12. If a nest was found, there are two options:
 - a. Defer disturbance within the required buffer as outlined in Appendix E-6. Activity can recommence after breeding bird nesting season, as described in Appendix E-1; or
 - b. 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 nest sweep 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.

Nest Sweep Extension

As per Appendix E-3 nest sweeps may be extended from the original expiry date for an additional day if a medium or high level disturbance is initiated on the expiry date or extended continuously if medium or high level disturbances are sustained un-interrupted.

Scenarios for nest sweep extension or expiration

Scenario A

01	02	03	04	05	06	07	08	09 thru to end of sensitive timing window
Original Sweep –clear of nesting activity						Medium or high level disturbance initiated at site	Sweep expiry date extended based on initiation of Medium or high level disturbance at site the previous day	Expiry Date continuously extended based on sustained Medium or high level disturbance at site the previous day

Scenario B

01	02	03	04	05	06	07	08
Original Sweep – Clear of nesting activity		Medium or high level disturbance initiated at site	Medium or high level disturbance sustained at site	Medium or high level disturbance sustained at site	No Medium or high level disturbance at site	Original Sweep Expiry No Medium or high level disturbance at site	Second sweep required due to un-sustained medium or high level activities

This page was left intentionally blank.

Appendix E-5:

Bird Nesting 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.

[illegible]

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	<i>Empidonax alnorum</i>				25	12-14	12-15	F
American Bittern	<i>Botaurus lentiginosus</i>			Emergent-dominated wetlands	25	24-28	1-4	F
American Coot	<i>Fulica americana</i>			Emergent-dominated wetlands	25	21-25	1-4	F
American Crow	<i>Corvus brachyrhynchos</i>				25	15-18	28-35	F
American Dipper	<i>Cinclus mexicanus</i>				25	13-18	12-14	F
American Goldfinch	<i>Spinus tristis</i>				25	10-12	12-14	F
Green-winged Teal	<i>Anas c. carolinensis</i>				25	20-24	1-4	F
American Kestrel	<i>Falco sparverius</i>			Forest clearings, grassland, or pasture	25	29-30	30	F
American Pipit	<i>Anthus rubescens</i>				25	13-15	12-14	F
American Redstart	<i>Setophaga ruticilla</i>				25	12-14	12-14	F
American Robin	<i>Turdus migratorius</i>				25	12-14	12-14	F
American Three-toed Woodpecker	<i>Picoides dorsalis</i>				25	12-14	18-23	P
American Tree Sparrow	<i>Spizella arborea</i>				25	12-14	12-14	F
American white pelican	<i>Pelecanus erythrorhynchos</i>			isolated islands	1000	30		F
Arctic Warbler	<i>Phylloscopus borealis</i>				25	12-14	12-14	F
Bald Eagle	<i>Haliaeetus leucocephalus</i>			forests near water	1000	28-35	35-49	P
Baltimore Oriole	<i>Icterus galbula</i>			Forest, deciduous	25	12-14	12-14	F
Band-tailed pigeon	<i>Patagioenas fasciata</i>	Special Concern -1	Special Concern	Riparian Forest;Pasture/Old Field;Cultivated Field;Deciduous/Broadleaf Forest;Conifer Forest	25			
Bank Swallow	<i>Riparia riparia</i>		Threatened (Apr 2013)	Rivers	300	14-16	17-18	F
Baird's Sparrow	<i>Ammodramus bairdii</i>	Special Concern -1	Special Concern	Native grass prairie	500	11-12	8-11	F
Barn Swallow	<i>Hirundo rustica</i>		Threatened (May 2011)	Forest clearings, grassland, or pasture	150	13-17	17-18	F
Barred Owl	<i>Strix varia</i>			mature forest	1000	28-33	28-35	P
Barrow's Goldeneye	<i>Bucephala islandica</i>			Open water wetlands or riparian	25	28-44	1-4	F

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
Bay-breasted Warbler	<i>Setophaga castanea</i>			Forest, coniferous	50	12-14	12-14	F
Belted Kingfisher	<i>Megaceryle alcyon</i>			Open water wetlands or riparian	25	22-24	27-29	F
Black Swift	<i>Cypseloides niger</i>			Riparian areas and forest; streams	25	24-27	12-14	F
Black Tern	<i>Chlidonias niger</i>			Open water wetlands or riparian	25	17-22	12-14	F
Black-and-white Warbler	<i>Mniotilta varia</i>				50	10-12	12-14	F
Black-backed Woodpecker	<i>Picoides arcticus</i>				25	12-14	21	P
Black-billed Magpie	<i>Pica hudsonia</i>				25	16-21	12-14	P
Black-capped Chickadee	<i>Poecile atricapillus</i>				25	11-13	12-14	P
Blackpoll Warbler	<i>Setophaga striata</i>					11-13	12-14	F
Black-throated Green Warbler	<i>Setophaga virens</i>			Forest, mixed wood; riparian	50	11-13	12-14	F
Blue Jay	<i>Cyanocitta cristata</i>				25	16-18	17-21	P
Blue-headed Vireo	<i>Vireo solitarius</i>				25	12-14	12-14	F
Blue-winged Teal	<i>Anas discors</i>			Open water wetlands or riparian	25	22-27	1-4	F
Bobolink	<i>Dolichonyx oryzivorus</i>		Threatened	forage crops	400	12	11-12	F
Bohemian Waxwing	<i>Bombycilla garrulus</i>				25	13-15	17-21	P
Boreal Chickadee	<i>Poecile hudsonicus</i>				25	14-18	12-14	P
Boreal Owl	<i>Aegolius funereus</i>			Forest, coniferous	1000	28-30	28-35	P
Brewers Blackbird	<i>Euphagus cyanocephalus</i>				25	11-17	12-16	F
Brewer's Sparrow	<i>Spizella breweri</i>				25	12-14	12-16	F
Broad-winged Hawk	<i>Buteo platypterus</i>			Forest, deciduous	200	28-31	28-35	F
Brown Creeper	<i>Certhia americana</i>			Forest, coniferous	25	14-18	12-16	P
Brown-headed Cowbird	<i>Molothrus ater</i>				25	10-13	12-16	F
Buff-brested Sandpiper	<i>Calidris subruficollis</i>	Special Concern-1	Special Concern (2012)	Stop-over sites, short grass	200	23-25	18-20	F
Bufflehead	<i>Bucephala albeola</i>				25	28-33	12-14	F
Burrowing owl	<i>Athene cunicularia</i>	Endangered-1	Endangered	pasture	500	28	21	F
Calliope Hummingbird	<i>Stellula calliope</i>				25	15-16	12-14	F
Canada Goose	<i>Branta canadensis</i>				25	25-30	1-2	F
Canada Warbler	<i>Cardellina canadensis</i>	1-Threatened (Feb 2010)	Threatened (Mar 2008)	Forest, mixed wood	450	11-13	12-14	F

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

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

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

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

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

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	<i>Phalaropus tricolor</i>			Open water wetlands or riparian	25	18-21	1-4	F
Wilson's Snipe	<i>Gallinago delicata</i>			Emergent-dominated wetlands; riparian areas and forest	25	18-21	1-4	F
Wilson's Warbler	<i>Cardellina pusilla</i>			Shrubland or young forest	25	11-14	12-14	F
Winter Wren	<i>Troglodytes hiemalis</i>				25	12-16	12-14	F
Yellow Rail	<i>Coturnicops noveboracensis</i>	1-Special Concern (Jun 2003)	Special Concern (Nov 2009)	Emergent-dominated wetlands	350	16-18	1-4	F
Yellow Warbler	<i>Setophaga petechia</i>			Forest, deciduous; young/disturbed; riparian; willow	25	11-14	12-14	F
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>				25	12-16	12-14	F
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>				25	11-14	25-29	F
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>			Open water wetlands or riparian	25	11-14	12-14	F

This page was left intentionally blank.

Appendix F: Reptile and Amphibian protection document

Habitat identification

Amphibians should be assumed to be present in all wetland or shallow water areas supporting emergent vegetation (cattails, bulrushes, lily pads) during the amphibian emergence and breeding period (April 1st to August 15th).

When sampling the habitat, a qualified biologist* should investigate the shallow water zone (to rubber - boot depth), the waterline and the shore zone (within 3 meters of the waterline) when possible. In this way, other age classes of amphibians may be observed, such as egg masses and larvae (depending on the time of year). Both flowing and standing water can be surveyed in this fashion.

Visual encounter survey

Visual Encounter Surveys are an effective method of locating amphibians and egg masses during the breeding season (See excerpt from Kendell, 2002 below for survey procedure). Egg masses are easily detected when walking the shorelines and other shallow sections of a pond. Also, adult amphibians are fairly active in the breeding season and are often found near egg masses, so that many can be located during visual searches. As a general rule, surveys conducted at various times of day are the single most effective method for removing amphibians of all life stages during the active seasons.

Survey protocol should follow the steps outlined in Kendell (2002), which outlines:

- The habitat should be walked at a constant speed that is conducive to observing amphibians under the given habitat characteristics at the site. For example, open habitats with sparse and low vegetation can be walked at a greater speed because the observer is less likely to overlook amphibians obscured by vegetation. In contrast, a slower walking speed is required if the habitat possess - thicker and taller vegetation. In either case, the observer should walk in a systematic fashion to cover all favorable habitats both thoroughly and equally.
- A good self-test, to ensure that the proper speed and diligence is being used while surveying a habitat, is as follows: The individual conducting the survey should be able to spot less obvious amphibian life underfoot and within peripheral vision. For example, the individual may observe or hear a mouse scurrying through the grass, a young garter snake basking on a rock, other amphibian species and large insects on the ground, vegetation, water or below the surface of the water.

- Report survey results to Manitoba Hydro Environment Officer.

Kendell, K. 2002. Survey protocol for the northern leopard frog. Alberta Sustainable Resources Development, Fish and Wildlife Division, Alberta Species at Risk Report No. 43. Edmonton, Alberta. 30 pp.

Mitigation measures

- Restrict access to shallow water areas to protect breeding ponds and their vegetation from trampling and other disturbances. In areas directly impacted by construction, and in which amphibians occur, all life stages should be captured and removed to areas outside of the construction area.
- Erect exclusion fencing (e.g., sedimentation fence) prior to activities occurring in areas of breeding habitat (e.g., wetland features, low-lying ephemeral ponds) to minimize the risk of amphibians entering the work area: Exclusion fencing height should be a minimum of 50 cm and the bottom of the fabric must be buried 10-20 cm down with an additional fabric lip extending outwards 90 degrees another 15 cm, the fabric lip must be backfilled and compacted to ensure it does not become exposed. Bury support stakes for exclusion fencing a minimum of 30 cm into the ground on the activity side of the fence; leave an overhang or lip on the exterior to prevent amphibians from entering the fenced off area.

*Qualified Biologist is someone who has at least one field season of demonstrated experience in visual encounter surveys with references, and a post-secondary degree/diploma in wildlife biology, resume to be supplied to Manitoba Hydro for review and approval 15 days prior to construction activities occurring within sensitive time period for amphibians.

Appendix G: Species of Concern contingency measures

Appendix G: Species of Concern contingency measures

The following procedures provide contingency measures for the discovery of species of concern prior to and during a construction project. Species of concern can include rare vascular plants, rare non-vascular plants, and rare wildlife species.

Plant Species of Concern Discovery Prior to Construction

In the event that rare plants are discovered during future vegetation studies along the transmission line, the plant or plant community will be assessed by a Manitoba Hydro vegetation specialist and appropriate mitigation measures will be determined prior to construction within the area of plant discovery. Mitigation measures will be determined following an assessment, which will include the following:

- the position of the plant or plant community on the construction right-of-way;
- the relative rarity of the plant or plant community (regionally, nationally, etc.);
- the local abundance of the plant or plant community.

Mitigation options to be implemented by the Contractor or Manitoba Hydro may include, however, are not limited to the following:

- narrowing down the proposed area of disturbance and protecting the site using fencing or clearly marking the site using flagging and signage (Contractor)
- informing project staff of access restrictions within in the vicinity of flagged or fenced sites (Contractor);
- temporarily covering the site with geotextile pads, flex net, mats or equivalent (Contractor);
- adjusting centerline access trail to avoid or limit potential effects on the plant or plant community (Contractor);
- adjusting tower location to avoid the plant or plant community (Manitoba Hydro);
- salvaging and transplanting portions of sod and surrounding vegetation Transplanted materials may be moved to a suitable location off right-of-way (Manitoba Hydro);
- other site-specific procedures to avoid disturbance to rare plants or plant communities, as recommended by the vegetation specialist (Contractor/Manitoba Hydro).

The Manitoba Hydro Senior Environmental Assessment Officer will be responsible for making the final decision on mitigation measures to be applied, in consultation with Environmental Officer/Inspector, a qualified biologist, Project Engineer and when uncertainty exists, the appropriate Provincial or Federal regulatory authorities. All mitigation measures for sites within the Project development area will be described in the Construction Environmental Protection Plan.

Wildlife Species of Concern Discovery Prior to Construction

In the event that wildlife species of concern or their site-specific habitat are discovered within the Project area, the discovery will be assessed and appropriate mitigation measures will be determined by Manitoba Hydro. The wildlife or habitat will be assessed based on the following criteria:

- the location of the wildlife or habitat feature with respect to the project development area;
- the presence of topographic features or vegetation to effectively screen the wildlife or habitat from construction activities;
- the existing level of disturbance and ongoing sensory disturbance at the site;
- the timing of construction versus the critical timing constraints for the species; and
- the potential for an alteration of construction activities to reduce or avoid sensory and/or physical disturbance; and
- the wildlife species, its conservation status and specific habitat needs relative to the area of development.

The mitigation measures to be implemented by the Contractor or Manitoba Hydro may include, but are not limited to, the following:

- abide by reduced risk timing windows within the recommended setback/buffer distances (Contractor);
- narrow down the proposed area of disturbance and protect the site using fencing or clearly mark the site using flagging (Contractor);
- alter or delay construction activities to avoid sensory disturbance (e.g., no burning) (Contractor);
- inform project staff of access restrictions in the vicinity of flagged or fenced sites (Contractor);
- adjust tower locations to avoid the site (Manitoba Hydro);
- install nest boxes or platforms, or otherwise replace or enhance habitat during reclamation or restoration; and
- with the appropriate approval, relocate species (i.e., amphibians) or features (i.e., unoccupied stick nests)(Contractor), if practical.

The Manitoba Hydro Senior Environmental Assessment Officer will be responsible for making the final decision on mitigation measures to be applied, in consultation with Environmental Officer/Inspector, a qualified biologist, Project Engineer and when uncertainty exists, the appropriate Provincial or Federal regulatory authorities. All sites and associated mitigation measures within the Project development area will be added to the Construction Environmental Protection Plan.

Species of concern discovery during project construction

In the event that rare plants or wildlife species are identified or suspected along the construction right-of-way during construction (e.g., during survey activities, prior to clearing and construction), Contractor staff are to follow the measures outlined below:

- Suspend work immediately in the vicinity of any newly discovered species of concern. Work at that location may not resume until the measures below are conducted.
- Notify Manitoba Hydro Environmental Officer/Inspector
- Flag or fence the area until the plant, wildlife species or community can be confirmed. MH Environmental Officer/Inspector may enlist a qualified biologist to assist with confirmation

Implement protection measures based on specific site conditions and criteria found in reference ii - CEnvPP Appendix D (buffers and setbacks) and or Appendix E (avian protection)

The Manitoba Hydro Senior Environmental Assessment Officer will be responsible for making the final decision on mitigation measures to be applied, in consultation with Environmental Officer/Inspector, a qualified biologist, Project Engineer and when uncertainty exists, the appropriate Provincial or Federal regulatory authorities. Mitigation measures generally fall into categories previously identified above.

This page was left intentionally blank.

Appendix H: Biosecurity Management Plan

This page was left intentionally blank.

Birtle Transmission Project

Biosecurity Management Plan

June 2020

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

This page was left intentionally blank.

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
FINAL 1.0	APPROVED VERSION PUBLISHED			2020_0610

This page was left intentionally blank.

Preface

This document presents the Biosecurity Management Plan (the Plan) for the construction of the Birtle Transmission Project (the Project) and is based on Manitoba Hydro's Biosecurity Policy and Transmission Standard Operating Procedures. It is intended to provide information and instruction to Manitoba Hydro employees and contractors. The Plan presents a Project-specific implementation plan and actions required to protect biosecurity on agricultural lands on which the Project will be constructed. Inspection and compliance along with monitoring and evaluation programs are described to confirm adherence to required actions including documentation and record-keeping. Environmental Management Practices and field forms are included in the Appendices.

Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro
Licensing and Environmental Assessment Department
360 Portage Avenue
Winnipeg, MB
Canada R3C 0G8
1-877-343-1631
LEAProjects@hydro.mb.ca

This page was left intentionally blank.

Table of contents

1.0	Introduction	1
1.1	Purpose and objectives.....	1
1.2	Roles and responsibilities	2
2.0	Biosecurity implementation	5
2.1	Biosecurity risk identification.....	6
2.1.1	Pre-construction sampling protocol.....	6
2.1.1.1	Benchmark sampling for clubroot.....	6
2.1.1.2	Weed surveys.....	8
2.1.1.3	Livestock operations.....	9
2.2	Agricultural land parcel zoning and access control.....	9
2.3	Biosecurity risk classification.....	11
2.4	Risk mitigation actions.....	15
2.4.1	Project mobilization.....	15
2.4.2	Prescribed actions.....	15
2.4.3	Specific actions.....	18
2.4.4	Equipment cleaning requirements	19
2.4.4.1	Types of cleaning.....	19
2.4.4.2	Cleaning stations	20
2.4.4.3	Disinfectants	21
2.5	Signage	23
2.6	Training.....	24
2.7	Documentation.....	25
3.0	Communication.....	26
4.0	Monitoring and follow-up.....	27
5.0	References	28

This page was left intentionally blank.

Appendices

- Appendix A: Noxious weeds regulation species list
- Appendix B: Field activity and inspection forms
- Appendix C: Environmental management practices guides
- Appendix D: Cleaning standards assessment guide

Tables

Table 1: Roles and responsibilities	3
Table 2: Biosecurity zones and control points.....	9
Table 3: Biosecurity risk levels.....	12
Table 4: Biosecurity risk classification matrix	14
Table 5: Low risk equipment cleaning requirements	16
Table 6: High risk equipment cleaning requirements.....	17
Table 7: Description of cleaning types.....	19

Figures

Figure 1: Manitoba Hydro biosecurity program components relevant to the project.....	1
Figure 2: Environmental protection program components	2
Figure 3: Environmental communication reporting structure.....	4
Figure 4: Implementation steps for biosecurity management plan.....	5
Figure 5: Conceptual diagram of controlled access zones, control access points and transition zones	11
Figure 6: Conceptual diagram of a cleaning station.....	21

This page was left intentionally blank.

Definitions

Accumulation – an amount of something that has been collected such as: soil, plant material or crop debris

Agricultural Land – land zoned for agricultural use by the provincial government, a municipality, planning commission or planning district.¹

Biosecurity – the protection of crops and livestock systems and natural environments against the threats of weeds, disease, pests, including invasive species.¹

Controlled Access Point (CAP) – Visually-defined (i.e. signed) entry point where vehicles, equipment and workers enter into and exit from a Project work area identified as a controlled/restricted access zone.

Controlled Access Zone (CAZ) – Agricultural land parcel requiring prescribed and/or specific actions to protect against a biosecurity risk. Two levels of controlled access zones are defined:

- Controlled access zone – low risk: a controlled access zone where a low level risk is identified.
- Controlled access zone – high risk: a controlled access zone where a high level risk is identified.

Frozen Soil Conditions – environmental conditions which result in the top layers of soil being completely frozen and able to support vehicle, equipment and pedestrian travel without rutting or accumulation of soil.

Frozen and Snow-Covered Soil Conditions – environmental conditions which result in the top layers of soil being completely frozen and able to support vehicle, equipment and pedestrian travel without rutting or accumulation of soil, and snow cover is sufficient such that bare soil is not visible including when traversed by vehicles or equipment (i.e. snow prevents direct tire or track contact with the soil surface).

¹ Modified from Manitoba Hydro Agricultural Biosecurity Policy

Invasive Species – 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

Noxious Weed – means a plant that is designated as a tier 1, tier 2 or tier 3 noxious weed in Manitoba's The Noxious Weeds Act and includes the seed of a noxious weed, whether it is still attached to the noxious weed or is separate from it.

Non-Frozen, Bare Soil Conditions – ground conditions that are not frozen adequately to support equipment travel without transfer of dirt, debris or mud. Soil moisture content or wetness play an important role in soil accumulating on vehicles, equipment and boots:

- Dry conditions – soil surface is dry and the potential for soil sticking to vehicles, equipment and boots is reduced; a field check to confirm dry soils is if your pants are dry after kneeling on the soil surface for 10 seconds.
- Moist/wet conditions – soil surface is moist to wet and the potential for soil sticking to vehicles, equipment and boots is increased; a field check to confirm moist or wet soils is if your pants show wetness after kneeling on the soil surface for 10 seconds.

Plan, the – the Biosecurity Management Plan

Project, the – the Birtle Transmission Project

Restricted Access Zone (RAZ) – Area where access is restricted. Vehicles, equipment or workers should not enter a restricted zone or area unless under special circumstances and with prior approval of the landowner/producers and a Manitoba Hydro Environmental Officer.

Rough cleaning – Use of brushing, scraping, and/or compressed air to remove most surface soil, plant material, and foreign matter from clothing, vehicles and equipment.

OR

Remove to the extent possible accumulated soil, plant material or crop debris from openings, tracks, tires and wheels using a hand scraper, shovel, broom, brush or compressed air.

Topsoil – the uppermost layer of soil, which typically contains elevated levels of organic matter. Topsoil is the portion of the soil environment that is of the most concern for biosecurity as it contains weed seeds, pathogens and other pests. It is also the most important soil layer for crops as it contain all of the nutrients and moisture required for growth.

Transition Zone – Visually-defined (i.e., signed) designated areas between controlled access zones (e.g., between “low risk” and “high risk” fields within a land section).

Transition Zones are where workers stop prior to entering an adjacent controlled access, and review and implement required actions. The requirement for Transition Zones between controlled access zones can be mitigated by permitting access from opposing sides of CAZ and not crossing the Transition Zone, choosing a direction of travel that moves from low risk area to high risk area, or the use of continuous matting throughout CAZ.

Work Area – the work area on the right-of-way, approach driveways, marshalling yards, temporary work areas and access trails or other areas approved by Manitoba Hydro. The work area includes agricultural field access approaches and undeveloped road allowances. The work area excludes developed municipal and provincial roads (gravel and paved road surfaces) which may be used to travel to the work area.

This page was left intentionally blank.

1.0 Introduction

1.1 Purpose and objectives

This Biosecurity Management Plan (the Plan) has been developed for the Birtle Transmission project (the Project) to provide guidance to Manitoba Hydro staff and contractors in order to prevent the introduction and spread of weeds and other pests, including invasive species, through Project pre-construction and construction activities.

Development of the Plan fulfills the requirements of Manitoba Hydro's Corporate Biosecurity Policy. The purpose of the corporate policy is to ensure that Manitoba Hydro staff and contractors take necessary precautions to protect the health and sustainability of the agricultural sector. The Plan provides required actions specific to the Project and a detailed implementation plan. This includes direction to individuals who may be required to enter agricultural lands, such as the level of cleaning necessary to reduce the likelihood of soil and manure transport of organisms of concern (diseases, weeds, and other pests, including invasive species). An overview of these two layers in Manitoba Hydro's biosecurity program for the Project is provided in Figure 1.

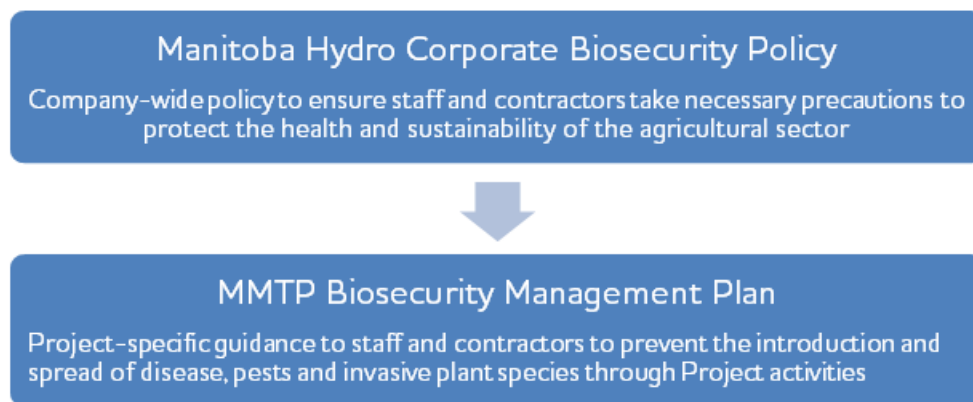


Figure 1: Manitoba Hydro biosecurity program components relevant to the project

1.2 Roles and responsibilities

This section outlines the major roles and responsibilities of those involved in the implementation of the Plan. The Plan forms a component of the Environmental Protection Program (EPP), which provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures for the Project. A visual reference for how the Plan fits into the overall EPP organization structure is provided in Figure 2.

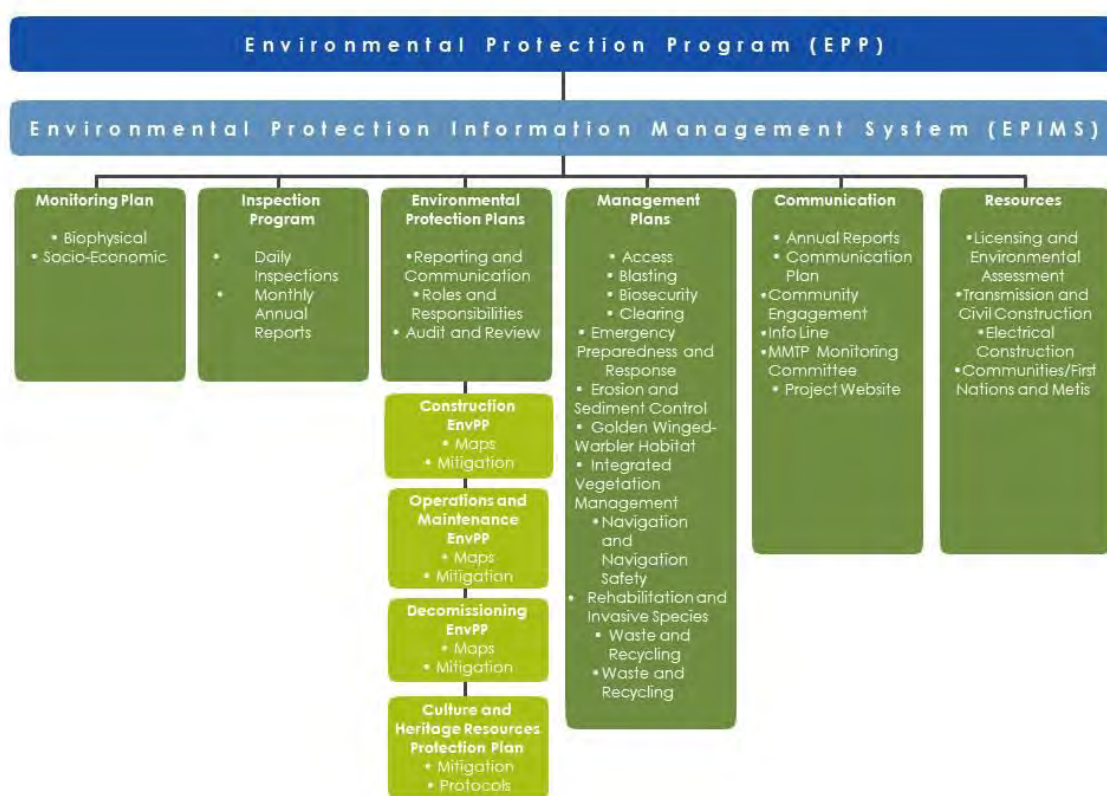


Figure 2: Environmental protection program components

A summary of roles and key responsibilities is found in Table 1. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 3.

Table 1: Roles and responsibilities

Role	Key Responsibilities
Manitoba Hydro	<ul style="list-style-type: none">• Determine potential biosecurity risk locations through consultation with landowners, Manitoba Agriculture and field assessments/soil testing, if necessary.• Conduct a pre-construction weed survey and document baseline weed occurrences observed on the Project right-of-way.• Conduct pre-construction clubroot sampling on lands under cultivation along the Project right-of-way.• Identify and map biosecurity control zones with identified pests such as clubroot, and noxious and invasive weeds, on or adjacent to agricultural lands along the Project right-of-way.• Select appropriate equipment cleaning station locations and types based on identified risk levels along the Project right-of-way.• Obtain approval of the landowner/producers for access to Restricted Access Zones.• Follow Biosecurity Management Plan including employee training, implement cleaning stations, prescribed actions, signage and submit all required cleaning documentation.• Implement post-construction weed management in areas identified with weed occurrences, as per the Plan.• Conduct post construction monitoring and reporting as per Environmental Monitoring Plan using the pre-construction survey report for baseline comparison.• Continue to implement post-construction weed management in areas with unresolved weed occurrences, as per the Plan.• Continue to monitor and report as per Environmental Monitoring Plan using the pre-construction survey report for baseline comparison.
Contractor	<ul style="list-style-type: none">• Shall adhere to Biosecurity Management Plan including employee training, implement cleaning stations, prescribed actions, signage and submit all required cleaning documentation.• Respond and act promptly to resolve if any activities are identified as not in compliance with the BMP or any regulatory requirements.• Supply and maintain all required, signage, cleaning equipment, approved disinfectants.

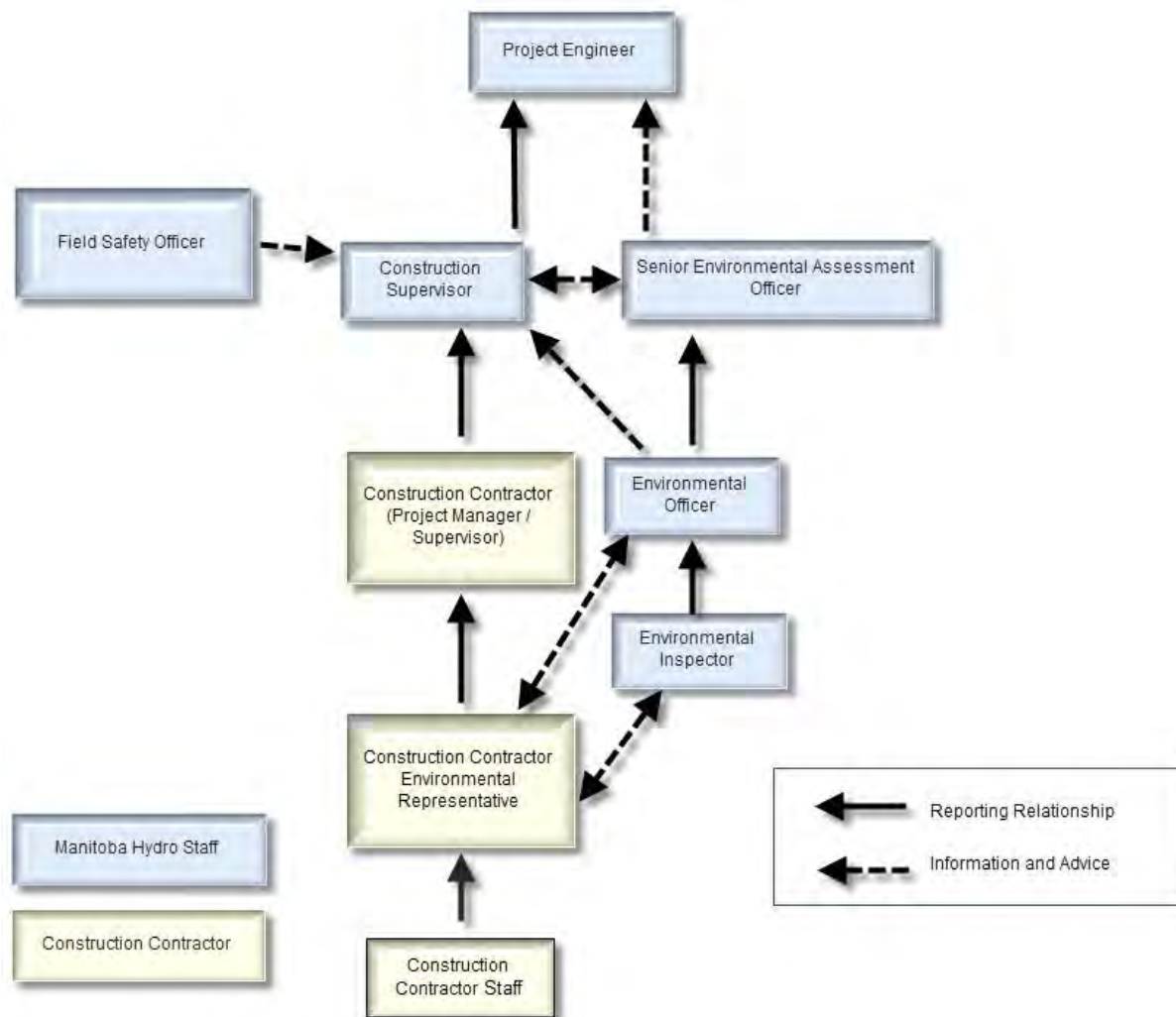


Figure 3: Environmental communication reporting structure

2.0 Biosecurity implementation

The intent of this section is to provide for implementation instructions to Manitoba Hydro and Contractor Project staff. The four key steps to implementing the plan are shown in Figure 4.

Once risks are identified through various means (Section 2.1), control areas are identified (Section 2.2), then risks will be classified into a risk level (Section 2.3), which will in turn be used to determine the nature of actions to be undertaken to manage the risk (Section 2.4). Mitigative actions will be determined and undertaken; the objective of which is to prevent the introduction, establishment, and spread of pests (i.e., weeds and diseases). Prescribed or issue-specific actions will be determined based on assessment of the biosecurity issue.

The implementation of the Plan utilizes a step-wise process; however, these steps will be undertaken at various times throughout the pre-construction and construction phases of the Project. The plan is founded on a principle of adaptive management – if aspects of the plan are found to require modifications for improved effectiveness or if new information becomes available (e.g., more effective control actions, pest outbreaks in the Project area) the Plan and actions will be updated.



Figure 4: Implementation steps for biosecurity management plan

2.1 Biosecurity risk identification

Manitoba Hydro will conduct assessments appropriate to the area in which there is a biosecurity concern based on the results of consultation with Manitoba Agriculture and Sustainable Development staff and/or individual landowners or producers, identified risks of spreading weeds and invasive species or disease pests of concern, and regulatory requirements. Specific actions to be undertaken, as necessary, may include:

- pre-construction meetings and discussion with landowners, including the identification of reasonable site-specific biosecurity concerns, if any
- pre-construction soil sampling program for the presence of clubroot on the ROW, access routes and any other Project infrastructure such as marshalling yards located on cultivated agricultural lands
- pre-construction weed surveys for determination of location and type (i.e., tier 1, tier 2, or tier 3) of weed concerns
- pre-construction inventory of livestock operations to identify risk areas associated with livestock and manure
- pre-construction inventory of waterbodies with aquatic invasive species present

2.1.1 Pre-construction sampling protocol

2.1.1.1 Benchmark sampling for clubroot

Soil Sample collection methodology

The soil sampling collection methodology as describe below was developed from methods established by Manitoba Agriculture.

1. Soil samples should be a composite of one cup scoops of soil taken at each of five points in one field. As clubroot concentration have been found to be the highest at field approaches in infected fields, the samples should be taken within the vicinity of where vehicles, equipment and pedestrians would usually enter into the field. Samples may also be collected when there is a significant change in cropping practice and/or potential for additional field entry. Travelling in a “W” pattern, stop at the five points of the “W” keeping each of these five points at least 20 metres from each other and at least 20 metres from the field edge.

2. Clear away residue from the soil surface, and scoop approximately one cup of the top zero to 10 cm of soil at each site (approximately one litre from all five points combined).

Document collection location with following information:

- Controlled Access Zone reference number
 - legal description of land parcel
 - sample reference number
 - GPS location of last sampling point
 - name of the person who collected the sample
 - date of sampling
3. Air-dry soil samples in paper boxes and send them to approved laboratory for testing.

Sample testing methodology

Soil samples will be submitted to an independent third-party laboratory, such as Pest Surveillance Initiative or Manitoba Agriculture Labs (each a “Testing Laboratory”). The selection of the Testing Laboratory will be at the discretion of Manitoba Hydro. The selected Testing Laboratory will perform conventional Polymerase Chain Reaction analysis on each composite sample submitted for testing, with a view to identifying the presence of clubroot DNA to a confidence level of 10³ (1000 spores/gram).

Test results

Manitoba Hydro will keep all test results in confidence, but will have the right to disclose test results (i) to the landowner to whose property they pertain; (ii) to those persons authorized by the landowner to whose property the test results pertain; (iii) to Manitoba Hydro and to contractors who will be undertaking work on the property, iv) to the Pest Surveillance Initiative; v) to Manitoba Agriculture or other Regulatory Authorities.

Sampling crew protocol

- If it is (i) reasonably practicable and (ii) safe, sampling crews will avoid parking motorized vehicles in field accesses.
- Sampling crews will travel by foot on lands to be sampled.

- Sampling crews will either (i) spray all footwear using an approved disinfectant solution prior to crossing a change in Controlled Access Zone, or (ii) wear disposable boot covers over footwear, which will be changed between each sampling site.
- Disposable gloves will be worn for soil sampling and will be changed at each sampling site.
- Hand tools used during the sampling process will be Rough Cleaned, and sprayed with a 1% Virkon solution upon leaving each sampling site.

2.1.1.2 Weed surveys

The weed survey methodology as described below was developed from methods established by Adams et al. (2009).

Weed survey data collection methodology

- Species will be recorded in field books, and GPS coordinates and photographs will be captured at each location.
- Environmental monitoring of these sites will involve recording species composition and determining species densities, if movement occurs into the Project right of way from roadside ditches.
- Weed density distribution will follow Adams et al. (2009) and involve a quantitative description of species abundance. Species abundance codes range from none to continuous occurrence of plants with a distinct linear edge.
- All legislated weeds and invasive plant species will be documented and phenology will be recorded (i.e., flowering, fruiting, seeding, vegetative).
- A site sketch will be completed for infestations into the Project right of way and photographs will be taken.

Sampling crew protocol

- If it is (i) reasonably practicable and (ii) safe, sampling crews will avoid parking motorized vehicles in field accesses.
- Sampling crews will travel by foot on lands to be sampled.

- Sampling crews will either (i) spray all footwear using an approved disinfectant solution, or (ii) wear disposable boot covers over footwear, which will be changed between each sampling site on agricultural land.
- At selected sites along the right of way, pre-construction roadside surveys will be conducted (e.g., bordering agricultural lands) to establish a baseline for future monitoring comparison.
- From the roadside, ditches will be traversed on foot to document species presence and record infestations into adjacent lands.

2.1.1.3 Livestock operations

Various types of livestock operations were identified during the environmental assessment process (Manitoba Hydro, 2015). The location and type of these have been inventoried and mapped and will be used by Manitoba Hydro to determine biosecurity risk areas and levels related to livestock operations.

2.2 Agricultural land parcel zoning and access control

Manitoba Hydro has developed a construction environmental protection plan mapbook, including the identification of controlled access points, transition zones and the classification of control and restricted zones for agricultural land parcels.

Different levels of access restriction and required actions, are assigned to controlled access zones and restricted access zones. Controlled access points are visually identifiable (i.e., signed) points used as access points into controlled/restricted access zones in Project work areas, and are used to control entry into and exit from these zones. Transition Zone are designated areas between controlled access zones (e.g., between “low risk” and “high risk” fields within a land section). These zones and controls are further defined in Table 2.

Table 2: Biosecurity zones and control points

Zone or point identification	Definition
Controlled Access Point	Visually-defined (i.e., signed) entry point where vehicles, equipment and workers enter into and exit from a Project work area identified as a controlled/restricted access zone.
Transition Zone	Visually-defined (i.e., signed) designated areas between controlled access zones (e.g., between “low risk” and “high risk” fields within a land section). Transition

Table 2: Biosecurity zones and control points

Zone or point identification	Definition
	zones are where workers stop prior to entering an adjacent controlled access, and review and implement required actions.
Controlled Access Zone	<p>Agricultural land parcel requiring prescribed and/or specific actions to protect against a biosecurity risk. Two levels of controlled access zones are defined:</p> <ul style="list-style-type: none">• Controlled access zone – low risk: a controlled access zone where a low level risk is identified.• Controlled access zone – high risk: a controlled access zone where a high level risk is identified.
Restricted Access Zone	Area where access is restricted. Vehicles, equipment or workers should not enter a restricted zone or area unless under special circumstances and with prior written approval of the landowner/producers and a Manitoba Hydro Environmental Officer.

The requirement for Transition Zones between controlled access zones can be mitigated by permitting access from opposing sides of CAZ and not crossing the Transition Zones, choosing a direction of travel that moves from low risk area to high risk area, or the use of continuous matting throughout CAZ.

A conceptual diagram of controlled access points, transition zones and controlled access zones (low and high risk) is presented in Figure 5.

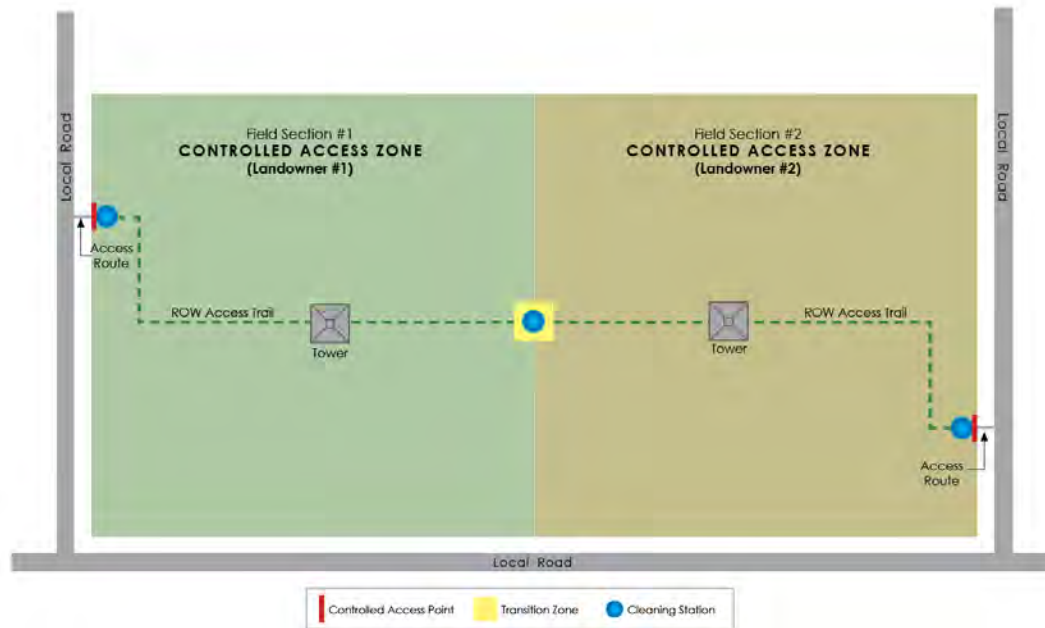


Figure 5: Conceptual diagram of controlled access zones, control access points and transition zones

2.3 Biosecurity risk classification

Manitoba Hydro will conduct a classification of the identified biosecurity risks for the Project based on the level of risk, in terms of the potential consequences associated with not undertaking risk mitigation actions. Risks will be classified as Low or High, according to the definitions provided in Table 3. Generally, the risk of soil borne biosecurity issues (i.e., weed seeds in soil, soil borne pathogens [e.g., clubroot, anthrax]) decreases according to the following soil conditions: non-frozen, bare soil – moist/wet > non-frozen, bare soil – dry > frozen, bare soil > frozen, snow-covered soil.

Known biosecurity risks for the Project are listed in Table 4, including the classified risk level for each identified risk. Any mapping produced will not be labelled with the name of the specific concern (i.e. clubroot, PED, Anthrax) for the controlled access zone to protect confidentiality concerns.

Weeds designated as tier 1, tier 2 and tier 3 noxious weeds under the Noxious Weeds Regulation (42/2017) is found in Appendix A.

Table 3: Biosecurity risk levels

Risk level	Risk definition
Low	A low risk to biosecurity is one in which may result in the introduction of new concerns or increased prevalence where concerns already exist if appropriate mitigative actions are not undertaken. In the case of low risks, the potential introduction or increased prevalence of a biosecurity concern is not anticipated to result in immediate or substantive damage to crops or livestock.
High	A high risk to biosecurity is one in which immediate and/or substantive damage could occur to crops or livestock if appropriate mitigative actions are not applied. These damages may occur from the introduction of new pests or the increase in prevalence of existing pests in a given area.
WC (Risk level modifier)	<p>Winter Conditions (WC) is a risk level modifier that may be applied (when directed by Manitoba Hydro) to low or high risk sites where the activity is less likely to result in the introduction of new concerns or increased prevalence where concerns already exist when the soil is frozen or frozen, snow-covered. This risk level modifier only applies to activities that are not likely to create subsurface disturbance such as pedestrian, vehicle and equipment travel activity, if any soil accumulates on the boots, vehicles or equipment the applicable low or high risk cleaning procedures apply. This risk level modifier does not apply to construction activities that create subsurface disturbance such as grubbing, excavation, drilling, foundation installation, clearing, conductor stringing, etc.</p> <p>Winter Conditions (WC) is a risk level modifier that may be applied (when directed by Manitoba Hydro) to low or high risk sites where the activity is less likely to result in the introduction of new concerns or increased prevalence where concerns already exist when the soil is frozen or frozen, snow-covered. This risk level modifier only applies to activities that are not likely to create subsurface disturbance such as pedestrian, vehicle and equipment travel activity, if any soil accumulates on the boots, vehicles or equipment the applicable low or high risk cleaning procedures apply. This risk level modifier does not apply to construction activities that create subsurface disturbance such as grubbing, excavation, drilling, foundation installation, clearing, conductor stringing, etc.</p>

Table 4: Biosecurity risk classification matrix

Biosecurity issue	Risk level		
	Non-frozen soil	Frozen soil	Frozen, snow-covered soil
Agricultural lands where no weeds, soil borne crop diseases, manure spreading or active livestock settings have been identified that present a substantial risk to biosecurity	Low	WC ¹ Low ²	WC ¹ Low ²
Specific sites identified as Tier 1 Noxious weeds as defined in the Noxious Weeds Regulation.	High	High	Low
Specific sites identified as Tier 2 or 3 Noxious weeds as defined in the Noxious Weeds Regulations and present a substantial biosecurity risk that the project activities will transfer the identified issue from one area to another.	Low	Low	Low
Laboratory testing has indicated clubroot spores are present	High	WC ¹ High ²	WC ¹ High ²
Manitoba Hydro will designate an operation with an existing and established biosecurity management plan as High risk. Manitoba Hydro will strive to meet the existing farm level biosecurity measures in these instances.	High		
Manitoba Hydro will designate active livestock settings (e.g., ILOs, active grazing areas) as High risk.	High		
Agricultural lands on which manure has been spread.	High	High	WC ¹ High ²

Note 1: This risk level modifier only applies to activities that create **no** subsurface

Table 4: Biosecurity risk classification matrix

Biosecurity issue	Risk level		
	Non-frozen soil	Frozen soil	Frozen, snow-covered soil

disturbance such as vehicle travel, inspection, surveying, etc.

