

**KEYYASK TRANSMISSION
PROJECT
DECOMMISSIONING
ENVIRONMENTAL PROTECTION
PLAN OF THE KR1 TAP**

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.

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, operational and decommissioning 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.

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

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1.0 INTRODUCTION

The purpose of this Decommissioning Environmental Protection Plan (DEnvPP) is to provide information that will guide contractors and field personnel in the decommissioning of the KR1 Tap for the Keeyask Transmission Project (the 'Project') in a manner that meets environmental legislation requirements. Environmental mitigation and other procedures are used to minimize the adverse environmental impacts of decommissioning. The DEnvPP 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 decommissioning of the KR1 Tap. The use of environmental protection plans is a practical and direct implementation of Manitoba Hydro's commitment to responsible environmental stewardship.

This DEnvPP provides guidance for the implementation of environmental protection measures for the development of the Project's various components (Map 1). The primary function of this KR1-Tap was back-up construction power for the Keeyask Project, as the project comes into service this portion of the KR1 line is no longer required. Manitoba Hydro will decommission the 4.98km KR1-Tap by salvaging the conductor and tower assemblies and removing foundations to approximately 1.5 meters below ground. The remaining portion of KR1 will be re-terminated into Keeyask Switching Station. This work entails:

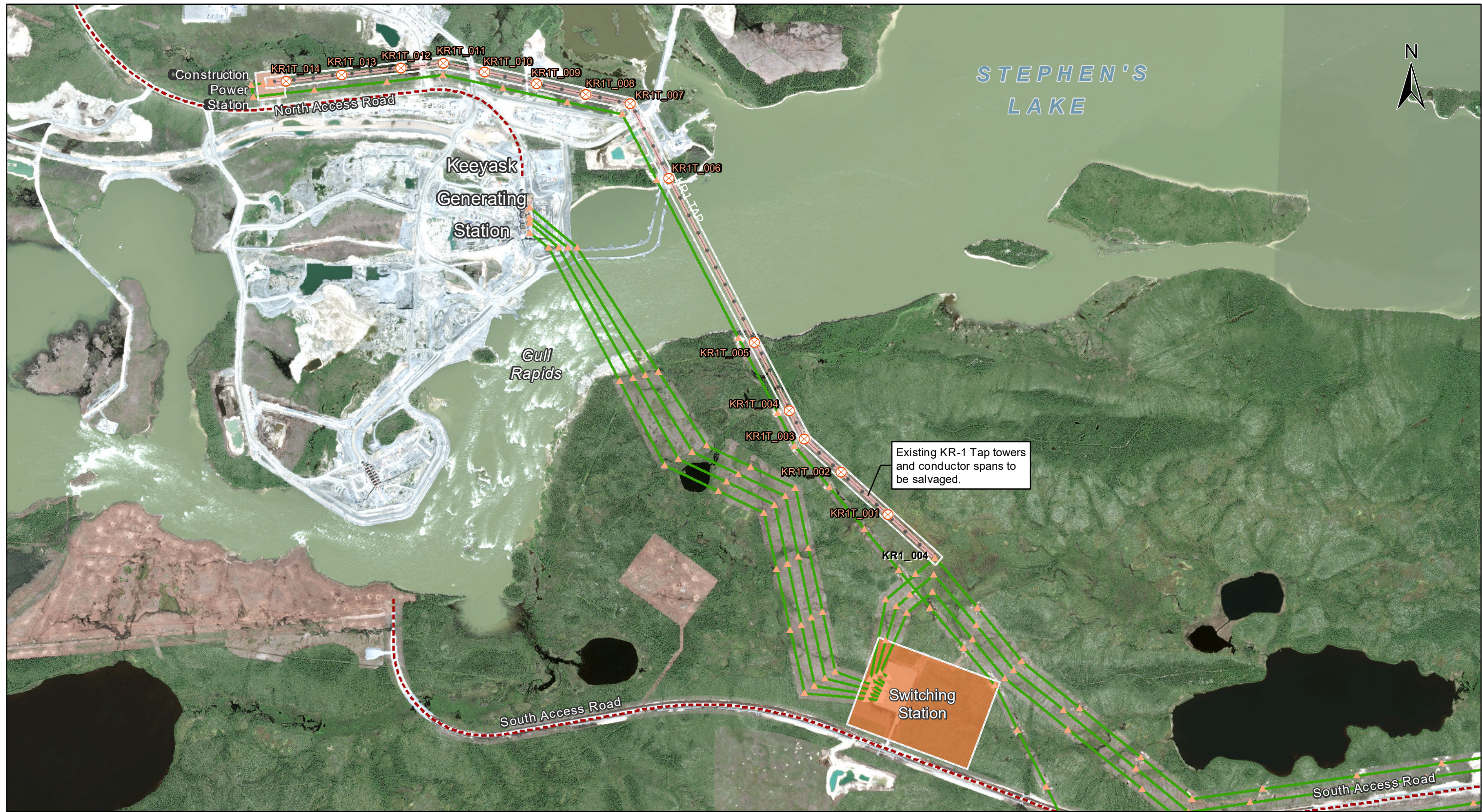
- Removal of three (14) structures: KR1T-1 thru KR1T-14
- Removal of 15 spans of conductor from start of KR1-Tap into the Keeyask Construction Power Station
- Removal of associated equipment within Keeyask Construction Power Station