Note 2: This risk level applies to activities that create subsurface disturbances such as grubbing, excavation, drilling, foundation installation, clearing, conductor stringing, etc.

2.4 Risk mitigation actions

2.4.1 Project mobilization

The contractor must ensure that all equipment shall arrive at the Project work area clean of soil and plant material to the satisfaction of the Manitoba Hydro Environmental Inspector/Officer. Any equipment that arrives dirty will not be permitted entry into the Project work area or adjacent lands until it has been cleaned. The Vehicle and Equipment Cleaning Field Log (Appendix B - Field Activity and Inspection Forms) will be completed for all equipment entering the work site. See Section 2.3.4 for more information on equipment cleaning requirements.

2.4.2 Prescribed actions

Prescribed actions to prevent or reduce the potential for an increased biosecurity risk as a result of Project activities are listed below according to the assessed risk level.

Winter conditions modifier (WC) No prescribed mitigative actions are required for:

- pedestrians, vehicles and equipment travelling through;
- construction activities such as clearing and non-excavated foundation installation, or other activities as determined by Manitoba Hydro Environmental Officer

that occur within controlled access zones when the WC risk level modifier is applied to low or high risk sites. This means that establishment of cleaning stations, cleaning, documentation of cleaning and/or inspection, and disinfection is not required at the areas where the WC risk level modifier is applied. However, if any soil, manure, plant material and foreign matter accumulates on the boots, vehicles or equipment the applicable low or high risk prescribed actions (as described below) apply.

Prescribed mitigative actions, as prescribed below, are required for:

- construction activities that create subsurface disturbance such as grubbing, excavation, drilling, excavated foundation installation, clearing, conductor stringing anchor installation, etc.

that occur within controlled access zones even when the WC risk level modifier is applied to low or high risk sites. This means the establishment of cleaning stations, cleaning, documentation of cleaning and inspection, and disinfection is required at these areas even if the WC risk level modifier is applied. This is because soil, manure, plant material and foreign matter is expected to accumulate during these construction activities.

Low risk

The following are prescribed mitigative actions for controlled access zones classified as Low Risk :

1. Inspect to ensure clothing, matting, vehicles and equipment is clean of soil, manure, plant material and foreign matter prior to entering agricultural lands.
2. When leaving agricultural lands, visually inspect clothing, matting, vehicles, and equipment for seeds, soil, or manure and if required, rough clean all surfaces prior to leaving the land. Rough cleaning (i.e. brushing, scraping, and/or compressed air) will remove most surface soil, plant material, and foreign matter from clothing, vehicles and equipment.
3. Complete the Biosecurity Cleaning Record anytime cleaning is required prior to entry (as per #1 above) and anytime clothing, matting, vehicles and equipment exits a controlled access zone.

Table 5: Low risk equipment cleaning requirements

Equipment	Cleaning requirements
Footwear	Rough clean
Vehicles	Rough clean
Matting	Rough clean
Equipment	Rough clean

High risk

The following are prescribed actions for controlled access zones classified as High Risks:

1. If possible, avoid the immediate area of the biosecurity risk (e.g., use alternate access to avoid active livestock grazing areas, identified weed infestations, avoid travelling through High Risk controlled access zones).

2. If possible, schedule activities to occur when ground conditions are more favourable (i.e., frozen or frozen and snow-covered or utilize matting and geotextile underlayment,).
3. Inspect to ensure clothing, matting, vehicles and equipment is clean of soil, manure, plant material and foreign matter prior to entering controlled access zones.
4. When leaving the controlled access zone, visually inspect clothing, matting, vehicles and equipment for soil, manure, plant material or foreign matter and if required, rough clean all surfaces prior to leaving the land. Brushing and/or scraping will remove most surface soil, plant material, and foreign matter from clothing, matting, vehicles and equipment.
5. Matting, vehicles and equipment may require fine cleaning to remove remaining soil, manure, plant material and foreign matter (see Table 6). Fine cleaning will be conducted using high pressure water, steam or compressed air to remove remaining soil, manure, plant material and foreign matter.
6. Fine cleaning and disinfecting of matting and equipment only, may be completed off site, if the matting or equipment is transported directly to a Manitoba Hydro approved or commercial wash facility.
7. In cases where there is a risk of spreading soil to agricultural lands (such as vehicle or equipment tires/tracks), pressure washing/steaming/compressed air cleaning must occur before leaving the controlled access zone.
8. After fine cleaning, disinfection of matting, vehicles and equipment through the use of an approved disinfectant spray that is applied to all surfaces that have been in contact with soil, manure, plant material and foreign matter is required.
9. Only disinfectants approved by Manitoba Hydro are to be utilized.
10. To clean footwear, use a brush or scraper to remove soil, manure, plant material and foreign matter. Apply disinfectants approved by Manitoba Hydro. Alternatively, use disposable footwear booties or change dirty footwear for clean footwear when leaving the controlled access zone.
11. Complete the Biosecurity Cleaning Record anytime cleaning is required prior to entry (as per #3 above) and anytime clothing, matting, vehicles and equipment exits a controlled access zone.

Table 6: High risk equipment cleaning requirements

Equipment	Cleaning requirements
Footwear	Rough clean and disinfectant spray

Table 6: High risk equipment cleaning requirements

Equipment	Cleaning requirements
Vehicles	Rough, fine clean and disinfectant spray
Matting	Rough, fine clean and disinfectant spray
Equipment	Rough, fine clean and disinfectant spray

Cleaning requirements for high risk areas must be carried out before moving between controlled access zones (i.e., landowner boundaries with a change in biosecurity risk and/or risk level, or change in land use). If there are continuous controlled access zones classified as high risk and where equipment will travel continuously along the right-of-way, the requirement will be to fine clean and spray with a disinfectant at the established controlled access point of the entire defined high risk area, and to complete the specified type of cleaning in designated transition zones between controlled access zones, if applicable. Controlled access points and transition zones are identified in the Biosecurity Management Plan Mapbook and any subsequent amendments.

Additional details on cleaning and cleaning areas/stations are found in Section 2.4.4.

2.4.3 Specific actions

As part of the adaptive management planning, it is understood that currently unknown and site-specific biosecurity issues and concerns yet to be identified may require assessment and action to manage risk associated with Project activities. For example, if during the construction phase a “new” biosecurity issue or threat is determined to occur in the Project area, the issue or threat will be reviewed by Manitoba Hydro and changes will be made to the Plan in order to appropriately protect against biosecurity risk. It is not possible to consider all potential situations or risks, therefore actions may need to be developed, as required and as appropriate, in these situations. In these cases, Manitoba Hydro Environmental Officer will discuss with Contractor Environmental Representative and an appropriate course of action will be developed. The issue and specific actions required will be documented by Manitoba Hydro, and will need to be followed up by the contractor(s) and their personnel.

If existing agricultural operation biosecurity measures exist, Project staff and contractors will strive to meet the requirements of the agricultural operation when access is required. Again, these specific actions will be documented by Manitoba Hydro and will need to be implemented by contractor(s) and their personnel.

In the event of an emergency situations (e.g., injured personnel, etc.), Project work areas may have to be accessed by emergency response personnel without adherence to mitigation actions.

2.4.4 Equipment cleaning requirements

Equipment cleaning is a critical component of the biosecurity management plan. Vehicles and equipment being used in agricultural fields during all project phases (i.e., pre-construction, clearing, construction, commissioning) must arrive at site clean and free of aquatic invasive species, soil, vegetative matter, and require cleaning during work on the Project, as discussed above, and described in further detail below.

2.4.4.1 Types of cleaning

Different types of cleaning of matting, vehicles and equipment are required as determined by the level of risk and the nature of the concern. The different types of cleaning that are required for the Project are presented in Table 7.

Table 7: Description of cleaning types

Cleaning type	Description
Rough clean	Remove to the extent possible accumulated soil, plant material or crop debris from openings, tracks, tires and wheels using a hand scraper, shovel, broom, brush or compressed air. This level of cleaning must occur on-site before leaving the selected cleaning location or the work area. Personnel cleaning the equipment must complete a visual inspection for accumulated soil and plant material prior to leaving the cleaning station.
Fine clean	Fine clean means high pressure water wash, high pressure air wash or high pressure steam wash to remove accumulated soil, plant material or crop debris. Wash matting, vehicles, and equipment paying extra attention to areas where soil or plant debris is likely to accumulate (i.e., tires or undercarriage). For hydrovac trucks, cleaning includes the inside of the tank and any implement in contact with soil. Prior to fine cleaning, matting, vehicles and equipment should receive a rough clean.
Disinfectant spray	Use disinfectant spraying as the final cleaning phase when working on controlled access zones where there is a confirmed high risk of encountering and spreading viruses, diseases that can be effectively treated with a disinfectant spray. Spray tracks, openings, tires, wheels and implements that may come in contact with soil, plant material or crop debris with an approved disinfectant solution. Disinfectant sprays should be used in accordance with label directions and applied according to the information presented in

Table 7: Description of cleaning types

Cleaning type	Description
	Section 2.3.4. Foot traffic may also utilize disposable boots. Hydrovac truck cleaning includes the inside of the tank and any implement that came into contact with soil or plant material or crop debris.

2.4.4.2 Cleaning stations

Cleaning area/station locations (see Figure 6 below) will be identified prior to construction by Manitoba Hydro and be established by the contractor(s) at applicable controlled access points and transition zones and not within road allowance. Cleaning stations will be established to address the determined risk level and the associated type of cleaning prescribed. There are two types of cleaning stations:

1. Low Risk Cleaning Station – contains equipment for rough cleaning and when required disinfecting spray.
2. High Risk Cleaning Station – contains equipment for rough and fine cleaning along with disinfecting spray.

Cleaning stations will have signs placed appropriately onsite by the contractor(s) to notify Project personnel of the cleaning station location and type of cleaning that should be conducted. Sediment released from the washing process will be fully contained (i.e., sump pit, berm).

When cleaning station sump pits, sump materials (dirt, water and disinfectant solution from washing activities) must be disposed of at an MH approved disposal facility.

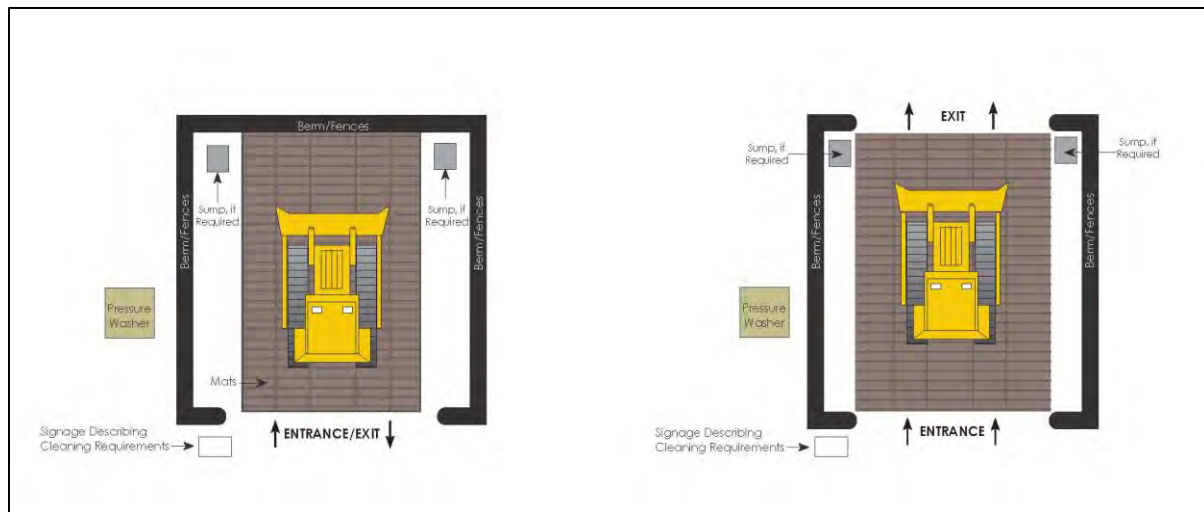


Figure 6: Conceptual diagram of a cleaning station

2.4.4.3 Disinfectants

Manitoba Hydro approves the use of disinfectants on Manitoba Hydro projects. Approved disinfectants for this Project include Virkon, Accel and Synergize. Mixing and use of these disinfectants are discussed below.

Virkon

Virkon is approved by Manitoba Hydro, for use in the prevention of the transport of invasive organisms in soil and manure onto or off of agricultural land. Please refer MSDS sheets prior to use for safe handling procedures. For disinfection, staff and contractors are to use Virkon 5 gram tablets, mixed and applied in accordance with the manufacturer's specifications. Virkon is biodegradable and no further treatment of the waste solution is required. The process for cleaning equipment and disinfecting is as follows:

- a) Scrape off all heavy soil accumulations and utilize pressure washing, steaming or compressed air to clean all surfaces that have been in contact with the soil.
- b) Virkon disinfectant is to be mixed as one tablet for every 500 ml of water for above freezing weather conditions.
- c) Virkon disinfectant is to be mixed as one tablet for every 500 ml of solution (400 ml of water and 100 ml of propylene glycol, pre-mix prior to adding disinfectant) for below freezing weather conditions.
- d) To ensure maximum effectiveness, mixed solution has a 7-day shelf life or when pink color fades and solution begins to appear milky.

- e) Virkon must be applied by spraying or the use of a mop, sponge or cloth to evenly apply onto the equipment surface that has been in contact with the soil. A minimum wetted contact time of 10 minutes is required for all surfaces that have been in contact with soil.
- f) Any waste solution associated with disinfection is to remain on the field where it was used. It must be disposed of at least ten metres from a drain or drainage ditch.
- g) Do not re-use a solution which has been used to soak contaminated tools or equipment.

Accel

Accel is approved by Manitoba Hydro, for use in the prevention of the transport of invasive organisms in soil and manure onto or off of agricultural land. For disinfection, staff and contractors are to use Accel mixed and applied in accordance with the manufacturer's specifications. Please refer MSDS sheets prior to use for safe handling procedures. Accel is biodegradable and no further treatment of the waste solution is required. The process for cleaning equipment and disinfecting is as follows:

- a) Scrape off all heavy soil accumulations and utilize pressure washing, steaming or compressed air to clean all surfaces that have been in contact with the soil.
- b) Accel disinfectant is to be mixed at 1:40, 100 ml of concentrate per 4 L of water for above freezing weather conditions. A minimum wetted contact time of 5 minutes is required for all surfaces that have been treated.
- c) For below freezing weather conditions, Accel is not recommended due to 40 minute minimum wetted contact time.
- d) To ensure maximum effectiveness, mixed solution has a 30-day shelf life.
- e) Accel must be applied by spraying or the use of a mop, sponge or cloth to evenly apply onto the equipment surface that has been in contact with the soil.
- f) Any waste solution associated with disinfection is to remain on the field where it was used. It must be disposed of at least ten metres from a drain or drainage ditch.
- g) Do not re-use a solution which has been used to soak contaminated tools or equipment.

Synergize

Synergize is approved by Manitoba Hydro, when requested by the landowner for use in the prevention of the transport of invasive organisms in manure.

Synergize has known aquatic environmental impacts on aquatic fish invertebrates. The application of the product will be contained in the field away from any watercourses to mitigate environmental impacts. Disinfecting with this product shall be done on the field away from any watercourse and leftover product will be disposed of at an approved facility. Please refer MSDS sheets prior to use for safe handling procedures. The process for cleaning equipment and disinfecting is as follows:

- a) Scrape off all heavy soil accumulations and utilize pressure washing, steaming or compressed air to clean all surfaces that have been in contact with the soil.
- b) Synergize is to be mixed with a ratio of 4 ml Synergize to 1 L water for above freezing weather conditions.
- c) Synergize is to be mixed with a ratio of 8 ml Synergize to 1 L solution (900 ml of water and 100 ml of propylene glycol, pre-mixed prior to adding disinfectant) for below freezing weather conditions.
- d) To ensure maximum effectiveness, mixed solution has a maximum 7-day shelf life.
- e) Synergize must be applied by spraying or the use of a mop, sponge or cloth to evenly apply onto the equipment surfaces that have been in contact with the soil. A minimum wetted contact time of 10 minutes is required for all surfaces that have been treated.
- f) Do not re-use a solution which has been used to soak contaminated tools or equipment.
- g) Any leftover product will be disposed of at an approved facility.

Propylene glycol

For the use of above-described solutions during freezing weather conditions, pure United States Pharmacopeia (USP) or food-grade propylene glycol must be utilized in the disinfectant solution. Propylene glycol improves spraying by preventing freezing of solution at low temperatures and fragmenting the solution drops into smaller particles, allowing for a better distribution and coverage of the sprayed surface. Propylene glycol is biodegradable, water-soluble, and is safe for humans.

2.5 Signage

Contractors will be required to supply and install signage prior to commencement of pre-construction and construction activities to notify and inform contractor's field personnel and Manitoba Hydro staff of controlled access zones. Signage will be installed at all

controlled access points where personnel are required to enter into and exit from a controlled access zone, Signage will have to differentiate between a Controlled Access Zone and a Restricted Access Zone. At the Controlled Access Point(s), or transition zone(s) will be established with signage installed to inform personnel of cleaning requirements.

Signage is required as follows:

- Controlled Access Point or Transition Zone signage must contain:
 - Indication to Stop
 - Cleaning requirements as applicable to current Controlled Access Zone risk rating.

2.6 Training

Manitoba Hydro and the contractor(s) each have responsibility to ensure that their respective personnel are appropriately trained to carry out their role in the protection of biosecurity, and that proper documentation and communication is being conducted throughout the Project. Manitoba Hydro has prepared Environmental Management Practices Guides (Appendix C) for variety of topics covered in this plan for use by Project field staff

Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and environmental requirements with all of its Contractors at a supervisory level. A summary of this Biosecurity Management Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.

Manitoba Hydro will also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth.

It is a mandatory requirement that the contractor(s) provide all personnel involved in construction work in the field or involved in supervision of those personnel (i.e., project manager, supervisors) Project-specific Biosecurity Management Plan orientation training prior to starting work. This training will present the objectives of the plan, roles and responsibilities, biosecurity issues and required actions, and documentation requirements. A training attendance record must be maintained by the contractor(s) and submitted to Manitoba Hydro Environmental Protection Information Management System.

2.7 Documentation

Once the matting, vehicles and equipment has been cleaned in accordance with the assigned risk level, the Cleaning Record Form will be filled out and signed off by the contractor personnel managing the cleaning station or the operator completing the cleaning. All Cleaning records will be digitized into an Excel Spreadsheet and submitted by the Contractor on a weekly basis to the Manitoba Hydro Environmental Protection Information Management System by the Contractor. Contractor will maintain all original copies until Project completion and will be transferred to Manitoba Hydro upon request.

This page was left intentionally blank.

3.0 Communication

In addition to the plan, mapbook and accompanying landowner information spreadsheet form critical components of communicating biosecurity requirement to personnel working on the Project. Manitoba Hydro will provide the contractor(s) the construction environmental protection plan mapbook visually identifying biosecurity information:

- Identified controlled access zones, and preliminary risk levels, as appropriate.
- Proposed access locations, controlled access points and transition areas, where cleaning areas/stations will be located.

Locations of controlled access points, transition areas and cleaning station areas/stations will be finalized by Manitoba Hydro in conjunction with the contractor(s). Any contractor-proposed additions, location modifications or plan requirement revisions will be submitted in writing to Manitoba Hydro and include a map containing legal land description and GPS location. Any Manitoba Hydro-required revisions to the plan will be communicated to the contractor's project manager for distribution to project staff.

This page was left intentionally blank.

4.0 Monitoring and follow-up

Manitoba Hydro will monitor the work carried out under the plan. Each contractor's work will be monitored to assess public and worker safety, permitting requirements and approvals, environmental concerns, completion schedules and adherence to, and compliance with, commitments made in the plan.

Manitoba Hydro environmental inspectors / officers and construction inspectors will be responsible for conducting inspections and reviewing the cleaning records and logs to ensure that prescribed actions and measures identified within this plan are being followed.

Inspections will involve assessing all vehicles, equipment and pedestrian access at controlled access points or transition areas using the cleaning standards assessment guide in Appendix D. Inspections will also include reviewing logs, along with assessing cleaning equipment availability and disinfectant at the cleaning stations. If the inspection determines that documentation, adherence to prescribed actions, cleaning station equipment and/or setup or any other activity is not to the satisfaction of Manitoba Hydro or does not meet the minimum expectations of this plan, measures to remedy the deficiencies will be communicated directly to onsite contractor staff. If deficiencies are not remedied in a timely manner according to Manitoba Hydro, measures will be implemented through corrective action report, environmental improvement or stop work orders to ensure compliance and overall project success.

This page was left intentionally blank.

5.0 References

Adams, B.W., G. Ehler, C. Stone, M. Alexander, D. Lawrence, M. Willoughby, D. Moisey, C. Hincz, A. Burkinshaw+, J. Carlson and K France. 2009. Range Health Assessment for Grassland, Forest and Tame Pasture. Pub. No. T/044. Revised April 2009. Alberta Environment and Sustainable Resource Development. Edmonton, AB. 152 pp. Website: <http://esrd.alberta.ca/lands-forests/grazing-range-management/documents/RangelandHealthAssessmentforGrasslandForestTamePasture-Revised-Apr2009.pdf>.

Manitoba Agriculture. No date [a]. Biosecurity Management on Agricultural Land for the Energy and Transportation Industries. Available from <https://www.gov.mb.ca/agriculture/crops/biosecurity-energy-and-transportation.html> (accessed December 2017).

Manitoba Agriculture. No date [b]. Clubroot Distribution in Manitoba. Available from <https://www.gov.mb.ca/agriculture/crops/plant-diseases/clubroot-distribution-in-manitoba.html> (accessed December 2017).

Manitoba Agriculture. No date [c]. Animal health - Anthrax. Available from <http://www.gov.mb.ca/agriculture/animals/animal-health/anthrax.html> (accessed December 2017).

Manitoba Government. 2017. The Noxious Weeds Act. URL: <http://web2.gov.mb.ca/laws/statutes/ccsm/n110e.php>.

Manitoba Hydro 2015. Assessment of Potential Environmental Effects on Agriculture. Chapter 15. Manitoba – Minnesota Transmission Project Environmental Impact Statement. September 2015.

This page was left intentionally blank.

Appendix A

Noxious Weeds Regulation Species List

This page was left intentionally blank.

Appendix A: Noxious weeds regulation species list

Designated Tier 1 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Amaranth, Palmer	<i>Amaranthus palmeri</i>	All areas of the province outside the Municipality of Bifrost-Riverton and the Rural Municipalities of Armstrong, Fisher, Gimli, Rockwood, St. Andrews and St. Clements
Bartsia, red	<i>Odontes vernus</i>	Whole province
Crupina, common	<i>Crupina vulgaris</i>	Whole province
Cupgrass, woolly	<i>Eriochloa villosa</i>	Whole province
Goatgrass, jointed	<i>Aegilops cylindrical</i>	Whole province
Hawkweed, orange	<i>Hieracium aurantiacum</i>	Whole province
Hogweed, giant	<i>Heracleum mantegazzianum</i>	Whole province
Hound's-tongue	<i>Cynoglossum officinale</i>	Whole province
Knapweed, diffuse	<i>Centaurea diffusa</i>	Whole province
Knapweed, Russian	<i>Acroptilon repens</i>	Whole province
Knapweed, spotted	<i>Centaurea stoebe</i>	Whole province
Knapweed, squarrose	<i>Centaurea virgata</i>	Whole province
Knotweed, Japanese	<i>Fallopia japonica</i>	Whole province
Mile-a-minute weed	<i>Persicaria perfoliata</i>	Whole province
Mustard, garlic	<i>Allaria petiolata</i>	Whole province
Patterson's curse	<i>Echium plantagineum</i>	Whole province
Pigweed, smooth	<i>Amaranthus hybridus</i>	Whole province
Saltcedar	<i>Tamarix spp.</i>	Whole province
Star-thistle, yellow	<i>Centaurea solstitialis</i>	Whole province
Tussock, serrated	<i>Nassella trichotoma</i>	Whole province
Waterhemp, tall	<i>Amaranthus turbriculatus</i>	Whole province

Designated Tier 2 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Alyssum, hoary	<i>Berteroa incana</i>	Whole province
Baby's-breath	<i>Gypsophila paniculata</i>	Whole province
Bartsia, red	<i>Odontes vernus</i>	Municipality of Bifrost-Riverton and the Rural Municipalities of Armstrong, Fisher, Gimli, Rockwood, St. Andrews and St. Clements
Bouncingbet	<i>Saponaria officinalis</i>	Whole province
Brome, downy	<i>Bromus tectorum</i>	Whole province
Brome, Japanese	<i>Bromus japonicas</i>	Whole province
Campion, bladder	<i>Silene vulgaris</i>	Whole province
Chamomile, scentless	<i>Matricaria perforata</i>	Whole province
Common reed, invasive	<i>Phragmites australis australis</i>	Whole province
Daisy, ox-eye	<i>Leucanthemum vulgare</i>	Whole province
Nutsedge, yellow	<i>Cyperus esculentus</i>	Whole province
Scabious, field	<i>Knautia arvensis</i>	Whole province
Spurge, Cypress	<i>Euphorbia cyparissias</i>	Whole province
Spurge, leafy	<i>Euphorbia esula</i>	Whole province
St. John's-wort	<i>Hypericum perforatum</i>	Whole province
Tansy, common	<i>Tanacetum vulgare</i>	Whole province
Thistle, nodding	<i>Carduus nutans</i>	Whole province
Toadflax, Dalmatian	<i>Linaria dalmatica</i>	Whole province

Designated Tier 3 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Absinth	<i>Artemisia absinthum</i>	Whole province
Barberry	<i>Berberis vulgaris</i>	Whole province
Barley, foxtail	<i>Hordeum jubatum</i>	Whole province
Bellflower, creeping	<i>Campanula rapunculoides</i>	Whole province
Buckthorn, European	<i>Rhamnus frangula</i>	Whole province
Burdock, common	<i>Arctium minus</i>	Whole province
Burdock, greater	<i>Arctium, lappa</i>	Whole province
Burdock, woolly	<i>Arctium, tomentosum</i>	Whole province
Campion, biennial	<i>Silene dioica</i>	Whole province
Catchfly, night-flowering	<i>Silene noctiflora</i>	Whole province
Cleavers	<i>Galium aparine</i>	Whole province
Cleavers, false	<i>Galium spurium</i>	Whole province
Cockle, white	<i>Silene alba</i>	Whole province
Dandelion	<i>Taraxacum officinale</i>	Whole province
Dodder	genus <i>Cuscuta</i>	Whole province
Fleabane, Canada	<i>Conyza canadensis</i>	Whole province
Flixweed	<i>Descurainia Sophia</i>	Whole province
Hawk's-beard, narrow-leaved	<i>Crepis tectorum</i>	Whole province
Hemlock, poison	<i>Conium maculatum</i>	Whole province
Hemp-nettle	<i>Galeopsis tetrahit</i>	Whole province
Hoary-cress	<i>Cardaria draba</i>	Whole province
Jimsonweed	<i>Datura stromonium</i>	Whole province
Kochia	<i>Kochia scoparia</i>	Whole province
Lamb's quarters	<i>Chenopodium album</i>	Whole province
Lettuce, prickly	<i>Lactuca seriola</i>	Whole province
Milkweed, common	<i>Asclepias syriaca</i>	Whole province
Milkweed, showy	<i>Aslepias speciosa</i>	Whole province
Mustard, wild	<i>Sinapis arvensis</i>	Whole province
Nightshade, American black	<i>Solanum americanum</i>	Whole province
Nightshade, cutleaf	<i>Solanum triflorum</i>	Whole province
Nightshade, hairy	<i>Solanum sarachoides</i>	Whole province
Parsnip, wild	<i>Pastinaca sativa</i>	Whole province
Ragweed, common	<i>Ambrosia artemisifolia</i>	Whole province

Designated Tier 3 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Ragweed, false	<i>Iva xanthifolia</i>	Whole province
Ragweed, giant	<i>Ambrosia trifida</i>	Whole province
Sow-thistle, annual	<i>Sonchus oleraceus</i>	Whole province
Sow-thistle, perennial	<i>Sonchus arvensis</i>	Whole province
Sow-thistle, spiny annual	<i>Sonchus asper</i>	Whole province
Stinkweed	<i>Thlaspi arvense</i>	Whole province
Stork's bill	<i>Erodium cicutarium</i>	Whole province
Thistle, bull	<i>Cirsium vulgare</i>	Whole province
Thistle, Canada	<i>Cirsium arvense</i>	Whole province
Thistle, Russian	<i>Salsola pestifer</i>	Whole province
Toadflax, yellow	<i>Linaria vulgaris</i>	Whole province
Water hemlock, bulb-bearing	<i>Cicuta bulbifera</i>	Whole province
Water hemlock, northern	<i>Cicuta virosa</i>	Whole province
Water hemlock, spotted	<i>Cicuta maculate</i>	Whole province
Water hemlock, western	<i>Cicuta douglasii</i>	Whole province
Whitetop, hairy	<i>Cardaria pubescens</i>	Whole province
Whitetop, lenspod	<i>Cardaria chalepensis</i>	Whole province

Appendix B

Field Activity and Inspection Forms

Biosecurity Cleaning Record

Vehicle and Equipment Cleaning Field Log

This page was left intentionally blank.

Biosecurity Cleaning Record

Version:2019/05/08

Completed Cleaning Records must be submitted to **TLC.AgriculturalBiosecurity@hydro.mb.ca** in accordance with project submission requirements. Use abbreviations as described in brackets. No "Quotes" to be used to signify same as above, fill out each cell.

[illegible]

This page left intentionally blank



EQUIPMENT CLEANING RECORD TRANSMISSION LINE CONSTRUCTION

Project *	Section *
-----------	-----------

Complete at cleaning area.

Unit number *			
Equipment type *		DATE OF CLEANING *	yyyy mm dd
Cleaned by *			
Location of cleaning *		Free of oil leaks? *	
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Inspected by *	Signed by *	yyyy mm dd	
Remarks			

Complete at destination site.

Destination			
Delivered to site by			
Inspected for cleanliness at site?		Free of oil leaks?	
<input type="checkbox"/> Yes <input type="checkbox"/> No		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Inspected by	Signed by	yyyy mm dd	
Remarks			

Appendix C

Environmental Management Practices Guides



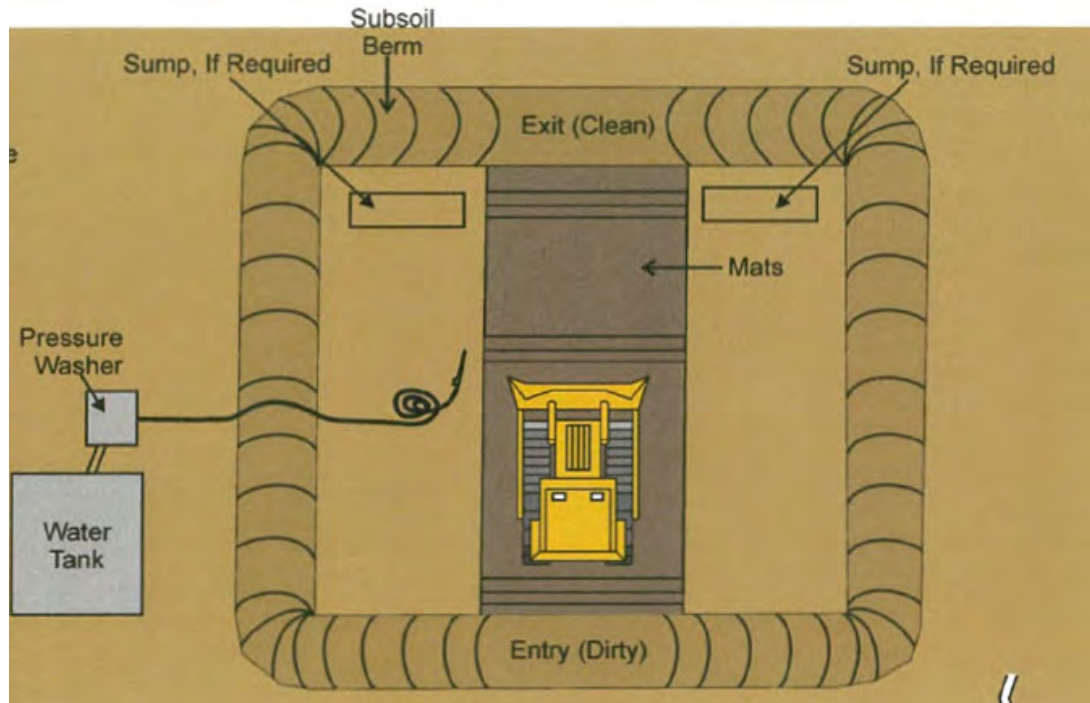
Description **Cleaning Station:** facilities that are located at designated Controlled Access Points or Transition Areas for the purposes of cleaning footwear, matting, vehicles and equipment of soil, manure, plant material and foreign matter

Wash Facility: facilities that are located outside of a controlled access zone and may be of two types: commercial wash facility or a washing facility developed by the contractor at a location and design that has been approved by Manitoba Hydro (MH)

Implementation Activities and Requirements

- To be established at all designated Controlled Access Points and Transition Areas identified in the latest version of the Biosecurity Management Plan Map Book
- Signage must be installed that describes cleaning requirements
- All Project staff must stop and review required cleaning requirements, implement required actions and initiate documentation requirements prior to entering a controlled access zone
- Cleaning Log Book entries must be completed for all pedestrian, matting, vehicles and equipment cleaning and/or inspection activities
- Sediment released from the washing process will be contained by berms or other containment to prevent surface run-off to another field or water course
- Only MH approved disinfectants are permitted to be used (See Disinfectants EMP)
- Sediment materials (dirt, water and disinfectant solution from cleaning activities) must be either buried on-site at a minimum depth of 2 m (requires written landowner permission and approval by MH) or, disposed of at an MH approved disposal facility
- Geotextile must be placed under matting or cleaning area to facilitate clean-up and disposed of at an MH approved disposal facility

Example Cleaning Stations



Cleaning Station Design



Disinfection at Cleaning Station



*Compressed Air Cleaning Station at
Controlled Access point*

See Also

- Controlled Access Points/Transition Areas
- Disinfectants
- Risk Level Determination
- Cleaning Requirements
- Cleaning Standards



Description

Inspection and cleaning requirements are determined by accumulation of soil, manure, plant material or foreign matter on footwear, mats, vehicles and equipment and current risk level assigned to controlled access zone.

Implementation Activities and Requirements

- All Project staff must stop and review required cleaning requirements, implement required actions and fulfill documentation requirements prior to entering or exiting a controlled access zone
- Foot traffic may utilize disposable boot covers that are replaced/cleaned before entering additional controlled access zones
- Personnel cleaning the equipment should complete a visual inspection post cleaning for accumulated soil, manure, plant material or foreign matter prior to leaving the cleaning station
- Only MH approved disinfectants are permitted to be used (See Disinfectants EMP)
- Footwear, matting, vehicles and equipment are considered clean when they meet the cleaning standards (See Cleaning Standards EMP) as required by the current Risk Level assigned to the controlled access zone
- Manitoba Hydro Environmental Officer or designate determines if cleaning standards have been achieved

Steps for Inspection and Cleaning

STEPS	DESCRIPTION
1- Inspection	<ul style="list-style-type: none"> Inspect all footwear, matting, vehicles and equipment prior to exiting or entering a controlled access zone at designated controlled access points and transition areas for soil, manure, plant material or foreign matter
2- Rough Clean	<ul style="list-style-type: none"> Remove clumps of soil, manure, plant material or foreign matter from mats, footwear, vehicle and equipment openings, tracks, tires and wheels using a hand scraper, shovel, broom or wire brush This step in cleaning of mats, vehicles and equipment must occur on-site before leaving the controlled access zone to a Wash Facility (See Cleaning Station EMP)
3- Fine Clean	<ul style="list-style-type: none"> Fine clean means high pressure water wash, high pressure air wash or high pressure steam wash. Wash matting, vehicles, and equipment paying extra attention to areas where soil, manure, plant material or foreign matter can accumulate (i.e., tires or undercarriage) For hydrovac trucks, cleaning includes the inside of the tank and any implement in contact with soil Prior to fine cleaning, matting, vehicles and equipment should receive a rough clean
4- Disinfectant Mist	<ul style="list-style-type: none"> Use disinfectant misting as the final cleaning step when working in controlled access zones where the current risk rating is High Spray footwear, tracks, openings, tires, wheels and implements that may come in contact with soil, manure, plant material or foreign matter with an approved disinfectant solution (See Disinfectants EMP) Hydrovac truck cleaning includes disinfecting inside of the tank and any implement in contact with soil, manure, plant material or foreign matter Prior to disinfecting, matting, vehicles and equipment should receive a fine clean

See Also

- Controlled Access Points/Transition Areas
- Disinfectants
- Risk Level Determination
- Cleaning Stations
- Cleaning Standards



Description

Risks will be classified as Low or High, according to the definitions provided in Risk Classification Matrix. Winter Conditions (WC) is a risk level modifier implemented only when approved by Manitoba Hydro.

Implementation Activities and Requirements

- All Project staff must stop and review required cleaning requirements, implement required actions and fulfill documentation requirements prior to entering or exiting a controlled access zone
- Manitoba Hydro Environmental Officer or designate has final determination of risk level

Risk Classification Matrix

Biosecurity risk classification matrix

Biosecurity issue	Risk level		
	Nonfrozen soil	Frozen soil	Frozen, snow-covered soil
Agricultural lands where no weeds, soil borne crop diseases, manure spreading or active livestock settings have been identified that present a substantial risk to biosecurity	Low	WC ¹ Low ²	WC ¹ Low ²
Specific sites identified as Tier 1 Noxious weeds as defined in the Noxious Weeds Regulation.	High	High	Low
Specific sites identified as Tier 2 or 3 Noxious weeds as defined in the Noxious Weeds Regulations and present a substantial biosecurity risk that the project activities will transfer the identified issue from one area to another.	Low	Low	Low
Laboratory testing has indicated clubroot spores are present	High	WC ¹ High ²	WC ¹ High ²
Manitoba Hydro will designate an operation with an existing and established biosecurity management plan as High risk. Manitoba Hydro will strive to meet the existing farm level biosecurity measures in these instances.	High		
Manitoba Hydro will designate active livestock settings (e.g., ILOs, active grazing areas) as High risk.	High		
Agricultural lands on which manure has been spread.	High	High	WC ¹ High ²

Note 1: This risk level modifier only applies to activities that create **no** subsurface disturbance such as vehicle travel, inspection, surveying, etc.

Note 2: This risk level applies to activities that create subsurface disturbances such as grubbing, excavation, drilling, foundation installation, clearing, conductor stringing, etc.

See Also

- Controlled Access Points/Transition Areas
- Disinfectants
- Risk Level Determination
- Cleaning Stations
- Cleaning Standards

Appendix D

Cleaning Standards Assessment Guide

BIOSECURITY MONITORING CLEAN EQUIPMENT/VEHICLE GUIDELINE

Grade	Pass/Fail	Definition
1	Fail	<p>No effort was made to clean the vehicle/equipment/footwear. Vehicle/equipment/footwear has clumps of mud and/or seeds attached to it. When travelling on public roadways, muddy tracks are left on the road.</p> <p><i>*No vehicles/equipment should be permitted to enter OR leave any site in this condition, regardless of Risk.</i></p>
2	Fail	<p>Vehicle/equipment/footwear was mechanically cleaned but there are still clumps of mud and/or seeds attached. No disinfectant was used.</p> <p><i>*At Low Risk site ONLY, may be permitted to leave site for off-site cleaning, though no vehicles/equipment may enter site in this condition.</i></p>
3	Pass	<p>Vehicle/equipment/footwear was mechanically cleaned, with no sign of clumping wet soil/seeds/debris remaining. Any small pockets of dirt/debris that cannot be removed have been disinfected.</p> <p><i>*High Risk Site: All vehicle/equipment surfaces that have come in contact with soil MUST be disinfected when exiting, to pass inspection.</i></p>
4	Pass	<p>Vehicle/equipment/footwear is clean. No clumps of mud or seeds are present.</p> <p><i>*High Risk Site: All vehicle/equipment surfaces that have come in contact with soil MUST be disinfected when exiting, to pass inspection.</i></p>

When working in agricultural areas, all reasonable effort must be made to ensure that all equipment, vehicles and clothing going from one property to another is not transporting any invasive species or pathogens. Above is the scale that will be used by Manitoba Hydro to grade the cleanliness of vehicles, equipment and footwear entering and leaving work sites in agricultural or invasive species areas on the project.

BIOSECURITY MONITORING CLEAN EQUIPMENT/VEHICLE GUIDELINE

Grade 1 (Fail)

-No effort made to clean vehicle; clumps of wet mud/seeds stuck to surfaces.

-No equipment/vehicles should be permitted to enter OR leave a site in this condition, regardless of Low or High Risk area.



BIOSECURITY MONITORING CLEAN EQUIPMENT/VEHICLE GUIDELINE

Grade 2 (Fail)

- Mechanical cleaning, but still clumps of wet mud/seeds in wheel wells/tracks/boot treads. No disinfectant used.
- *At low risk site, may be permitted to leave site for off-site cleaning, though no vehicles/equipment may enter site in this condition.*



BIOSECURITY MONITORING CLEAN EQUIPMENT/VEHICLE GUIDELINE

Grade 3 (Pass)

-Mechanical cleaning, with only minimal sign of dirt with no clumps/seeds/debris remaining. Pressure wash and/or disinfectant applied to any surfaces where dirt clumping remains.

-ALL vehicles/equipment leaving High Risk site MUST be disinfected upon exit.



BIOSECURITY MONITORING CLEAN EQUIPMENT/VEHICLE GUIDELINE

Grade 4 (Pass)

-Equipment/Vehicle/Footwear is clean. No signs of soil/seeds/debris on any surfaces.

-All vehicles/equipment entering a job site should be at this level.



This page was left intentionally blank.

Appendix I: Erosion and Sediment Control Plan

This Page has been intentionally left blank

Birtle Transmission Project

Erosion and Sediment Control Plan

June 2020

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

This page was left intentionally blank.

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
FINAL 1.0	APPROVED VERSION PUBLISHED			2020_0610

This page was left intentionally blank.

Preface

This document presents the Erosion and Sediment Control Plan (ESCP; the Plan) for the construction of the Birtle Transmission Project (the Project). It is intended to provide information and instruction to Contractors and Manitoba Hydro employees as well as information to regulators and members of the public. The Plan provides general considerations and guidance pertinent to erosion and sediment control during the development of the Project. More importantly it presents a Project-specific implementation plan and actions required to prevent and mitigate erosion and sedimentation as a result of construction of the Project. Inspection and compliance along with monitoring programs are described to confirm adherence to required actions including documentation and record-keeping. Environmental Management Practices guidance sheets are provided for the installation and maintenance of erosion and sedimentation control measures in the Appendices.

Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro
Licensing and Environmental Assessment Department
360 Portage Avenue
Winnipeg, MB
Canada R3C 0G8
1-877-343-1631

LEAProjects@hydro.mb.ca

This page was left intentionally blank.

Table of contents

1.0	Introduction	1
1.1	Commitment to environmental protection	2
1.2	Purpose and objectives	3
1.3	Background	3
1.4	Potential effects of erosion and sedimentation	4
1.5	Roles and responsibilities	4
2.0	Regulatory context	6
3.0	Implementation	7
3.1	Erosion risk identification	7
3.1.1	Desktop evaluation	7
3.1.2	On-site evaluation	7
3.1.3	Weather	8
3.2	Erosion and sediment control management strategy	8
3.2.1	Pre-construction planning	8
3.2.2	Scheduling	9
3.3	General mitigation measures	9
3.4	Specific erosion control mitigation measures	9
3.5	Specific sediment control mitigation measures	10
3.6	Education and training	11
3.7	Monitoring and maintenance	12
3.7.1	ESCP removal	13
3.7.2	Environmental shutdown/ contingency measures	13
3.7.3	Environmental shutdown	14
3.7.4	Contingency measures	14
4.0	Environmental management practices	15
4.1	Erosion controls	15
4.2	Sediment controls	15
5.0	References	16

This page was left intentionally blank.

Appendices

Appendix A: EC_01 Vegetation Retention and Replacement
Appendix B: EC_02 Surface Cover
Appendix C: EC_03 Erosion Control Blankets
Appendix D: EC_04 Impermeable Sheeting
Appendix E: EC_05 Organic Fibre Rolls (Wattles)
Appendix F: EC_06 Ditch Check Dams
Appendix G: EC_07 Water Diversion
Appendix H: EC_08 Timber Matting
Appendix I: EC_09 Wind Erosion Control
Appendix J: SC_01 Sediment Fencing
Appendix K: SC_02 Sediment Retention Berm

Tables

Table 1: Key roles and responsibilities.....	4
Table 2: Erosion Controls.....	10
Table 3: Sediment Controls.....	11

Figures

Figure 1: Transmission Environmental Protection Program.....	2
--------------------------------------------------------------	---

This page was left intentionally blank.

Definitions

Erosion – occurs when energy (wind or water) is applied to a soil surface causing the detachment, suspension and transfer of soil particles from a stable mass.