Salvage work is scheduled to start March 2020 and will involve removing and salvaging conductor onto spools under tension so it can be re-used. The towers will be disassembled and lowered using a crane onto flat bed trucks for transport to Thompson, MB for storage. Soil will be excavated surrounding the tower foundations allowing them to be cut off 1.5 meters below grade. Surrounding soil will be used to backfill the excavation and graded to allow for re-vegetation.

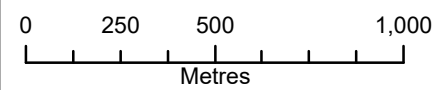
Environmentally Sensitive Sites (ESS) have been identified for the DEnvPP for the Project. The ESS are locations, features and areas that were identified within the Project ROW to be ecologically, socially, economically or culturally important or sensitive to disturbance and require protection during decommissioning of the project. The determination of ESS has included the consideration of Aboriginal Traditional Knowledge (ATK).

This document provides general and specific mitigation measures to reduce the potential for environmental effects that may occur during the decommissioning phase. It is designed to be a resourceful, user-friendly tool to guide onsite implementation of environmental protection measures. . Where contractors have experience using other federally or provincially accepted methods of environmental protection, they are encouraged to apply these practices where appropriate and where they meet or exceed the level of environmental protection prescribed herein.

A map has been developed at a scale of 1:20,000 for the Project to present the location and spatial extent of ESS. Each map has corresponding tabular summary information including ESS feature information and relevant mitigation measures to address the potential environmental effects at each ESS site.



Coordinate System: UTM Zone 15N NAD83
 Data Source: MB Hydro, ProvMB, NRCAN
 Date Created: February 10, 2020



1:20,000

Land Base

- Provincial Highway
- Provincial Road
- - - North/South Access Road
- Road (Other)
- + Abandoned Rail
- + Active Rail
- Transmission Line

Project Infrastructure

- ▲ Tower Location
- Project Line
- Right-of-way
- Construction Power Site
- Switching Station

Tower and Transmission Line Salvage

- ⊗ Existing Tower Location (Salvage)
- KR1 Tap (Salvage)

**Keyyask Transmission Project
 Decommissioning Map
 KR1 Tap Decommissioning**

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Roles, Responsibilities and Reporting

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

Table 1-1: Environmental Roles and Responsibilities of Personnel During the Decommissioning of the Project

Role	Key Responsibilities
Project Engineer	<ul style="list-style-type: none"> Accountable for all aspects of their construction component in the Project Oversees construction supervisors who are responsible for construction activities
MH senior environmental assessment officer	<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 Liaises with Manitoba Sustainable Development, Environmental Approvals Branch
MH environmental specialist	<ul style="list-style-type: none"> Responsible for the implementation of CEnvPP Liaises with regional regulatory authorities and other regulatory authorities where required or applicable Provides advice and guidance to construction supervisors and MH Environmental Officer/Inspector for non-compliance situations, environmental incidents and emergencies Supervises MH Environmental Officer/Inspectors and monitors Provides support and guidance to contractors regarding CEnvPP Responsible for implementing and ongoing compliance monitoring to ensure consistent and accurate reporting into EPIMS
Construction Supervisor(s)	<ul style="list-style-type: none"> Reports to the project engineer Facilitates construction contractors implementation of remedial actions or responses to non-compliance situations or incidents are implemented as required Works with the MH environmental specialist, senior environmental assessment officer and Environmental Officer/Inspector to ensure implementation of environmental protection Ensures that appropriate authorities are notified in emergency or incident situations