Sedimentation – The process whereby the energy of wind or water carrying soil particles is reduced down to the point that those suspended particles are allowed to settle out and be deposited, creating a build-up of sediment at that location.

Deleterious – The federal *Fisheries Act* defines it as “Any substance that, if added to water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use of by man of fish that frequent that water” (Canadian *Fisheries Act*).

This page was left intentionally blank.

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Birtle Transmission Project (the Project) Environmental Assessment to developing an Erosion and Sediment Control Plan (ESCP) as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects. This document outlines the procedures to be employed by contractors to mitigate the potential for erosion and sediment transport during the activities related to transmission project construction. With an advance review of the project locations and topography, the Contractor can identify areas at risk of erosion during the different construction activities.

This document identifies some of the common erosion and sediment control (ESC) materials and environmental management practices. This document also includes detailed design drawings that indicate correct installation methods for ESC materials to help ensure effectiveness and reduce maintenance.

Note that the methods presented here are not exhaustive and alternative methods may be proposed by the Contractor but would require approval from a Manitoba Hydro Environmental Officer prior to implementation.

Manitoba Hydro's Environmental Protection Program (EPP) provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and best practices, and input during the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental effects. This ESCP is a component of the EPP as illustrated in Figure 1.

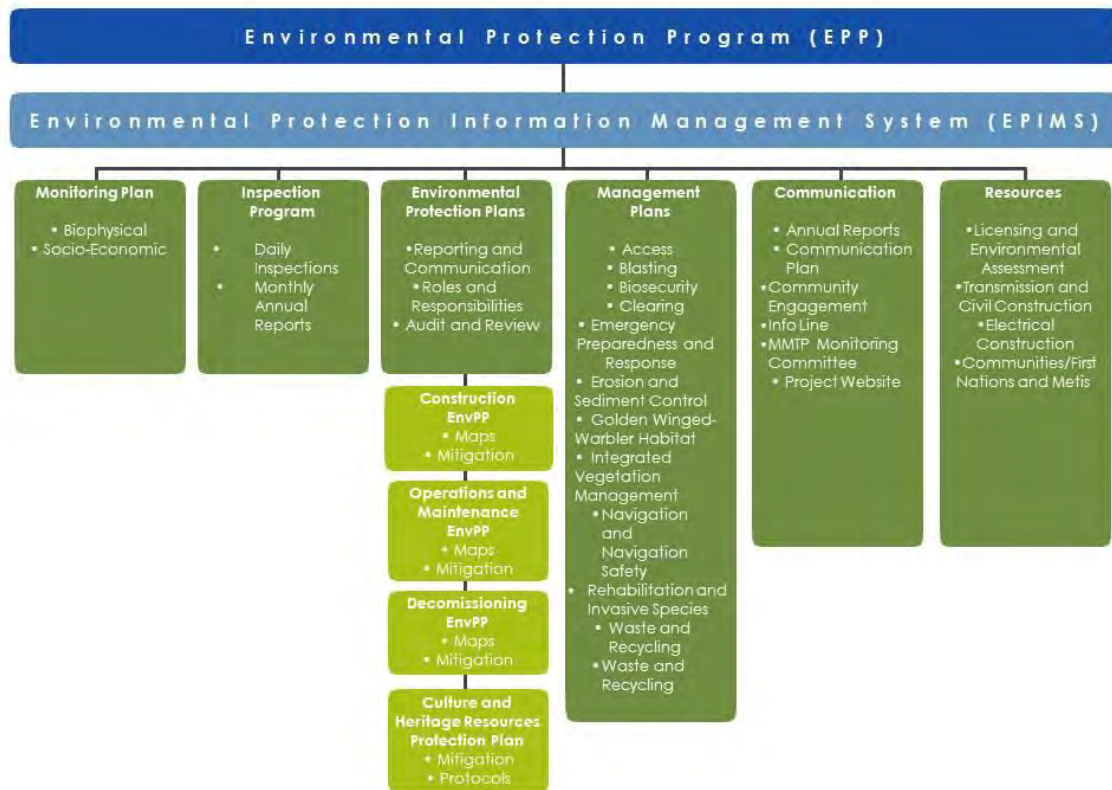


Figure 1: Transmission Environmental Protection Program

1.1 Commitment to environmental protection

Manitoba Hydro integrates environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the involvement of Manitoba Hydro employees, consultants, contractors, Indigenous communities and organizations and the public at all stages of the Project from planning and design through construction and operational phases.

The use of an ESCP is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential effects of access related to the construction of a new transmission line.

Manitoba Hydro is committed to implementing this ESCP and requiring Contractors to follow the terms of this and other applicable plans within the Environmental Protection Program.

1.2 Purpose and objectives

This Erosion and Sediment Control Plan is intended to be used as a reference document in the field, during construction activities to address sediment transport and erosion concerns while ensuring compliance with Manitoba Hydro's Construction Environmental Protection Plan requirements, industry best practices, and Provincial/Federal regulations and legislation. In order to effectively mitigate the potential effects of erosion and sedimentation due to construction activities, a variety of ESC measures are available for implementation. The appendix outlines standard erosion and sediment control techniques along with a description of the situations where each technique may be employed and directions for correct implementation. Should a contractor wish to deviate from the control techniques or implementation described in this document they must first obtain approval from a Manitoba Hydro Environmental Officer.

The objectives of this erosion and sediment control plan are as follows:

- To establish a process prior to the start of construction that can be used to identify erosion prone sites and where necessary, implement, monitor and maintain erosion and sediment controls. This process will meet regulatory requirements, industry standards and best practices with regards to ESC during construction activities.
- To provide guidance on the correct implementation and installation of erosion and sediment control measures.

1.3 Background

Construction activities associated with the Project will involve vegetation removal as well as disturbed soil/ground which may alter and increase water runoff in some areas. Excessive runoff has the potential to cause flooding as well as a rapid increase in natural erosion and sedimentation rates that, if left uncontrolled, can irreparably harm the environment and aquatic habitats.

Wind is not considered to be a major contributing factor to erosion on transmission construction projects due to the limited instances of exposed soil and the short term duration in which they are exposed. For this reason management practices controlling

water erosion are the primary focus of this manual. While several of the water erosion control methods are also effective at reducing wind erosion, specific mitigations are addressed in the Erosion and Sediment Control Management Practices in Section 3.0.

1.4 Potential effects of erosion and sedimentation

The importance of erosion and sedimentation control is primarily to reduce the potential impact that erosion has on watercourses such as creeks, streams, rivers and lakes etc. Soil consists of many components, the majority of which are organic material, sand, silt and clay. It is the silt and clay that are the most damaging to watercourses as they are comprised of small particles that can be carried for long distances while suspended in water. Small silt and clay particles can cloud the water making it difficult for fish to find food, and also block sunlight reaching aquatic plants. When small silt and clay particles settle on the bottom they can smother fish and amphibian eggs. There is an added risk that eroded soil may carry hard metals, traces of petroleum product or other pollutants from land into a watercourse.

The effects of sedimentation in watercourses can be profound enough to be considered deleterious (harmful or damaging) to fish. Failure to prevent erosion and sedimentation of watercourses is considered a reportable offence under section 35 of the *Fisheries Act*.

1.5 Roles and responsibilities

This section outlines the major roles and responsibilities of those involved in the implementation of the Plan.

A summary of key roles and responsibilities is found in Table 1.

Table 1: Key roles and responsibilities	
Role	Key responsibilities
Manitoba Hydro	<ul style="list-style-type: none"> • Approves ESC planning, design, implementation, inspection, monitoring, maintenance, operation, and decommissioning. • May delegate this responsibility to other 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. • Ensures ESC measures are installed, maintained or restored by

Table 1: Key roles and responsibilities

Role	Key responsibilities
	<p>the contractor.</p> <ul style="list-style-type: none"> • Appoints an Environmental Inspector/Officer or delegate to confirm that regulatory criteria are being met by the ESCP. • The Manitoba Hydro Environmental Inspector/Officer or delegate will inspect erosion and sediment control measures to confirm effectiveness.
Construction Contractor	<ul style="list-style-type: none"> • Will communicate erosion and sediment control information/training to all project staff and will ensure a copy of the Erosion and Sediment Control Plan is available at the project site. • Responsible for installation, maintenance and decommissioning of erosion and sediment control installations to ensure continued effectiveness. • Confirm with an MH Environmental Inspector\Officer that regulatory criteria are being met by the ESCP. • Respond and act promptly to resolve if any activities are identified as not in compliance with the ESCP or any regulatory requirements. • Responsible for sourcing ESC materials and maintaining a sufficient readily available stockpile onsite. • Responsible for modifying and maintaining erosion and sediment control installations to ensure continued effectiveness through regular monitoring performed by their Environmental Representative. • Responsible to monitor and report to MH on ESC implementation effectiveness including any need for repair and maintenance. • Stabilize and re-vegetate disturbed areas as soon as practicable or where deemed necessary by Manitoba Hydro , rehabilitation is not to be deferred until construction is complete

This page was left intentionally blank.

2.0 Regulatory context

Federal and Provincial Acts and regulations govern activities that have the potential to cause harm to the environment. This erosion and sediment control plan will provide the contractor with a required process to mitigate erosion and sedimentation to be in compliance with Provincial/Federal regulations and legislation. One of the most pertinent Acts involving construction activities and erosion and sedimentation is the federal *Fisheries Act*.

The *Fisheries Act* prohibits serious harm to fish which is defined in the Act as “the death of fish or any permanent alteration to, or destruction of, fish habitat.”

The purpose of the *Fisheries Act* is to protect the productivity of commercial, recreational and Aboriginal fisheries and it prohibits activities that deposit deleterious substances (damaging substances) of any type into water or that create conditions that allow deleterious substances to be deposited into water frequented by fish. Sediments are considered to have a deleterious effect on aquatic habitats.

Construction activities are required to take every precaution to prevent deposition of sediments into aquatic habitats and there is a duty to notify and take corrective action on any incidences of incidental deposition.

Manitoba Hydro staff and contractors must comply with all regulatory requirements relating to the construction of a project. Specific regulatory requirements for the Project may also be listed in regulatory work permits and/or Department of Fisheries and Oceans letters of advice/authorizations.

This page was left intentionally blank.

3.0 Implementation

The intent of this section is to provide implementation instructions to the Contractor. The key steps to implementing the plan are outlined below:

- 1) Erosion risk identification
- 2) Planning
- 3) General mitigation measures for susceptible construction activities
- 4) Specific erosion control measures
- 5) Specific sediment control measures

The implementation of the Plan utilizes a step-wise process; however, these steps will be undertaken at various times throughout the pre-construction and construction phases of the Project. The plan is founded on a principle of adaptive management meaning if aspects of the plan are found to require modifications for improved effectiveness or if new information becomes available (e.g., more effective control actions, pest outbreaks in the Project area) the Plan and actions will be updated.

3.1 Erosion risk identification

There are a number of different methods to be conducted by the Contractor including desktop evaluation, pre-construction surveys, and onsite evaluations that will be used to identify areas that are at risk of erosion. Contractors are required to plan ahead and have an understanding of what mitigations will be necessary.

3.1.1 Desktop evaluation

A desktop evaluation of aerial/satellite imagery as well available Geographical Information System (GIS) data will provide Contractors information on site conditions in the project right of way. Elevation or contour data of an area will help to identify the slope of elevation changes and drainage to determine where erosion risk may be higher. Soil information is also available to help understand where fine textured soil types are as they are at a higher risk from erosion.

3.1.2 On-site evaluation

The initial stage of construction involves clearing vegetation along a centerline down the middle of the transmission right of way. That initial clearing of the centerline allows access

to areas prior to the remainder of clearing and construction activities. Ground surveys will be completed by the Contractor when access is available that could identify areas that are at a higher risk of erosion or ground disruption.

There are numerous distinct construction activities for the development of a transmission project some of which have a higher susceptibility to cause erosion and sedimentation.

These include:

- Vegetation clearing
- Earthworks and stock piles
- Draining and Dewatering
- Watercourse crossing

3.1.3 Weather

The effects of wet weather during construction activities can have a significant impact on ground conditions and can change otherwise stable soils into soils that are affected by erosion and sedimentation. The effects of wet weather during construction activities can have a significant impact on ground conditions and can change otherwise stable soils into soils that are affected by erosion and sedimentation. Freeze thaw cycles during the spring can also expose stable soils to an unstable condition overnight and throughout the day.

3.2 Erosion and sediment control management strategy

The Contractor will implement an erosion and sediment control management strategy that will focus on pre-planning, scheduling and preventing erosion as a result of its construction activities. If erosion is not preventable, mitigation measures that prevent sedimentation will be implemented.

3.2.1 Pre-construction planning

In many cases the need for erosion and sediment control can be avoided by considering erosion mitigation during the planning stages of a project or prior to construction activities. For instance, access routes should be planned to avoid steep grades, unstable soils and avoid close proximity to a watercourse or topography that could direct run-off to a watercourse. The Contractor must continuously review their planned construction activities and evaluate the need for ESC measures, while considering weather, soil conditions, identified environmentally sensitive sites within CEnvPP, and any newly disturbed areas for risk of erosion.

3.2.2 Scheduling

The contractor, when developing schedules for construction activities that have the potential to cause erosion and sedimentation, must consider seasonal climate, identified environmentally sensitive sites within CEnvPP, and any newly disturbed areas.

Including erosion and sedimentation as a consideration in the scheduling of activities, is the first step in preventing effects to the environment. Through the use of scheduling, construction activities that are required in erosion prone areas such as adjacent to watercourses can be mitigated by timing those activities during frozen or dry soil conditions. Where possible, work should be scheduled so that construction activities that remove vegetation or disrupt the soil surface happen in short duration before erosion control measures can be installed so that the amount of time soil surface is exposed is minimized.

3.3 General mitigation measures

General mitigation measures that are particular to preventing erosion and sedimentation during construction activities are found in the Construction Environmental Protection Plan, General mitigation tables:

- EI-3 Erosion protection and sediment control
- PC-1 Access roads and trails
- PC-2 Borrow pits and quarries
- PA-5 Draining
- PA-8 Grubbing
- PA-10 Stripping

3.4 Specific erosion control mitigation measures

Chosen erosion and sediment control measures should not be permanent in nature but designed with long term protection in mind (until re-vegetation takes place). Temporary ESC's are those that are in place during the construction phase, or a portion thereof, when exposed soils are vulnerable to erosion with nearby water courses at risk of sedimentation. Permanent solutions would only be considered under extraordinary circumstances and would require MH and regulatory approval.

Control of erosion and sedimentation is most efficient and cost effective when it can be recognized and prevented early. A basic understanding of the erosion and sedimentation

processes will help with this early detection and application of mitigation measures and controls. Due to the varying conditions of the work site, the Contractor will be responsible for determining which protection measures should be installed in each work area in consultation with Manitoba Hydro. Table 2 below show examples of frequently employed erosion controls that are currently approved by MH for use by the Contractor(s).

Table 2: Erosion Controls

EROSION CONTROLS					
Method	Application		Location	Description	BMP
Vegetation retention and replacement	Flat Ground	Y	Any location with potential for exposed soil	Natural regeneration, seeding, planting, sodding	ID-EC_01
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			
Surface Cover	Flat Ground	Y	Any location of exposed soil, seeded or not	Organic- Weed free straw, mulch, natural fiber erosion control blankets. Inorganic- geotextile, sheeting, rock	ID-EC_02
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	N			
Erosion Control Blankets	Flat Ground	Y	Exposed soil on flat or sloping ground, stockpiles and ditches	Variety of products manufactured into "blankets" placed tight to the ground in a matrix to cover soil and reduce surface erosion	ID-EC_03
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			
Impermeable Sheeting	Flat Ground	Y	Large areas of exposed soil, steep terrain, stockpiles	Impermeable sheeting (Polyethylene plastic, or tarps) prevents impact and saturation of soil from rainfall	ID-EC_04
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			
Organic Fiber Rolls (Wattles)	Flat Ground	N	Steep slopes, stepped terraces	Rolls of organic material (usually straw) that reduce erosion by reducing slope and the energy of overland flow	ID-EC_05
	Sloping Ground	Y			
	Stockpiles	N			
	Ditches	N			
Ditch Check Dams	Flat Ground	N	For use on drainage ditches or large diversions but not natural watercourses	Decreases the grade and water flow velocities	ID-EC_06
	Sloping Ground	N			
	Stockpiles	N			
	Ditches	Y			
Water Diversion	Flat Ground	N	Areas with large amount of exposed soil, worksite or stock pile	Diversion ditching or berms to direct overland flow around a worksite	ID-EC_07
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			
Matting	Flat Ground	Y	Flat ground at risk of erosion or	Diversion ditching or berms to direct overland flow around a worksite	ID-EC_08
	Sloping Ground	N			
	Stockpiles	N			
	Ditches	N			
Wind Erosion	Flat Ground	Y	Any location with exposed soil	Watering the surface, using impermeable sheeting (Polyethylene plastic, or tarps) or any surface cover	ID-EC_09
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			

3.5 Specific sediment control mitigation measures

It is important to understand that sedimentation controls themselves are only employed as a second line of defence. Sedimentation controls are designed to provide a place for water to slow down and allow the particles to be deposited that the primary erosion controls were unable to prevent. Sediment fencing does not "filter" the water but rather

are meant to slow down the water and allow fine soil particles or other potentially deleterious materials to settle behind it. Even perfectly constructed sediment controls will not be sufficient if a construction site lacks adequate erosion controls. Sediment controls are most effective under low input flow conditions. Listed in Table 3 below are examples of frequently employed sediment controls that are currently approved by MH for use by the Contractor(s).

Table 3: Sediment Controls

SEDIMENT CONTROLS					
Method			Application	Description	BMP
Sediment fencing	Flat Ground	Y	Anywhere low flow runoff is a concern and retention of sediment	Geotextile fabric, buried at the bottom and suspended vertically by wooden stakes	ID-SC_01
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			
Sediment Retention Berm	Flat Ground	Y	Anywhere low flow runoff is a concern and retention of sediment	Constructed of rock, wood chips, compost, soil and topsoil or similar materials	ID-SC_02
	Sloping Ground	Y			
	Stockpiles	Y			
	Ditches	Y			

3.6 Education and training

Education and training form a critical component of the implementation plan. Manitoba Hydro and the contractor(s) each have responsibility to ensure personnel are appropriately trained to carry out their role in the prevention of erosion and sedimentation, and that proper documentation is being conducted throughout the Project. Manitoba Hydro has prepared Erosion and Sediment Control Environmental Practices found in appendices which guides the implementation of controls, for use by Project field staff.

Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.

Manitoba Hydro will also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth.

It is a mandatory requirement that all contractor(s) provide Project-specific erosion and sedimentation control orientation training to all personnel involved in construction

activities susceptible to erosion and sedimentation or involved in supervision of those personnel (i.e., project manager, supervisors) prior to starting work. This training will present the objectives of the plan, roles and responsibilities, erosion and sedimentation issues and prevention actions, and documentation requirements. A training attendance record must be maintained by the contractor(s) and submitted to Manitoba Hydro Environmental Inspector/Officer or delegate, for upload to the Environmental Protection Information Management System.

3.7 Monitoring and maintenance

Monitoring, inspection and adaptive management are necessary to ensure the effectiveness of the plan. It provides confirmation of proper implementation and effectiveness of erosion and sediment control measures. Monitoring will take place until the concern of erosion and sedimentation no longer exists. 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.

The effectiveness of the ESCP depends directly on the frequency of monitoring and what actions are taken to address any failures that may occur. A tracking document will be maintained by the Contractor's Environmental Representative indicating location, timing of construction activities and reason for implementation. This document will be submitted to Environmental Protection Information Management System (EPIMS) to ensure that all installed ESCP measures can be tracked for continued maintenance, monitoring and decommissioning/removal.

Components of monitoring, maintenance and decommissioning to be conducted by the Contractor will include:

- A monitoring schedule will be drawn up to include times, areas and individual(s) responsible for monitoring. (Will be included in the Contractor's environmental inspection reports submitted to MH).
- Inspect and assess effectiveness of ESC control structures regularly and after storms, and repair, replace or upgrade, as required. If shortcomings are identified, the contractor must take immediate action to restore their proper function.
- All employees are required to report any ineffective erosion and sedimentation control measures or those in need of repair.

- Sediment control measures may require accumulated sediment to be removed to function properly or to not overload the structure. It is important to remove sediment from the area completely and take it to landfill or relocated where it is no longer at risk of being washed into a watercourse.
- Any maintenance of ESC should be recorded and reported to MH to help identify failure prone sites or areas requiring reinforced measures.
- Weather forecasts should be monitored as weather events have the potential to play a part in erosion sedimentation risk during construction activities.
- During inactive construction periods, where the site is left alone for 30 days or longer monthly monitoring should be conducted.

3.7.1 ESCP removal

The Contractor will stabilize sites as soon as feasible after construction activities causing surface disruptions are complete. The site will then be assessed and re-vegetated in accordance with the Rehabilitation and Invasive Species Management Plan. Temporary erosion and sediment control measures will remain intact and maintained until:

- The MH Environmental Inspector/Officer determine that there are no longer erosion and sedimentation concerns in an area, or
- Either natural vegetation is established and stable or permanent measures are established.

Although work may be conducted in the winter months, care must be taken to ensure that materials are not left to degrade the surrounding waterways when the spring thaw arrives. When sediment control systems are removed by the Contractor, accumulated sediment must be removed and taken to landfill or relocated where it is no longer at risk of being washed into a watercourse.

3.7.2 Environmental shutdown/ contingency measures

The contractor has a responsibility to recognize and prevent working in adverse weather conditions that would increase erosion potential and overwhelm designed erosion and sediment control systems. Construction activities in areas with high erosion risk should be scheduled to take place during favourable weather conditions. Activities should be stopped in these areas when they have encountered periods of significant melt or prolonged precipitation and surface runoff cannot be sufficiently managed. Conditions

that cannot be mitigated through contingency measures in areas of high erosion risk will require a shutdown of activities until conditions improve or there is modification of work practices.

Suitable work conditions will be established and agreed upon between the Contractor and Manitoba Hydro. Work modification or weather shut down to mitigate erosion and sedimentation may be considered if:

- During extended periods of adverse conditions (for rain is considered greater than 5 mm of rain in a 24 hour period)
- more than 50 mm of rain/5 cm of wet snow in the preceding 5 days; or
- the forecast calls for more than 50% certainty of 5 mm of rain/or 5 cm of wet snow in the next 24 hours
- If extreme wet weather conditions result if erosion is resulting in sedimentation of adjacent waterbodies due to compromised erosion control measures.

3.7.3 Environmental shutdown

Should a weather shutdown be deemed necessary it will be communicated to the Contractor in writing through the MH Construction Supervisor. Once the shutdown is in place, the Contractor may propose Work Modifications to Manitoba Hydro that prevent further damage or employ mitigation measures. Once conditions improve or changes are approved by Manitoba Hydro the weather shut-down will be released by Manitoba Hydro. Some of the possible work modifications include: placement of matting, geotextile installation or change of work hours (working in the morning with frozen ground conditions).

3.7.4 Contingency measures

Should an extreme weather event result in a breach of existing erosion and sediment controls and sediment laden water is able to flow and reach a watercourse the following contingency measures may be employed by the Contractor to mitigate the breach:

- Install additional sediment fencing, or construct a containment berm to create a containment area for runoff and prevent it flowing to watercourses and wetlands.
- Excavate a cross ditch or diversion berm to divert water away from watercourses and wetlands and into a vegetated area, sump or containment area.
- Place sandbags to raise the height of banks, preventing flooding of nearby areas or of run-off into watercourses.

4.0 Environmental management practices

Below is a list of environmental management practices used for sediment and erosion control. An appendix is provided for each that provides the description, application, implementation and installation of each.

4.1 Erosion controls

- EC_01 Vegetation Retention and Replacement
- EC_02 Surface Cover
- EC_03 Erosion Control Blankets
- EC_04 Impermeable Sheeting
- EC_05 Organic Fibre Rolls (Wattles)
- EC_06 Ditch Check Dams
- EC_07 Water Diversion
- EC_08 Timber Matting
- EC_09 Wind Erosion Control

4.2 Sediment controls

- SC_01 Sediment Fencing
- SC_02 Sediment Retention Berm

This page was left intentionally blank.

5.0 References

Manitoba Stream Crossing Guidelines For The Protection of Fish and Fish Habitat (DFO and MNR 1996). Available at:

<https://www.gov.mb.ca/waterstewardship/fisheries/habitat/sguide.pdf>.

Minister of Justice. 1985. *Fisheries Act*. Available at: <http://laws-lois.justice.gc.ca/PDF/F-14.pdf>.

This page was left intentionally blank.

Appendix A: EC_01 Vegetation Retention and Replacement

Appendix B: EC_02 Surface Cover

Appendix C: EC_03 Erosion Control Blankets

Appendix D: EC_04 Impermeable Sheeting

Appendix E: EC_05 Organic Fibre Rolls (Wattles)

Appendix F: EC_06 Ditch Check Dams

Appendix G: EC_07 Water Diversion

Appendix H: EC_08 Timber Matting

Appendix I: EC_09 Wind Erosion Control

Appendix J: SC_01 Sediment Fencing

Appendix K: SC_02 Sediment Retention Berm

This page was left intentionally blank.

Appendix A

EC_01 Vegetation Retention and Replacement

This page was left intentionally blank.



Description

Retention- Retain as much vegetation as possible for as long as possible as it naturally reduces erosion potential. Vegetation reduces the energy of wind or water on the soil surface, lessening its impact. Vegetation also extends the amount of time water is in contact with the soil, allowing more time for absorption rather than it flowing across the surface. It also naturally reduces the sediment load of overland flow by reducing the energy of water and wind, providing an opportunity for soil particles to settle out.

Replacement- Areas disturbed by construction activities may have areas of exposed soil. Once assessed these areas will likely require seeding to aid natural re-vegetation (hydro-seeding, broadcast seeding, hand seeding, transplanting). Seeding of disturbed areas should be completed as soon as possible after construction activities or travel has stopped in each work area. Areas that have steeper slopes prone to producing sheet flow run off may require erosion control blankets to help stabilize the soil and protect seed while it establishes. See below for more information on seeding design best practice.

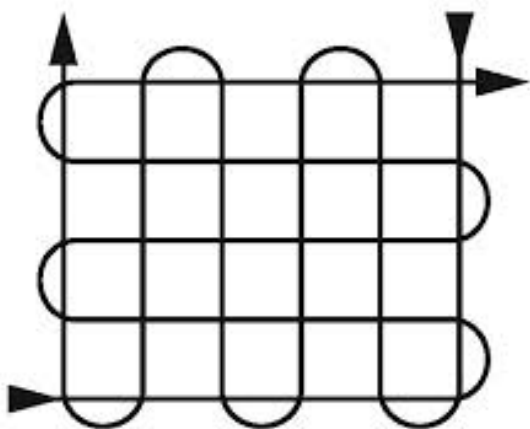
Application

Flat Ground	Y	Any location with potential for exposed soil
Sloping Ground	Y	
Stockpiles	Y	
Ditches	Y	

Implementation

Seeding- Several application methods are acceptable for seeding (Hand Broadcast, Hand-operated rotary seeders, cyclone seeders). Other methods such as drill seeding and Hydraulic seeding may be appropriate. Refer to the "REHABILITATION AND INVASIVE SPECIES MANAGEMENT PLAN for MANITOBA HYDRO TRANSMISSION PROJECTS" for direction on selecting the appropriate seed mix, seeding method and rates and other important considerations for an area. Please refer to installation diagram below for criss-cross seeding pattern used when seeding by hand.

Installation



Criss-cross seeding pattern helps to ensure adequate and even distribution of seed.
Diagram credit: <https://www.seedsuperstore.com/how-to-plant-new-lawn/>

References

- REHABILITATION AND INVASIVE SPECIES MANAGEMENT PLAN for MANITOBA HYDRO TRANSMISSION PROJECTS March 2016

Also See

- ID-EC_02 Surface Cover
- ID-EC_03 Erosion Control Blankets

Appendix B

EC_02 Surface Cover

This page was left intentionally blank.



Photo Credit: <https://www.todayshomeowner.com/benefits-of-spreading-straw-or-mulch-over-grass-seed/>

Description

The most effective long term erosion control is to establish vegetation, it is often necessary to protect the soil surface while this is occurring. Covering the soil surface controls erosion by buffering the impact rainfall which protects the surface and seeds until vegetation can establish. Biodegradable materials such as weed free straw (not hay), organic mulch can be used for cover on gentle slopes, where natural fibre erosion control blankets can be used on steeper slopes. Inorganic materials such as geotextile, impermeable sheeting can also be used temporarily but will have to be removed prior to re-vegetating.

Application

Flat Ground	Y	Any location with potential for exposed soil, seeded or not
Sloping Ground	Y	
Stockpiles	Y	
Ditches	N	

Installation

Straw: Weed free straw bales can be broken up and spread over the surface to cover it until vegetation is established, or it can be blown on by machine. Weed free straw must be provided by a local source approved by an MH Environmental Officer. The depth of the spread straw is important to its function.

VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual provides the following recommended specification for spreading straw:

"If site **will be seeded** and straw is a temporary mulch to control soil erosion until a stabilizing vegetation develops:

- Place/apply straw evenly in a 20-40 mm thick layer.

Bulk application rate is 3300 to 4500kg/ha.

Straw should cover 80 to 90% of the soil surface.

If site **will not be seeded** and straw is a temporary mulch to control soil erosion:

- Place/apply straw evenly in a 40-60 mm thick layer.

Bulk application rate is 4500 to 6700kg/ha.

Straw should cover >90% of the soil surface."

Wood chips: Typically sourced through project mulching operations. While wood chips are resistant to movement and is good erosion protection, caution should be used as dense applications can inhibit subsequent vegetation establishment.

Clearing debris: Tree tops, branches and limbs from clearing operations in the area can be manually spread, covering and protecting the soil surface. This method has the additional benefit of potentially providing a seed source to aid in natural regeneration of vegetation.

References

- REHABILITATION AND INVASIVE SPECIES MANAGEMENT PLAN for MANITOBA HYDRO TRANSMISSION PROJECTS March 2016
- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_01_VegRetention And Replacement
- ID-EC_03_Erosion Control Blankets
- ID-EC_04_Impermeable Sheeting

This page was left intentionally blank.

Appendix C

EC_03 Erosion Control Blankets

This page was left intentionally blank.



Description

Applied to flat or sloping ground, in drainage ditches (not fish bearing) or over stock piles to provide temporary erosion protection allowing permanent vegetation to be established. These products typically consist of a biodegradable material that is sandwiched between a netted material to form a “blanket” and supplied in rolls. These rolls are then installed tight to the ground in a matrix protecting the surface. Produced from a wide range of materials that are either biodegradable, photo-degradable, or designed for permanent long term use. On Manitoba Hydro projects only products that are %100 biodegradable will be accepted for use. Biodegradable products are considered to be temporary as they will naturally decompose and permanent vegetation will be able to establish through it.

Application

Flat Ground	Y	Exposed soil on flat or sloping ground, stockpiles and ditches
Sloping Ground	Y	
Stockpiles	Y	
Ditches	Y	

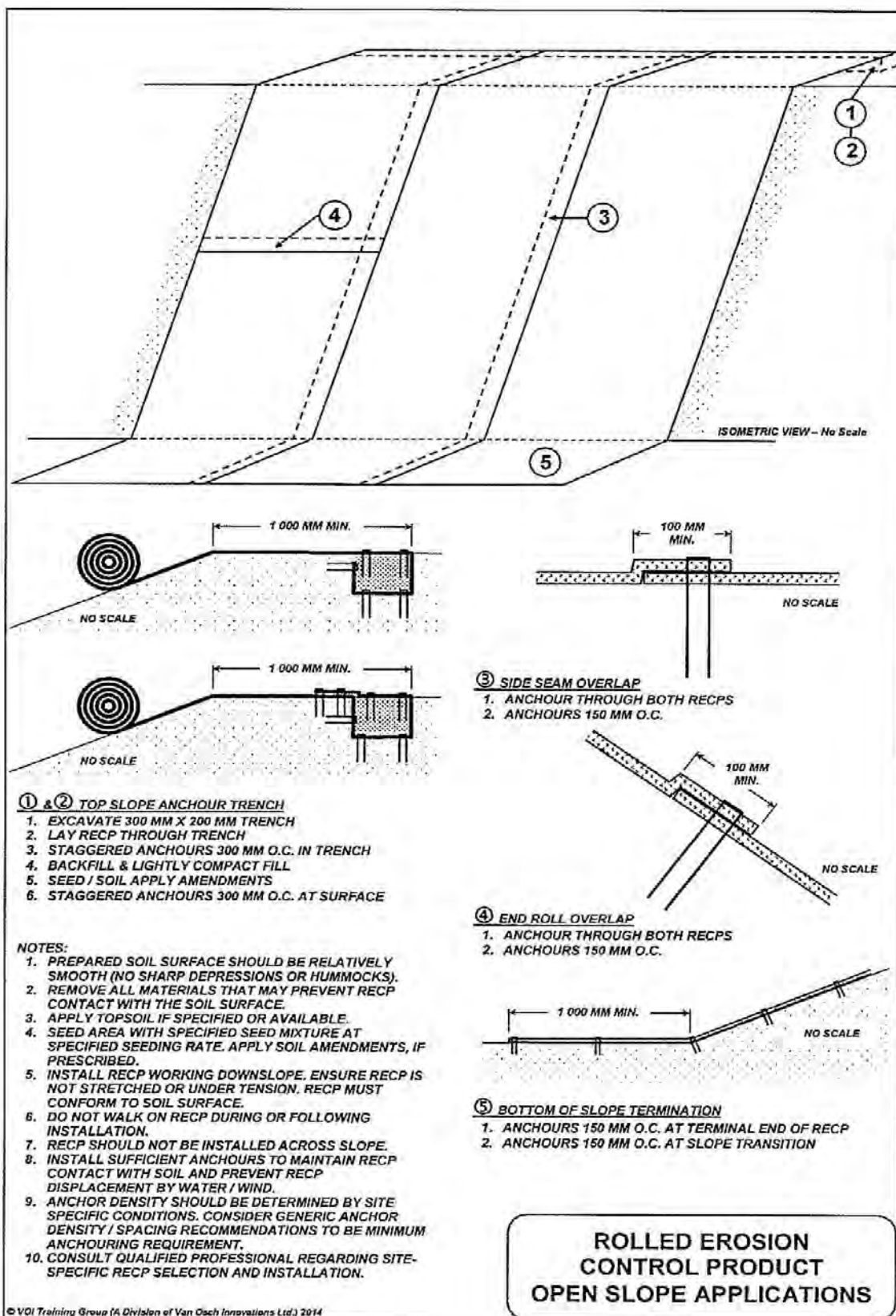
Implementation

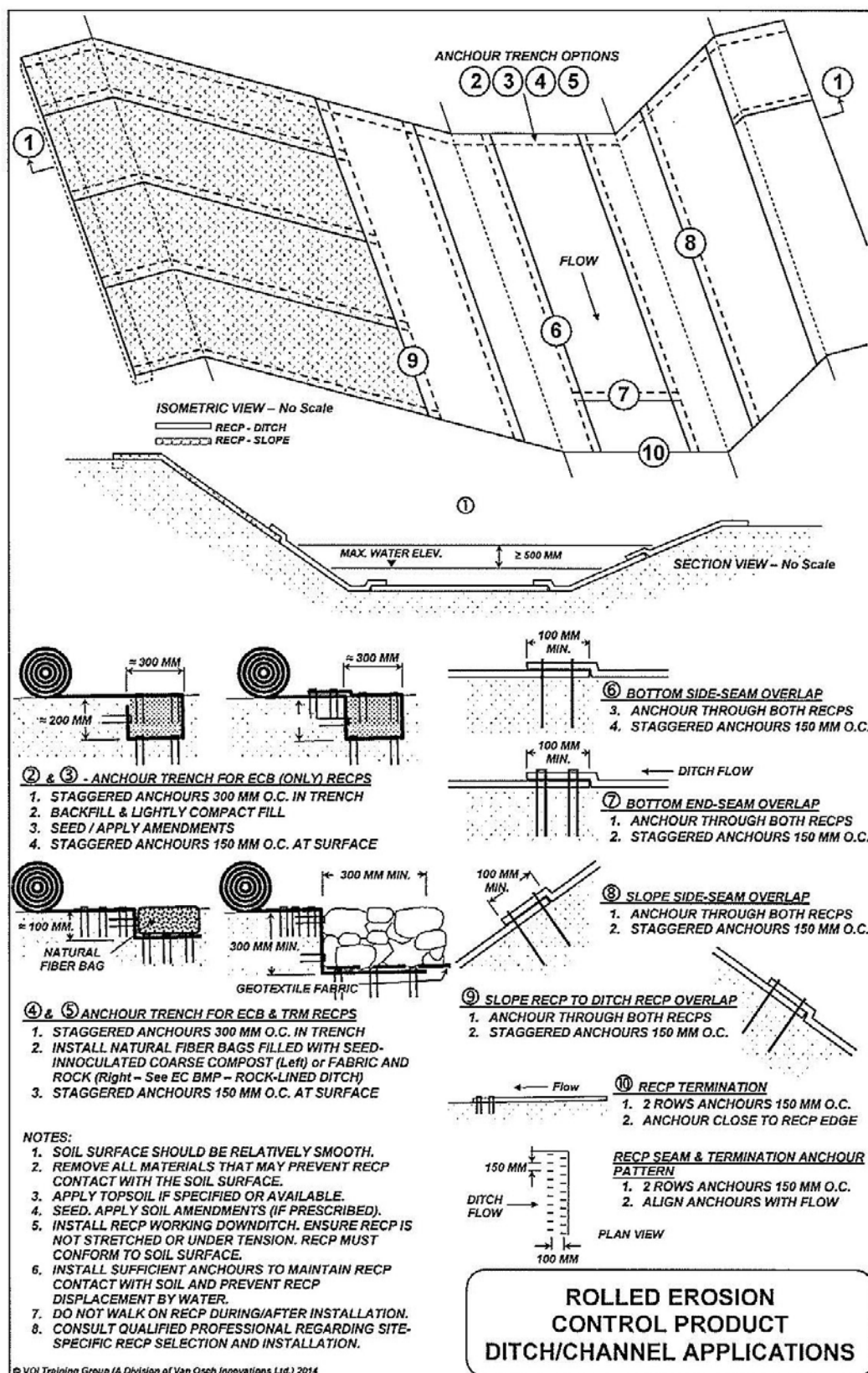
Has shown to be very effective at reducing surface soil erosion if installed correctly. Loose weave blankets should be used to allow for vegetation to regenerate through it while preventing wildlife becoming trapped or entrained in the netting. Can be used for erosion protection on a variety of locations, to protect stockpiles and used in conjunction with other erosion and sediment control products

Installation

Weight and peg erosion control blankets so that blankets are in full contact with ground; spaces and gaps under blankets will result in increased erosion rendering this measure ineffective.

The following installation instructions should be followed in the absence of manufacturer's installation instructions. VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual provides the following two diagrams provide recommended specification for installing Erosion control blankets:





References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_01_Vegetation Retention And Replacement
- ID-EC_02_Surface Cover

This page was left intentionally blank.

Appendix D

EC_04 Impermeable Sheeting

This page was left intentionally blank.



Photo Credit: VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Description

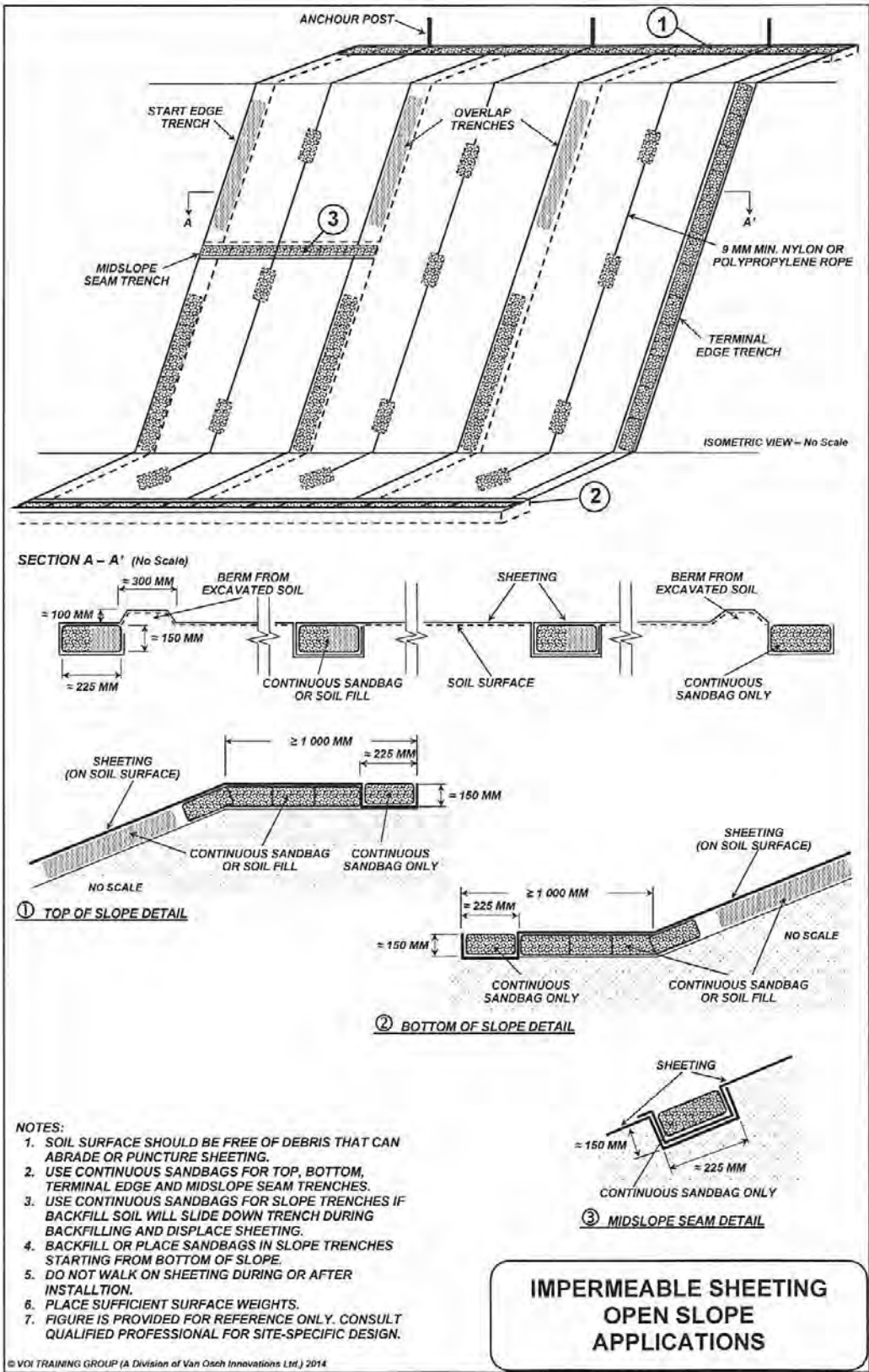
Impermeable sheeting can be used to cover erosion prone areas that require immediate and temporary short term protection, such as a stock pile or erodible soil prior to use or re-vegetation. Typically polyethylene (plastic) sheets or impermeable tarps which will later be removed and reused or recycled after use.

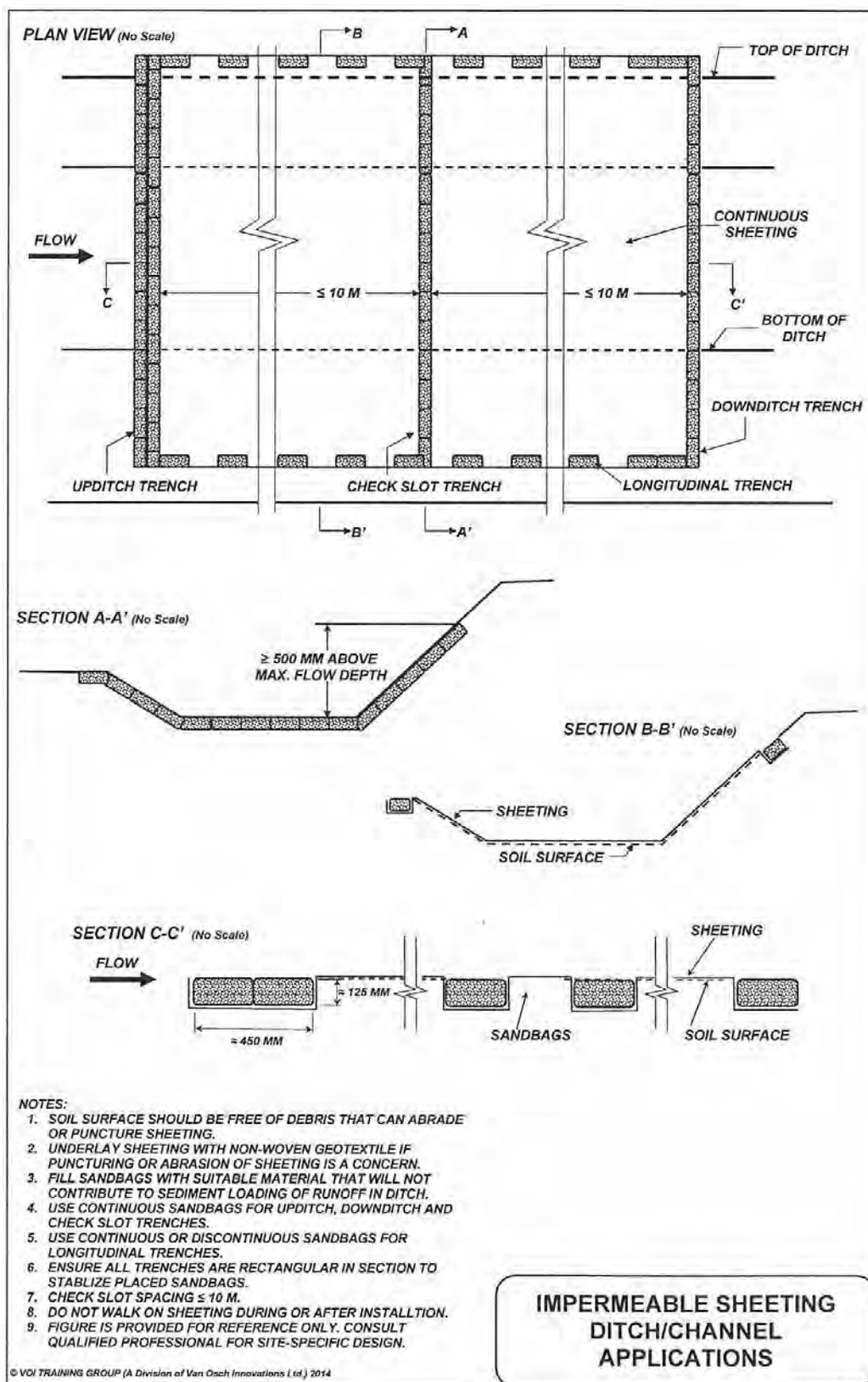
Implementation

Used for short term protection from erosion, and can be applied in most applications. Caution has to be exercised when using this method as the downslope side of the impermeable sheeting can receive high velocity and concentrated flows resulting in erosion. Precautions may have to be taken to prevent undercutting or increased erosion at the downslope extent of the sheeting.

Application

Flat Ground	Y	Large areas of exposed soil, steep terrain, stockpiles
Sloping Ground	Y	
Stockpiles	Y	
Ditches	Y	





References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_02_Surface Cover

Appendix E

EC_05 Organic Fibre Rolls (Wattles)



Photo credit: <http://www.earth-savers.com/>

Description

Organic fibres (straw, woodchips etc.) are encased in a photodegradable plastic net casing that form a tube or roll used for erosion control but sediment control as a secondary use. Installed perpendicularly across a slope it reduces erosion by shortening the slope length by providing grade breaks. They are also effective at slowing flow velocity of overland flow and retaining sediment that accumulates behind the roll instead of migrating down slope. These locations also help to retain seed and other organics that would otherwise be washed away.

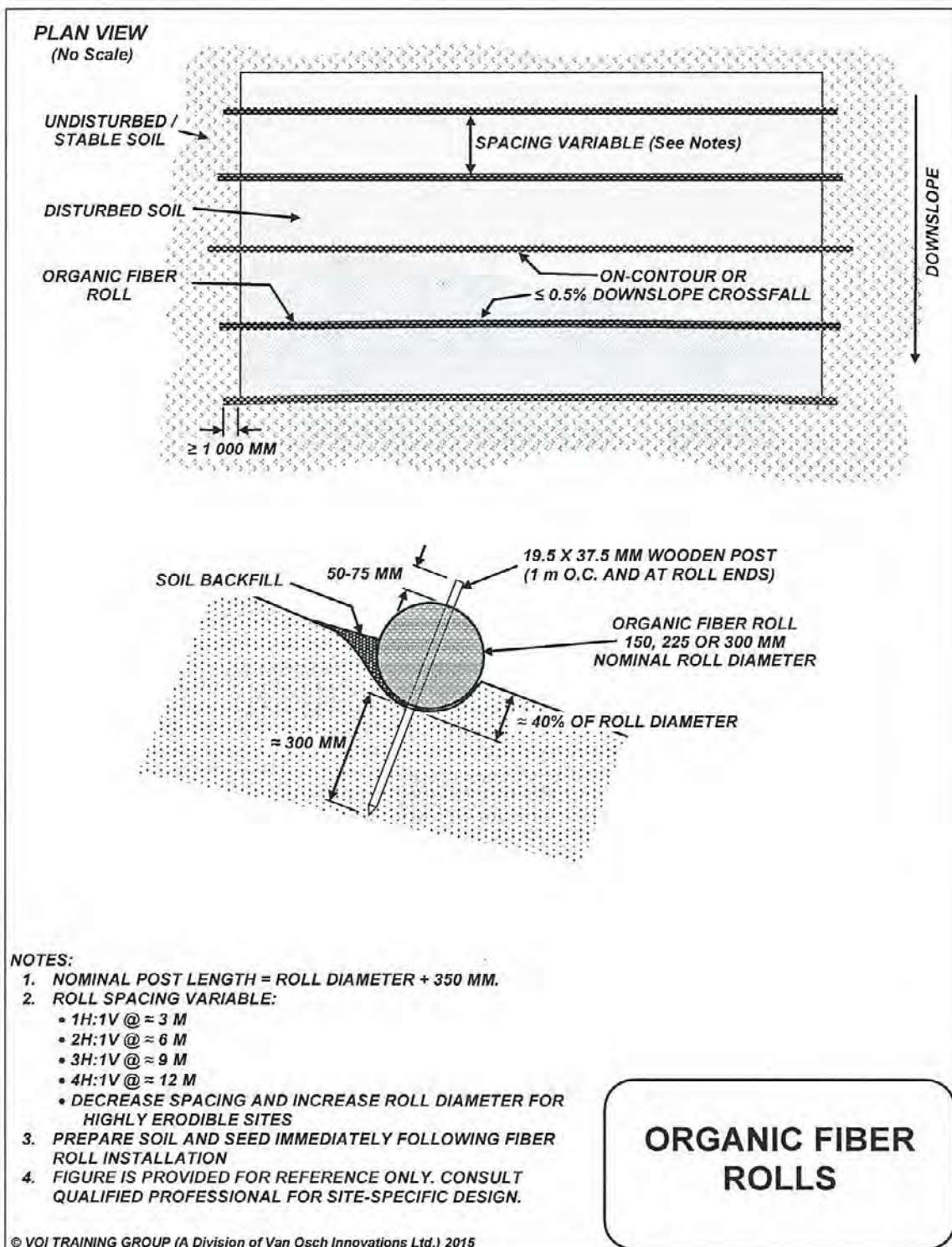
Implementation

Organic fibre rolls are typically used on steep slopes where the surface has been disturbed and at a risk of erosion. Advantageous on steep slopes as they can be installed by hand in remote sites and can be combined with other methods such as erosion control blankets to optimize protection. Intended to be used temporarily until slope is re-vegetated. The rolls cannot be installed across ditches, swales or natural water flow paths.

Application

Flat Ground	N	Steep slopes, stepped terraces
Sloping Ground	Y	
Stockpiles	N	
Ditches	N	

Installation



References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_01_VegRetentionAndReplacement
- ID-EC_03_Erosion Control Blankets
- ID-EC_04_Impermeable Sheeting

This page was left intentionally blank.

Appendix F

EC_06 Ditch Check Dams

This page was left intentionally blank.



Photo Credit: FP Innovations https://fpinnovations.ca/media/presentations/Documents/Presentation-handbook-Gillies-Erosion_and_sediment_control.pdf Photo

Description

Installed as a series of concave dams used in ditches (not fish bearing) natural swales, or overland flow paths that are carrying sediment. Used as a longer term solution to reduce erosion over the duration of onsite activities. By decreasing the grade of a ditch and decreasing flow velocities, this erosion control also has a secondary function in the capture and storage of larger sized sediments.

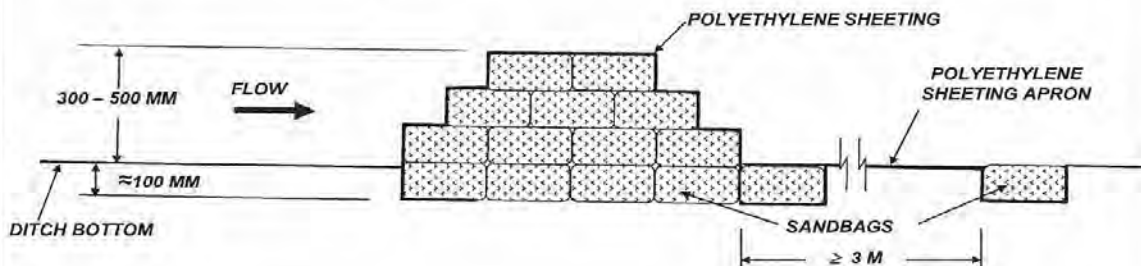
Application

Flat Ground	N	For use on drainage ditches or large diversions but not natural watercourses
Sloping Ground	N	
Stockpiles	N	
Ditches	Y	

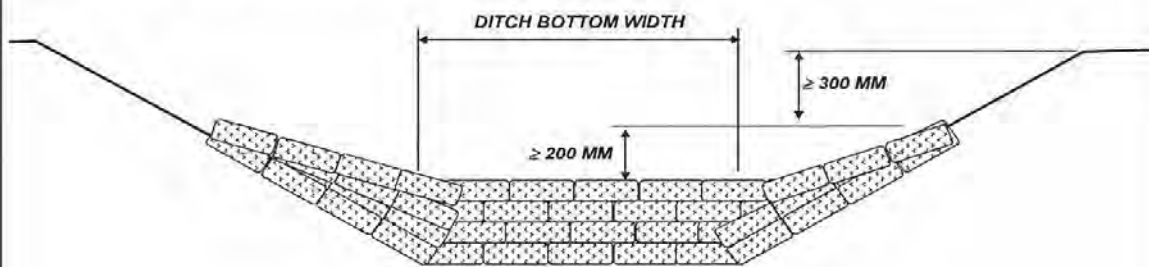
Implementation

Ditch check dams are installed in a series , with steeper slopes requiring a closer spacing to maintain a reduction in the velocity of flowing water. Check dams are most effective where drainage area is relatively small, with low velocity flow and with a low gradient or slope angle. Typically installed in ditches where water flow is eroding and scouring a channel in finer textured soils. Attention to specifications is required for effective installation, poor installation can cause undercutting and increase erosion. Can be combined with other methods such as erosion control blankets.

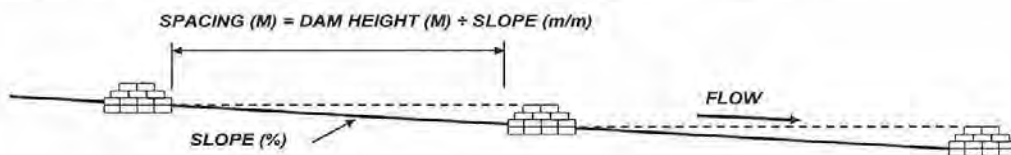
SECTION VIEW THROUGH DAM (No Scale)



SECTION VIEW ACROSS DITCH (No Scale)



PROFILE VIEW AND TYPICAL SPACING FOR SANDBAG DAMS IN DITCH (No Scale)

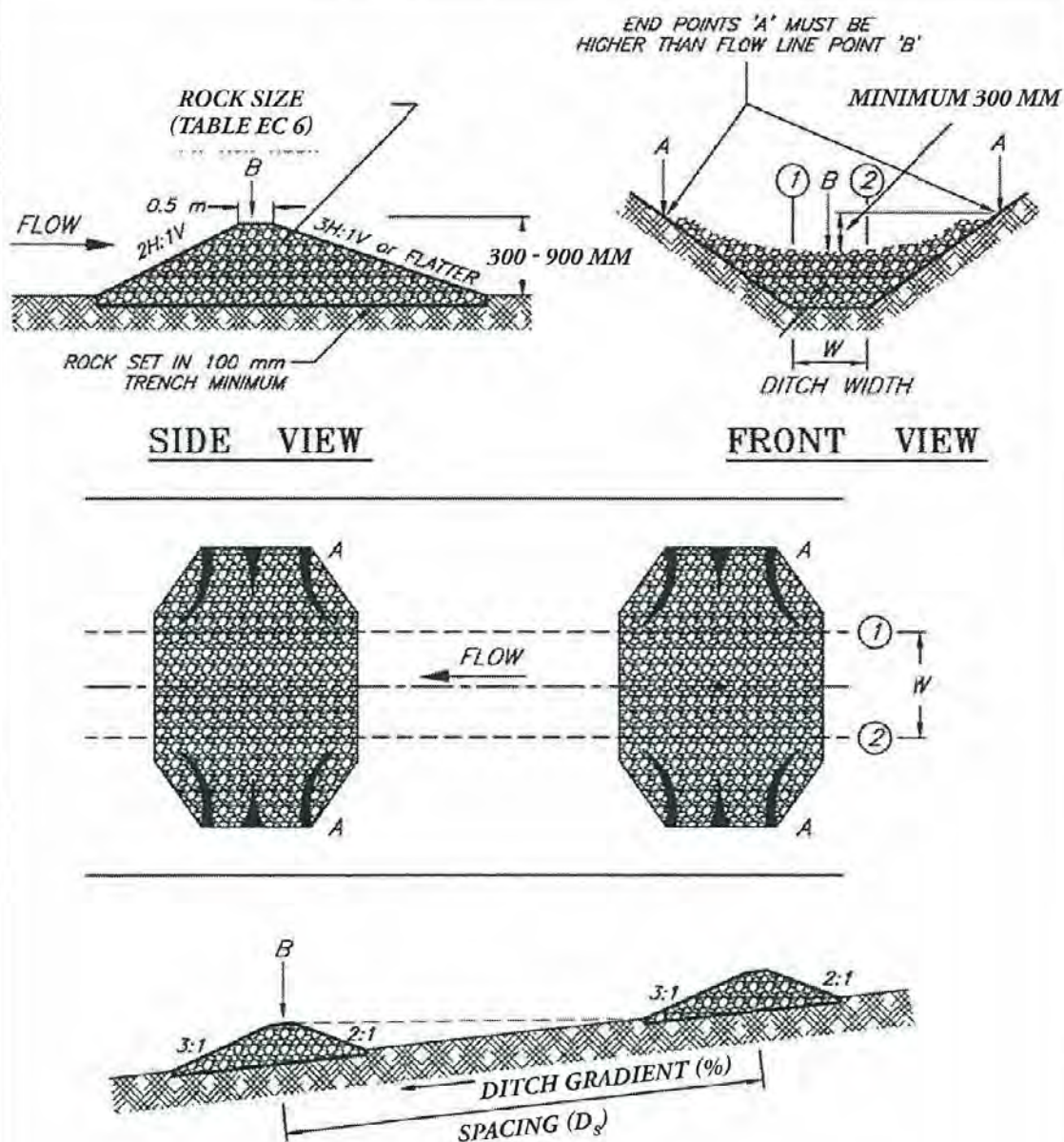


NOTES:

1. EXCAVATE NOMINAL 100MM DEEP TRENCH FOR FULL DAM FOOTPRINT.
2. INCREASE/DECREASE WIDTH, HEIGHT AND CONFIGURATION OF CHECK DAM TO MEET MINIMUM AND MAXIMUM DAM HEIGHT REQUIREMENT. RESULTING STRUCTURE MUST BE HYDRAULICALLY STABLE.
3. WRAP DAMS WITH POLYETHYLENE SHEETING AND EXTEND 3 M DOWNDITCH (MIN.) OF DAMS. IF SHEETING IS NOT INSTALLED, ALTERNATIVE EROSION RESISTANT APRON MUST BE PLACED.
4. POLYETHYLENE SHEETING 6 MIL (MIN.) THICKNESS AND OF SUFFICIENT WIDTH TO COVER ENTIRE WIDTH OF DAM.
5. DITCH MUST HAVE SUFFICIENT DEPTH TO ENSURE ALL FLOW REMAINS WITHIN DITCH.
6. DITCH SLOPE $\leq 5\%$.
7. CONTRIBUTING DRAINAGE AREA ≤ 2 HA.
8. REMOVE ACCUMULATED SEDIMENT WHEN SEDIMENT DEPTH IS $\leq \frac{1}{2}$ OF DAM HEIGHT.
9. FIGURE IS PROVIDED FOR REFERENCE ONLY. SITE SPECIFIC DESIGN SHOULD BE OBTAINED FROM QUALIFIED PROFESSIONAL.

© VOI TRAINING GROUP (A Division of Van Osch Innovations Ltd.) 2014

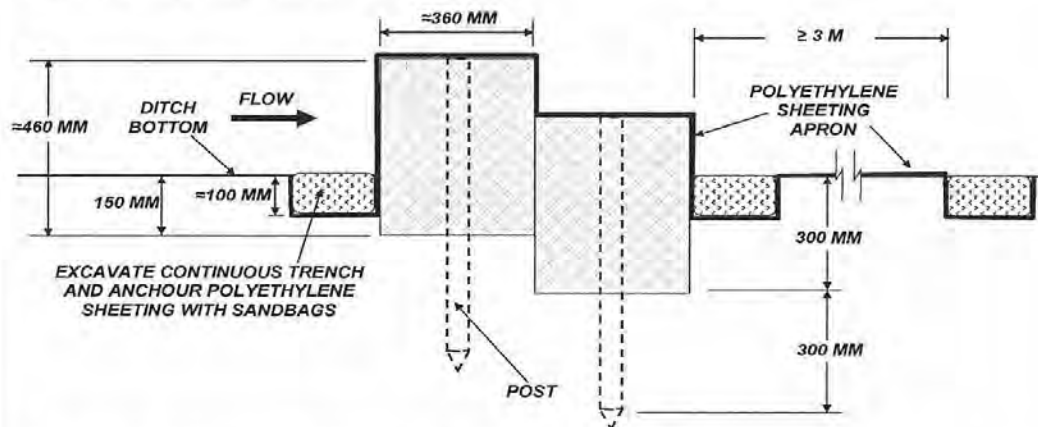
**SANDBAG
CHECK DAM**



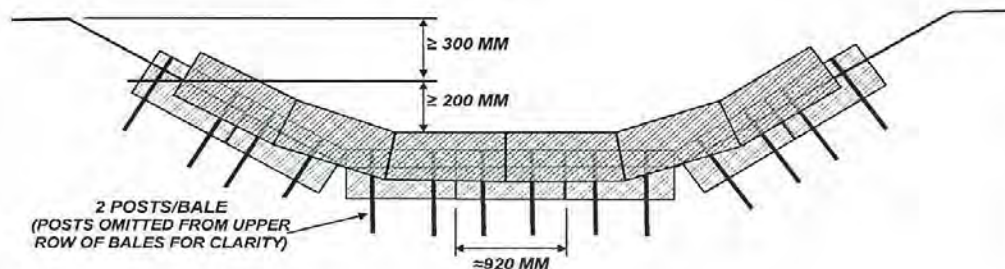
1. NOTES:
2. FLOW VELOCITY ≤ 1.5 M/S.
3. DRAINAGE AREA ≤ 4 HA.
4. DITCH GRADIENT $\leq 8\%$.
5. EXTEND ROCK APRON MIN. 3 M DOWNDITCH OF EACH CHECK DAM.
6. FIGURE IS PROVIDED FOR REFERENCE ONLY. SITE SPECIFIC DESIGN SHOULD BE OBTAINED FROM QUALIFIED PROFESSIONAL.

ROCK CHECK DAM

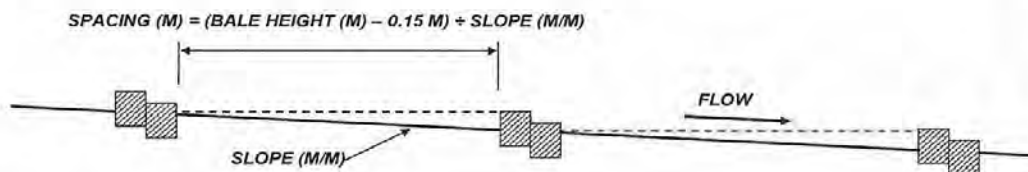
SECTION VIEW THROUGH DAM (No Scale)



SECTION VIEW DOWNDITCH ACROSS DITCH (No Scale)



PROFILE VIEW AND TYPICAL SPACING FOR DAMS IN DITCH (No Scale)



NOTES:

1. ASSUMED BALE DIMENSIONS = 920 MM X 460 MM X 360 MM.
2. CONSTRUCT DAM ONE BALE HIGH (ONLY). MAXIMUM EFFECTIVE DAM HEIGHT IS 310 MM.
3. WRAP DAMS WITH POLYETHYLENE SHEETING AND EXTEND 3 M DOWNDITCH (MIN.) OF DAMS. IF SHEETING IS NOT INSTALLED, ALTERNATIVE EROSION RESISTANT APRON MUST BE PLACED.
4. POLYETHYLENE SHEETING 6 MIL (MIN.) THICKNESS AND OF SUFFICIENT WIDTH TO COVER ENTIRE WIDTH OF DAM.
5. ANCHOUR POSTS – 25 MM X 25 MM X 800 MM WOODEN STAKE, 19 MM X 800 MM REBAR, OR 800 MM STEEL T-BAR.
6. DITCH MUST HAVE SUFFICIENT DEPTH TO ENSURE ALL FLOW REMAINS WITHIN DITCH.
7. DITCH SLOPE $\leq 5\%$.
8. CONTRIBUTING DRAINAGE AREA ≤ 2 HA.
9. REMOVE ACCUMULATED SEDIMENT WHEN SEDIMENT DEPTH ≤ 100 MM.
10. FIGURE IS PROVIDED FOR REFERENCE ONLY. SITE SPECIFIC DESIGN SHOULD BE OBTAINED FROM QUALIFIED PROFESSIONAL.

**STRAW BALE
CHECK DAM**

References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_03_Erosion Control Blankets
- ID-EC_04_Impermeable Sheeting

This page was left intentionally blank.

Appendix G

EC_07 Water Diversion



Description

Constructed temporary drainage that is used to collect and direct sediment laden surface water run off away from water courses, water bodies and wetlands and to a desirable location for sediment control. Can be constructed around the perimeter of where work is occurring. Location of drainage should consider existing topography and utilize drainage patterns where possible.

Application

Flat Ground	N	Areas with large amount of exposed soil, worksite or stock pile
Sloping Ground	Y	
Stockpiles	Y	
Ditches	Y	

Implementation

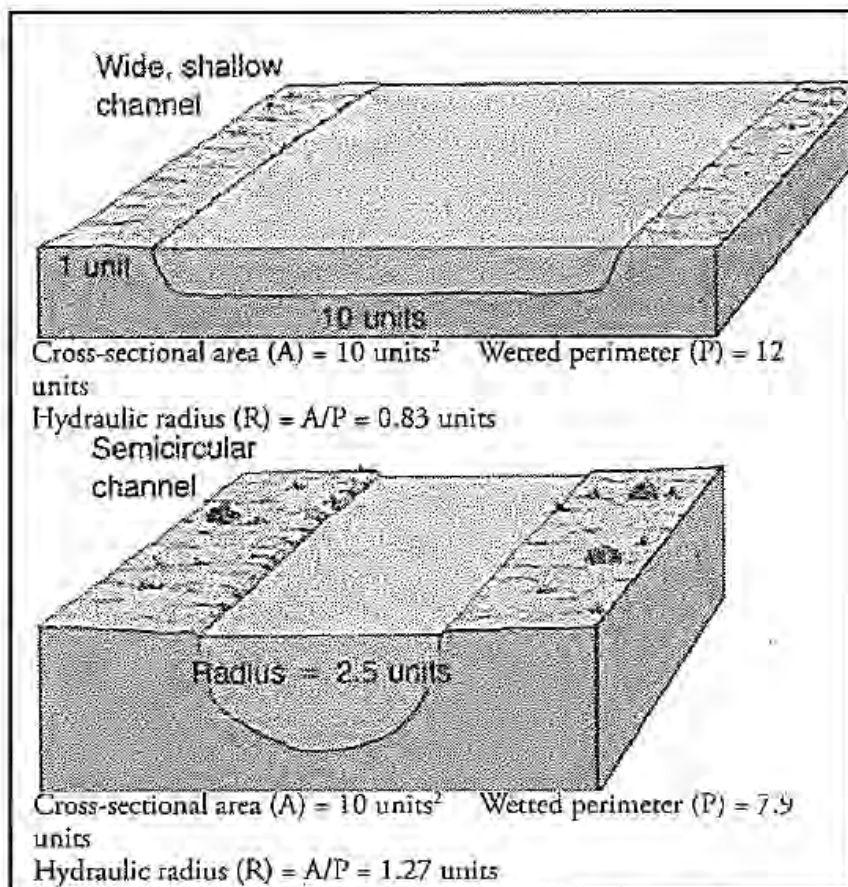
Ditching-

Can be constructed around or through active construction sites. In order to prevent erosion in areas of fine soils, the ditch may need to be lined with either, or a combination of rock (armouring), polyurethane sheeting, or geotextile fabric. Should be combined with other methods such as retention or settling ponds. These catchment areas can be created with retention berms or sediment fabric.

Berms-

Constructed using compacted lifts from soil or materials found on site, using heavy equipment. Must be inspected on a regular basis (or after rainfall) to identify any failure points that need repair. Berms must be stabilized after construction and should not be used as the primary erosion control measure, and should incorporate other erosion and sediment control methods to optimize performance.

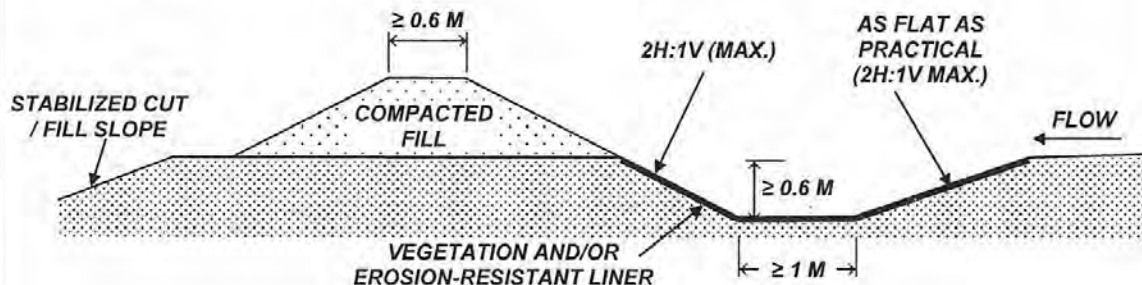
Installation



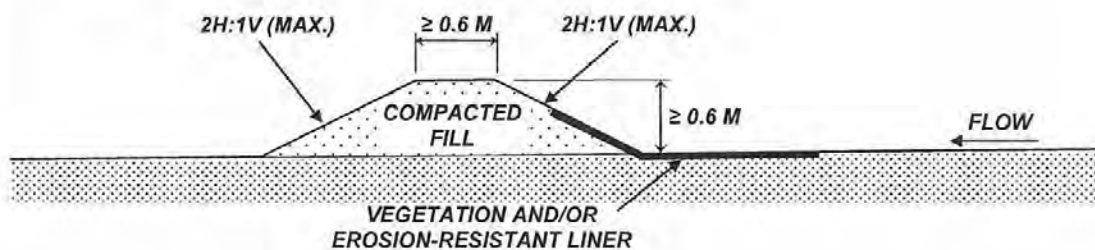
Channel shape influences hydraulic radius and applied shear stress at the channel boundary. A channel shape that decreases hydraulic radius will have deeper flow and higher channel boundary applied shear stress. Channels that decrease hydraulic radius will have shallower flow and lower channel boundary applied shear stress (adapted from Tarbuck, E.J. and E.K. Lutgens, 1990, *The Earth*, 3rd ed. Columbus, Ohio: Merrill Publishing Company.

Channel design instructions diagram provided by: VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

TYPICAL DIVERSION DITCH (No Scale)



TYPICAL DIVERSION BERM (No Scale)



NOTES:

1. DIVERSION DITCH / BERM SHALL HAVE POSITIVE DRAINAGE TO A STABILIZED OUTLET.
2. GRADIENT ALONG DITCH / BERM $\leq 0.5 \%$ DOES NOT REQUIRE EROSION-RESISTANT LINER.
3. SEED ALL DISTURBED SOIL AND INSTALL AND MAINTAIN OTHER EROSION CONTROLS AS REQUIRED.
4. FOR CATCHMENT AREAS $\leq 2 \text{ HA}$.
5. FIGURE IS PROVIDED FOR REFERENCE ONLY. SITE-SPECIFIC DESIGN SHOULD BE OBTAINED FROM QUALIFIED PROFESSIONAL.

© VOI TRAINING GROUP (A Division of Van Osch Innovations Ltd.) 2014

TEMPORARY DIVERSION DITCH AND BERM

References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_03_Erosion Control Blankets
- ID-EC_04_Impermeable Sheeting
- ID-EC_06_Ditch Check Dams

Appendix H

EC_08 Timber Matting

This page was left intentionally blank.



Description

Timber mats (Rig mats, swamp mats) are portable mats that are constructed of non-treated wood or plastic which are placed over an area in a network to create a work platform or structural roadway. Matting reduces ground pressure and compaction from heavy equipment by increasing the surface area. This allows for passage or work to take place over sensitive or unstable ground while protecting it and minimizing ground surface disruption. Matting minimizes the amount of compaction and rutting that takes place which can predispose to erosion.

Implementation

Can be utilized in any area of concern such as in areas with thawing or unfrozen ground conditions, riparian areas and other environmentally sensitive sites. Can be used to prevent soil compaction, rutting and as a tool for biosecurity mitigation as it help to minimize ground surface disruption and soil contact.

Application

Flat Ground	Y	Flat ground at risk of erosion due to sensitivities or weather conditions
Sloping Ground	N	
Stockpiles	N	
Ditches	N	

Installation

- Verify that mats are clean and free of soil, debris and plant material when they arrive for use on site.
- Mats cannot be constructed of chemically treated wood products.
- In wetlands three mats is the maximum number that can be stacked and used in one location.
- Follow the biosecurity management plan for cleaning washing and disinfecting matting prior to moving it to a new project location.
- Matting should not impede or redirect natural drainage patterns or water courses.
- Mat removal will take place from the existing mat road, working in a backwards fashion (from work site to initial access point).
- When mat removal is complete all remaining matting debris will be cleaned, up and transported to an approved waste disposal facility
- When matting is removed any compaction of soils will have to be rehabilitated

References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_03_Erosion Control Blankets

Appendix I

EC_09 Wind Erosion Control

This page was left intentionally blank.



Description

Wind can be a mechanism of erosion, particularly for dry, finely textured soils with low organic content that is exposed by construction activities. Wind erosion can influence local air quality on the project site and be a source of sediment for water bodies. Areas of potential wind erosion are roads, stockpiles, exposed soil and helicopter landing pads.

Mitigation Implementation

Wind erosion can be minimized by reducing the factors that cause it, by covering susceptible soils or reducing the amount and duration of exposure.

- The most common method of chemical free dust control approved by Manitoba Hydro is the periodic application of water to the surface.
- If stockpiles are retained for an extended period or during high wind events they can be wetted and or covered with impermeable sheeting.
- Longer term retention of stockpiles could also reduce erosion by packing them with equipment and or converting them to low profile berms.
- Erosion control blankets, impermeable sheeting, surface cover, as well as vegetation retention and replacement are effective ways to stabilize soil and prevent wind erosion in the majority of situations.

Also See

- ID-EC_04_Impermeable Sheeting
- ID-EC_03_Erosion Control Blankets
- ID-EC_01_Vegetation Retention And Replacement
- ID-EC_02_Surface Cover

This page was left intentionally blank.

Appendix J

SC_01 Sediment Fencing

This page was left intentionally blank.

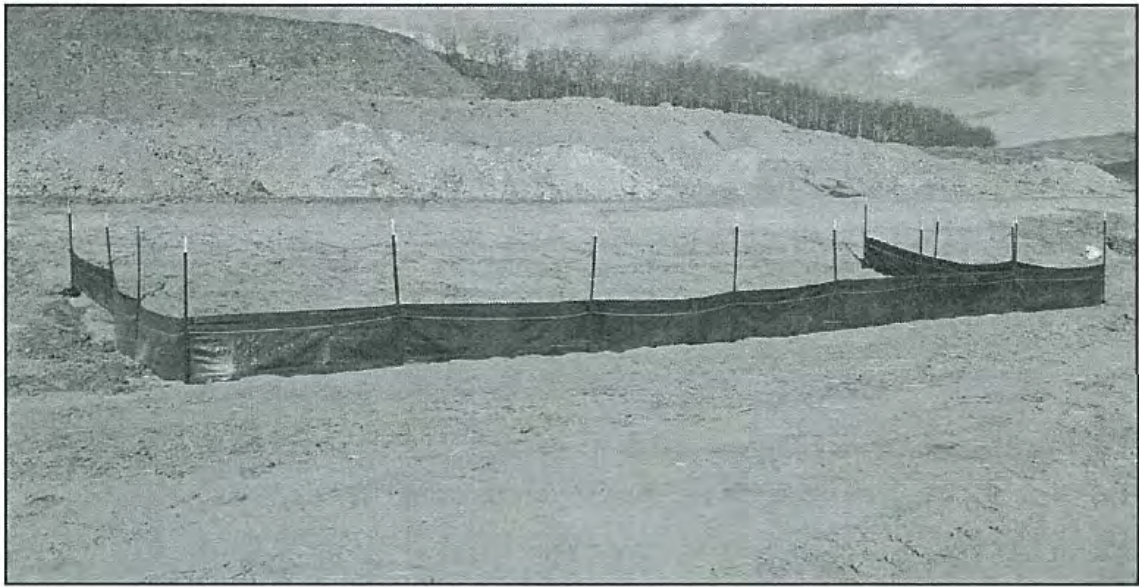


Photo Credit: VOI Training Group’s Erosion and Sediment Control Practitioner (ESCP) Participant’s Manual

Description

Permeable geotextile fabric installed vertically, supported by posts with the bottom of the fabric buried in a trench at the bottom. Designed to prevent transport of sediment off site. Sediment fencing is designed to be used as a sediment catch basin but not as a “filter” which is commonly thought. It acts as an above ground settling pond to provide an area of catchment where water can remain still and allow sediment to settle out. Sediment fencing requires frequent monitoring and maintenance to remain effective.

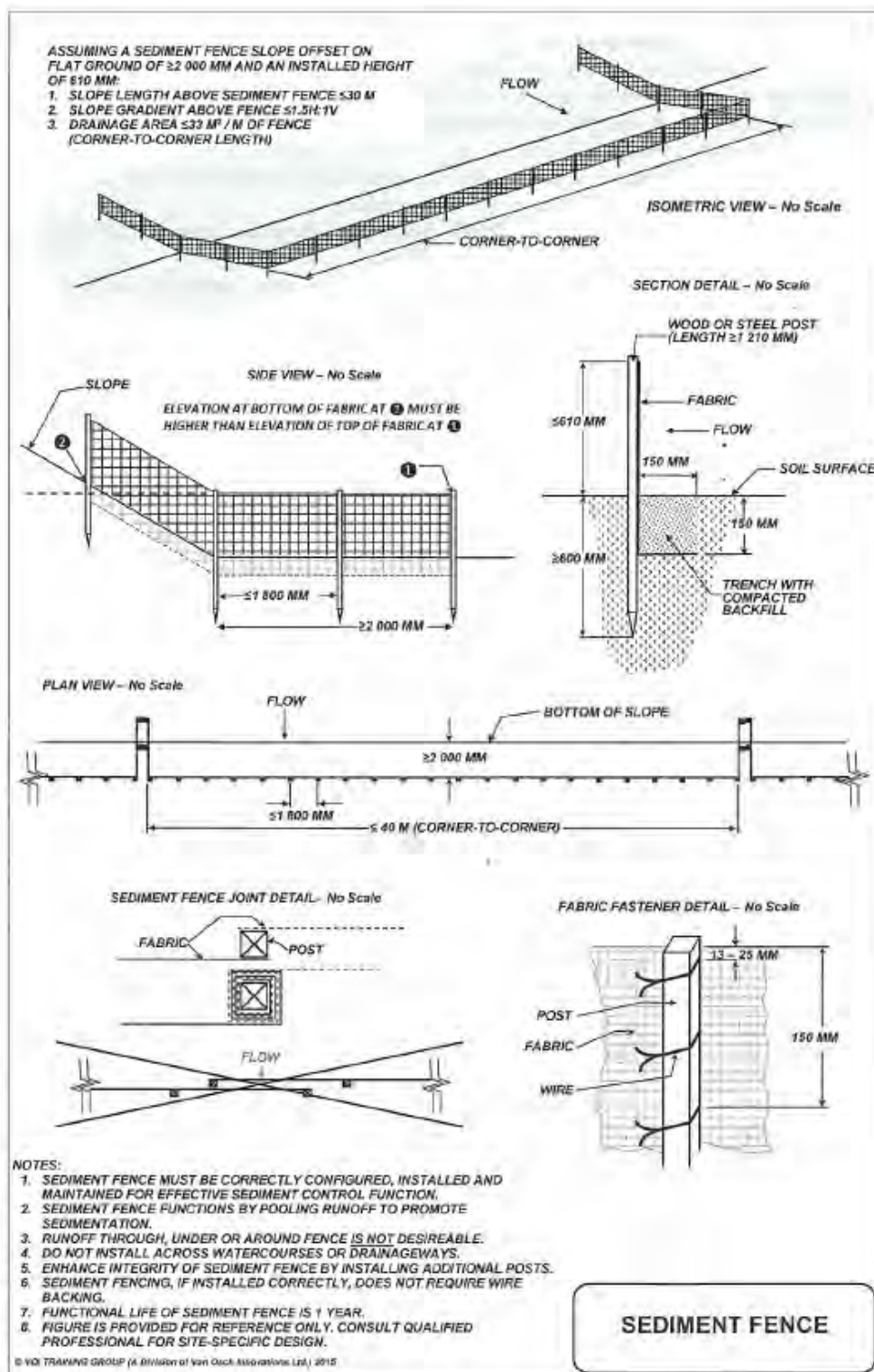
Implementation

Note that correct installation of this sediment control measure is crucial to its effectiveness and the level of maintenance it will require. Installed downslope from construction activities, and used with other control measures (such as straw wattles/roles, or sediment check dams). Should follow the contour of the slope with have sides going upslope making the shape of a “U” or a “smile” to trap water. Minimize the amount of joints if any in the fabric. Regular inspections of the fence should occur, especially after rain events.

Application

Flat Ground	Y	Anywhere low flow runoff is a concern and retention of sediment
Sloping Ground	Y	
Stockpiles	Y	
Ditches	Y	

Installation



References

- VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

Also See

- ID-EC_07_Water Diversion
- ID-SC_02_Sediment Retention Berm

This page was left intentionally blank.

Appendix K

SC_02 Sediment Retention Berm

This page was left intentionally blank.



Description

Berms are constructed with heavy equipment using wood chips, soil or bulk material found on site. Purpose of retention berm is to force low volumes of overland flow to pool, allowing sediment to settle out of suspension. Must be inspected on a regular basis (or after rainfall) to identify any failure points that need repair. Berms should not be used as the primary erosion control measure, and should incorporate other erosion and sediment control methods to optimize performance.

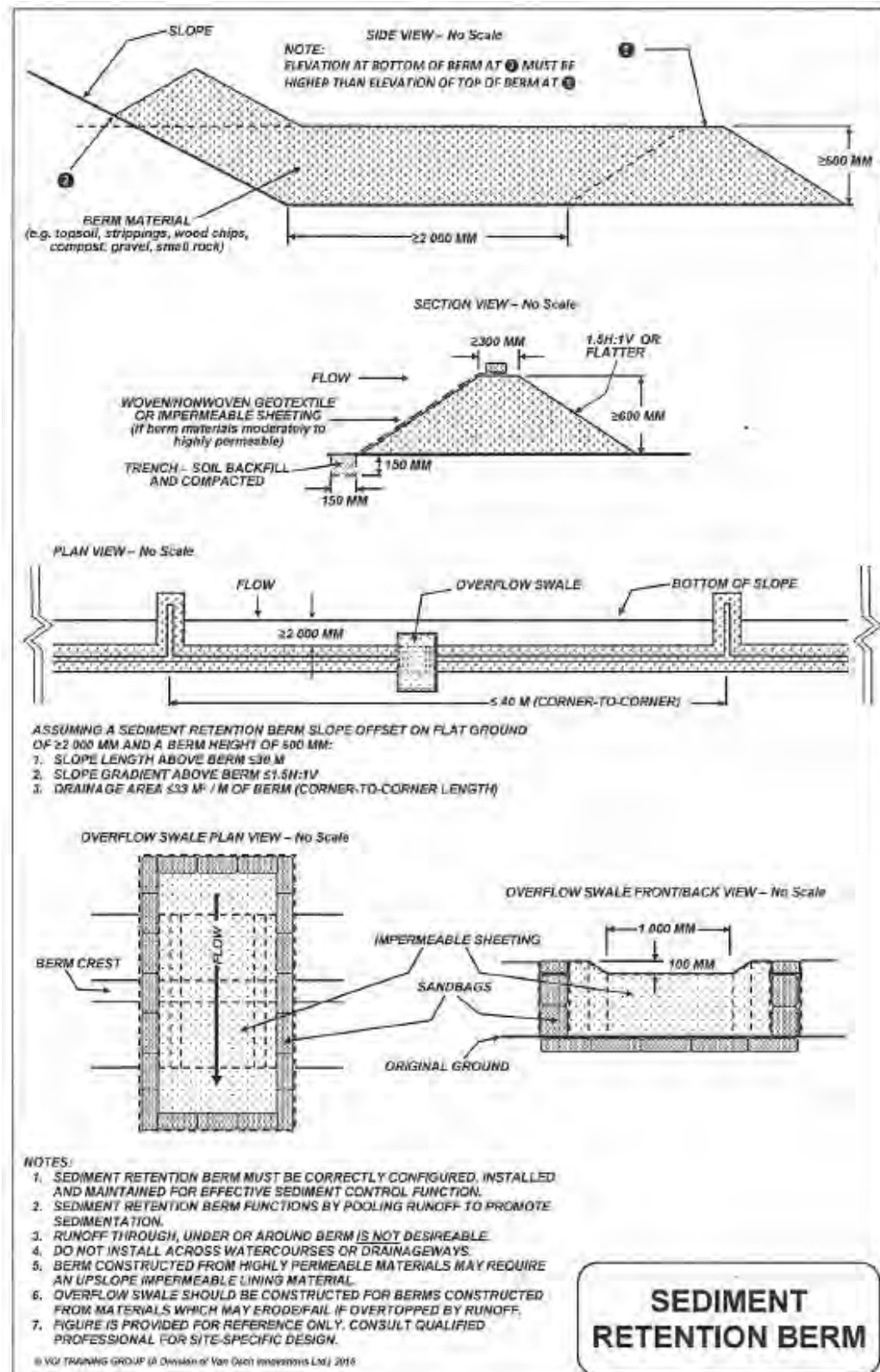
Implementation

Located on the downslope of construction activities where a sediment pond or catch basin has been designed to contain site run off. Layout of the berm should follow the site contour and forming a “U” shape or a “smile” configuration with the ends going upslope. Do not install across a drainage ditch or watercourse.

Application

Flat Ground	Y	Anywhere low flow runoff is a concern and retention of sediment
Sloping Ground	Y	
Stockpiles	Y	
Ditches	Y	

Installation



**SEDIMENT
RETENTION BERM**

References

- VOI Training Group’s Erosion and Sediment Control Practitioner (ESCP) Participant’s Manual

Also See

- ID-EC_04_Impermeable Sheeting
- ID-EC_07_Water Diversions
- ID-SC_01_Sediment Fencing

This page was left intentionally blank.

Appendix J: Saturated/Thawed Soils Operating Guidelines

This page was left intentionally blank.

Birtle Transmission Project



Saturated/Thawed Soils Operating Guidelines

June 2020

This page was left intentionally blank.

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
FINAL 1.0	APPROVED VERSION PUBLISHED			2020_0610

This page was left intentionally blank.

Table of contents

1.0	Intent and Implementation	3
2.0	Consideration of Guidelines when Planning Work.....	5
3.0	Potential effects.....	5
4.0	Weather parameters.....	5
5.0	Rutting and Admixing identification.....	6
6.0	Remediation.....	7
7.0	Guidelines by land cover	5
7.1	Wetlands.....	5
7.2	Riparian areas and areas in proximity to water.....	6
7.3	Cultivated lands	7
7.4	Access routes and trails.....	8
7.5	Forest, tame pasture and grasslands.....	9

Figures

Figure 1: Rut Measurement Guide.....	6
Figure 2: Beginning of Admixing.....	7
Figure 3: Advanced Soil Admixing.....	7

This page was left intentionally blank.

1.0 Intent and Implementation

These operating guidelines define Contractor requirements with respect to saturated and/or thawed soils, including trigger conditions, assessment criteria, potential work modification options, thresholds for work shutdown, and plan submittal requirements.

These operating guideline are applicable to all Project Components including but not limited to the access roads/trails, right of way, marshalling yards (i.e. laydown yards, fly-yards) and temporary structures (i.e. stringing sites).

The process for utilization of these operating guidelines is:

1. The Contractor monitors site conditions against Trigger conditions
2. The Contractor assesses Criteria to determine if Work Modification is required
3. The Contractor determines the Work Modification (if applicable) that will be applied and submit their plan to Manitoba Hydro for Review.
 - a. Plan submittal shall occur promptly.
 - b. Unless the Work Modification chosen is stoppage of work, the work may proceed (with Work Modifications implemented) prior to Manitoba Hydro providing review comments to the Contractor.
 - c. The Contractor shall notify Manitoba Hydro each time when/if the Contractor determines that any specific Work Modification is no longer required.
4. If the Threshold for a particular land cover type is exceeded:
 - i. The Contractor shall reassess Criteria and submit a revised Work Modification plan to Manitoba Hydro for Review. Plan resubmittal shall occur promptly. Unless the Work Modification chosen is stoppage of work, the work may proceed (with Work Modifications implemented) prior to Manitoba Hydro providing review comments to the Contractor.
 - ii. Manitoba Hydro may issue an Environmental Improvement Order or an Environmental Stop Work Order depending on the severity of the non-compliance, in accordance with the Contract.
5. A record of the location, timing, and reason for implementation of work stoppages, work resumptions, and Work Modifications will be maintained by the Contractor Environmental Representative and submitted to Manitoba Hydro in the Weekly Environmental Report.

This page was left intentionally blank.

2.0 Consideration of Guidelines when Planning Work

The Contractor shall plan, sequence, and schedule work activities in a manner that reduces environmental impact risks and the need for Work Modifications by reducing the activities occurring in saturated/thawed soil conditions. . The Contractor is responsible for developing any related protocols to facilitate the implementation of these guidelines.

Site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro (MH) representatives for review.

3.0 Potential effects

The effects of wet weather during construction activities can have a significant impact on ground conditions and can change otherwise stable soils into soils that are affected by erosion and sedimentation. Freeze thaw cycles during the spring can also expose stable soils to an unstable condition overnight and throughout the day. Variations in soil conditions, construction activities, weather conditions, soil types and land cover are all contributing factors when considering working conditions and potential impacts to soil during saturated or thawed conditions. Potential effects to various types of land cover include:

- Compaction, which is considered the primary mechanism of effect to soil productivity and can affect re-vegetation success and crop performance.
- Rutting and admixing (mixing of topsoil and subsoils).
- Increased risk of water erosion and sedimentation in riparian areas affecting water quality and fish habitat.
- Access restrictions for traditional resource users, farmers, and the public due to road or trail rutting.

4.0 Weather parameters

Weather plays an integral role in the planning of work activities. Conditions such as spring thaw, shorter term warmer temperature periods, and heavy precipitation may require implementation of Work Modification, including localized work stoppage until ground conditions improve. The following weather events will trigger assessment for Work Modifications:

- Melting conditions indicated by rising air temperatures above -5° Celsius
- During extended periods of adverse conditions (for rain is considered greater than 5 mm of rain in a 24 hour period)
- more than 50 mm of rain/5 cm of wet snow in the preceding 5 days; or
- the forecast calls for more than 50% certainty of 5 mm of rain/or 5 cm of wet snow in the next 24 hours

5.0 Rutting and Admixing identification

A rut is a depression made into the soil surface by the passage of a vehicle or equipment. Figure 1 illustrates how a rut is measured. Admixing – Examples of rutting can be found in Figure 2 which shows the beginning of soil admixing and Figure 3 shows advanced stages of admixing from continued travel.

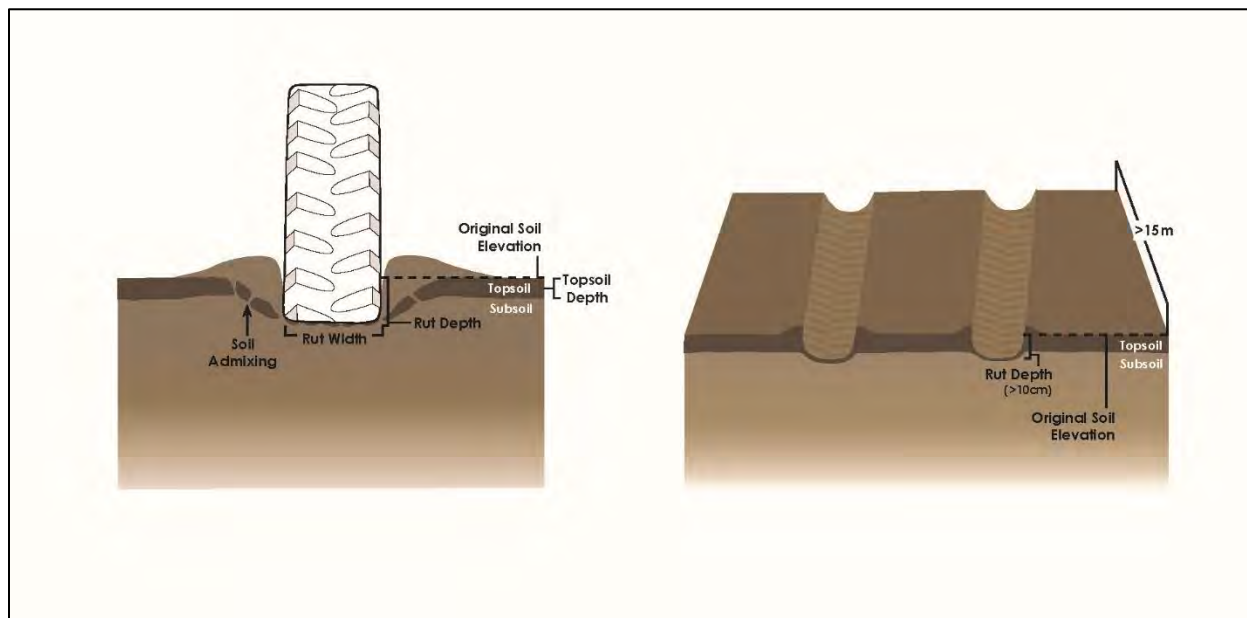


Figure 1: Rut Measurement Guide



Figure 2: Beginning of Admixing



Figure 3: Advanced Soil Admixing

6.0 Remediation

The level and type of disturbance at each individual site will dictate the amount of remediation necessary. Re-vegetation and/or erosion and sediment controls are site-specific conditions to be considered when planning remediation activities. Refer to the Erosion and Sediment Control Management Plan and the Rehabilitation and Invasive Species Management Plan for further guidance for each disturbed site.

This page was left intentionally blank.

7.0 Guidelines by land cover

7.1 Wetlands

Trigger(s) for the Assessment for Work Modification by Contractor

- When air temperature is projected to exceed -5°C that day or when ground conditions cannot support equipment without rutting and compaction; or
- MH Environmental Officer advises Contractor of requirement for potential work modification

Criteria to be assessed by the Contractor (Manitoba Hydro may conduct its own assessment)

- current and forecasted weather
- current ground conditions
- work schedule
- nature of work activities (i.e., pedestrian traffic vs heavy equipment)
- safety concerns

Potential Work Modifications (site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro for review)

- placement of matting or snow
- low(er) ground pressure equipment
- reduced scope of work
- aerial work methods
- change of work hours
- change of work location
- stoppage of work
- Other modifications as approved by Manitoba Hydro

Thresholds for immediate implementation of Work Modification(s):

- When the depth of rutting exceeds 10 cm for more than 15 m in length;
- Admixing (mixing of topsoil and subsoils); or
- MH Environmental Officer advises Contractor of requirement for work modification.

If thresholds continue to be exceeded, either due to inadequate Work Modifications or lack of Work Modification, Manitoba Hydro may issue an Environmental Improvement Order or an Environmental Stop Work Order depending on the severity of the non-compliance, in accordance with the Contract.

7.2 Riparian areas and areas in proximity to water

Trigger(s) for the Assessment for Work Modification by Contractor

- Any excessive soil disturbance within riparian area including disturbance on the access trail crossing, ground conditions unable to support equipment without rutting and compaction; or
- MH Environmental Officer advises Contractor of requirement for work modification.

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment)

- | | |
|-----------------------------------------|---------------------------------------------------------------------------|
| • current and forecasted weather | • nature of work activities (i.e., pedestrian traffic vs heavy equipment) |
| • current ground and aquatic conditions | • accessibility to Project site(s) |
| • work schedule | • safety |

Potential Work Modifications (site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro for review)

- | | |
|-------------------------------------|-----------------------------------------------------|
| • placement of matting or snow | • closure of access trail within riparian area |
| • ice bridge | • change of work hours |
| • low(er) ground pressure equipment | • change of work location |
| • reduced scope of work | • stoppage of work |
| • aerial work methods | • Other modifications as approved by Manitoba Hydro |

Thresholds for immediate implementation of Work Modification(s):

- Any construction activity that affects surface water drainage directly into a water body (watercourse and/or wetland) without sufficient erosion and sediment control measure in place;
- Admixing (mixing of topsoil and subsoils); or

- MH Environmental Officer advises Contractor of requirement for work modification.

If thresholds continue to be exceeded, either due to inadequate Work Modifications or lack of Work Modification, Manitoba Hydro may issue an Environmental Improvement Order or an Environmental Stop Work Order depending on the severity of the non-compliance, in accordance with the Contract.

7.3 Cultivated lands

Trigger(s) for the Assessment for Work Modification by Contractor

- When the depth of topsoil is rutted to 50% of the depth of topsoil for more than 15 m in length; or
- MH Environmental Officer advises Contractor of requirement for potential work modification

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment)

- | | |
|--------------------------------------|---------------------------------------------------------------------------|
| • current and forecasted weather | • work schedule |
| • current ground conditions | • nature of work activities (i.e., pedestrian traffic vs heavy equipment) |
| • current crop and farming practices | • accessibility to Project site(s) |
| • depth of topsoil | • safety |
| • salinity | |

Potential Work Modifications (site-specific work modifications will be developed by the Contractor, and proposed to Manitoba Hydro for review with the landowner)

- | | |
|-----------------------------------|-----------------------------------------------------|
| • placement of matting or snow | • change of work location |
| • lower ground pressure equipment | • stoppage of work |
| • reduced scope of work | • Other modifications as approved by Manitoba Hydro |
| • aerial work methods | |
| • change of work hours | |

Thresholds for immediate implementation of Work Modification(s):

- When rutting depth of topsoil exceeds 80% of the topsoil depth for more than 15 m in length;
- Admixing (mixing of topsoil and subsoils); or

- MH Environmental Officer advises Contractor of requirement for immediate work modification.

If thresholds continue to be exceeded, either due to inadequate Work Modifications or lack of Work Modification, Manitoba Hydro may issue an Environmental Improvement Order or an Environmental Stop Work Order depending on the severity of the non-compliance, in accordance with the Contract.

7.4 Access routes and trails

Trigger(s) for the Assessment for Work Modification by Contractor

- When access route or trail conditions caused by the Project create additional risk of damage or barriers to movement to vehicles of other users; or
- MH Environmental Officer advises Contractor of requirement for potential work modification.

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment)

- | | |
|----------------------------------|---------------------------------------------------------------------------|
| • current and forecasted weather | • nature of work activities (i.e., pedestrian traffic vs heavy equipment) |
| • current ground conditions | • accessibility to Project site(s) |
| • work schedule | • safety |

Potential Work Modifications (site-specific work modification(s) will be developed by the Contractor, and proposed to Manitoba Hydro for review with the landowner)

- | | |
|----------------------------------------------|-----------------------------------------------------|
| • placement of matting or snow | • change of work hours |
| • lower ground pressure equipment | • change of work location |
| • closure of access route to Project traffic | • stoppage of work |
| • aerial work methods | • Other modifications as approved by Manitoba Hydro |

Thresholds for immediate implementation of Work Modification(s):

- Any evidence of access route/trail structure damage occurring, such as admixing, or the creation of ruts that impedes local vehicle traffic; or
- MH Environmental Officer advises Contractor of requirement for immediate implementation of work modification.

If thresholds continue to be exceeded, either due to inadequate Work Modifications or lack of Work Modification, Manitoba Hydro may issue an Environmental Improvement Order or an Environmental Stop Work Order depending on the severity of the non-compliance, in accordance with the Contract.

7.5 Forest, tame pasture and grasslands

Trigger(s) for the Assessment for Work Modification by Contractor

- When rutting depth exceeds 10 cm for more than 15 m in length; or
- MH Environmental Officer advises Contractor of requirement for immediate implementation of work modification(s).

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment)

- current and forecasted weather
- current ground conditions
- work schedule
- nature of work activities (i.e. pedestrian traffic vs heavy equipment)
- accessibility to Project site(s)
- safety

Potential Work Modifications (site-specific work modifications will be developed by the Contractor, and proposed to Manitoba Hydro for review with the landowner)

- placement of matting or snow
- lower ground pressure equipment
- reduced scope of work
- aerial work methods
- change of work hours
- change of work location
- stoppage of work
- Other modifications as approved by Manitoba Hydro

Thresholds for immediate implementation of Work Modification(s):

- When rutting depth exceeds 30 cm for more than 15 m in length;
- Admixing (mixing of topsoil and subsoils); or
- MH Environmental Officer advises Contractor of requirement for immediate implementation of work modification.

If thresholds continue to be exceeded, either due to inadequate Work Modifications or lack of Work Modification, Manitoba Hydro may issue an Environmental Improvement Order or an Environmental Stop Work Order depending on the severity of the non-compliance, in accordance with the Contract.

This page was left intentionally blank.

Appendix L: Cultural and Heritage Resources Protection Plan

This page was left intentionally blank.



STANDARD CULTURAL AND HERITAGE RESOURCES PROTECTION PLAN

This page was left intentionally blank.

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
Final 1.0	Document has been approved and published			2020_0610 9

This page was left intentionally blank.

Key messages for construction

Workers in the field should remain vigilant to watch for and report any discoveries. Manitoba Hydro expects workers to report any findings to the Manitoba Hydro On-Site Supervisor or designate.

If human remains, a cultural and/or heritage site are found, activities stop at that location.

The Manitoba Hydro Licensing and Environmental Assessment Department is prepared to offer the required support to On-Site Supervisors including archaeological services, to preserve and protect cultural and heritage resources. LEA can be contacted at 1-877-343-1631 or leaprojects@hydro.mb.ca.

Potential fines

Under The Heritage Resources Act, any person who contravenes or fails to observe a provision of this Act or a regulation, order, by-law, direction or requirement made or imposed thereunder is guilty of an offence and liable, on summary conviction, where the person is an individual, to a fine of not more than \$5,000. for each day that the offence continues and, where the person is a corporation, to a fine of not more than \$50,000. for each day that the offence continues.

This page was left intentionally blank.

Preface

This standard Cultural and Heritage Resources Protection Plan outlines protection measures and protocols that Manitoba Hydro, its contractors and/or consultants will undertake in the event of the discovery of previously unrecorded cultural and **heritage resources** during construction, maintenance or operation of an electrical or gas transmission line or facility.

The intent for this document is to be a straightforward and practical reference document for use by the Manitoba Hydro On-Site Lead, Environmental Inspector and/or Indigenous Communities and Organizations. Manitoba Hydro - Licensing and Environmental Assessment Department encourages anyone to provide feedback on this document and will review this plan on an annual basis. Feedback can be provided to LEAprojects@hydro.mb.ca.

Some words in the text are in **bold face** the first time they occur in the document and definitions are included in the glossary in section 3.0.

This page was left intentionally blank.

Table of contents

1.0	Introduction.....	1-1
1.1	Commitment to environmental protection.....	1-1
1.2	Regulatory and policy setting.....	1-1
1.3	Implementation.....	1-2
1.4	On-site project management structure	1-3
1.5	Human remains.....	1-3
1.6	Heritage resources.....	1-5
1.7	Cultural resources.....	1-6
1.8	Practices that Manitoba Hydro will follow if cultural and heritage resources are found.....	1-6
2.0	Reporting and follow-up.....	2-9
3.0	Glossary of terms	3-11
	Appendix A: Resources Identification Guide.....	13
	Appendix B: Cultural and heritage resource protection protocol.....	19

This page was left intentionally blank.

1.0 Introduction

Manitoba Hydro understands and appreciates the value that Manitobans place on cultural and heritage resources and the rich legacy found throughout our Province. Manitoba Hydro's commitment to safeguarding these resources has led to the development of this Cultural and Heritage Resources Protection Plan (CHRPP). The CHRPP will provide clear instructions if Manitoba Hydro, its contractors and/or consultants, discover or disturb a cultural or heritage resource and will determine the ongoing protection measures for the resources through processes outlined in this document.

1.1 Commitment to environmental protection

Protecting the environment is an integral part of everything Manitoba Hydro does. Manitoba Hydro accomplishes this by integrating environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the full cooperation of Manitoba Hydro employees, consultants and contractors at all stages of the Project from planning and design through construction and operational phases.

The use of a Cultural and Heritage Resources Protection Plan (CHRPP) is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential discoveries of **human remains**, cultural and heritage resources.

Manitoba Hydro is committed to implementing this CHRPP. Manitoba Hydro will also require companies that contract with us to follow the terms of this and other applicable plans.

1.2 Regulatory and policy setting

Legislation that commonly applies to cultural and heritage resources for construction, maintenance or operation of transmission lines or facilities includes: *The Heritage Resources Act (The Act)* and the *Province of Manitoba Policy Concerning the Reporting, Exhumation and Reburial of Found Human Remains (Burials Policy)*. This CHRPP is consistent with and does not replace the above. In effect, the CHRPP builds on the protective measures afforded by *The Act and policy*.

1.3 Implementation

The goal of the CHRPP is to act as a reference manual to describe key actions in the event of discovery of cultural or heritage resources or human remains. Manitoba Hydro will inform relevant employees and contractors working on the Project of the contents of applicable regulatory specifications, guidelines, licenses, authorizations and permits, and of this Plan, and copies will be available from the On-Site Lead office.

The plan also allows for adaptive management to include new and evolving strategies, protocols and information to support and protect culture and heritage resources. Appendix B includes a Protocol template that interested communities and organizations can complete to augment and enhance this CHRPP.

This Protocol could provide feedback on items such as:

- Whether the community/organization wants Manitoba Hydro to contact them upon discovery of unrecorded cultural or heritage resources
- Who and how to contact the Community Representative(s) upon discovery of unrecorded cultural or heritage resources
- When the Community Representative(s) would like to be contacted
- Description of the Area of Interest the Community feels may contain heritage and **cultural resources** important to them
- General types of cultural and heritage resources that may be in Area of Interest
- Ceremonial or spiritual activities the community would like conducted prior to construction
- Any other concerns the community may have with regard to cultural and heritage resources
- Whether the community has received a copy of this Standard CHRPP

Upon the discovery of unrecorded cultural or heritage resources, Manitoba Hydro will follow the steps outlined in section 1.8 in conjunction with the applicable attached Protocols.

1.4 On-site project management structure

Manitoba Hydro staff and consultants will be required to undertake activities, steps, procedures and measures set out in the Figure 1-1 and Figure 1-2 should cultural or heritage resources or human remains be discovered during the construction, operation or maintenance of the project. There is a potential to discover cultural and heritage resources in many different locations and workers in the field should remain vigilant to watch for and report any discoveries. Manitoba Hydro expects workers to report any findings to the Manitoba Hydro On-Site Supervisor or designate.

The Manitoba Hydro Licensing and Environmental Assessment Department is prepared to offer the required support to On-Site Supervisors including archaeological services, to preserve and protect cultural and heritage resources. LEA can be contacted at 1-877-343-1631 or leaprojects@hydro.mb.ca.

In order to conduct any type of archaeological or heritage resource investigation, a Heritage Permit is required from the Historic Resources Branch (HRB) (Manitoba Sport, Culture and Heritage Department). The HRB is responsible for the issuance and management of heritage permits. Permits can only be issued to Registered Archaeologists; LEA has access to archaeologists to support any investigation.

1.5 Human remains


The Heritage Resources Act (1986), Section 43 (1) states that “human remains” means:

“remains of human bodies that in the opinion of the minister have heritage significance and that are situated or discovered outside a recognized cemetery or burial ground in respect of which there is some manner of identifying the persons buried therein.”

Manitoba Hydro will not disturb or remove human remains from their original resting place unless removal is unavoidable and necessary. Out of respect for the remains, all work related to the remains will be conducted as much as possible out of the public eye.

Funerary (grave) goods found with human remains will accompany human remains at all times. No reports related to any such find and its analysis will be published unless the Community Representative(s) consents to such publication, other than such reports provided to Manitoba Hydro and the Historic Resources Branch or other agencies as may be required by law. The following describes the practices that Manitoba Hydro will follow if **skeletal remains** believed or known to be human remains and/or accompanying grave goods are discovered or disturbed:

Figure 1-1 Discovery of human remains

Discovery of Human Remains					
	On Site Lead	Licensing and Environmental Assessment	Archaeologist	Manitoba Historic Resources Branch (HRB)	RCMP
Step 1					
Step 2	Immediately mark discovery location with flagging tape and cordon off with temporary fencing (minimum buffer distance 35 m radius from centre of discovery)		Size of buffer may be adjusted once archaeologist, in consultation with HRB, examine site [i.e., on a case-by-case basis].		
Step 3	Contact Licensing and Environmental Assessment	Contact archaeologist and communities/organizations with protocols	Contact HRB		
Step 4			Determine whether human remains are present	If remains human, contact RCMP	
Step 5				For human remains, if not already known, confirm whether RCMP and/or the Chief Medical Examiner have an ongoing interest in remains under <i>The Fatalities Inquiries Act</i> .	
Step 6				If remains are non-forensic and their removal is required to protect remains, lead exhumation of human remains.	If remains are forensic in nature or cannot be immediately determined whether remains are forensic, RCMP and Chief Medical Examiner have jurisdiction over area of find and human remains

Discovery of Human Remains					
	On Site Lead	Licensing and Environmental Assessment	Archaeologist	Manitoba Historic Resources Branch (HRB)	RCMP
Step 7		If human remains are left in place where discovered, Community Representative(s) may arrange for and facilitate an appropriate ceremony	HRB and/or archaeologist directs cautious investigation of surrounding surface prior to exhumation of remains to determine if other human remains or artifacts are in area		
Step 8			Locate and document human remains with GPS, record relevant data and submit with reports to HRB, construction supervisor and Community Representative(s)	Oversee basic non-invasive physical anthropological techniques, including drawings, sketches and initial measurements to assist in determining basic information about individual	
Step 9	Construction activities in vicinity of site that will not impact artifacts or related archeological activities may proceed	LEA would work with communities to decide whether and what type of analysis would be done on remains.	No construction activities within buffer until archaeologist has completed archaeological investigation		

1.6 Heritage resources

Heritage resources are the physical remains of past cultures. They are the product of human art, workmanship or use, including plant and animal remains that have been modified by or left behind due to human activities.

The *Manitoba Heritage Resources Act* (1986) defines “Heritage Resource” as:

(a) a heritage site;

(b) a heritage object, and;

(c) any work or assembly of works of nature or of human endeavour that is of value for its archaeological, palaeontological, pre-historic, historic, cultural, natural, scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof (Section 1).

There are two types of heritage resources, **artifacts** and features. Heritage objects (artifacts) can be as small as a single stone flake (a product from stone tool production) or as large as a shipwreck. Other types of artifacts can include butchered animal bones, pottery, and historic materials such as nails, bottle glass, beads that are at least 75 years or older. Features are in situ (or in place) objects or changes to the landscape that are non-portable, meaning that they cannot be easily removed from their original location. Examples of features include petroforms (stones that have been placed in a shape or design and may be an effigy of an animal or thunderbird nest). Stones were also used as waymarkers or could indicate a food cache or burial location.

All heritage resources, whether a single isolated find (such as single artifacts) or a site with numerous artifacts and/or features, are protected under the Act. These physical remains can provide some evidence of specific activities such as campsites, work stations, quarries, kill sites, and post-contact settlement, industry and events. Deliberate destruction or disturbance of heritage resources is considered an offence. Certain heritage resources have special consideration such as pictographs, petroforms or ceremonial sites and represent a connection to First Nation and Metis to the landscape. Cultural resources

1.7 Cultural resources

For the purposes of this plan, Manitoba Hydro defines Cultural resources as an object, site or location of a traditional or cultural practice that is the focus of traditional or contemporary use and is of continuing importance to people. Some examples include important resource gathering areas, sites of spiritual significance or ceremonial sites.


Although there are some commonalities, each community has a unique interpretation of what the cultural resource value represents.

1.8 Practices that Manitoba Hydro will follow if cultural and heritage resources are found

Manitoba Hydro and its contractors will leave all artifacts **in situ**, that is, in the same position and will not remove objects from the site until advised by the archaeologist. There will be no activities within the buffer until the archaeologist has completed their archaeological investigation. No reports related to any such find and its analysis will be published, other than such reports provided to Manitoba Hydro and the Historic Resources Branch or other agencies, as may be required by law.

The following describes the practices that Manitoba Hydro will follow if cultural and heritage resources are found:

Figure 1-2 Discovery of cultural and heritage resources

Discovery of Cultural and Heritage Resources				
	On Site Lead	Licensing and Environmental Assessment	Archaeologist	Manitoba Historic Resources Branch (HRB)
Step 1				
Step 2	Contact Licensing and Environmental Assessment	Contact archaeologist and communities/ organizations with protocols	Contact HRB	
Step 3	Establish buffer around find (minimum 35 m radius from centre of discovery)			
Step 4	Talk to archaeologist and immediately email them photos of find		Talk to On Site Lead, review photos and determine significance of find	
Step 5			Obtain Heritage Permit from HRB	
Step 6			Direct cautious exploratory investigation to determine if other artifacts in area	
Step 7		If discovery includes sacred or ceremonial objects, Community Representative(s) may arrange and facilitate appropriate ceremony		

Discovery of Heritage Resources				
	On Site Lead	Licensing and Environmental Assessment	Archaeologist	Manitoba Historic Resources Branch (HRB)
Step 7			Undertake: extended surface reconnaissance; - shovel tests at regular intervals perpendicular and parallel to artifact deposit; - controlled collection of data about artifacts, including mapping using global positioning system or chain and compass; and - test excavations, if necessary	
Step 8			Locate and document finds with GPS, record relevant data	
Step 9			Collect and place artifacts in protective container include date, project, contents, coordinates and other information, including site classification	
Step 10				Evaluate heritage resource site and findings presented by archaeologist to determine if further mitigative action is necessary before construction in site vicinity may continue
Step 11	Construction activities in vicinity of site that will not impact artifacts or related archeological activities may proceed		If MH cannot avoid site based on progress of construction, direct site's removal by standard and most appropriate excavation methods.	No construction activities will take place at site until HRB is satisfied that site removal is complete and meets provincial standards
Step 12			Submit copies of technical data and reports to HRB and MH	

2.0 Reporting and follow-up

The archaeologist will establish and maintain a record for each discovered or disturbed heritage object and of any human remains found during construction. Information will include the **provenience**, artifact chain of custody, as well as a conservation and /or identification plan for the heritage resource or resources associated with each record. This is a requirement of *The Heritage Resources Act*. The Province of Manitoba manages a descriptive inventory regarding the physical location and composition of archaeological sites. All artifacts and field-collected data such as notes, photographs and geo-referenced information is provided to the HRB who has ownership of heritage resources found in the Province.

The archaeologist will prepare an annual report, as well as updated summaries and technical reports as are necessary, to the HRB as partial fulfillment of the Heritage Permit and to Manitoba Hydro who in turn will share with the applicable Community Representative(s). The report will provide the following information:

- A record of the human remains found. This will include the reporting, exhumation and reburial of the found human remains per the Provincial policy, the date of the report and the process by which Manitoba Hydro managed, honored and reinterred the remains.
- A record of archaeological investigations and finds documented throughout each year.
- A summary of any directions provided by the Community Representative(s) regarding permission granted to conduct specialized analysis (where such permission is required).
- A record of the heritage objects that Manitoba Hydro found and the process by which they managed the heritage objects.
- Any additional information concerning matters of significance related to heritage resources.

Manitoba Hydro will treat information shared by Indigenous communities regarding burial sites, sacred sites and other sites traditionally and presently used for cultural and ceremonial purposes as confidential and may only be shared with the Province or other authorities if agreed upon by the community to which the resource is associated.

Specific information regarding details or locational information of these cultural or ceremonial sites will not be included in the recording or reporting processes nor included in the HRB's site database.

Manitoba Hydro appreciates that this is sensitive information; the reports will be treated as confidential, unless otherwise authorized or specified by the Community Representative(s), if applicable, in discussion with the HRB.

The archaeologist will prepare an overview of the annual report and provide it LEA to review with the On-Site Supervisor. The overview report will not contain confidential information but will include information required by the On-Site Supervisor in order to fulfill regulatory and managerial responsibilities.

If requested, the archaeologist will meet with the applicable Community Representative(s), HRB and the Manitoba Hydro Licensing and Environmental Assessment Department to review the reports.

3.0 Glossary of terms

Artifacts	Any object made or modified by a human being.
Caches	Rock features in which supplies were stored.
Cultural Resource	An object, site or location of a traditional or cultural practice that is the focus of traditional or contemporary use and is of continuing importance to people.
Diagnostic	Any artifact that provides information as to cultural affiliation or age.
Exhumation	The act of removing a buried, or once buried, human body from the grave or found location.
Funerary goods	Items placed with a person at the time when they were buried. Often referred to as Grave Goods, these items are treated no differently than the person's actual skeletal remains.
Forensic	Of interest to law enforcement or Office of Chief Medical Examiner.
Heritage Resource	The Manitoba Heritage Resources Act (1986) defines "Heritage Resource" as: (as) a heritage site; (b) a heritage object, and; (c) any work or assembly of works of nature or of human endeavour that is of value for its archaeological, palaeontological, pre-historic, historic, cultural, natural, scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof (Section 1).
Human Remains	The remains of human bodies, normally referring to those recovered in the skeletal form. This may range from a single bone or tooth to complete skeletons.
Identification	Refers to the process of examining human skeletal remains in order to determine jurisdiction and disposition of the remains. This may be done by archaeologists trained in human osteology, or physical anthropologists. Age at death, sex, height, general health, relative age: recent, early contact or ancient age may be possible along with ethnic identification.
In situ	An artifact is found in the exact spot that it was probably deposited at some time in the past.
Manitoba's Burials Policy (1987)	Short name of: 'Province of Manitoba Policy Concerning the Reporting, Exhumation, and Reburial of Found Human Remains.' This is the 1987 Provincial Cabinet approved policy based on <i>The Heritage Resources Act</i> (1986) governing and directing the actions, responsibilities, duties and task to be undertaken upon the discovery of found human remains in Manitoba.
Matrix	The consistency and quality of the soil.

Morphology	The form, structure and method by which an object is created.
Non-Forensic	Not of interest to law enforcement or Office of Chief Medical Examiner.
Ochre	An earthy clay colored by iron oxide – usually red, but can be yellow.
Provenience	The original place of an artifact. Can be measured by two or three-points.
Stratum	A layer of soil that is distinct and separate from that above and below it.
Skeletal Remains	Skeletal remains are all that is left of a corpse after nature has taken its course and has disposed of skin, tissue, and any other organ that may cover the skeletal frame.
<i>The Heritage Resources Act</i> (1986)	The Provincial legislation (law) governing the physical heritage of all Manitobans, located in Manitoba on either provincial crown lands or private lands within the province of Manitoba.
Way-markers	A sign or feature that marks a portage or trail or announces a change in direction.

Appendix A: Resources Identification Guide

This page was left intentionally blank.

Examples of cultural and heritage resources of potential interest

The following are some examples of surface or sub-surface heritage objects or features that may be encountered in the field that have the potential to be of archaeological interest or cultural significance. These descriptions are provided for information only.

When the features described in these examples are encountered in the field, or when it is otherwise believed that a site potentially may be of archaeological interest, a Manitoba Hydro On-Site Supervisor/delegate or Environmental Inspector/Officer must be notified.

In situ artifacts

Projectile points, pottery, historic trade goods and thousands of other types of artifacts have been recovered from across the Province. Before collection, the artifact will be photographed and the surrounding vegetation and soils described in detail. If a diagnostic artifact is found during a controlled surface collection, the recovery of the artifact will not take place until mapping is complete.

Often metal objects are found abandoned along old portage routes, former trails and at long-forgotten cabin sites. This old, blue enameled kettle was found in the hollow of a tree with tin cups nestled inside. The way that metal tins were constructed can be dated. Glass fragments can also be identified as belonging to a certain time period. The morphology and markings on bottles help archaeologists to date sites.



Soil Staining

Discolourations in the soil may indicate an archaeological site. The following examples are common colours associated with artifacts, features that have been found within the Province.



Red or yellow Ochre or rust stains can be found in the soil. They can be the result of oxidized metal fragments or nails, red or yellow ochre nodules may indicate a burial or ceremonial activity.

Soil staining can also be found in the form of charcoal flecks and white ash from a hearth or fire pit. Black soil stains may indicate human activity and organic materials or a living floor. Cultural strata can vary in depths depending on the length of occupation at the site. The presence of burned bone, fire-cracked rock, stone chips, pottery and other objects may be found in association with soil discolouration and would confirm the soil staining is a cultural layer.



Animal Bone

Animal Bone (mammal, bird, fish) at a site can indicate the kinds of resources that were being used as food as well as indicate seasonality of occupation.



Bone was also an important material for tool manufacturing. Common bone tools include fleshers and beamers fashioned from large mammal long bones, barbed spear points and harpoons, awls and needles. Bones at a site can indicate the kinds of animals that were being used as food. The ulna of swans, eagles and other large birds were used for bird whistles.



Key features to look for on bones to determine if they have been deposited by humans include signs of cut-marks or burning or staining which may indicate human modification by various butchering or processing techniques.

Culturally modified trees

Occasionally evidence of cultural practices is found in the form of modified trees such as the birch trees noted in this photograph. Birch bark was used for many purposes such as storage baskets, canoes and more recently, birch-bark biting crafts. Cut wood has been used to construct animal traps, as a material for building or for firewood and indicates that humans have been in the area.



Stone features

There are many different kinds of stone alignments that have been constructed by humans: **Way-markers**, **caches**, ceremonial sites, building foundations, tepee rings and burials are the major rock features that are found during archaeological investigations. These can be on or above the ground surface or buried features.



Ground or Structural Features

It is especially important to note unusual ground features. Depressions or mounds that are out-of-place from the surrounding landscape may indicate an underlying structure or possible burial. The manner in which structural features are constructed can be dated.



This page was left intentionally blank.

Appendix B: Cultural and heritage resource protection protocol

This page was left intentionally blank.

CULTURAL AND HERITAGE RESOURCE PROTECTION PROTOCOL

Community/Organization: _____

1. Do you want Manitoba Hydro to notify your community/organization about cultural and heritage discoveries?

Yes

☐

No

☐

2. If yes, we would like to be notified about the following type of discoveries:

Human remains	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Heritage/cultural resources (pictographs, petroforms, bone tools)	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

3. Leadership have chosen _____ as the community representative that Manitoba Hydro should contact for heritage or cultural resources discoveries

Phone number: _____

Cell phone: _____

Email address: _____

Preference for contact _____

(i.e.: cell phone, email)

4. Should a previously unrecorded heritage or cultural resource be encountered, would your community like to conduct a ceremonial or spiritual activity?

Yes

☐

No

☐

5. Could you please draw the area of interest to your community for cultural and heritage resources on the attached map? This information can be kept confidential.

6. Are you aware of recent discoveries of the following in the area near the project:

Human remains	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>
Heritage/cultural resources	Yes	<input type="checkbox"/>	No	<input type="checkbox"/>

7. Have you received a copy of the Cultural and Heritage Resources Protection Plan?

Yes

☐

No

☐

Date:

Filled out by (Please print):

Signature

Appendix M: Access Management Plan

This page was left intentionally blank.

Birtle Transmission Project

Construction Access Management Plan

June 2020

Prepared by:

Licensing and Environmental Assessment Department

This page was left intentionally blank.

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
FINAL 1.0	APPROVED VERSION PUBLISHED			2020_0610

This page was left intentionally blank.

Preface

This document presents the Construction Access Management Plan (the Plan) for the construction of the Birtle Transmission Project (the Project). It is intended to provide information and instruction to Manitoba Hydro employees as well as contractors, regulators and members of the public. The Plan provides regulatory context as well as general considerations and guidance pertinent to how Manitoba Hydro will access the Right of way (ROW) during the construction phase in the Project area within Manitoba. Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro

Licensing and Environmental Assessment Department

360 Portage Avenue

Winnipeg, MB

Canada R3C 0G8

1-877-343-1631

LEAProjects@hydro.mb.ca

This page was left intentionally blank.

Table of contents

1.0	Introduction	7
1.1	Commitment to environmental protection	8
1.1	Purpose and objectives	9
1.2	Roles and responsibilities	9
2.0	Implementation	13
2.1	Construction access management plan coverage	13
2.2	Identification of potential construction access opportunities	13
2.3	Transmission line construction access opportunities	14
2.4	Access mitigation measures	14
2.5	By-pass routes and trails	14
2.6	Traffic safety and access management mechanisms overview	16
2.6.1	Access allowance	17
2.6.2	Recreational vehicles	18
2.6.3	Temporary work camp sites, marshalling yards and borrow pits	18
2.6.4	Compliance	19
2.7	Education and training	19
2.8	Access rehabilitation	20

Figures

Figure 1: Transmission Environmental Protection Program	8
Figure 2: Environmental communication reporting structure	10
Figure 3: By-pass trail/access route siting and approval process on Crown land	15

Tables

Table 1: Key roles and responsibilities	11
Table 2: Access allowance and authorization in active construction areas	18

This page was left intentionally blank.

Definitions

Approach: These are either temporary or permanent structures to allow access through a ditch or drain.

Access Point: These are locations where the ROW intersects and existing road, highway or trail.

Access Route: These are roads, and trails that facilitate access from a Provincial Road or Highway, they are primarily existing, however new access routes may be developed, new developed access routes are primarily trails less than 15 m in width construction.

Right of Way Access Trail: This access trail is along the entire length of the ROW and is approximately 15m in width, typically centered in the ROW to accommodate construction activities and allow access around towers and stringing equipment. The ROW access trail is not a continually active road and not constructed (no cut and fill, soil storage or use of gravel base) or maintained as such during operations.

By-Pass Trail: This type of trail is typically outside the ROW and less than 15m in width and vary in length depending on obstacle on the ROW being avoided (i.e. unfrozen wetland, steep slope). A By-Pass Trail is not a continually active road and not constructed (no cut and fill, soil storage or use of gravel base) or maintained as such during operations.

List of acronyms

AC	Alternating current
AMP	Access Management Plan
ATK	Aboriginal Traditional Knowledge
ATV	All-terrain Vehicle
CEnvPP	Construction Environmental Protection Plan
ESS	Environmentally Sensitive Site
kV	Kilovolt
ORV	Off-road Vehicle

PR	Provincial Road
PTH	Provincial Trunk Highway
RCMP	Royal Canadian Mounted Police
ROW	Right-of-way
MH	Manitoba Hydro
SD	Sustainable Development

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Birtle Transmission Project Environmental Assessment Report to managing construction access as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects. This access management plan (AMP) is designed to accomplish this goal. . General and site specific access management mitigation strategies are detailed in the Birtle Transmission Project Construction Environmental Protection Plan (CEnvPP).

Manitoba Hydro's Environmental Protection Program (EPP) provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and best practices, and input during the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental effects. This AMP is a component of the EPP as illustrated in Figure 1.

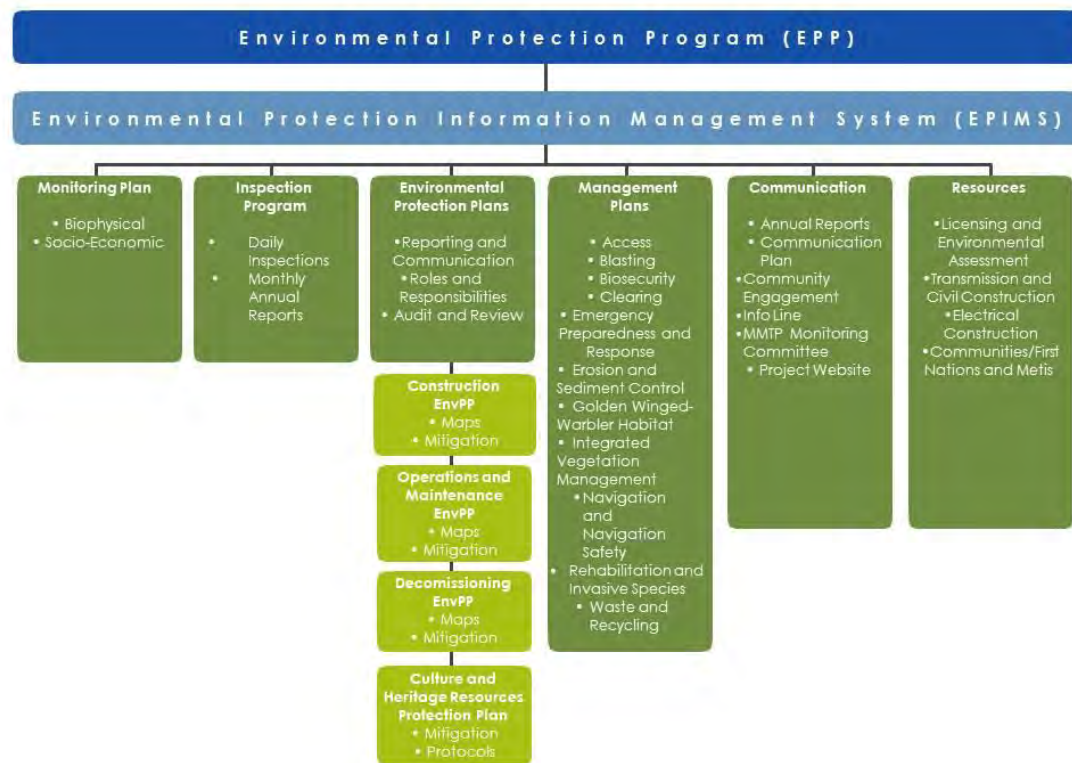


Figure 1: Transmission Environmental Protection Program

In this document access management for the Project is considered only during the construction phase of the development. The implementation of this AMP requires the performance of tasks prior to and during construction.

1.1 Commitment to environmental protection

Manitoba Hydro integrates environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the involvement of Manitoba Hydro employees, consultants, contractors, Indigenous communities and organizations and the public at all stages of the Project from planning and design through construction and operational phases.

The use of an AMP is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential effects of access related to the

construction of a new transmission line and minimizes the needs for site rehabilitation and invasive species management as well as minimizing the impacts on cultural and heritage resources.

Manitoba Hydro is committed to implementing this AMP and requiring Contractors to follow the terms of this and other applicable plans within the Environmental Protection Program.

1.1 Purpose and objectives

The AMP is intended to address concerns regarding the preservation of environmental, socio-economic, cultural and heritage values within the Projects' area of direct impacts. The focus of this AMP is on the construction phase of the Project.

The objectives of the AMP are to:

- Provide for safe, coordinated access onto and along the Project construction site for Project workers.
- Support sustainable use through the protection of natural resources within the Project area.
- Support the preservation of socio-economic, cultural, spiritual and heritage values within the Project area.
- Allow Manitoba Hydro staff and contractors to construct the Project year round (where applicable).
- Provide security for Project personnel and property.
- Prescribe strategies and mitigation measures to minimize potential negative direct and indirect effects of Project access.

1.2 Roles and responsibilities

A successful construction program requires commitment and cooperation from all participants. Instrumental for those involved is to fully understand their roles, responsibilities and lines of communication within the Project. For purposes of implementing this AMP, responsibilities rest with Manitoba Hydro's Construction Supervisor, Senior Environmental Assessment Officer, Construction/Environmental Inspectors, and the Construction Contractors' Project Manager/Supervisor, and

Environmental Officer/Supervisor. The communication and reporting structure is detailed in Figure 2. Their key responsibilities are shown in Table 1.

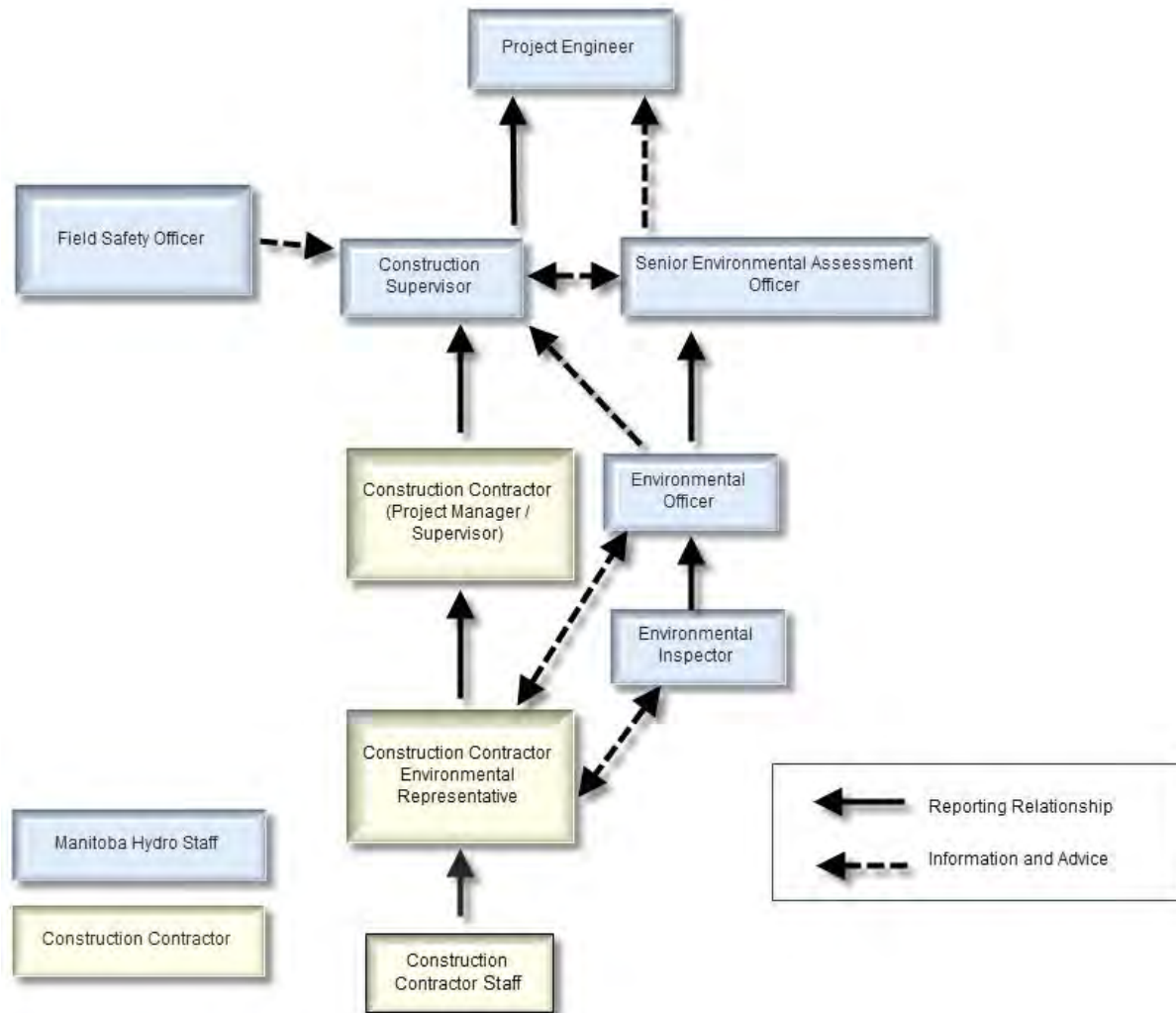


Figure 2: Environmental communication reporting structure

Table 1: Key roles and responsibilities

Role	Key responsibilities
Manitoba Hydro	<ul style="list-style-type: none"> • Provides advice and guidance on access management and environmental protection matters • Issues environmental improvement and stop work orders as required for non-compliance issues • Responsible for the inspection of compliance with CEnvPP • Seeks approval for any Access Routes or By-pass trails from Landowner. • Liaises with regional regulatory authorities and other regulatory authorities where required or applicable • Responsible for implementing compliance inspection to ensure consistent and accurate reporting into EPIMS • Responsible for MH Project staff compliance with Access Management Plan • Ensures construction contractor(s) implementation of remedial actions, responses to non-compliance situations or incidents are implemented as required • Ensures that appropriate authorities are notified in emergency or incident situations • Implement Invasive Species Management Treatment Options where required

Table 1: Key roles and responsibilities

Role	Key responsibilities
Construction contractor(s)	<ul style="list-style-type: none"> • 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 access requirements of the Project related to their position • Report any discoveries of non-compliance, accidents or incidents to the construction supervisor and environmental inspector/officer • Ensure that all remedial actions are carried out as per Manitoba Hydro instruction • Ensures contractor staff utilize only approved access as per Construction Environmental Protection Plan Mapbook • Ensures all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to supervisor or contractor's environmental representative • Responsible for implementation, coordination and verification of pre-project employee environmental orientation. • Ensures that the contractor employees adhere to all aspects of the AMP. • Sign and/or flag all access approaches, points, routes, bypass trails in the field as per flagging and signage standards. • Communicate any access related issues and/or concerns to Manitoba Hydro Environmental Officer

2.0 Implementation

This section discusses the proposed access strategies for construction purposes and describes the proposed access routes to be used for construction.

2.1 Construction access management plan coverage

From a geographic perspective the scope of this AMP includes the Project's transmission construction site (i.e., rights-of-way, camps, marshalling yards, borrow pits and access trails specifically constructed for Project purposes). Public access restrictions are primarily limited to the "active" construction site, for reasons of safety, and will generally not interfere with traditional traffic patterns.

This AMP also addresses Project specific issues relating to existing provincial and municipal roads and concerns relating to private lands within Manitoba Hydro's control. Manitoba Hydro will minimize damage to infrastructure and private lands from its activities, and where possible, limit third party access to the active construction site. Of greatest concern are areas with environmental sensitivities, and areas of work force concentrations (e.g. camps, marshalling yards).

2.2 Identification of potential construction access opportunities

Manitoba Hydro has conducted a survey along the final preferred route to identify all potential construction access opportunities to the ROW using existing roads and trails.

These access opportunities outlined in Construction Environmental Protection Plan Mapbook have been selected based on the following criteria:

- To provide reasonable and safe entrance and egress to the Transmission Line ROW while minimizing disruption to Provincial, Municipal and private roads along with trails and private property.
- To ensure that there a minimum of one access point to get to any given location on the ROW.
- To provide good visibility for upcoming traffic at each access point turn off from existing roads and trails.
- To minimize the number of new access ditch crossings and potential culverts where the ROW intersects existing roads or trails by utilizing existing crossings if available

within the ROW. If there is an existing crossing outside of the ROW within reasonable distance from the ROW, obtain permission to utilize crossing from owner.

- Minimize the use of existing access routes in heavily populated residential areas.
- Minimize the use of private roads and trails

2.3 Transmission line construction access opportunities

Manitoba Hydro and its contractors will use existing roads, trails and linear features where possible for accessing the Project construction site. To facilitate this, Manitoba Hydro has identified existing strategic access routes relative to the construction site and major roads to guide construction planners and contractors.

The Construction Environmental Protection Plan Mapbook illustrates the existing access opportunities (i.e., intersections between the proposed ROW and existing highways, roads, trails and linear features) that minimize the need for new access development to access the ROWs. The AMP will restrict Manitoba Hydro and its contractors to use the identified access options, thereby minimizing Project effects as they relate to access.

2.4 Access mitigation measures

Manitoba Hydro, its personnel, contractors and consultants will adhere to the access management measures (AMMs) outlined in Section 5.0 (Table Access Roads and Trails PC-1) in the Construction Environmental Protection Plan (CEnvPP).

2.5 By-pass routes and trails

Manitoba Hydro and its Contractors will be accessing the ROW through existing trails and access points to the extent feasible. However, in some instances there may be a requirement for a by-pass trail located outside, but along the ROW, or the creation of a new access route to the ROW. In those situations where a new by-pass trail/access route would be required, Manitoba Hydro would undertake the following process to:

- 1) site the by-pass trail/access route,
- 2) evaluate location for environmental and cultural sensitivities, and
- 3) ensure any new by-pass trails/access routes follow the applicable mitigation measures as outlined in the Construction Environmental Protection Plan (CEnvPP).

Figure 3 illustrates the process and details of the steps are provided to operationalize the process. .

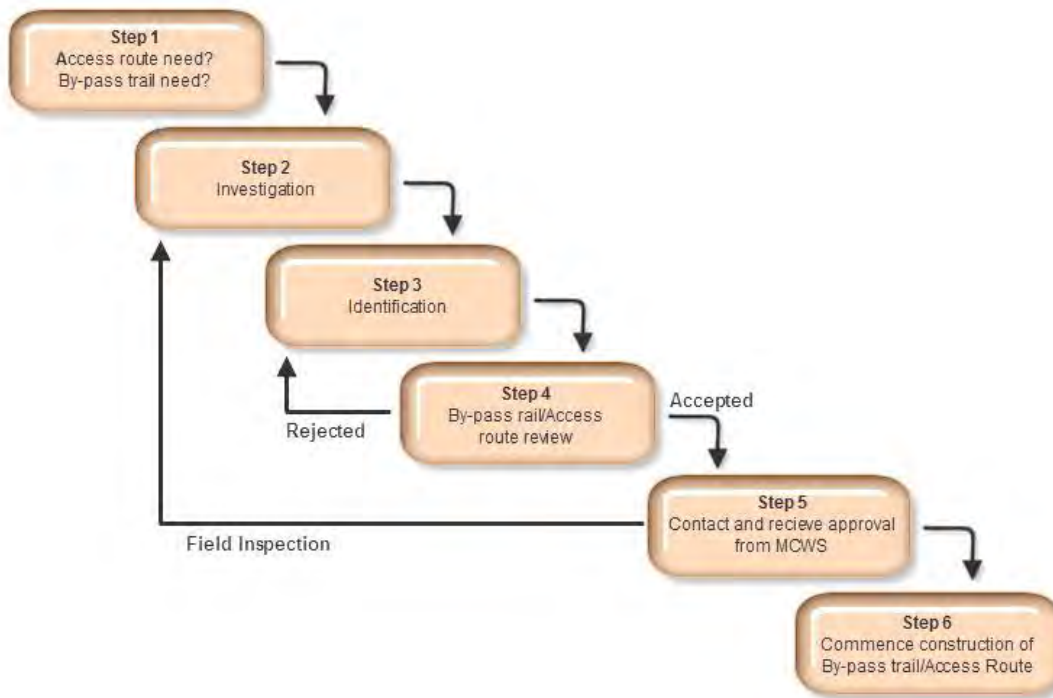


Figure 3: By-pass trail/access route siting and approval process on Crown land

Step 1: Determine by-pass trail/access route need: Manitoba Hydro in conjunction with the Contractor identifies the need for a by-pass trail or new access route (i.e., unfrozen wetlands, impassable terrain) outside of the approved access routes and the Potential By-pass Areas identified in this plan. If any new access routes or by-pass trail is required on private land, MH will seek written approval from the Landowner

Step 2: Investigation: Manitoba Hydro and Contractor will assess potential by-pass area/access route area on foot for a viable location. In some instances an overflight may be required.

Step 3: Identification: Manitoba Hydro Environmental Officer/Inspector will review the by-pass trail/access route for the presence of environmentally sensitive sites, invasive species or any other biosecurity concerns. If none are found they will identify and verify the location of the by-pass trail/access route and sensitive sites by recording GPS coordinates and flagging the centerline, buffers and/or boundaries. The above information

is then submitted to Environmental Protection Information Management System (EPIMS) as “Unplanned Infrastructure” for review.

Step 4: By-pass trail/access route review: Manitoba Hydro Senior Environmental Assessment Officer or Environmental Officer will review by-pass trail/access route and evaluate against known Environmentally Sensitive Sites (ESS) as well as sensitive sites identified by the Environmental Inspector’s site investigation. **If Rejected**, by-pass trail/access route alternatives will be suggested for field assessment (Return to Step 3) and the process of submitting “Unplanned Infrastructure” through EPIMS will be restarted. **If Accepted**, proceeds to Step 5 or 6 for approval.

Step 5: By-pass trail/access route approval: If by-pass trail/access route is approved in Step 4, it will be added to the AMP and appropriate CEnvPP including any ESS sites; and move to Step 6.

Step 6: Commence construction of by-pass trail/access route: Implement mitigation and commence construction. Manitoba Hydro will identify and document any by-pass trails/access routes that may be required post construction for line maintenance activities and incorporate into the Operations and Maintenance Environmental Protection Plan.

2.6 Traffic safety and access management mechanisms overview

Manitoba Hydro and its Contractors will rely extensively on the provincial and municipal existing road infrastructure to transport vehicles, personnel, equipment and materials to the Project construction site. In the interests of safety, Manitoba Hydro expects that all of its personnel and those of its contractors and consultants will adhere to all traffic laws while engaged in Project related activities and while commuting back and forth between their residences/camps/offices and the construction site.

Safety is of primary concern during the construction phase for construction workers, stakeholders and the public. During the clearing and construction process, a seasonal access trail will be constructed on the rights-of-way to facilitate the transportation of construction materials, equipment and workers. Manitoba Hydro and its contractors will restrict non-Project traffic on and along the active construction site during this period.

Where Manitoba Hydro and its contractor staff encounter non-project related traffic on the active construction site, safety advisory information will be provided and individuals will be asked to vacate the area for reasons of safety.

Signs may be placed at road/rights-of-way crossings and other locations in the active construction area to discourage/minimize access and to outline safety concerns.

Various types of signage may be used to convey safety or educational information, including:

- No hunting/shooting
- Guy wire shields/sleeves (brightly colored and/or reflective), where appropriate
- Reflective tape on tower legs and other obstructions
- Access restrictions to specific infrastructure sites (e.g. transformer, converter, repeater stations)
- Access restrictions to hazardous materials and petroleum storage sites
- Warning signs on vehicles transporting hazardous materials and petroleum products
- Private land
- Directional guidance signs
- High risk wildlife collision areas
- Speed limit postings
- Road/trail hazard warning signs
- Bollards, signage at water wells, petroleum storage areas, etc.
- Other

Manitoba Hydro will determine the type and quantity of signage required for the Contractor to supply and install.

2.6.1 Access allowance

During the construction phase of the Project, one of Manitoba Hydro's concerns is safety for workers and others who may access the active construction site. Access and safety issues will be monitored by the Construction Contractor, the Manitoba Hydro Construction Supervisor and the Environmental Officer/Inspector.

All intersecting trails/roads will be kept clear of debris so as not to impede existing travel routes. Manitoba Hydro will limit/restrict access to the active construction site as safety is a primary consideration.

Those authorized to access the active construction site (including work camps) are noted in Table 3. Manitoba Hydro and its contractors will carefully monitor for safety and security issues and, if problems warrant, are prepared to limit access to only those directly associated with the Project.

Table 2: Access allowance and authorization in active construction areas

User	Type of user	Authority
Project traffic	Manitoba Hydro staff	No conditions
	Contractor personnel	
	Government (provincial and federal) personnel	Construction supervisor or delegate
	Research and monitoring personnel	
	Emergency vehicles/personnel	No conditions
Resource harvesters	Licensed outfitters/rights-based hunters	Construction supervisor or delegate
Non-project traffic	Public	Restricted
Others	Community officials, Manitoba Hydro staff/ officials/ contractors/ consultants, employee family members	Construction supervisor or delegate
	School and public tours, media, etc.	

2.6.2 Recreational vehicles

Project personnel will not be permitted to transport, use or store their personal off-road vehicles (ORV) (e.g., snowmobiles, all-terrain vehicles, boats, etc.) on the construction site where the intent of use is not Project work related. This condition will form part of the condition of employment and will be conveyed to all personnel at the time of hire. Breach of the condition will be grounds for disciplinary action, including dismissal. Manitoba Hydro and contractor ORV equipment shall be used exclusively for Project work related purposes.

2.6.3 Temporary work camp sites, marshalling yards and borrow pits

Temporary work camp sites, marshalling yards and borrow pits used for Project purposes form part of the construction site. All Project related access management measures shall

apply to these sites. When any of the new sites are no longer required for Project purposes, and if not required by other non-project parties (e.g. Manitoba Sustainable Development, Manitoba Infrastructure and Transportation, etc.), access into such sites may be decommissioned and all Project personnel will be restricted from entering such sites. Access decommissioning could include the placement of impediments (e.g., berms, boulders, debris, etc.) to restrict public access.

2.6.4 Compliance

Manitoba Hydro Environmental Officers/Inspectors will regularly inspect all aspects of the clearing and construction work to ensure compliance with the Environment Act licence, work permits, regulations, applicable guidelines and the applicable CEnvPP. Manitoba Hydro and its' contractor personnel will limit/restrict non-project related vehicles and personnel on the construction site with particular emphasis on the active construction site. Information about safety, firearms/weapons rules will be distributed, as required, through:

- Signage at access points and on the construction site.
- Orientation of all workers.

Breach of stated employment conditions (e.g., ORV, weapons, fishing) by Manitoba Hydro employees or contractor staff will result in disciplinary action, including potential dismissal from employment.

Clear communication of restrictions and safety measures, included in the construction access management plan, to workers, resource harvesters, stakeholders and local Aboriginal communities will contribute to safe work practices and the prevention of conflicts.

2.7 Education and training

Training and communication form a critical component of the implementation plan. Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Access Management Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.

2.8 Access rehabilitation

Transmission development on the landscape often requires the creation of or improving of existing access roads and trails to facilitate construction and operation of the development. Manitoba Hydro's preference is to utilize existing roads and trails to the extent possible prior to development of any new access routes. The use of existing access routes may result in vegetation removal and road base improvements. Where access is not required for operations those access routes may require decommissioning activities such as trenching and mounding and/or vegetation rehabilitation to ensure that areas previously inaccessible are returned back to that state. Prior to access route development the route will be assessed for existing access restrictions, including details such as trail width, vegetation, presence of previous decommissioning activity.

Appendix N: Environmental pre-work orientation record

This page was left intentionally blank.



Appendix N: Environmental pre-work orientation record

**Transmission Line and Civil Construction
Contractor Environmental Pre-job Orientation**

The following Transmission Line and Civil Construction Environmental Pre-Job Orientation will be reviewed with the contractor at the contract start-up meeting by the Manitoba Hydro Project Engineer and/or Construction Supervisor as well the Senior Environmental Assessment Officer and/or Environmental Inspector.

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 & Line Maintenance
Department: Transmission Line & Civil Construction
Project Name:
Contract Number:
Work Location:
Environment Act Licence Number:
MCWS Work Permit Number:
Date:

In accordance with the Workplace Safety and Health Act the

Prime Contractor designated for this project is:

INSERT COMPANY NAME HERE

Manitoba Hydro Project Engineer:

Manitoba Hydro Construction Supervisor:

Manitoba Hydro TLCC Environmental Representative:

Manitoba Hydro Environmental Officer/Inspector:

For any emergency situation (Fire, Accident, etc.) call 911 and relay pertinent information including the location and the nature of the emergency. Emergencies may also be reported through Manitoba Hydro Radio System Control at 040 or 050 on the radio keypad or by calling 204-474-3327 or 204-474-3007.

Contractor:

Contractor Project Manager:

Contractor Construction Manager:

Contractor Environmental Supervisor:

Please list proposed Sub-Contractors:

1.

2..

3.

4.

5.

6.

Key Environmental Requirements Review:

All work on this project must be completed in accordance with applicable federal and provincially legislated regulations and all work shall be performed in accordance with applicable project specific Environment Act Licence and/or Crown Lands Act Work Permit conditions.

All work on this project must be completed in accordance with applicable project specific contract specifications and Environmental Protection Plan mitigation measure requirements.

All work on this project should be completed in accordance with Manitoba Hydro approved project specific contractor Environmental Protection Plans. The Manitoba Hydro Project Engineer, Construction Supervisor, and Environmental Officer/Inspector must be notified in writing of any changes to contractor environmental related project plans that have been submitted to Manitoba Hydro for the project or any changes to contractor supervisor or environmental representatives that have been identified for the project.

Site Specific Concerns:

Local site conditions and their associated mitigation measures are detailed in the project specific Environmental Protection Plan. The Senior Environmental Assessment Officer and/or Environmental Officer/Inspector can provide clarification related to information contained in the project specific Environmental Protection Plan but any proposed amendments to the project specific Environmental Protection Plan should be submitted in writing to the Manitoba Hydro Project Engineer and/or Construction Supervisor.

The Manitoba Hydro Construction Supervisor and Environmental Officer/Inspector must be immediately notified of any environmental incidents or if any sensitive environmental or heritage occurrences are encountered during contract clearing activities that are not identified in the project specific Environmental Protection Plan; no work can occur within the specific area until it has been assessed by Manitoba Hydro and any additional mitigation measures have been communicated to all applicable project workers.

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 it should be identified as "Not Applicable (N/A)". If for any reason any item identified as "N/A" becomes applicable during the course of the contracted work the contractor must inform the Manitoba Hydro Project Engineer and/or Construction Supervisor.

ITEM #	ITEM	Yes	No	N/A
1.				
1.1	Is there an EnvPP, environmental job plan or other environmental plan requirement for the work? <ul style="list-style-type: none">• <i>Yes- there is an Environmental Protection Plan (insert name of project/section).</i>• <i>Provide a detailed Environmental Management Plan (Erosion and Sediment Control, Spill Response, Waste/Recycling, Biosecurity, etc.) that meets approval of Manitoba Hydro representatives.</i>	✓		
2.	Key Environmental Issues and Requirements Review			
2.1	Generation and disposal of waste: <ul style="list-style-type: none">• <i>All project areas of work should be maintained clean and free of accumulations of waste materials, rubbish, and debris. All construction and personal waste generated during the project must be collected for recycling or disposal at an approved facility.</i>• <i>Ensure local landfill/facility has been notified of intent to dispose.</i>			
2.2	Generation and disposal of hazardous substances: <ul style="list-style-type: none">• <i>All hazardous substances that are generated during the project must be stored and transported in accordance with regulations and recycled or disposed of in a timely manner at an approved facility.</i>• <i>Provide a list of employees that hold current TDG certification.</i>• <i>Provide waste generator numbers for hazardous waste disposal.</i>• <i>Work crews must participate in formal training. Prior to starting work on the project, staff and subcontractors must have training in Workplace Hazardous Materials Information Systems (WHMIS) and Waste management procedures</i>			
2.3	Fuel and flammable storage: <ul style="list-style-type: none">• <i>All fuel tanks being used on the project must be double walled or have secondary containment to hold 110% of product and must be protected from vehicular traffic.</i>• <i>Preventative measures including drip pails, spill trays, and absorbent pads should be utilized to minimize contamination of surrounding materials.</i>• <i>An adequate spill kit and recently inspected fire extinguisher is required at all fuel storage and fuelling locations.</i>• <i>All fuel storage and fuelling must be at minimum 100m from the</i>			

	<p><i>ordinary high water mark of any waterbody.</i></p> <ul style="list-style-type: none"> <i>Federal and provincial legislations related to the Storage and Handling of Petroleum Products and Allied Products Regulations (MR188/2001) must be complied with at all times.</i> 			
2.4	<p>Spill of hazardous substances:</p> <ul style="list-style-type: none"> <i>Ongoing efforts to prevent and minimize spills should be undertaken throughout the project (e.g. routine inspection and maintenance of construction vehicles and equipment, etc.).</i> <i>The contractor spill response procedures that are submitted and approved by Manitoba Hydro must be followed at all times and all workers on the project must be aware of their responsibilities in the event of a spill.</i> <i>All pieces of equipment or vehicles entering the contract area of work must be equipped with an adequate spill kit. All spills regardless of quantity must be verbally reported within 2 hours of the event and formally reported in writing within 24 hours of the event to the Construction Supervisor or Environmental Officer/Inspector.</i> <i>Any quantities that exceed the amounts that are stipulated by provincial regulation will be reported to the province within the required 24 hours of the event.</i> <i>All spills should be cleaned up and remediated as soon as practical. All spill locations will be flagged/staked until a Manitoba Hydro Environmental Officer/Inspector provides approval to backfill (may need to wait until receive soil analysis results from lab confirming that any contamination does not exceed applicable criteria).</i> 			
2.5	<p>Construction Traffic and Noise</p> <ul style="list-style-type: none"> <i>Limited to daytime hours.</i> <i>Implodes?</i> <i>All equipment kept in work area.</i> <i>Traffic signs and barricades installed and monitored.</i> <i>All traffic laws and by-laws obeyed.</i> 			
2.6	<p>Soil Compaction:</p> <ul style="list-style-type: none"> <i>Construction activities are to be avoided on water saturated ground conditions where rutting is likely to occur.</i> <i>Mats or other additional measures may be required in some locations to mitigate the impacts of soil compaction.</i> <i>No tracking of dirt and mud onto road ways.</i> 			
2.7	<p>Vegetation disturbance or removal:</p> <ul style="list-style-type: none"> <i>Retention of vegetation wherever practical is the most effective measure to minimize the risks of erosion. Where vegetation removal cannot be avoided additional measures may be required to mitigate the impacts of soil erosion.</i> 			

2.8	Erosion and sedimentation: <ul style="list-style-type: none"> • <i>Employing best practices to avoid or minimize erosion and/or sedimentation is a key environmental component of this contract. Adequate erosion and sediment control products should be available on-site in the event of an erosion/sediment issue.</i> • <i>Contractor's personnel s must be aware of and adhere to their approved erosion and sediment control plan.</i> • <i>Ensure personnel are appropriately trained to carry out their role in the prevention of erosion and sedimentation, and that proper documentation is being conducted throughout the Project.</i> 			
2.9	Rehabilitation and Invasive Species Management <ul style="list-style-type: none"> • <i>All Environmental Inspectors/Officers or Manitoba Hydro employees assigned to weed monitoring will be trained in weed identification and will be familiar with legislated weed species listed within Manitoba.</i> 			
2.1	Fish and Aquatic – Habitat alteration, disturbance or loss <ul style="list-style-type: none"> • <i>All No Machine Zones (NMZ) and low disturbance clearing buffers on riparian areas must be maintained. Riparian areas are described as the minimum 30m buffer from the Ordinary High Water Mark (typically the tree line).</i> • <i>No instream works to be undertaken at anytime.</i> 			
2.11	Wildlife/Bird – Habitat Alteration, Disturbance or Loss <ul style="list-style-type: none"> • <i>There is sensitive wildlife within the area of work and the applicable mitigation measures identified in the Environmental Protection Plan must be implemented.</i> • <i>Construction workers must never harass or feed wildlife species.</i> • <i>All wildlife mortalities caused by construction vehicles or equipment should be reported to the Manitoba Hydro Construction Supervisor or Environmental Officer/Inspector so that Manitoba Hydro can notify the local Sustainable Development Natural Resource Officer.</i> 			
2.12	Disturbance to Heritage Resources / Archaeological Features <ul style="list-style-type: none"> • <i>Contractor must be aware of and adhere to the Project's Heritage and Cultural Resource Management Plan and any related requirements noted in the EPP.</i> • <i>If any heritage or archaeological features are encountered during the contract no work activities can continue within the specific area until it has been assessed by Manitoba Hydro and any additional mitigation measures have been communicated to all applicable project workers.</i> 			
2.13	Bio-security <ul style="list-style-type: none"> • <i>Contract activities occurring in agricultural areas must implement the protocols and procedures outlined in the Manitoba Hydro Agricultural Biosecurity Standard Management Plan found in Appendix</i> • <i>Arrive at site clean, leave clean.</i> • <i>Manitoba Hydro to review Project specifics and environmental requirements with all of its Contractors at a supervisory level. A summary of this Biosecurity Management Plan, implementation</i> 			

	<i>requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.</i>			
2.14	Clearing <ul style="list-style-type: none"> • <i>Manitoba Hydro will review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Clearing Management Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.</i> • <i>Manitoba Hydro will also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth.</i> 			
2.15	Access Management <ul style="list-style-type: none"> • Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Access Management Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time. Manitoba Hydro will also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth. 			

Date of contractor pre-job on-site employee environmental orientation meeting:

XXXXXXXXXXXXXXXXXXXXXXX

YYYY MM DD

REMARKS:

Any specific environmental concerns that are not mentioned here will be discussed at weekly progress meetings and/or at pre-job (TAILBOARD) meetings prior to the work being performed.

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

MANITOBA HYDRO REPRESENTATIVE (SIGN)

YYYY MM DD

CONTRACTOR'S REPRESENTATIVE (SIGN)

YYYY MM DD

All individuals present at the Contractor Pre-Job Orientation must indicate that they have participated and understand all items discussed by signing the document below:

[illegible]



Contractor Environmental Pre-Job Orientation Procedures

NOTE:

The instructions provided on this sheet are intended only for internal use by
Manitoba Hydro employees.

1. The Contractor Environmental Pre- Job Orientation is to be held with Contractor Supervisory and Environmental Representatives prior to the start of any onsite activities associated with the contract.
2. All individuals present at the Contractor Environmental Pre- Job Orientation must sign the attendance sheet.
3. The Contractor Environmental Pre- Job Orientation should be read out loud in its entirety. Discussions on each topic and the opportunity to ask questions should be provided as required.
4. All required information regarding the Contractor Environmental Pre- Job Orientation must be completed in the appropriate box as a Yes, No, or N/A (additional notes as required).
5. Obtain all names/signatures and other information required in the Contractor Environmental Pre- Job Orientation
6. Distribution of the Contractor Safety Orientation:

A copy of the signed original is to be kept in the contract environment folder as well as onsite with all other relevant documents, permits, etc.

A copy of the signed original should be sent to:

- Contractor Supervisory Representative(s)
- Contractor Environmental Representative(s)
- Manitoba Hydro Project Engineer and/or Construction Supervisor
- Senior Environmental Assessment Officer and/or Environmental Officer/Inspector(s)

Appendix O: Contractor developed plans

This page was left intentionally blank.

Appendix P: Rehabilitation and invasive species management plan

This page was left intentionally blank.

Birtle Transmission Project

Rehabilitation and Invasive Species Management Plan

June 2020

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

This page was left intentionally blank.

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
1	Added statement regarding revegetation in Spy Hill Community Pastue	3.7.4	Manitoba Hydro	April 1, 2020
Final 1.0	Document Approved and Published			June 10 2020

This page was left intentionally blank.

Preface

This document presents the Rehabilitation and Invasive Species Management Plan (the Plan) for the construction of the Birtle Transmission Project (the Project). It is intended to provide information and instruction to Manitoba Hydro employees as well as contractors, regulators and members of the public. The Plan provides regulatory context as well as general considerations and guidance pertinent to the post construction rehabilitation of project sites and management of invasive species within the Project footprint.

Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro
Licensing and Environmental Assessment Department
360 Portage Avenue
Winnipeg, MB
Canada R3C 0G8
1-877-343-1631
LEAProjects@hydro.mb.ca

This page was left intentionally blank.

Table of contents

1.0	Introduction	7
1.1	Commitment to environmental protection	8
1.2	Purpose and objectives	9
1.3	Roles and responsibilities	9
2.0	Regulatory context	12
3.0	Implementation	13
3.1	Assessment	13
3.2	Timing	13
3.3	Guidelines for rehabilitation by land cover	13
3.3.1	Wetlands and riparian areas	13
3.3.2	Cultivated lands	14
3.3.3	Access routes and trails	15
3.3.4	Forest, tame pasture and grasslands	16
3.3.5	Borrow pits and quarries	17
3.4	Erosion and sediment control	18
3.5	Site preparation	18
3.6	Revegetation	19
3.6.1	Passive	19
3.6.2	Active	20
3.6.2.1	Planting options	20
3.6.2.2	Seeding options	20
3.7	Other important considerations and options	21
3.7.1	Ecological context	21
3.7.2	Using native/traditional use species	21
3.7.3	Seed mix recommendations	21
3.7.4	Commercial seed and plant providers	22
3.7.5	Seeding dates	22
3.7.6	Rates for seeding	22

This page was left intentionally blank.

3.7.7	Rates for planting tree seedlings.....	23
3.7.8	Fertilizers	23
4.0	Invasive species management.....	24
4.1	Prevention	25
4.2	STEP 1: Weed management thresholds and priority levels.....	25
4.3	STEP 2: Determine whether management threshold has been reached.....	26
4.4	STEP 3: Review treatment criteria.....	27
4.5	STEP 4: Select weed management treatment method	27
4.5.1	Manual / mechanical treatment option.....	27
4.5.2	Biological / Cultural / Native treatment option.....	28
4.5.3	Chemical treatment option.....	28
4.5.4	No control management option.....	29
4.6	Treatment options for common species	29
4.6.1	Leafy spurge.....	29
4.6.2	Common tansy.....	29
4.6.3	Scentless chamomile	29
4.6.4	Purple loosestrife.....	30
4.6.5	Ox-eye daisy.....	30
4.6.6	Sweetclover	30
4.6.7	Canada thistle.....	30
4.7	Training and documentation	30
5.0	Monitoring and follow-up.....	32
6.0	References	33

This page was left intentionally blank.

Appendices

- Appendix A: Rehabilitation checklist
- Appendix B: Selection of traditional plant species commercially available for rehabilitation
- Appendix C: Characteristic vegetation of Manitoba's ecozones
- Appendix D: Recommended baseline native seed mixes
- Appendix E: Selection of plant species commercially available for rehabilitation
- Appendix F: Invasive species listed by the Invasive Species Council of Manitoba
- Appendix G: Noxious Weeds Regulation Species List

Figures

- Figure 1: Transmission Environmental Protection Program.....8
- Figure 2: Environmental communication reporting structure.....11

Tables

- Table 1: Key Roles and responsibilities10
- Table 2: Priority levels for weed management26

This page was left intentionally blank.

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Birtle Transmission Project (the Project) environmental assessment to developing a Rehabilitation and Invasive Species Management Plan (RISMP) as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects.

Manitoba Hydro's Environmental Protection Program (EPP) provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and best practices, and input during the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental effects. This RISMP is a component of the EPP as illustrated in Figure 1.

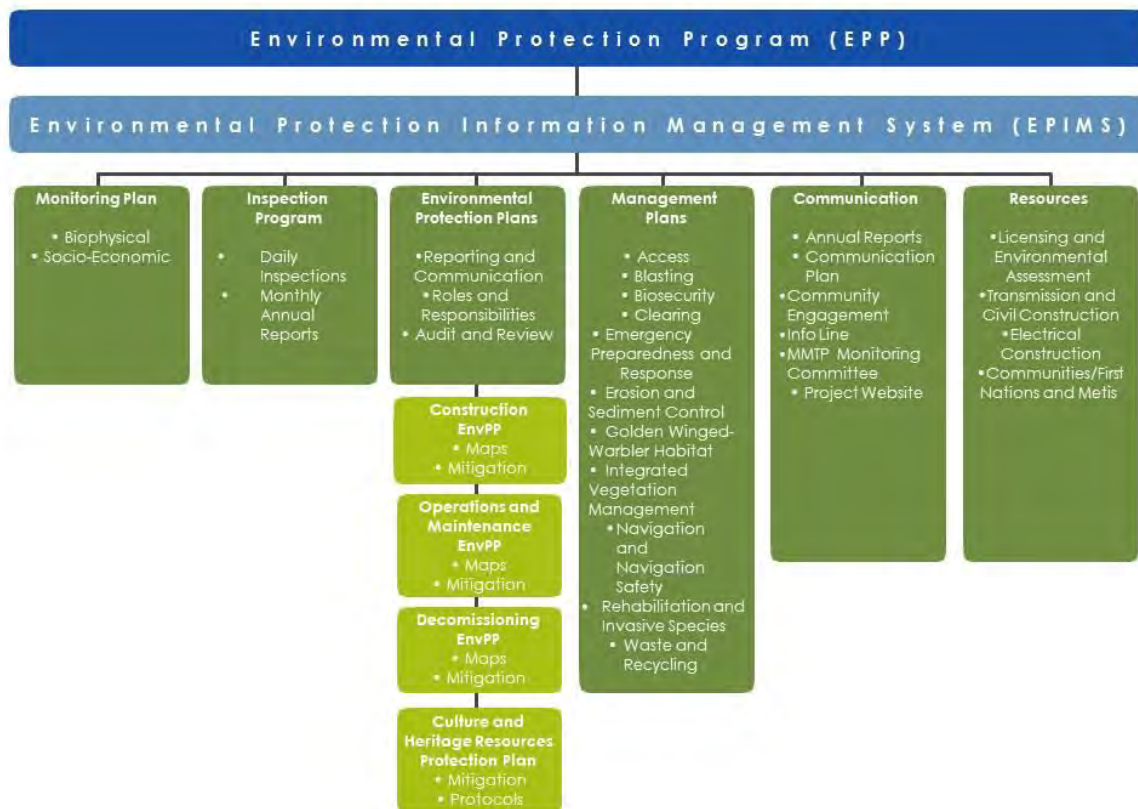


Figure 1: Transmission Environmental Protection Program

1.1 Commitment to environmental protection

Manitoba Hydro integrates environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the involvement of Manitoba Hydro employees, consultants, contractors, Indigenous communities and organizations and the public at all stages of the Project from planning and design through construction and operational phases.

The use of an RISMP is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential disturbance of access related to the construction of a new transmission line.

Manitoba Hydro is committed to implementing this RISMP and requiring Contractors to follow the terms of this and other applicable plans within the Environmental Protection Program.

1.2 Purpose and objectives

The purpose of this Rehabilitation and Invasive Species Management Plan (RISMP) is to provide information that will guide contractors and Manitoba Hydro staff through project construction, maintenance, and decommissioning in a manner that meets Manitoba Hydro's Environmental Management Policy and project commitments.

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. As there has already been a large amount of habitat degradation and increasing pressures on the surrounding areas, Manitoba Hydro seeks to enhance habitat and biodiversity on the ROW through the implementation of rehabilitation measures that consider traditional resource use along with wildlife habitat. Manitoba Hydro has participated in endeavours with researchers to measure and enhance the biodiversity of its ROW's. Manitoba Hydro continues to be open to discussing opportunities for research and collaboration with researchers from universities and Indigenous communities and organizations.

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. 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

1.3 Roles and responsibilities

This section outlines the major roles and responsibilities of those involved in the implementation of the Plan.

A summary of roles and key responsibilities is found in Table 1. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 2.

Table 1: Key Roles and responsibilities

Role	Responsibilities
Manitoba Hydro	<ul style="list-style-type: none"> • Identifying Invasive species locations in Biosecurity Management Plan Mapbook • Monitoring rehabilitation measure success • Review Contractor developed site-specific rehabilitation measures • Implement Invasive Species Management Treatment Options where required
Contractor	<ul style="list-style-type: none"> • Shall adhere to Rehabilitation and Invasive Species Management Plan including employee training, implement rehabilitation measures prescribed actions, signage and submit all required assessment documentation. • Respond and act promptly to resolve if any activities are identified as not in compliance with the RISMP or any regulatory requirements. • Conducting assessment of Project sites for rehabilitation • Develop and propose site specific rehabilitation measures as per guidelines • Implement site specific Rehabilitation Measures • Prevent the spread of Invasive plant species • Rehabilitate disturbed areas as soon as practicable or where deemed necessary by Manitoba Hydro , rehabilitation is not to be deferred until construction is complete

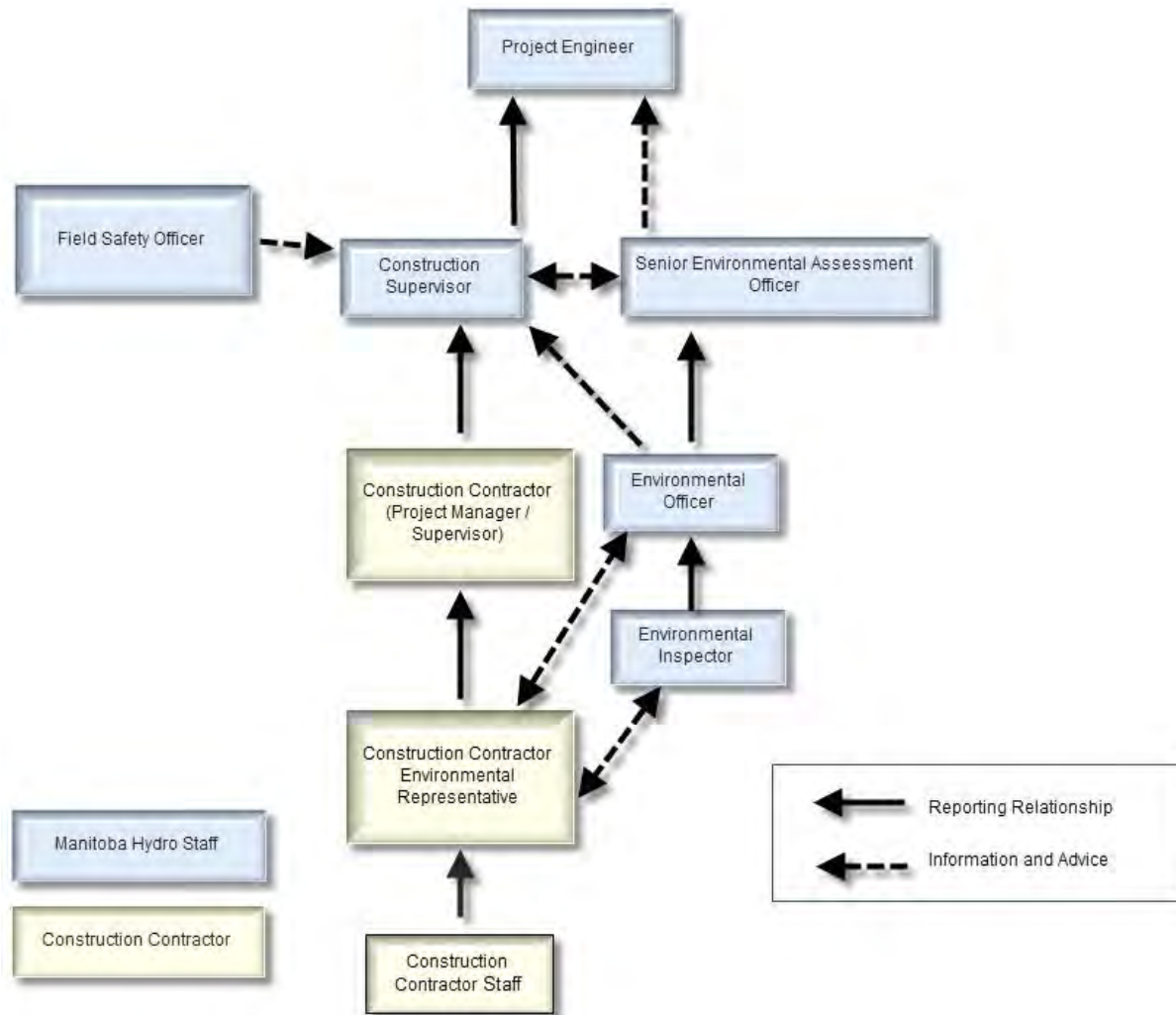


Figure 2: Environmental communication reporting structure

This page was left intentionally blank.

2.0 Regulatory context

In Manitoba, the control of noxious weeds is regulated by The Noxious Weeds Act, C.C.S.M. c. N110 (including amendments from The Noxious Weeds Amendment Act, S.M. 2015, c. 38) and the Noxious Weeds Regulation (42/2017). Through recent amendments to the Act, the list of regulated noxious weeds has been updated and noxious weeds have been designated as tier 1, tier 2 or tier 3 noxious weeds based on prevalence, distribution and invasiveness.

The list of weeds designated as tier 1, tier 2 and tier 3 noxious weeds under the Noxious Weeds Regulation (42/2017) is found in Appendix G.

This page was left intentionally blank.

3.0 Implementation

The intent of this section is to provide for implementation instructions to Manitoba Hydro and Contractor Project staff. The main project components that may require rehabilitation and invasive species management include the following:

- Right-of-way (RoW)
- Access routes and by-pass trails
- Borrow pits and quarries
- Marshalling yards (material and/or equipment storage, fly yards)
- Construction camps
- Station sites

3.1 Assessment

The Contractor shall conduct a rehabilitation assessment as described in the Guidelines of Rehabilitation by Land Cover below. The assessment will be documented through the use of the Rehabilitation Assessment Checklist (Appendix A).

3.2 Timing

The timing of when rehabilitation activities occur is key to preventing erosion, invasive species establishment, and preventing damage to rehabilitation measures. The Contractor is required to implement rehabilitation measures as soon practicable or as required by MH Environmental Inspector/Officer, rehabilitation is not to be deferred until construction is complete.

3.3 Guidelines for rehabilitation by land cover

3.3.1 Wetlands and riparian areas

Trigger(s) for the Assessment for rehabilitation by Contractor:

- Any construction activity that affects surface water drainage directly into a water body (watercourse and/or wetland) without sufficient erosion and sediment control measure in place
- When the depth of rutting exceeds 10cm for more than 15m in length;
- Admixing (mixing of topsoil and subsoils)

- Any excessive soil disturbance within wetland outside of tower footprint and stringing corridor
- Removal of riparian buffer shrub and understorey vegetation
- Debris from clearing or stream crossing below high water mark

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground and aquatic conditions
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- Safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific rehabilitation measures will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Flag or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Flag or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Debris removal
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.2 Cultivated lands

Trigger(s) for the Assessment for rehabilitation by Contractor:

- Sites that exceed threshold for work modification(s) as described in the Saturated/Thawed Soils Operating Guidelines
- Any excess construction materials (granular, clay, waste)
- Any travel off designated access routes
- Disturbance to existing in-field drainage
- Installation of tower or poles

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- proximity to weed seed source
- Current ground conditions
- Current crop and farming practices
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- Safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific rehabilitation measures will be developed by the Contractor and proposed to Manitoba Hydro for review with landowner):

- Flag or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Cultivation to remove ruts and compaction
- Restore drainage to pre-existing condition
- Implement active revegetation through seeding of native/crop species acceptable to landowner within tower footprint
- Addition, spreading or removal of topsoil
- Flag or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Construction material removal
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.3 Access routes and trails

Trigger(s) for the Assessment for rehabilitation by Contractor:

- Any evidence of access route / trail structure damage occurring, such as admixing, or the creation of ruts that impedes local vehicle traffic
- Any excess construction materials (granular, clay, waste) within route/trail or ditches including rider pole installations
- Removal of snow fill approaches within access route / trail right of way prior to spring thaw

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground conditions
- Current access route / trail use
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- Safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific rehabilitation measures will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Flag/sign or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Back blading or grading to remove ruts/level surface
- Construction material and debris removal
- Adding or replacing gravel surface material
- Contouring or re-sloping
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Excess construction material removal
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.4 Forest, tame pasture and grasslands

Trigger(s) for the Assessment for rehabilitation by Contractor:

- When rutting depth exceeds 30 cm for more than 15 m in length
- Any travel off existing designated access routes
- Any excess construction materials (granular, clay, waste)
- Installation of tower or poles

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground conditions
- Current farming practices
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Flag/sign or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Back blading or grading to remove ruts
- Construction material and debris removal
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Addition, spreading or removal of topsoil
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.5 Borrow pits and quarries

Trigger(s) for the Assessment for rehabilitation by Contractor:

- When borrow pits or quarries are no longer required for foundation installation

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground conditions
- Existing erosion and sediment control measures
- Safety

- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Contouring or re-sloping
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Back blading or grading to remove ruts
- Addition of topsoil
- Construction material and debris removal
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Other rehabilitation measures as approved by Manitoba Hydro

3.4 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, rills 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. Refer to the Erosion and Sediment Control Plan for any measures that may need to be put in place prior to rehabilitation.

3.5 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 30 cm. Effective topsoil management is an essential component of rehabilitation success. Note: that should the addition of topsoil be required onsite, refer to the Biosecurity Management Plan to minimize biosecurity risk.
- **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 which could reduce the capacity of the soil to support desired vegetation. 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.

3.6 Revegetation

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

3.6.1 Passive

Passive revegetation is a viable means of rehabilitation by natural seeding, sprouting, suckering or layering of vegetation. Where conditions are ideal regarding seedbank,

propagules, topography, slope, moisture, time of year, and condition of surrounding vegetation, natural regeneration will occur.

3.6.2 Active

Where conditions are not ideal for passive revegetation such as lack of seedbank or propagules, rehabilitation should involve active revegetation by planting or seeding.

3.6.2.1 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 and red pine, white and black spruce.
- **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.

3.6.2.2 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.

3.7 Other important considerations and options

3.7.1 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 C identifies characteristic vegetation of Manitoba's ecozones.

3.7.2 Using native/traditional use species

Native species are plants occurring within their historic range bounded by the dispersal potential of the plant. These native/traditional use species are favoured for rehabilitation for several reasons, including resource use, ecological compatibility, palatability, and adaptation to local soils and climate. Native/traditional plant material will be used for rehabilitation of a disturbance area where the goal is to re-establish a native/traditional plant community. Appendix B is a selection of commercially available traditional plant species.

3.7.3 Seed mix recommendations

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. If seed availability is an issue, it would be preferable to use the correct species, rather than the prescribed seed rates. Species listed in Appendix D 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 E are commercially available in Manitoba and may be added for diversity.

3.7.4 Commercial seed and plant providers

Purchasing native seed from commercial providers is a practical option for large rehabilitation sites. 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 region with similar ecological conditions.
- Commercial seed providers should produce certificates of analysis from an accredited laboratory that provides seed purity and germination values.
- For revegetation within the Spy Hill Community Pasture, preference should be given to seed suppliers who collected seed from the Spy Hill Ellice Community pasture (with no cultivars).

3.7.5 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°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°C, where seeds will germinate the following growing season. For sites with a high risk of erosion, seeding could occur at anytime.

3.7.6 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:

Birtle Transmission Project
Rehabilitation and Invasive Species Management Plan

- 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: $84 \text{ kg/ha} \times 0.10 = 8.4 \text{ kg/ha}$.

3.7.7 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.

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.

3.7.8 Fertilizers

Fertilizers can be added to the soil to supply one or more plant nutrients essential to the growth of plants that may be lacking in the soil at the site prescribed for rehabilitation. 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.

This page was left intentionally blank.

4.0 Invasive species management

Many Invasive 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 threaten 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 F.

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

The management of invasive species must consider the ownership of the land. The responsibilities for management on different ownership types are described below:

- **ROW on private/municipal lands:** As Manitoba Hydro has only an easement the responsibility of invasive species management lies with the landowner. If invasive weeds are introduced to the right-of-way as a direct result of Manitoba Hydro activities it will work with the landowner to implement control options.
- **ROW on railway, road allowance or highway lands:** As Manitoba Hydro does not have an easement the responsibility of invasive species management lies with the landowner. If invasive weeds are introduced to the right-of-way as a direct result of Manitoba Hydro activities it will work with the landowner to implement control options.
- **ROW on Manitoba Hydro-owned lands:** Manitoba Hydro is responsible for invasive species management to be in compliance with the *Manitoba Noxious Weeds Act*.
- **ROW on Crown lands (including lands with third-party interests):** As Manitoba Hydro has only an easement the responsibility of invasive species management lies with the Crown (landowner) or the third party interest. If invasive weeds are introduced to the right-of-way as a direct result of Manitoba Hydro activities Manitoba Hydro would consult with local Weed Supervisors and Manitoba Agriculture and/or Sustainable Development departments to implement control options.

4.1 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. Detailed biosecurity measures are outlined in the biosecurity management plan for the Project. Preventative measures may include the following:

- Education on how to identify invasive species and infestations.
- Avoid driving or walking through areas of invasive species.
- Clean and wash equipment and boots before entering and leaving a site to prevent transport of seeds.
- Design seed mixes with species that have differing growth forms to occupy the variety of niches available, and seed native species that are known to be competitive.
- Record early detection of invasive species problem areas on adjacent lands.
- A combination of promoting natural re-vegetation and re-establishment of vegetation cover, where required, using species suited to the post-construction land use to provide competition for germinating weeds.

4.2 STEP 1: Weed management thresholds and priority levels

Weed management conducted prior to and during construction will focus on managing weeds identified during pre-construction surveys, as necessary, as well as occurrences identified during construction.

The management thresholds for weed species for the Project are as follows:

- Invasive weed species (Appendix G of Reference i) must be maintained or reduced to a density and distribution level equivalent to or less than levels observed on adjacent lands with equivalent or similar land use and land management. The comparison should be made to the invasive weed conditions found during pre-construction surveys and as compared to adjacent lands during/after construction.
- Weeds must be treated and managed in compliance with the Manitoba Noxious Weeds Act and Regulation. Under the regulation, a person must:
 - destroy all tier 1 noxious weeds as listed in the Regulation that are on land that the person owns or occupies
 - destroy all tier 2 noxious weeds as listed in the Regulation that are on land that the person owns or occupies if the area colonized by the weeds is less than five acres

- control all tier 2 noxious weeds as listed in the Regulation that are on land that the person owns or occupies if the area colonized by the weeds is five acres or more
- control a tier 3 noxious weed as listed in the Regulation that is on land that the person owns or occupies if the weed's uncontrolled growth or spread is likely to negatively affect an aspect of Manitoba's economy or environment in the area of the land or the well-being of residents in proximity to the land

The priority for managing sites where the threshold as described above has been reached will be determined by the level of risk of increasing the density and distribution of weed species. Criteria for the site priority levels are outlined in Table 2.

Table 2: Priority levels for weed management

Priority level	Purpose or intent
High	To destroy Tier 1 and Tier 2 noxious weeds (<5 acres) currently threatening non-infested or highly susceptible sites within Project footprint.
Moderate	To control Tier 2 noxious weeds (>5 acres) and invasive species on sites in less susceptible areas of the Project footprint. This includes areas adjacent to lands such as treed pasture lands that have a well-established vegetation cover and, therefore, are less susceptible to weed species introduction.
Low	To control a tier 3 noxious weed on within the Project footprint if the weed's uncontrolled growth or spread is likely to negatively affect an aspect of Manitoba's economy or environment in the area of the land or the well-being of residents in proximity to the land

4.3 STEP 2: Determine whether management threshold has been reached

Compare the density and distribution of each weed species observed on the construction right-of-way to the density and distribution of the same species off-site or as outlined in the pre-construction weed survey report, to determine whether the management threshold has been reached.

4.4 STEP 3: Review treatment criteria

Choose an appropriate management option (i.e., mechanical, biological, or chemical) or a combination of treatments that will provide effective weed management, based on the data collected at weed occurrence sites. The criteria used to select a treatment method that balances the potential environmental impacts while providing adequate and cost efficient weed management are:

- Effectiveness of previous treatments;
- Biology of target weed species, area and density;
- Existing land use;
- Land ownership;
- Proximity of organic farms, water sources, bodies of water and environmentally sensitive sites;
- The possibility of adverse impacts to wildlife, fish, surrounding land, workers and adjacent residents;
- Economic impacts of weeds on surround land use;
- Timing of treatment
- Existing soil type;
- Site accessibility
- Cost and availability of treatment options; and
- The consequences of no treatment.

4.5 STEP 4: Select weed management treatment method

4.5.1 Manual / mechanical treatment option

Manual/Mechanical treatments are preferred for weeds located adjacent to cultivated or agricultural lands, organic farm lands and near waterbodies (e.g., drainages, wetlands).

Manual/Mechanical options include:

- Mowing: mowing of weeds before weeds go to seed. Mowing may be combined with a pre-mowing herbicide treatment, ensuring that the herbicide has had sufficient time to absorb into the plants.
- Burning: targeted burning of weeds with torches or prescribed controlled burns
- String trimmers: to cut weeds at the ground surface to remove herbaceous vegetation at locations where access limits the use of larger equipment.

- Hand pulling: pulling of weeds in riparian and environmentally sensitive locations for annual and certain perennial weeds where all roots can be easily removed and weed density is sufficiently low enough to make hand pulling effective.
- When selecting a treatment, consideration should be made for the cultural, medicinal or commercial value of a plant to local communities.

Manual/Mechanical treatment options may be considered for use within 30 m of a watercourse, wetland or MH's ESSs.

4.5.2 Biological / Cultural / Native treatment option

Biological/Cultural/Native treatments are an alternative option near watercourses, within pastures, public recreation areas; where chemical application is not approved; or where manual/mechanical methods may not be effective. Biological options include:

- Biological insects and fungi: Canadian Food Inspection Agency approved insects and fungi might be considered to manage weed infestations where other methods have not proven successful.
- Grazing: High intensity livestock grazing has also proven an effective method for limiting weed infestations in select applications.
- Revegetation and erosion control: The use of erosion control measures such as blankets or the establishment of competitive vegetative cover on disturbances to stabilize soils and provide competition to weeds.

Biological/Cultural/Native treatment options may be considered for use within 30 m of a watercourse, wetland or MH's ESSs.

4.5.3 Chemical treatment option

Chemical treatments may be a necessary option when:

- Weed density and distribution has reached levels that other management options are not viable to control the weed infestation;
- Weed management in areas where mechanical and biological methods are not feasible or practical; and
- Where chemical management is the preferred option of the landowner or Weed Supervisor as designated under the Manitoba Noxious Weeds Act regulations.

Chemical treatments may be considered for use within 30 m of a MH's ESSs, but NOT within 30m of watercourses or wetlands.

4.5.4 No control management option

In some instances the implementation of a “no control” option and ongoing monitoring is the most practical and environmentally responsible course of action. In instances where “no control” is being considered as the treatment option, discussions with landowner and government regulators will occur. The No Control option may be considered for use within 30 m of a watercourse, wetland or MH’s ESSs.

4.6 Treatment options for common species

The following identifies an overview of treatment options for some common invasive species.

4.6.1 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.

4.6.2 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.

4.6.3 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.

4.6.4 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.

4.6.5 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.

4.6.6 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.

4.6.7 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.

4.7 Training and documentation

Training, documentation and communication form a critical component of the implementation of this plan. Manitoba Hydro and the contractor(s) each have responsibility to ensure that their respective personnel are appropriately trained to carry

out their role in rehabilitation, and that proper documentation and communication is being conducted throughout the Project.

Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time. Manitoba Hydro will also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth.

5.0 Monitoring and follow-up

Monitoring and follow-up 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 monitoring of disturbance areas:

- Disturbance areas should be inspected frequently in the first year and monitored annually thereafter until vegetation re-established.
- Monitoring may include an assessment of erosion control.
- Monitoring will include an assessment of vegetation to measure plant growth.
- Monitoring will be conducted by Manitoba Hydro Environmental Officer and/or vegetation specialists.

Environmental monitoring will determine if follow-up maintenance activities are required. Maintenance activities may include additional erosion control, re-seeding or further plantings, protection from browsing, and invasive species control.

This page was left intentionally blank.

6.0 References

Alberta Environment. 2003. Revegetation Using Native Plant Materials, Guidelines for Industrial Development Sites. 03-3. 8 pp.

California Invasive Plant Council. 2012. Preventing the Spread of Invasive Plants: Best Management Practices for Land Managers (3rd ed.). Cal-IPC Publication 2012-03. California Invasive Plant Council, Berkeley, California.

Dobb, A., and Burton, S. 2013. Rangeland Seeding Manual for British Columbia. British Columbia Ministry of Agriculture, Sustainable Agriculture Management Branch, Abbotsford, British Columbia.

Gerling, H.S., Willoughby, M.G., Schoepf, A. Tannas, K.E. and Tannas, C.A. 1996. A Guide to Using Native Plants on Disturbed Lands. Alberta Agriculture, Food and Rural Development and Alberta Environmental Protection. 247 pp.

Green, J.E., Van Egmond, T.D., Wylie, C., Jones, I., Knapik, L. and Paterson, L.R. 1992. A User Guide to Pit and Quarry Reclamation in Alberta. Alberta Land Conservation and Reclamation Council. Edmonton, Alberta. 137 pp.

Invasive Species Council of Manitoba. Available at <http://invasivespeciesmanitoba.com/site/>

Invasive Species Council of Manitoba. 2013. River, Lake and Wetland Invaders. A Pocket Field Guide by the Invasive Species Council of Manitoba, 4th Edition.

Kilde, R. and Fuge, E. 2000. Going Native, a Prairie Restoration Handbook for Minnesota Landowners. Minnesota Department of Natural Resources, Section of Ecological Services, Scientific and Natural Areas Program. 63 pp.

Manitoba Hydro. 2007. Hazardous Materials Management Handbook. Employee Safety and Health.

Manitoba Hydro. 2007. Transmission Line and Transmission Station Vegetation Management Practices.

Manitoba Hydro. 2008. Pesticide Application Requirements for Manitoba Hydro Employees and Contractors.

Morgan, J.P., Collicutt, D.R. and Thompson, J.D. 1995. Restoring Canada's Native Prairies. Prairie Habitats Inc. Argyle, MB. 94 pp.

Birtle Transmission Project
Rehabilitation and Invasive Species Management Plan

Parks, C. 2010. Best Management Practices for Industry: Top Invasive Plant Concerns for Rights-of-Way. Invasive Species Council of Manitoba. Brandon University. 27 pp.

Plus 4 Consulting Inc. and Calyx Consulting. 2007. Manitoba Hydro Transmission and Distribution Non Right-of-way Integrated Vegetation Management Plan.

Smith, R.E., Veldhuis, H., Mills, G.F., Eilers, R.G., Fraser, W.R. and Lelyk, G.W. 1998. Terrestrial Ecozones, Ecoregions and Ecodistricts of Manitoba. An Ecological Stratification of Manitoba's Landscapes. Land Resource Unit. Brandon Research Centre, Research Branch. Agriculture and Agri-Food Canada. Technical Bulletin 1998-9E.

United States Department of Agriculture, Forest Service. 2014. Collecting Native Seed. Available at
http://www.fs.fed.us/wildflowers/Native_Plant_Materials/developing/collecting.shtml

Appendix A

Rehabilitation checklist

Appendix A: Rehabilitation checklist

Date (yyyy mm dd)	
Name of recorder	Company (<i>if different from Manitoba Hydro</i>)
Location GPS Coordinates (<i>UTM 14N</i>)	
Closest Structure Number if applicable #	
Description of disturbance (<i>type, size, sensitivity i.e. riparian area</i>)	
Proximity to weed sources (<i>closest invasive weed ESS</i>)	
Severity of disturbance (<i>e.g., erosion is occurring, disturbance is stable</i>)	
Slope of site (<i>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%</i>)	
Current Ground conditions (<i>dry, moist, wet</i>)	
Timing of rehabilitation activities (<i>Immediate/once surface disturbance activities are complete and ground conditions allow</i>)	
Post disturbance vegetation conditions (<i>e.g. vegetation is removed or little is remaining</i>)	
Surrounding vegetation (<i>e.g. grassland, forest, riparian, wetland</i>) and predominant species if known	
Adjacent land uses (<i>e.g. agriculture/forest/residence</i>)	
Safety (<i>Are there any safety concerns?</i>)	
Accessibility (<i>Is the site accessible year round/winter/summer, is there alternate access to avoid site</i>)	
Existing Sediment and Erosion Control Measures (<i>silt fence, blanket</i>)	

Appendix B

Selection of traditional plant species commercially available for rehabilitation

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
<i>Abies balsamea</i>	balsam fir	S5	yes	yes	forest
<i>Achillea millefolium</i>	yarrow	S5	yes	low	forest, grassland
<i>Acorus americanus</i>	weke	S5	yes	yes	wetland
<i>Actaea racemosa</i>	black snakeroot	not listed by MBCDC	plant unknown	unknown	unknown
<i>Actaea rubra</i>	baneberry	S5	potential to transplant	low	forest
<i>Agastache foeniculum</i>	giant hyssop	S5	yes	low	moist meadow, forest
<i>Alnus incana</i>	speckled alder	S5	yes	yes	riverbank, moist forest
<i>Amelanchier alnifolia</i>	saskatoon berry	S5	yes	yes	forest
<i>Apocynum androsaemifolium</i>	dogbane	S5	potential to transplant	low	forest
<i>Aquilegia</i> sp.	columbine	–	yes	low	forest
<i>Aralia nudicaulis</i>	wild sarsaparilla	S5	yes	low	forest
<i>Arctostaphylos uva-ursi</i>	common bearberry	S5	yes	yes	forest
<i>Artemisia</i> sp.	sage	–	yes	low	grassland
<i>Asarum canadense</i>	wild ginger	S3S4	yes	low	moist forest
<i>Asclepias incarnata</i>	swamp milkweed	S4	yes	low	wetland
<i>Asclepias syriaca</i>	common milkweed	S4	potential to transplant	low	riverbank, grassland
<i>Betula papyrifera</i>	paper birch	S5	yes	yes	forest
<i>Caltha palustris</i>	marsh marigold	S5	yes	low	wetland
<i>Campanula</i> sp.	harebell	–	yes	low	grassland, forest
<i>Cannabis sativa</i>	hemp	SNA	potential to transplant	low	forest
<i>Chamerion angustifolium</i>	fireweed	S5	yes	yes	forest
<i>Conyza canadensis</i>	Canada fleabane	S5	potential to transplant	low	grassland
<i>Cornus canadensis</i>	bunchberry	S5	yes	low	forest
<i>Cornus sericea</i>	red osier dogwood	S5	yes	yes	forest
<i>Corylus americana</i>	American hazelnut	S4	yes	yes	forest
<i>Corylus cornuta</i>	beaked hazelnut	S5	yes	yes	forest

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
<i>Corylus</i> sp.	hazelnut	–	yes	yes	forest
<i>Crataegus</i> sp.	hawthorn	–	yes	yes	forest
<i>Dasiphora fruticosa</i>	shrubby cinquefoil	S5	yes	yes	forest
<i>Fragaria virginiana</i>	wild strawberry	S5	yes	low	forest
<i>Geranium bicknellii</i>	Bicknell's geranium	S5	potential to transplant	low	forest
<i>Geum aleppicum</i>	yellow avens	S5	potential to transplant	low	moist meadow, forest
<i>Heuchera richardsonii</i>	alumroot	S5	yes	low	grassland, forest
<i>Hierochloa odorata</i>	sweet grass	S5	yes	yes	grassland, forest
<i>Hypericum perforatum</i>	St. John's wort	SNA	yes	low	moist meadow, forest
<i>Larix laricina</i>	tamarack	S5	yes	yes	forest, wetland
<i>Rhododendron groenlandicum</i>	Labrador tea	S5	potential to transplant	low	forest
<i>Lilium philadelphicum</i>	wood lily	S4	yes	low	grassland, forest
<i>Lycopus uniflorus</i>	northern bugle-weed	S5	potential to transplant	low	wetland
<i>Maianthemum canadense</i>	Canada mayflower	S5	potential to transplant	low	forest
<i>Mentha</i> sp.	wild mint	–	yes	low	moist meadow
<i>Oenothera flava</i>	yellow evening primrose	SNA	potential to transplant	low	grassland, riverbank
<i>Polygala senega</i>	Seneca	S4	potential to transplant	low	grassland, forest
<i>Populus balsamifera</i>	balsam poplar	S5	potential to transplant	yes	forest
<i>Potentilla arguta</i>	tall cinquefoil	S5	potential to transplant	low	grassland
<i>Prenanthes</i> sp.	rattlesnake root	–	potential to transplant	low	forest
<i>Prunella vulgaris</i>	self-heal	S4	potential to transplant	low	grassland, forest
<i>Prunus nigra</i>	Canada wild plum	S4	yes	yes	forest
<i>Prunus pensylvanica</i>	pin cherry	S5	yes	yes	forest
<i>Prunus pumila</i>	sand cherry	S4	yes	yes	grassland, forest
<i>Prunus</i> sp.	plum	–	yes	yes	grassland, forest
<i>Prunus virginiana</i>	choke cherry	S5	potential to transplant	yes	forest

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
<i>Pyrola</i> sp.	wintergreen	–	potential to transplant	low	forest
<i>Quercus macrocarpa</i>	bur oak	S5	yes	yes	forest
<i>Ribes americanum</i>	wild black currant	S5	yes	yes	forest
<i>Ribes oxycanthoides</i> ssp. <i>oxycanthoides</i>	northern gooseberry	S5	potential to transplant	yes	forest
<i>Rosa arkansana</i>	prairie rose	S4	potential to transplant	yes	grassland
<i>Rosa</i> sp.	wild rose	–	yes	yes	grassland, forest
<i>Rubus pubescens</i>	dewberry	S5	potential to transplant	low	forest
<i>Rubus</i> sp.	blackberry	not listed by MBCDC	potential to transplant	low	forest
<i>Rubus idaeus</i>	raspberry	–	yes	yes	forest
<i>Rubus</i> sp.	wild raspberry	–	yes	yes	forest
<i>Sibbaldiopsis tridentata</i>	three-toothed cinquefoil	S5	potential to transplant	low	forest
<i>Solidago canadensis</i>	Canada goldenrod	S5	yes	low	grassland
<i>Solidago gigantea</i>	smooth goldenrod	S5	potential to transplant	low	grassland, forest
<i>Spiraea alba</i>	meadowsweet	S5	yes	yes	forest
<i>Stachys palustris</i>	marsh hedge-nettle	S5	potential to transplant	low	moist meadow
<i>Symphoricarpos albus</i>	snowberry	S5	yes	yes	forest, grassland
<i>Thuja occidentalis</i>	cedar	S4	yes	yes	forest
<i>Trifolium pratense</i>	red clover	SNA	yes	yes	forest, grassland
<i>Vaccinium</i> sp.	blueberry	–	yes	low	forest
<i>Viburnum opulus</i>	highbush cranberry	S5	yes	yes	forest
<i>Viburnum rafinesquianum</i>	downy arrow-wood	S4	yes	yes	forest
<i>Vitis riparia</i>	wild grapes	S3S4	yes	low	forest
<i>Zizania palustris</i>	wild rice	S4	yes	low	wetland

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
-----------------------------------	-----------------------------------	------------------------	--------------------------------	---------------------------------	------------------------

Notes:

1. A list of suppliers is available upon request
2. Traditional use plant names taken from the *Aboriginal Traditional Knowledge Study Community Report* submitted by Black River First Nation, Long Plain First Nation, and Swan Lake First Nation for the Manitoba-Minnesota Transmission Project (Manitoba Hydro 2015).

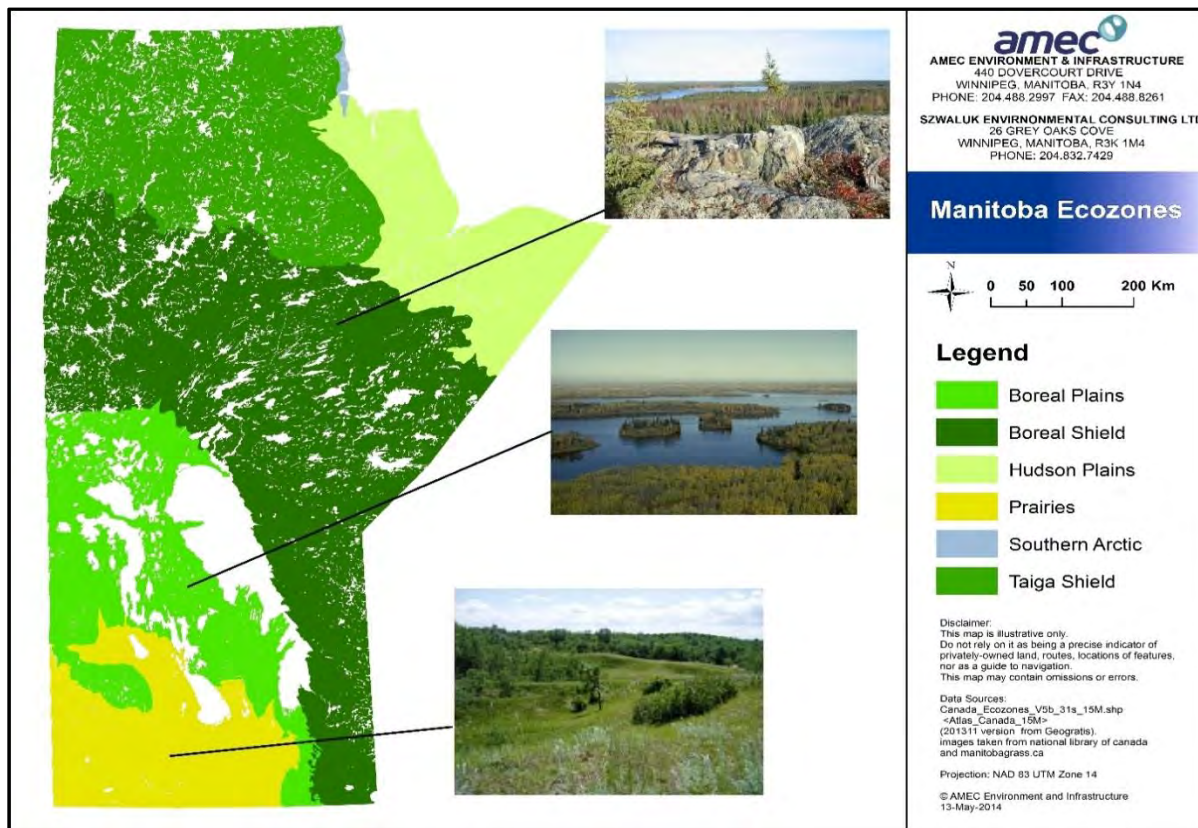
Appendix C

Characteristic vegetation of Manitoba's ecozones

Appendix C: 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 D

Recommended Baseline Native Seed Mixes

Appendix D: Recommended baseline native seed mixes		
Common name	Scientific name	Percent in mix (total 100%)
Northern Manitoba – upland mesic to dry soils		
Short-leaved Fescue	<i>Festuca brachyphylla</i>	10
Canada Wild Rye	<i>Elymus canadensis</i>	20
Tickle-grass	<i>Agrostis scabra</i>	10
Hairy Wild Rye	<i>Leymus innovatus</i>	20
June Grass	<i>Koeleria macrantha</i>	10
Rocky Mountain Fescue	<i>Festuca saximontana</i>	10
Richardson Needle Grass	<i>Achnatherum richardsonii</i>	15
Common Vetch	<i>Vicia americana</i>	5
Northern Manitoba – lowland wet meadow soils		
Fowl Blue Grass	<i>Poa palustis</i>	30
Marsh or Northern Reed Grass	<i>Calamagrostis canadensis</i> or <i>C. stricta</i>	10
Slough Grass	<i>Beckmannia syzigachne</i>	50
Tufted Hairgrass	<i>Deschampsia caespitosa</i>	10
West Central Manitoba – upland mesic to dry soils		
Tickle-grass	<i>Agrostis scabra</i>	10
Big Bluestem	<i>Andropogon gerardii</i>	20
Purple Prairie Clover	<i>Dalea purpurea</i> var. <i>purpurea</i>	5
Canada Wild Rye	<i>Elymus canadensis</i>	30
Hairy Wild Rye	<i>Leymus innovatus</i>	10
Rocky Mountain Fescue	<i>Festuca saximontana</i>	5
Awned Wheatgrass	<i>Elymus trachycaulus</i> spp. <i>subsecundus</i>	10
June Grass	<i>Koeleria macrantha</i>	5
Common Vetch	<i>Vicia americana</i>	5
West Central Manitoba – lowland wet meadow soils		
Slough Grass	<i>Beckmannia syzigachne</i>	50
Marsh or Northern Reed Grass	<i>Calamagrostis canadensis</i> or <i>C. stricta</i>	5
Tufted Hairgrass	<i>Deschampsia caespitosa</i>	30
Baltic Rush	<i>Juncus arcticus</i> var. <i>balticus</i>	5
Fowl Blue Grass	<i>Poa palustis</i>	10
Southern Manitoba – upland mesic to dry soils		
Awned Wheatgrass	<i>Elymus trachycaulus</i> spp. <i>subsecundus</i>	10
Big Bluestem	<i>Andropogon gerardii</i>	30

Appendix D: Recommended baseline native seed mixes

Common name	Scientific name	Percent in mix (total 100%)
White Prairie-clover	<i>Dalea candida</i>	5
Purple Prairie Clover	<i>Dalea purpurea</i> var. <i>purpurea</i>	5
Canada Wild Rye	<i>Elymus canadensis</i>	20
June Grass	<i>Koeleria macrantha</i>	5
Little Bluestem	<i>Schizachyrium scoparium</i>	10
Indian Grass	<i>Sorghastrum nutans</i>	10
Common Vetch	<i>Vicia americana</i>	5
Southern Manitoba – lowland wet meadow soils		
Slough Grass	<i>Beckmannia syzigachne</i>	50
Marsh or Northern Reed Grass	<i>Calamagrostis canadensis</i> or <i>C. stricta</i>	10
Tufted Hairgrass	<i>Deschampsia caespitosa</i>	10
Fowl Blue Grass	<i>Poa palustis</i>	10
Prairie Cord Grass	<i>Spartina pectinata</i>	20

Appendix E

Selection of plant species commercially available for rehabilitation

Appendix E: Selection of plant species commercially available for rehabilitation

Note: A list of suppliers is available upon request

Scientific name	Common name	Seed	Seedling
<i>Abies balsamea</i>	Balsam Fir		X
<i>Achnatherum hymenoides</i>	Indian Rice Grass	X	
<i>Achnatherum richardsonii</i>	Richardson Needle Grass	X	
<i>Agrostis scabra</i>	Tickle-grass	X	
<i>Andropogon gerardii</i>	Big Bluestem	X	
<i>Arctagrostis latifolia</i>	Polar Grass	X	
<i>Astragalus canadensis</i>	Canada Milkvetch	X	
<i>Beckmannia syzigachne</i>	Slough Grass	X	
<i>Bouteloua curtipendula</i>	Side-oats Grama	X	
<i>Bouteloua gracilis</i>	Blue Grama	X	
<i>Bromus anomalus</i>	Nodding Brome	X	
<i>Bromus ciliatus</i>	Fringed Brome	X	
<i>Buchloe dactyloides</i>	Buffalo Grass	X	
<i>Calamagrostis canadensis</i>	Marsh Reed Grass	X	
<i>Calamagrostis stricta ssp. inexpansa</i>	Northern Reed Grass	X	
<i>Calamovilfa longifolia</i>	Sand Grass	X	
<i>Carex bebbii</i>	Bebb's Sedge	X	
<i>Dalea candida</i>	White Prairie-clover	X	
<i>Dalea purpurea var. purpurea</i>	Purple Prairie Clover	X	
<i>Deschampsia caespitosa</i>	Tufted Hairgrass	X	
<i>Distichlis spicata</i>	Alkali Grass	X	
<i>Elymus alaskanus ssp. latiglumis</i>	Alaska Wild Rye	X	
<i>Elymus canadensis</i>	Canada Wild Rye	X	
<i>Elymus glaucus</i>	Smooth Wild Rye	X	
<i>Elymus lanceolatus ssp. lanceolatus</i>	Thickspike Wheatgrass	X	
<i>Elymus lanceolatus ssp. psammophilus</i>	Sand-dune Wheatgrass	X	
<i>Elymus trachycaulus</i>	Slender Wheat Grass	X	
<i>Elymus trachycaulus spp. subsecundus</i>	Awned Wheatgrass	X	
<i>Elymus virginicus</i>	Virginia Wild Rye	X	
<i>Festuca brachyphylla</i>	Short-leaved Fescue	X	

Appendix E: Selection of plant species commercially available for rehabilitation

Note: A list of suppliers is available upon request

Scientific name	Common name	Seed	Seedling
<i>Festuca hali</i>	Plains Rough Fescue	X	
<i>Festuca saximontana</i>	Rocky Mountain Fescue	X	
<i>Glyceria grandis</i>	Tall Manna Grass	X	
<i>Helianthus maximiliani</i>	Narrow-leaved Sunflower	X	
<i>Hesperostipa comata ssp. comata</i>	Spear Grass	X	
<i>Hesperostipa curtisetia</i>	Western Porcupine Grass	X	
<i>Juncus arcticus var. balticus</i>	Baltic Rush	X	
<i>Koeleria macrantha</i>	June Grass	X	
<i>Leymus innovatus</i>	Hairy Wild Rye	X	
<i>Nassella viridula</i>	Green Needle Grass	X	
<i>Panicum virgatum</i>	Switch Grass	X	
<i>Pascopyrum smithii</i>	Western Wheat Grass	X	
<i>Picea glauca</i>	White Spruce		X
<i>Picea mariana</i>	Black Spruce		X
<i>Pinus banksia</i>	Jack Pine		X
<i>Pinus resinosa</i>	Red Pine		X
<i>Pinus strobus</i>	Eastern White Pine		X
<i>Poa alpina</i>	Alpine Blue Grass	X	
<i>Poa glauca</i>	Glaucous Spear-grass	X	
<i>Poa palustris</i>	Fowl Blue Grass	X	
<i>Poa secunda ssp. secunda</i>	Curly Bluegrass	X	
<i>Populus spp.</i>	Hybrid Poplar		X
<i>Pseudoroegneria spicata ssp. spicata</i>	Bluebunch Wheat Grass	X	
<i>Quercus macrocarpa</i>	Bur Oak		X
<i>Salix spp.</i>	Hybrid Willow		X
<i>Schizachyrium scoparium</i>	Little Bluestem	X	
<i>Scolochloa festucea</i>	Sprangletop	X	
<i>Sorghastrum nutans</i>	Indian Grass	X	
<i>Spartina gracilis</i>	Alkali Cord Grass	X	
<i>Spartina pectinata</i>	Prairie Cord Grass	X	

Appendix E: Selection of plant species commercially available for rehabilitation***Note: A list of suppliers is available upon request***

Scientific name	Common name	Seed	Seedling
<i>Sporobolus cryptandrus</i>	Sand Dropseed	X	
<i>Thuja occidentalis</i>	Eastern White Cedar		X
<i>Trisetum spicatum</i>	Spike Trisetum	X	
<i>Vicia americana</i>	Common Vetch	X	

Appendix F

Invasive species listed by the Invasive Species Council of Manitoba

Appendix F: 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
<i>Alliaria petiolata</i>	Garlic Mustard
<i>Arctium minus</i>	Common Burdock
<i>Berteroa incana</i>	Hoary Alyssum
<i>Bromus japonicus</i>	Japanese Brome
<i>Bromus tectorum</i>	Downy Brome
<i>Butomus umbellatus</i>	Flowering Rush
<i>Campanula rapunculoides</i>	Creeping Bellflower
<i>Carduus nutans</i>	Nodding Thistle
<i>Cirsium arvense</i>	Canada Thistle
<i>Cirsium vulgare</i>	Bull Thistle
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Cynoglossum officinale</i>	Hound's Tongue
<i>Echium vulgare</i>	Blue Weed
<i>Eichhornia crassipes</i>	Water Hyacinth
<i>Euphorbia esula</i>	Leafy Spurge
<i>Fallopia japonica</i>	Japanese Knotweed
<i>Gypsophila paniculata</i>	Baby's Breath
<i>Heracleum mantegazzianum</i>	Giant Hogweed
<i>Hesperis matronalis</i>	Dame's Rocket
<i>Hieracium aurantiacum</i>	Orange Hawkweed
<i>Hypericum perforatum</i>	St. John's Wort
<i>Impatiens glandulifera</i>	Himalayan Balsam
<i>Jacobaea vulgaris</i>	Tansy Ragwort
<i>Knautia arvensis</i>	Field Scabious
<i>Leucanthemum vulgare</i>	Ox-eye Daisy
<i>Linaria dalmatica</i>	Dalmatian Toadflax
<i>Linaria vulgaris</i>	Yellow Toadflax
<i>Lychnis alba</i>	White Cockle
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Matricaria perforata</i>	Scentless Chamomile
<i>Odontites serotina</i>	Red Bartsia
<i>Onopordum acanthium</i>	Scotch Thistle
<i>Phalaris arundinacea</i>	Reed Canary Grass
<i>Phragmites australis</i> spp. <i>australis</i>	Invasive Phragmites
<i>Ranunculus acris</i>	Tall Buttercup

Appendix F: 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
<i>Rhamnus cathartica</i>	European Buckthorn
<i>Saponaria officinalis</i>	Bouncing Bet
<i>Saponaria vaccaria</i>	Cow Cockle
<i>Sonchus arvensis</i>	Perennial Sow Thistle
<i>Tanacetum vulgare</i>	Common Tansy
<i>Tribulus terrestris</i>	Puncture Vine
<i>Typha angustifolia</i> and <i>Typha x glauca</i>	Narrow-leaved and Hybrid Cattail
<i>Vicia cracca</i>	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.	

Appendix G

Noxious Weeds Regulation Species List

Appendix G: Noxious Weeds Regulation Species List

Designated Tier 1 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Amaranth, Palmer	<i>Amaranthus palmeri</i>	All areas of the province outside the Municipality of Bifrost-Riverton and the Rural Municipalities of Armstrong, Fisher, Gimli, Rockwood, St. Andrews and St. Clements
Bartsia, red	<i>Odontes vernus</i>	Whole province
Crupina, common	<i>Crupina vulgaris</i>	Whole province
Cupgrass, woolly	<i>Eriochloa villosa</i>	Whole province
Goatgrass, jointed	<i>Aegilops cylindrical</i>	Whole province
Hawkweed, orange	<i>Hieracium aurantiacum</i>	Whole province
Hogweed, giant	<i>Heracleum mantegazzianum</i>	Whole province
Hound's-tongue	<i>Cynoglossum officinale</i>	Whole province
Knapweed, diffuse	<i>Centaurea diffusa</i>	Whole province
Knapweed, Russian	<i>Acroptilon repens</i>	Whole province
Knapweed, spotted	<i>Centaurea stoebe</i>	Whole province
Knapweed, squarrose	<i>Centaurea virgata</i>	Whole province
Knotweed, Japanese	<i>Fallopia japonica</i>	Whole province
Mile-a-minute weed	<i>Persicaria perfoliata</i>	Whole province
Mustard, garlic	<i>Allaria petiolata</i>	Whole province
Patterson's curse	<i>Echium plantagineum</i>	Whole province
Pigweed, smooth	<i>Amaranthus hybridus</i>	Whole province
Saltcedar	<i>Tamarix spp.</i>	Whole province
Star-thistle, yellow	<i>Centaurea solstitialis</i>	Whole province
Tussock, serrated	<i>Nassella trichotoma</i>	Whole province
Waterhemp, tall	<i>Amaranthus turbiculatus</i>	Whole province

Designated Tier 2 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Alyssum, hoary	<i>Berteroa incana</i>	Whole province
Baby's-breath	<i>Gypsophila paniculata</i>	Whole province
Bartsia, red	<i>Odontes vernus</i>	Municipality of Bifrost-Riverton and the Rural Municipalities of Armstrong, Fisher, Gimli, Rockwood, St. Andrews and St. Clements
Bouncingbet	<i>Saponaria officinalis</i>	Whole province
Brome, downy	<i>Bromus tectorum</i>	Whole province
Brome, Japanese	<i>Bromus japonicas</i>	Whole province
Campion, bladder	<i>Silene vulgaris</i>	Whole province
Chamomile, scentless	<i>Matricaria perforata</i>	Whole province
Common reed, invasive	<i>Phragmites australis australis</i>	Whole province
Daisy, ox-eye	<i>Leucanthemum vulgare</i>	Whole province
Nutsedge, yellow	<i>Cyperus esculentus</i>	Whole province
Scabious, field	<i>Knautia arvensis</i>	Whole province
Spurge, Cypress	<i>Euphorbia cyparissias</i>	Whole province
Spurge, leafy	<i>Euphorbia esula</i>	Whole province
St. John's-wort	<i>Hypericum perforatum</i>	Whole province
Tansy, common	<i>Tanacetum vulgare</i>	Whole province
Thistle, nodding	<i>Carduus nutans</i>	Whole province
Toadflax, Dalmatian	<i>Linaria dalmatica</i>	Whole province

Designated Tier 3 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Absinth	<i>Artemisia absinthum</i>	Whole province
Barberry	<i>Berberis vulgaris</i>	Whole province
Barley, foxtail	<i>Hordeum jubatum</i>	Whole province
Bellflower, creeping	<i>Campanula rapunculoides</i>	Whole province
Buckthorn, European	<i>Rhamnus frangula</i>	Whole province
Burdock, common	<i>Arctium minus</i>	Whole province
Burdock, greater	<i>Arctium, lappa</i>	Whole province
Burdock, woolly	<i>Arctium, tomentosum</i>	Whole province
Campion, biennial	<i>Silene dioica</i>	Whole province
Catchfly, night-flowering	<i>Silene noctiflora</i>	Whole province
Cleavers	<i>Galium aparine</i>	Whole province
Cleavers, false	<i>Galium spurium</i>	Whole province
Cockle, white	<i>Silene alba</i>	Whole province
Dandelion	<i>Taraxacum officinale</i>	Whole province
Dodder	genus <i>Cuscuta</i>	Whole province
Fleabane, Canada	<i>Conyza canadensis</i>	Whole province
Flixweed	<i>Descurainia Sophia</i>	Whole province
Hawk's-beard, narrow-leaved	<i>Crepis tectorum</i>	Whole province
Hemlock, poison	<i>Conium maculatum</i>	Whole province
Hemp-nettle	<i>Galeopsis tetrahit</i>	Whole province
Hoary-cress	<i>Cardaria draba</i>	Whole province
Jimsonweed	<i>Datura stromonium</i>	Whole province
Kochia	<i>Kochia scoparia</i>	Whole province
Lamb's quarters	<i>Chenopodium album</i>	Whole province
Lettuce, prickly	<i>Lactuca seriola</i>	Whole province
Milkweed, common	<i>Asclepias syriaca</i>	Whole province
Milkweed, showy	<i>Aslepias speciosa</i>	Whole province
Mustard, wild	<i>Sinapis arvensis</i>	Whole province
Nightshade, American black	<i>Solanum americanum</i>	Whole province
Nightshade, cutleaf	<i>Solanum triflorum</i>	Whole province
Nightshade, hairy	<i>Solanum sarachoides</i>	Whole province
Parsnip, wild	<i>Pastinaca sativa</i>	Whole province
Ragweed, common	<i>Ambrosia artemisifolia</i>	Whole province
Ragweed, false	<i>Iva xanthifolia</i>	Whole province
Ragweed, giant	<i>Ambrosia trifida</i>	Whole province

Sow-thistle, annual	<i>Sonchus oleraceus</i>	Whole province
Designated Tier 3 Noxious Weeds		
Common name	Scientific name	Area for which Designation applies
Sow-thistle, perennial	<i>Sonchus arvensis</i>	Whole province
Sow-thistle, spiny annual	<i>Sonchus asper</i>	Whole province
Stinkweed	<i>Thlaspi arvense</i>	Whole province
Stork's bill	<i>Erodium cicutarium</i>	Whole province
Thistle, bull	<i>Cirsium vulgare</i>	Whole province
Thistle, Canada	<i>Cirsium arvense</i>	Whole province
Thistle, Russian	<i>Salsola pestifer</i>	Whole province
Toadflax, yellow	<i>Linaria vulgaris</i>	Whole province
Water hemlock, bulb-bearing	<i>Cicuta bulbifera</i>	Whole province
Water hemlock, northern	<i>Cicuta virosa</i>	Whole province
Water hemlock, spotted	<i>Cicuta maculate</i>	Whole province
Water hemlock, western	<i>Cicuta douglasii</i>	Whole province
Whitetop, hairy	<i>Cardaria pubescens</i>	Whole province
Whitetop, lenspod	<i>Cardaria chalepensis</i>	Whole province

Appendix Q: Waste and Recycling Management Plan

This page was left intentionally blank.

Birtle Transmission Project

Waste and Recycling Management Plan

June 2020

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

This page was left intentionally blank.

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
Final 1.0	Document Approved and Published			2020_0610

This page was left intentionally blank.

PREFACE

This document presents the Waste and Recycling Management Plan (WRMP; the Plan) for the construction of the Birtle Transmission Project (the Project). It is intended to provide information and instruction to Contractors and Manitoba Hydro employees as well as information to regulators and members of the public.

The Plan provides general considerations and guidance pertinent to waste and recycling management during the development of the Project. More importantly it presents a Project-specific implementation plan and actions required to proactively address the issue of waste management as a result of construction of the Project.

Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro
Licensing and Environmental Assessment Department
360 Portage Avenue
Winnipeg, MB
Canada R3C 0G8
1-877-343-1631

LEAProjects@hydro.mb.ca

This page was left intentionally blank.

Table of contents

1.0	Introduction	4
1.1	Commitment to environmental protection	4
1.2	Purpose and objectives	5
1.3	Potential effects of waste	5
1.4	Roles and responsibilities	5
2.0	Regulatory context	9
3.0	Implementation	10
3.1	Waste identification	10
3.2	Waste management	10
3.3	Training	11
3.4	General mitigation measures	11
3.5	Documentation	11
4.0	Communication	13
5.0	Monitoring and follow-up	13
6.0	Environmental management practices	14

Figures

Figure 1: Transmission Environmental Protection Program	6
Figure 2: Environmental communication reporting structure	8

Tables

Table 1: Roles and responsibilities	6
Table 2: Examples of commonly produced waste during construction	10

This page was left intentionally blank.

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Birtle Transmission Project (the Project) Environmental Assessment process to developing a Waste and Recycling Management Plan (WRMP) as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects. This document outlines the procedures to be employed by Contractors to proactively address the issue of waste management.

This document is intended to provide measures to manage waste during the construction of the Project. Waste generated during the construction activities of a transmission project will be collected, sorted, isolated, stored and disposed of or recycled. This document identifies some of the common waste materials generated during different construction activities.

Note that the methods presented here are not exhaustive and alternative methods may be proposed by the Contractor but would require approval from a Manitoba Hydro Environmental Officer prior to implementation.

1.1 Commitment to environmental protection

Manitoba Hydro integrates environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the involvement of Manitoba Hydro employees, consultants, contractors, Indigenous communities and organizations and the public at all stages of the Project from planning and design through construction and operational phases.

The use of a WRMP is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential effects of access related to the construction of a new transmission line.

Manitoba Hydro is committed to implementing this WRP and requiring Contractors to follow the terms of this and other applicable plans within the Environmental Protection Program.

1.2 Purpose and objectives

This Plan is intended to be used as a reference document in the field, during construction activities to address waste management while ensuring compliance with Manitoba Hydro's Construction Environmental Protection Plan requirements, industry best practices, and Provincial/Federal regulations and legislation. In order to effectively manage waste during construction activities, a variety of methods are available for implementation. The appendix outlines waste management techniques along with a description of the situations where each technique may be employed and directions for correct implementation.

Should a contractor wish to deviate from the techniques or implementation described in this document they must first obtain approval from a Manitoba Hydro Environmental Officer.

The objectives of this Plan are as follows:

- To establish a process prior to the start of construction that can be used to identify potential waste streams and plan for proper handling and disposal. This process will meet regulatory requirements, industry standards and best practices with regards to waste management during construction activities.
- To provide guidance on the correct handling and management of waste.

1.3 Potential effects of waste

The Project has potential to generate significant amounts of waste of various types. To manage and reduce waste from the Project, Manitoba Hydro requires all Contractors to utilize the Waste and Recycling Management Plan (WRMP) in an effort to reduce the volume of materials going to landfill and facilitate reuse and recycling. Where applicable, this WRMP will also address wastes developed in the operation of construction camps.

1.4 Roles and responsibilities

This section outlines the major roles and responsibilities of those involved in the implementation of the Plan. The Plan forms a component of the Environmental Protection Program (EPP), which provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures for the Project. The EPP describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental

effects from Project activities. A visual reference for how the Plan fits into the overall EPP organization structure is provided in Figure 1.

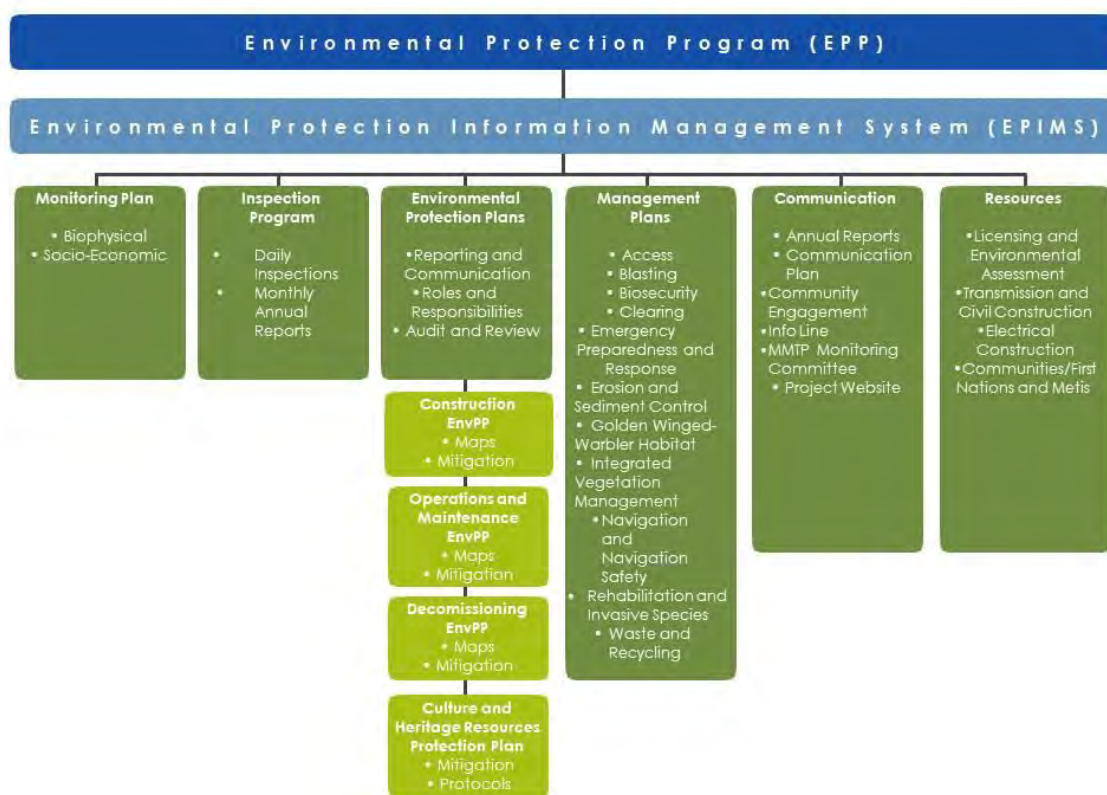


Figure 1: Transmission Environmental Protection Program

A summary of roles and key responsibilities is found in Table 1. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 2.

Table 1: Roles and responsibilities

Role	Key Responsibilities
Manitoba Hydro	<ul style="list-style-type: none"> • Develops and amends the WRMP. • May delegate this responsibility to other construction professionals to implement, maintain and inspect /monitor for the duration of the undertaking. • Signs agreements, approvals, permits and Authorizations to which compliance is legally binding. • Ensures Contractors are aware of their responsibilities

	<ul style="list-style-type: none"> • Appoints an Environmental Inspector/Officer to confirm that regulatory criteria are being met. • The Manitoba Hydro Environmental Inspector/Officer will regularly inspect waste management measures to confirm effectiveness.
Construction Contractor(s)	<ul style="list-style-type: none"> • Ensure that all activities comply with the requirements of the WRMP. • Ensure that all activities comply with applicable regulatory requirements. • Responsible for acquiring any applicable regulatory permits related to waste management and submitting copies to MH. • Responsible for implementation, coordination and verification of pre-project employee environmental orientation. • Ensure all contractor project staff are adequately trained/informed of pertinent requirements and of the Project related to their position. • Ensure that only adequately trained personnel are permitted to handle hazardous materials. • Ensure that hazardous material storage areas are only accessible to adequately trained personnel. • Ensure all staff will be trained in Work Hazardous Materials Information Systems (WHMIS) and have access to MSDS sheets. • Report any discoveries of non-compliance, accidents or incidents to MH. • Respond and act promptly to resolve if any activities are identified as not in compliance with the WRMP or any regulatory requirements. • Ensure that adequate equipment and materials are on hand to safely store, segregate and manage waste products • Ensure that all documentation is maintained and copies submitted to MH in a timely manner. • Responsible for implementation of the emergency response and hazardous materials plans, and other related topics. • Ensure that food waste is carefully sorted and stored in wildlife proof containers. Seek clarification from Environmental Inspector/Officer and/or Hydro Field Safety Officers as necessary.

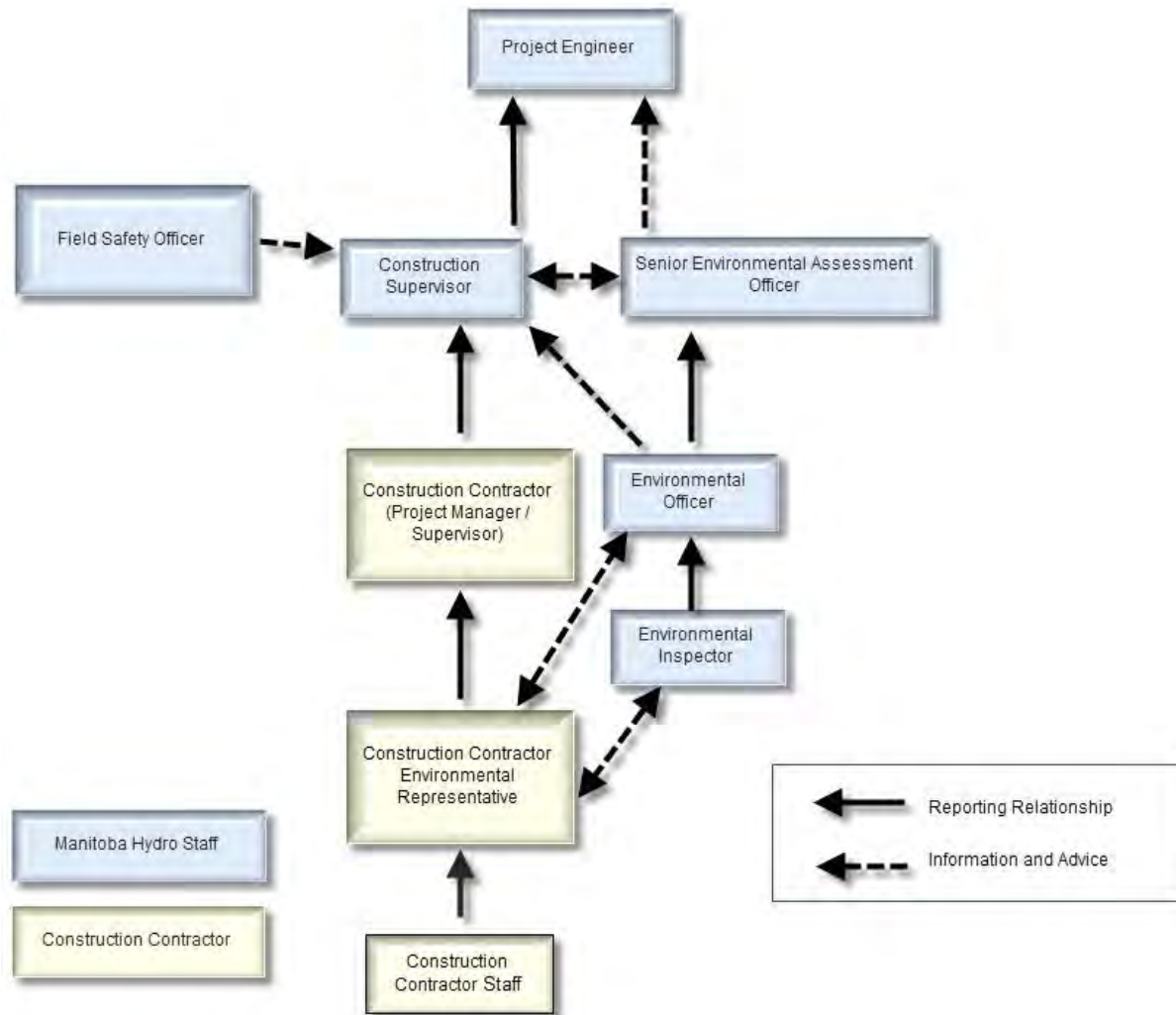


Figure 2: Environmental communication reporting structure

This page was left intentionally blank.

2.0 Regulatory context

Below is a list of the applicable legislation regarding waste and recycling practises:

Provincial

- The Workplace Health and Safety Act and Regulations
- The Waste Reduction and Prevention Act and Regulations
- The Ozone Depleting Substance Act
- The Dangerous Goods Handling and Transportation Act
 - Dangerous Goods Handling and Transportation Regulation
 - Hazardous Waste Regulation
- Environment Act (C.C.S.M. E125)
 - MR 37/2016 Waste Management Facilities Regulation
 - MR 83/2003 Onsite Wastewater Management Systems Regulation
 - MR 92/88R Litter Regulation

Federal

- Transportation of Dangerous Goods Act
- Fisheries and Oceans Regulations and Legislation

This page was left intentionally blank.

3.0 Implementation

3.1 Waste identification

Waste will be categorized and segregated by the contractor, examples of waste that are expected to be produced by the Project and be covered by this plan are found in Table 2 (Note: this is not an exhaustive list).

Table 2: Examples of commonly produced waste during construction

Category	Items
Hazardous waste	Motor oils, fuels, solvents, coolants, lead-acid batteries, hydraulic fluid, oil filters, pesticides, solids and liquids (water/snow, soils, clean-up materials) contaminated by petroleum products or other hazardous materials, 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, general purpose batteries (lithium, nickel-cadmium)
Construction equipment	Rubber tires, equipment parts etc.
Wastewater	Sewage, grey water

3.2 Waste management

This Waste and Recycling Management Plan takes a hierarchical approach 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
- Waste disposal (as a final option)

Prior to the start of construction, the Contractor must ensure that the local waste management facilities are willing, and have the capacity to accommodate the projected waste volume. Only waste management facilities that are approved by MH may be used by the Contractor.

3.3 Training

As part as their pre-job training and site orientation, work crews must participate in formal training. Prior to starting work on the project, staff and subcontractors must have training in:

- Workplace Hazardous Materials Information Systems (WHIMIS)
- When applicable, the Transportation of Dangerous Goods (TDG)
- Environmental Awareness (Environmental Orientation)
- Waste management procedures
- Spill response procedures

3.4 General mitigation measures

General mitigation measures that are particular to waste management and construction activities are found in the Construction Environmental Protection Plan, General mitigation tables:

- EI-13 Concrete wash water and waste
- EI-4 Hazardous materials
- EI-5 Petroleum products
- EI-10 Waste management
- EI-12 Wastewater

3.5 Documentation

The list below outlines the documentation requirements that the contractor is responsible for as part of the implementation of the Plan.

- Submit a copy of a valid hazardous waste generator licence to MH.

- Maintain an accurate and detailed inventory of various hazardous waste types being generated and submit a copy to MH on a bi-weekly basis.
- Submit all copies of manifests and waste receipts related to transport and/or disposal of hazardous waste materials to MH
- Complete required reporting to regulatory agencies and either copy MH on all correspondence or provide copies of all correspondence to MH in a timely manner
- Submit copies of all valid TDG certificates to MH for all Contractor staff that require.
- Submit to MH in writing the valid Sewage Haulers Provincial Registration Number for any individuals/companies completing this service for the Contractor.
- Submit in writing to MH the name/company of any subcontractors involved in transport of Project related recycling and/or waste transport to recycling and/or disposal sites and notify MH in writing if any changes are made.
- Receive approval from MH prior to hauling of Project related waste to a recycling and/or disposal site and submit a request to MH in writing if would like to propose any changes.

This page was left intentionally blank.

4.0 Communication

Any contractor-proposed additions, location modifications or Plan requirement revisions will be submitted in writing to Manitoba Hydro and include a map containing legal land description and GPS location. Any Manitoba Hydro-required revisions to the Plan will be communicated to the contractor's Project Manager for distribution to Project staff.

5.0 Monitoring and follow-up

Monitoring, Inspection and adaptive management are necessary to ensure the effectiveness of waste management and the Waste and Recycling Management Plan. It is the duty of the Contractor to ensure that the storage requirements and processes described in this plan are being followed. Regular monitoring of worksites and storage facilities will take place to track and document compliance. To accomplish this, the Contractor's Environmental Representative will conduct monitoring that includes the following:

- Ensure that proper general housekeeping practices are being followed and that any unnecessary waste/mess at work and/or storage sites is being cleaned up on a daily basis.
- Ensure waste is not exceeding the capacity of containers and coordinating transport/disposal as required.
- Ensure that general waste, recycling and hazardous waste are being appropriately segregated and labelled
- Ensure that general waste, recycling and hazardous waste containers are very clearly signed accordingly.
- Ensure that all hazardous waste storage has adequate secondary containment.
- Ensure that all hazardous waste storage is adequately covered and protected from precipitation.
- Ensure that all hazardous waste storage areas are appropriately ventilated.
- WHMIS procedures are being followed and MSDS sheets are accessible.
- Check the capacity of containers, determining and reporting on levels and determine if transport to a waste management facility is needed.
- Ensure tracking documentation is being completed by site personnel.

This page was left intentionally blank.

6.0 Environmental management practices

Below is a list of environmental management practices applicable to waste and recycling. An appendix is provided for each that provides material examples, methods, reduction techniques, applicable legislation for each.

- WR_01 Hazardous materials handling
- WR_02 Hazardous materials – storage and facility requirements
- WR_03 Construction waste
- WR_04 Wastewater
- WR_05 Concrete waste
- WR_06 Biosecurity waste

This page was left intentionally blank.

Appendix A

Environmental Management Practices

This page was left intentionally blank.



Material Examples

Motor oils, oil filters, lead-acid batteries, hydraulic fluid, fuels, solvents, coolants, pesticides, soil and water impacted by hazardous materials, other chemicals and their containers

Waste management method

Materials will be shipped to an approved Recycling facility or Hazardous waste management facility

Waste reduction technique

- Where possible order hazardous materials in a container type that can be returned to the vendor when emptied.
- Non-hazardous products will be used in place of hazardous substances to the extent possible. Such as the use of Industrial soaps can be used instead of solvents when similar results can be achieved

Applicable Legislation

- Waste Management Facilities Regulation 37/2016, Feb 23, 2016)
- Transportation of Dangerous Goods Act and Regulations
- The Workplace Health and Safety Act and Regulations
- The Ozone Depleting Substance Act
- Fisheries and Oceans Regulations and Legislation
- Hazardous Waste Regulation (MR 195/2015)

Handling

- Contractor personnel will be trained in emergency response procedures in accordance with provincial legislation.
- Contractor personnel will receive WHMIS training in accordance with provincial legislation. Controlled substances will be labeled in accordance with WHMIS requirements.
- Hazardous substances management procedures will be communicated to all project staff and a copy will be made available at the project site.
- Orientation for Contractor and Manitoba Hydro employees working in construction areas will include hazardous substance awareness.
- For instruction on handling and disposal of soil and water impacted by soil see the “Guidance document for the Identification and Management of soils, surface waters or groundwater suspected to be impacted by Hazardous Materials” Found in Appendix G of the CEnvPP
- All Batteries (lithium, nickel-cadmium and lead-acid) will be segregated and stored.

Treatment

- Waste materials will be categorized and segregated Non-Hazardous and Hazardous
- In the even that hazardous and non-hazardous material are mixed, the entire mixture must be managed as hazardous material.
- Rags, cloths and clean up debris that have been used to apply or remove hazardous materials are also considered to be hazardous waste and should be treated as such.
- Sludge from solvent parts cleaning must be shipped with the solvent being recycled
- Used oil storage tanks or drums will be clearly marked as “Used Oil” with nothing else added to them including waste solvents and antifreeze
- Waste Oils, fluids and filters from vehicle maintenance will be stored in drums
- Used oil filters removed from equipment while still warm will be punctured and placed on a drain rack, once drained will be placed in a labeled drum and shipped for recycling
- Containers will be weatherproof

Transportation and Disposal

- Waste oil will be transported by licensed carriers to licensed or approved waste oil recycling facilities.
- Empty hazardous waste containers will be removed to a licensed or approved disposal site by the contractor.
- All Batteries (lithium, nickel-cadmium and lead-acid) will be transported to licensed or approved waste recycling facilities.
- Transportation of Hazardous materials off-site is to be performed by licensed regulated waste transporter and disposal off-site should be accommodated by a regulated waste receiver, for recycling or proper disposal.
- Material Safety Data Sheets (MSDS) will be available for transportation

Record Keeping

- Record kept of amounts of waste generated
- Manifesting transportation of wastes
- Inventory and account for hazardous waste leaving collection areas.



Facility Design

- Hazardous substances storage areas will be located a minimum of 100 m from the ordinary high water mark of a waterway and above the 100-year flood level.
- Temporary hazardous material storage containers will be located on level ground and within a structure that is covered by roofing preventing precipitation from entering the storage area or the secondary containment system
- Indoor storage of flammable and combustible substances will be in fire resistant and ventilated enclosed storage area or building in accordance with national codes and standards.
- Bulk waste oil will be stored in approved aboveground tanks provided with secondary containment in accordance with provincial legislation.
- Hazardous materials shall be stored in a secondary a containment system that is designed to contain at least 110% of the volume stored
- Access to hazardous materials storage areas will be restricted to authorized and trained Contractor and Manitoba Hydro personnel.
- Ensure Emergency response provisions are available and employees working with Hazardous Materials are trained in Emergency response
- The contractor employees will monitor the level of used oil in storage tanks or drums to ensure that the container isn't at risk of overflow.

Documentation

- An inventory of WHMIS controlled substances and their Material Safety Data Sheets (MSDS) will be prepared by the Contractor and maintained at each project site and updated as required by provincial legislation.
- Hazardous materials storage sites will be secured, and signs will be posted that include hazard warnings, as well as contacts in case of a release, access restrictions and under whose authority the access is restricted.

Treatment

- Hazardous waste materials will be segregated and stored by type in approved containers within a secondary containment system.
- Pesticide storage will be in accordance with provincial legislation and Manitoba Hydro guidelines.
- Hazardous waste can be stored temporarily for no longer than 30 days before removal to a licensed or approved disposal site.
- All batteries will be segregated by type.

Monitoring

- The Contractor will monitor containers of hazardous substance containers regularly for leaks and to ensure that labels are legible and prominently displayed.
- The MH Environmental Inspector\Officer will make routine inspections of hazardous substance storage facilities to confirm that environmental protection measures are implemented and effective.
- Hazardous materials storage facilities will undergo regular inspections to inspect storage containers and records of inspections be maintained by the contractor

Applicable Legislation

- Waste Management Facilities Regulation 37/2016, Feb 23, 2016)
- Transportation of Dangerous Goods Act and Regulations
- The Workplace Health and Safety Act and Regulations
- The Ozone Depleting Substance Act
- Fisheries and Oceans Regulations and Legislation
- Hazardous Waste Regulation (MR 195/2015)



Material examples	<ul style="list-style-type: none"> Aluminum, copper, steel, scrap conductors Cardboard packing and boxes Plastic bags and plastic packaging
Waste management method	Collected and segregated on-site, transported for off-site recycling.
Waste reduction technique	Observe the 4 R's (reduce, reuse, recycle and repurpose). Minimize waste by producing or using only the amount necessary. Where possible, be re-used or re-purposed and recycle.
Material examples	<ul style="list-style-type: none"> Wood - timber off cuts, pallets, wooden boxes
Waste management method	Off cuts and pallets to be burnt on-site or disposed of in landfills licensed by Sustainable Development with capacity to accept and separate construction wastes.
Material examples	<ul style="list-style-type: none"> Equipment and vehicle tires
Waste management method	Tires that cannot be returned to the vendor will be sent to the local receiving waste management facility where it will be collected for recycling
Material examples	<ul style="list-style-type: none"> Electronic Wastes, Computers, circuitry appliances
Waste management method	Electronic waste will be stored and transported off-site to a licensed e-waste receiver for recycling or disposal.

Applicable Legislation

- Waste Management Facilities Regulation 37/2016, Feb 23, 2016)



Material examples	<ul style="list-style-type: none"> • Sewage or grey water
Waste management method	<ul style="list-style-type: none"> • Sewage and grey water will be collected in holding tanks and chemical toilets. • In remote locations, an appropriate number of portable toilets will be made available to ensure that each crew has ready access to washroom facilities. The facilities will be serviced and cleaned regularly, and will be adequately secured. All site personnel are to use portable toilets, as provided. • On-site disposal of septic waste if employed, must be in accordance with the on-site waste disposal systems regulation (MR 83/2003). • Wastewater holding tanks will be installed as per provincial legislation and regulation and a minimum of 100 m from the ordinary high water mark of any waterbody. • 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 licensed wastewater treatment facility. • All sewage haulers will be registered with the Manitoba Sustainable Development. A copy of the hauler registration will be provided to MH environmental inspector/officer upon request. • Septic and solid wastes from work sites must be disposed of at <i>Environment Act</i> licensed wastewater treatment facilities and waste disposal grounds that have sufficient capacity to accept the waste stream.
Applicable legislation	<ul style="list-style-type: none"> • On-site waste disposal systems regulation (MR 83/2003).



Material examples	<ul style="list-style-type: none"> • Concrete wash water (water remaining from the process of washing concrete from equipment) • Remaining cured or partially cured concrete
Waste management method	<ul style="list-style-type: none"> • Wash water will not be discharged onto the ground at the project site, washout pits will be constructed to cure concrete and settle out wash water. • All water from chute washing activities will be contained in leak proof containers or in an approved settling pond that are situated at least 100 meters from a waterbody. • Contain wash out in a temporary plastic-lined (10-mil polyethylene minimum) pit • Maintain at least 4" (aboveground) or 12" (below ground) of freeboard in pits • All water that has been 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. • All water that has been 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. • All water that has been 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 into a watercourse.



Material examples	<ul style="list-style-type: none"> • Remaining cured or partially cured concrete
Waste management method	<ul style="list-style-type: none"> • Cured or partially cured concrete will not be discharged onto the ground at the project site, washout pits will be constructed to cure concrete and settle out wash water. • High density polyethylene geomembrane liners (10-mil polyethylene minimum) and either earth or physical berms may be used for a temporary concrete washout for uncured or partially cured concrete. • Pits should be of sufficient volume for site requirements • Maintain at least 4" (aboveground) or 12" (below ground) of freeboard in pits • Regularly break-up cured concrete can be transported in non-hazardous waste containers and disposed of at a licensed facility. • Any uncured and partly cured concrete will be kept isolated from watercourses/ditches.
Waste Reduction Technique	<ul style="list-style-type: none"> • Minimize waste by producing only the amount necessary.
Applicable legislation	<ul style="list-style-type: none"> • Fisheries and Oceans Regulations and Legislation • Waste Management Facilities Regulation 37/2016, Feb 23, 2016)



Material examples	<ul style="list-style-type: none">• Waste disinfectants, waste water from biosecurity cleaning
Waste management method	<p>Sediment released from the washing process will be fully contained (i.e., sump pit, berm).</p> <p>When cleaning station sump pits, sump materials (dirt, water and disinfectant solution from washing activities) must be either:</p> <ul style="list-style-type: none">• Disposed of at an MH approved disposal facility;• Or remain on the field where it was used; mixed and buried on-site at a minimum depth of 2 m (requires landowner permission) at least ten metres from a drain or drainage ditch.
Waste Reduction Technique	<ul style="list-style-type: none">• Minimize waste by producing only the amount of disinfection solution necessary to be used prior to solution expiry.

This page was left intentionally blank.

Appendix R: Clearing Management Plan

This page was left intentionally blank.

Birtle Transmission Project

Clearing Management Plan

June 2020

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

This page was left intentionally blank.

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
FINAL 1.0	APPROVED VERSION PUBLISHED			2020_0610

This page was left intentionally blank.

Preface

This document presents the Clearing Management Plan (the Plan) for the construction of the Birtle Transmission Project (the Project). It is intended to provide information and instruction to Manitoba Hydro employees as well as contractors, regulators and members of the public.

The Plan provides regulatory context as well as general considerations and guidance pertinent to right of way (ROW) vegetation clearing in the Project area.

Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro
Licensing and Environmental Assessment Department
360 Portage Avenue
Winnipeg, MB
Canada R3C 0G8
1-877-343-1631
LEAProjects@hydro.mb.ca

This page was left intentionally blank.

Table of contents

1.0	Introduction	5
1.1	Commitment to environmental protection	5
1.2	Purpose and objectives	6
1.3	Commitments	7
1.4	Roles and responsibilities	7
1.5	Regulatory context	8
2.0	Implementation	10
2.1	Woody debris disposal methods	10
2.2	Danger trees	10
2.3	Forest health considerations	11
2.3.1	Firewood	11
2.3.2	Processing of timber salvage	11
2.4	General mitigation measures	11
2.5	Flagging/signage	12
2.6	Clearing Prescriptions	12
2.7	Training and documentation	17
2.7.1	Education and training	17
3.0	Communication	19
4.0	Inspection	19

Figures

Figure 1: Transmission Environmental Protection Program	6
Figure 2: Environmental communication reporting structure	9

Tables

Table 1: Key roles and responsibilities	7
Table 2: Clearing prescription types	13
Table 3: Estimated clearing prescription types by construction section	17

This page was left intentionally blank.

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Birtle Transmission Project (the Project) Environmental Assessment Report to conducting clearing activities in an environmentally sensitive manner, as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects.

Manitoba Hydro's Environmental Protection Program (EPP) provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and best practices, and input during the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental effects. The CMP is a complementary document to the Construction Environmental Protection Plan and a component of the EPP as illustrated in Figure 1.

In this document clearing management for the Project is considered only during the construction phase of the development.

1.1 Commitment to environmental protection

Manitoba Hydro integrates environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the involvement of Manitoba Hydro employees, consultants, contractors, Indigenous communities and organizations and the public at all stages of the Project from planning and design through construction and operational phases.

The use of a CMP is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential effects of access related to the construction of a new transmission line.

Manitoba Hydro is committed to implementing this CMP and requiring Contractors to follow the terms of this and other applicable plans within the Environmental Protection Program.

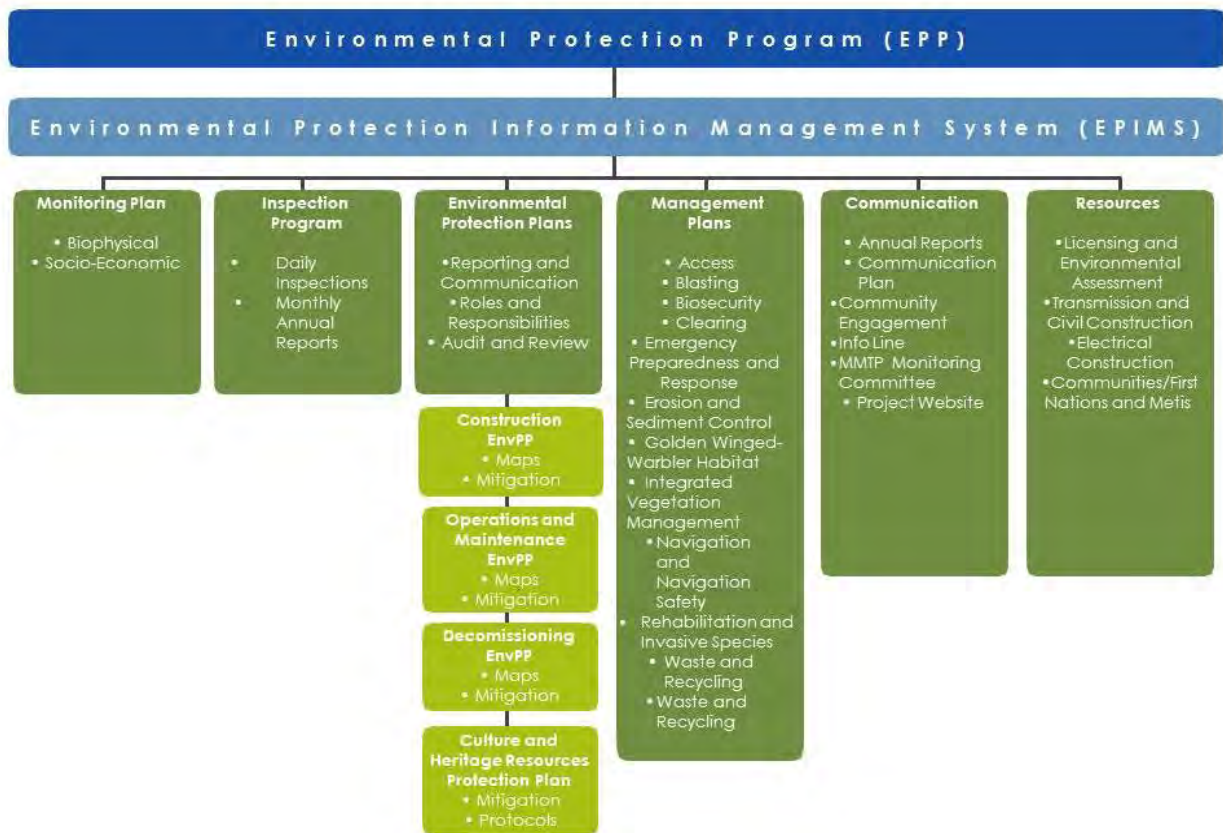


Figure 1: Transmission environmental protection program

1.2 Purpose and objectives

This Clearing Management Plan (the Plan) has been developed for the Birtle Transmission Project (the Project) to provide guidance and instruction to Contractors to manage the vegetation required to be removed within the Right of Way to construct the Project.

The Plan provides clearing prescriptions, additional guidance and required actions specific to the Project and is augmented by the Construction Environmental Protection Plan Mapbook that contains the detailed locations where clearing prescriptions are to be implemented.

The objectives of the Plan are to inform staff, contractors, regulators and the public on the:

- general information about how the Plan fits into the Project Environmental Protection Program and the relevant regulatory context

- roles and responsibilities in delivering the Plan
- guidance on the implementation of the Plan and steps to be taken in its implementation, including clearing prescriptions and measures to retain understory vegetation within the ROW.
- inspection and compliance activities to provide assurance the plan requirements are being followed and met.

1.3 Commitments

On private land, the landowners may be consulted to determine if they have a requirement for firewood. If the landowner requests firewood MH will in consultation with the landowner determine the volume of firewood to be set aside as well as a suitable stockpile location on private land adjacent to the ROW. Trees will be processed to the landowner firewood specification described in Processing of Timber Salvage. If a landowner does not have a requirement for firewood the trees will be disposed of by one of the approved woody debris disposal methods identified in the applicable Clearing Prescription Type.

1.4 Roles and responsibilities

This section outlines the major roles and responsibilities of those involved in the implementation of the Plan.

A summary of roles and key responsibilities is found in Table 1. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 2.

Table 1: Key roles and responsibilities

Roles	Key Responsibilities
Manitoba Hydro	<ul style="list-style-type: none"> • Determine clearing prescriptions through consultation with landowners • Conduct a pre-construction survey to determine species and timber merchantability within the Project ROW. • Determine any private land special clearing considerations through consultations with landowners. • Identify and map clearing prescriptions with identified methods

Table 1: Key roles and responsibilities

Roles	Key Responsibilities
	<p>and debris disposal in the Construction Environmental Protection Plan Mapbook.</p> <ul style="list-style-type: none"> • Determine firewood requirements through consultations with landowners. • Where landowner has requested firewood determine a suitable stockpile location on their private land adjacent to the ROW in consultation with the landowner.
Contractor	<ul style="list-style-type: none"> • Shall adhere to Clearing Management Plan and Construction Environmental Protection Plan Mapbook including employee training, prescribed actions, flagging and submit all required documentation. • Respond and act promptly to resolve if any activities are identified as not in compliance with the CMP or any regulatory requirements. • Notify Manitoba Hydro in writing after firewood has been piled and processed to specification.

1.5 Regulatory context

The Forest Health Protection Act along with its associated regulation is the primary piece of legislation specific to clearing of the Project footprint,

Below is an excerpt of *The Forest Health Protection Act* describing how it applies to the Project:

The purpose of this Act is to protect the health of all trees and forests in Manitoba by

(a) preventing forest diseases and insects that are not native to Manitoba from entering or becoming established in the province;

(b) detecting, containing, suppressing and eradicating forest diseases and insects in Manitoba; and

(c) developing programs to protect and promote the overall health of trees and forests and their ecosystems in Manitoba.

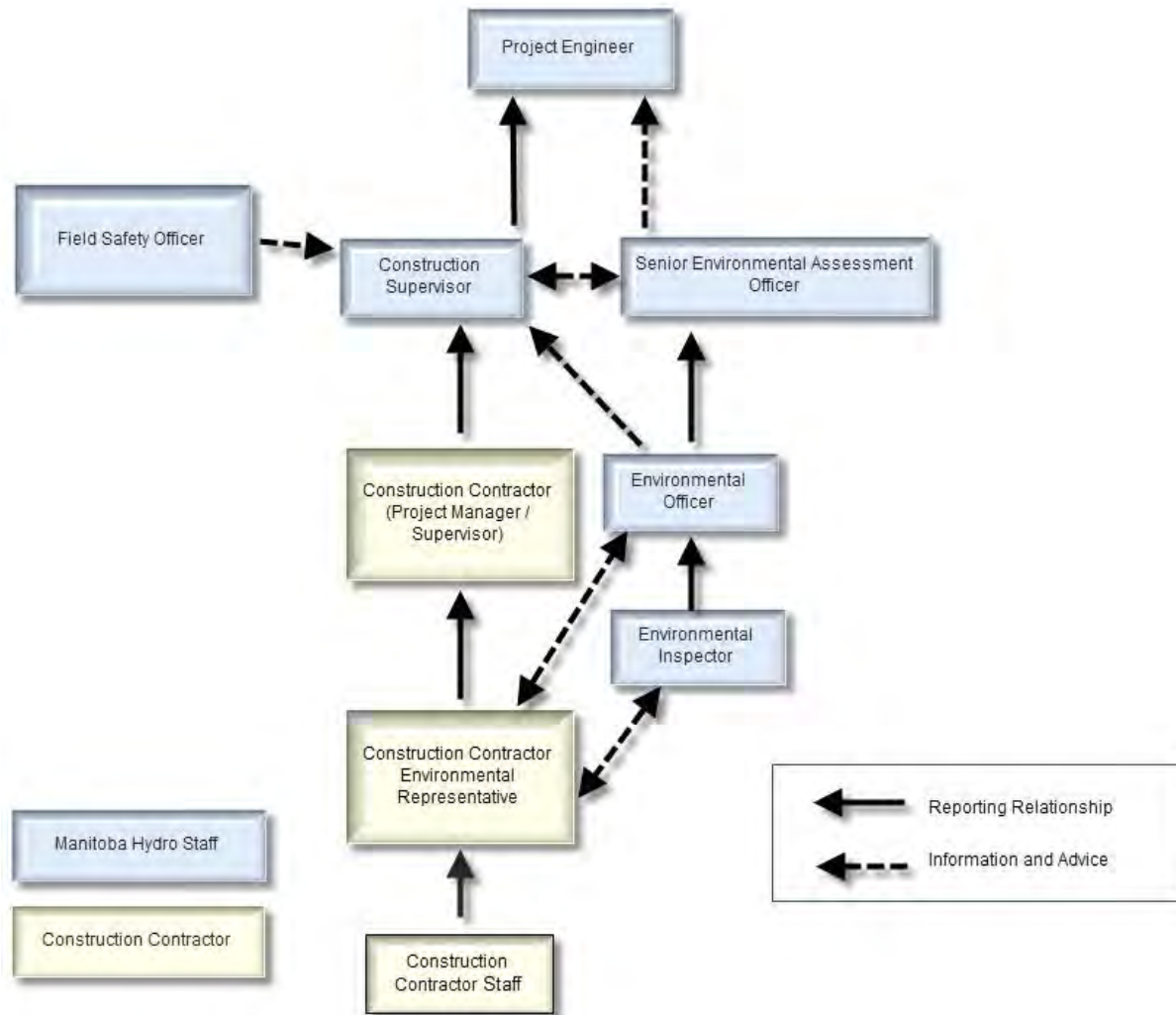


Figure 2: Environmental communication reporting structure

This page was left intentionally blank.

2.0 Implementation

The implementation of the Plan utilizes a step-wise process; however, these steps will be undertaken at various times throughout the pre-construction and construction phases of the Project. The plan is founded on a principle of adaptive management – if aspects of the plan are found to require modifications for improved effectiveness or if new information becomes available (e.g., more effective control actions, pest outbreaks in the Project area) the Plan and actions will be updated.

2.1 Woody debris disposal methods

Woody debris is vegetation matter such as shrubs, trees not identified for salvage, branches, and other coarse woody material generated from clearing activities that must be disposed of through one of the following approved methods:

- Chipping – this method involves the use of chipper to chip woody debris so that chips can be spread on the ROW or hauled offsite to a location designated or approved by a Manitoba Hydro Environmental Officer. Chipping debris on the ROW must be evenly distributed and cannot exceed a depth of 20cm.
- Mulching – this method involves the use of rotary drum mulchers to mulch debris on the ROW. Mulch debris on the ROW must be evenly distributed and cannot exceed a depth of 20cm.

Woody debris on the ROW will only be considered to be satisfactorily mulched and/or chipped if there are no woody pieces greater than 30cm in length or wider than 10cm in diameter. If inspections determine that woody debris in an area has not been satisfactorily mulched and/or chipped below these size thresholds it is the contractor's responsibility to return to the area to complete mulching and/or chipping woody debris.

2.2 Danger trees

Danger trees are trees outside of the cleared ROW width that violate clearance distances from the conductor and therefore need to be removed. Danger trees are identified based on their height and proximity to the transmission line. When a danger tree is encountered it will be flagged by Manitoba Hydro for removal by the Contractor. Typically danger trees will be cut by feller buncher or chainsaw and brought into the cleared ROW for disposal.

2.3 Forest health considerations

The primary forest health consideration in the Project area is Dutch Elm Disease. Any elm harvested within the Project footprint must be chipped and spread on ROW or disposed of at a MH approved disposal facility. Elm wood cannot be left on the ROW or allocated as firewood under any circumstances.

2.3.1 Firewood

Some timber along the ROW may be salvaged for the purposes of firewood.

2.3.2 Processing of timber salvage

All timber salvage should be kept clean and free of other foreign materials. For the purposes of the Project all timber salvage must meet the following timber salvage processing specifications:

1) Landowner firewood specification

Trees designated as landowner firewood will be sorted and piled by species, de-limbed using appropriate equipment, and topped at a 10cm diameter. Processed landowner firewood will then be skidded to a suitable stockpile location on the landowner's property adjacent to the ROW.

2.4 General mitigation measures

The Construction Environmental Protection Plan contains general mitigation measures that are applicable to preventing environmental effects during clearing activities. Key tables to reference in regards to the CMP include:

- Access roads and trails (PC-1),
- Clearing (PA-3)
- Grubbing (PA-8)
- Heritage Resources (EC-5)
- Management Measures (MM)
- Rights-of-way (PC-8)
- Water Crossings (PC-9)
- Wetlands (EC-8)
- Wildlife Protection (EC-9)

2.5 Flagging/signage

The Contractor is responsible for adequately flagging and/or installing signage for clearing prescription areas and timber stockpiles locations prior to commencement of clearing activities in that area. All flagging used for the purpose of the CMP will be spotted (polka dot).

2.6 Clearing prescriptions

Clearing prescriptions are instructions to the Contractor on how vegetation and woody debris is to be managed during the initial clearing of the ROW. Clearing prescriptions have been developed based on:

- Size, species and density of vegetation from pre-construction survey
- Environmentally Sensitive Sites
- Previous experiences in transmission line clearing methods
- Regulatory requirements

Table 2 below summarizes the different clearing prescription types. Based on site specific conditions MH reserves the option to change the clearing prescription type. It is also important to note that instances may arise after this plan is finalized where other requirements such as landowner commitments prompt specific prescriptions or instructions that override the general prescriptions.

Table 2: Clearing prescription types

Type	Description	General prescription	Approved clearing equipment	Approved woody debris disposal method
WAC	Work Area Clearing <ul style="list-style-type: none"> Encompasses areas where clearing is required to accommodate the stringing corridor and the tower footprints. The stringing corridor is typically 15m wide except within the Riparian Buffers where it is 7m wide or within the Steep Slope areas where there will be no stringing corridor established unless required. Tower footprints will typically be 60m wide x 60m long. In areas where the ROW widens (steep slope areas) the tower footprints will be approximately 100m wide x 100m long. These areas will be fully cleared to accommodate transmission line construction activities. 	<ul style="list-style-type: none"> Develop an access trail that is <15m wide Remove all trees and shrubs Retain herbaceous vegetation where feasible Minimize grubbing of vegetation for construction purposes to the extent possible 	<ul style="list-style-type: none"> Feller Buncher Single Grip Harvester Excavator with rotary drum mulcher head Chainsaw/brushsaw Skidder Grapple loader Whole tree wood chipper Roundwood and/or chip transport truck Wide tracked dozer with blade or rake (where necessary) 	<ul style="list-style-type: none"> Chipping Mulching
GC	General Clearing <ul style="list-style-type: none"> Encompasses areas that require timber clearing activities that have not been 	<ul style="list-style-type: none"> Remove all trees and shrubs If not directed to salvage the timber as firewood it will be chipped and spread on the ROW or mulched 	<ul style="list-style-type: none"> Feller Buncher Excavator with rotary drum mulcher head 	<ul style="list-style-type: none"> Chipping Mulching

Table 2: Clearing prescription types

Type	Description	General prescription	Approved clearing equipment	Approved woody debris disposal method
	identified as environmentally sensitive sites.	<ul style="list-style-type: none"> If directed to salvage the timber as firewood the timber will be sorted and piled by species at a suitable stockpile location and then processed (de-limbed & topped at 10cm) Woody debris will be chipped and spread on the ROW or mulched Retain herbaceous vegetation where feasible 	<ul style="list-style-type: none"> Rotary drum mulcher Chainsaw/brushsaw Skidder Grapple Loader Whole tree wood chipper 	
SC	Selective Clearing <ul style="list-style-type: none"> Encompasses areas that require timber clearing activities that have been identified as environmentally sensitive sites 	<ul style="list-style-type: none"> Remove all trees If not directed to salvage the timber as firewood it will be chipped and spread on the ROW or mulched If directed to salvage the timber as firewood the timber will be sorted and piled by species at a suitable stockpile location and then processed (de-limbed & topped at 10cm) Woody debris will be chipped and spread on the ROW or mulched Remove all shrubs >2m tall Retain shrubs and herbaceous vegetation <2m tall to the extent possible 	<ul style="list-style-type: none"> Feller Buncher Rotary Drum Mulcher (Only to be utilized selectively on sites approved by Manitoba Hydro Environmental Officer) Skidder Delimber Chainsaw/brushsaw Grapple loader Whole tree wood chipper 	<ul style="list-style-type: none"> Chipping Mulching
RB	Riparian Buffer <ul style="list-style-type: none"> Encompasses areas near watercourses/waterbodies and wetlands. Typical 	<ul style="list-style-type: none"> Remove all trees and shrubs >2m tall. Trees and woody debris should be brought outside of the riparian buffer for salvage and/or disposal 	<ul style="list-style-type: none"> Feller Buncher Skidder Delimber Chainsaw/brushsaw 	<ul style="list-style-type: none"> Chipping Mulching

Table 2: Clearing prescription types

Type	Description	General prescription	Approved clearing equipment	Approved woody debris disposal method
	riparian buffer width is 30m but can be as wide as 85m (based on slope of land entering waterway as described in the Riparian Buffer Table in the CEnvPP)	<ul style="list-style-type: none"> Retain trees, shrubs and herbaceous vegetation <2m tall to the extent possible The WAC (access trail/stringing corridor) within an RB should not exceed 7m in width 	<ul style="list-style-type: none"> Grapple loader Whole tree wood chipper 	
SS	Steep Slopes <ul style="list-style-type: none"> Encompasses areas that have steep terrain prone to erosion 	<ul style="list-style-type: none"> Remove all trees and shrubs >2.4m tall. Woody debris will be chipped and spread on the ROW or mulched Retain trees, shrubs and herbaceous vegetation <2.4m tall to the extent possible The WAC (access trail/stringing corridor) within an RB should not exceed 7m in width Refer to drawing numbers: <ul style="list-style-type: none"> 1-34780-DD-12100-0003 1-34780-DC-12100-0005 1-34780-DD-12100-0004 	<ul style="list-style-type: none"> Feller Buncher Excavator with rotary drum mulcher head (Only to be utilized selectively on sites approved by Manitoba Hydro Environmental Officer) Chainsaw/brushsaw Whole tree wood chipper 	<ul style="list-style-type: none"> Chipping Mulching
LC	Limited Clearing <ul style="list-style-type: none"> Areas that have been previously cleared or are naturally free of forest vegetation. Little or no clearing required. <p>Examples:</p> <ul style="list-style-type: none"> Cultivated land; Natural grassland or marsh land; Recently cleared areas; 	<ul style="list-style-type: none"> Limited clearing areas generally require no clearing except potentially some mulching/grubbing where necessary. Develop an access trail that is <15m wide 	<ul style="list-style-type: none"> Excavator with rotary drum mulcher head Rotary Drum Mulcher Chainsaw/brushsaw Wide-tracked dozer with blade or rake where necessary 	<ul style="list-style-type: none"> Mulching

Table 2: Clearing prescription types

Type	Description	General prescription	Approved clearing equipment	Approved woody debris disposal method
	<ul style="list-style-type: none"> Developed land; Areas with consistently low lying shrubby vegetation <2m tall			

The locations associated with the above clearing prescriptions are illustrated in the Construction Environmental Protection Plan Mapbook. The estimated amount of area in hectares by clearing prescription type is described in Table 3 below.

Table 3: Estimated clearing prescription types by construction section	
Clearing prescription	(HA)
Work Area Clearing	11.5
General Clearing Area	6.5
Selective Clearing	9.1
Riparian Buffer	6.5
Steep Slopes	10.1
Limited Clearing	168.8
Total area of ROW	212.5

2.7 Training and documentation

Training and documentation form critical components of the implementation of this plan. Manitoba Hydro and the contractor(s) each have responsibility to ensure that their respective personnel are appropriately trained to carry out their role in clearing management within the ROW, and that proper documentation and communication is being conducted throughout the Project.

2.7.1 Education and training

Education and training form a critical component of the Plan. Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Clearing Management Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.

Manitoba Hydro may also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth.

This page was left intentionally blank.

3.0 Communication

The Plan as well as the Construction Environmental Protection Plan Mapbook and accompanying Landowner Information Map form critical components of communicating clearing requirements to personnel working on the Project. Manitoba Hydro will provide the contractor(s) a Construction Environmental Protection Plan Mapbook visually identifying clearing information.

Identification of land parcels where landowners have requested firewood will be finalized by Manitoba Hydro prior to clearing.

Any contractor-proposed additions, location modifications or Plan requirement revisions are required to be submitted in writing to Manitoba Hydro and include a map containing legal land description and GPS location. Any Manitoba Hydro-required revisions to the Plan will be communicated to the contractor's Project Manager for distribution to Project staff.

4.0 Inspection

Manitoba Hydro will inspect the Contractor's work carried out under the Plan to assess compliance with the clearing prescriptions and other commitments made in the Plan.

If Manitoba Hydro inspections determine that documentation, adherence to clearing prescriptions, landowner commitments, prescribed actions, documentation or any other activity is not to the satisfaction of Manitoba Hydro or does not meet the minimum expectations of this Plan; measures to remedy the deficiencies will be communicated directly to onsite Contractor staff.