<p>Environmental Inspector / Officer</p>	<ul style="list-style-type: none"> • The Environmental Officer/Inspector reports to the Senior Environmental Assessment Officer and provides advice and guidance to the Construction Supervisor • Provides support and guidance in developing solutions for environmental issues on-site with the Construction Supervisor and the Contractor and where applicable with the input from the Senior Environmental Assessment Officer • Provides support and guidance to the Contractor regarding CEnvPP • Assist the Contractor's Environmental Representative in ensuring that all necessary information is covered in the Contractors pre-project 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
<p>Construction Contractor(s) (Project Manager / Construction Supervisor)</p>	<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). • Responsible for providing a Environmental Report summarizing work activities and events as they pertain to environmental protection compliance.

Construction Contractor 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 Officers	<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

Environmental Protection

Manitoba Hydro will provide copies of all available permits, licences, approvals and authorizations obtained for the Project to the Contractor. The contractor will provide Manitoba Hydro with copies of all available permits, licences, approvals and authorizations obtained for the Project.

The Contractor will comply with the Environmental Protection Plans prepared for the Project, including mitigation measures identified during the environmental assessment and contained herein.

Environmental aspects of the work including applicable licence/permit conditions will be discussed during the Pre-Job Meeting, Weekly Progress Meetings, and Daily Job Planning Meetings.

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

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

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

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

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

Environmental Improvement Orders

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

The Environmental Improvement Order, once communicated verbally or in writing is considered "effective immediately". Manitoba Hydro will establish a compliance date for each Environmental Improvement Order issued. The Contractor must provide written documentation of the actions taken regarding the environmental improvement order as follows:

The Contractor shall:

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

Manitoba Hydro Environmental Stop Work Order

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

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

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

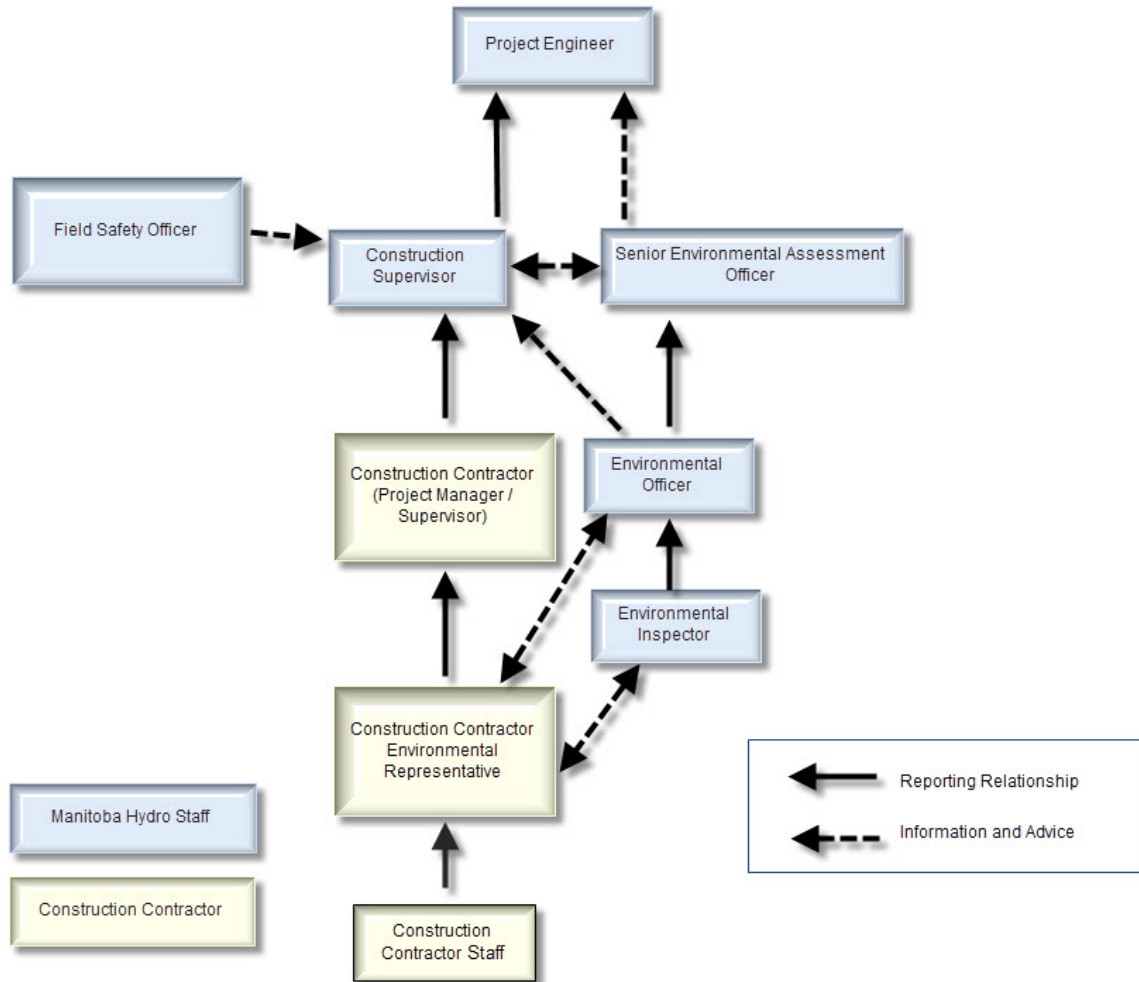


Figure 1-2: Environmental Communication Reporting Structure

Regulatory Requirements

All relevant regulatory approvals for the Project will be obtained by Manitoba Hydro prior to decommissioning activities. 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.

2.0 ENVIRONMENTAL CONSIDERATIONS

Important environmental considerations for decommissioning planning are required at environmental sensitive sites (ESS), which include locations, features, areas, activities or facilities that were identified to be ecologically, socially, economically or culturally important or sensitive to disturbance. These ESS require protection and mitigation during decommissioning ESS include riparian areas, valued and protected vegetation, wildlife and habitats, and other important locations requiring specific protection (e.g., resource use, access).

Timing Windows

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 decommissioning activities for the time of year when risks of adverse decommissioning impacts are negligible. Where conflicting timing restraints with decommissioning activities exist in a particular area, appropriate mitigation will be implemented to reduce effects.

Burning

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

Fish

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

- Spawning and egg incubation;

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

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

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

Setbacks and Buffers for Wildlife and Anthropogenic Features

Setbacks and buffer distances from sensitive environmental features are provided in Appendix 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 Senior Environmental Assessment Officer.

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

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

Soils and Terrain

Soils

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

Encountering Unexpected Contamination

Manitoba Hydro considers any of its electrical stations as potentially containing contaminated soils and/or groundwater; subsequently, there is potential to encounter contamination during decommissioning activities. Contamination at Manitoba Hydro Stations may have resulted from historical spills or leaks of fuels, oils, lubricants, and coolants.

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

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

Terrain

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

Cultural

Heritage

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

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

Access

Existing intersections, such as those for trails, provincial trunk highways (PTHs), provincial roads (PRs) and railways, are considered sensitive to change or conflicting land uses. As a fixed component of the larger transportation network, intersections are difficult to close or relocate. Use of trails is important for both recreational, commercial and subsistence hunters, gatherers and trappers. Ensuring there is safe access to these trails is important to minimize effects on resource users.

3.0 ENVIRONMENTAL PROTECTION PLAN ORIENTATION AND AWARENESS

Pre-Job Meeting (environmental component)

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

The environmental portion of this meeting will include the following:

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

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

Contractor Start-Up Meeting

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

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

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

Weekly Progress Meetings

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

Daily Job Planning Meetings

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

4.0 CONTRACTOR-DEVELOPED ENVIRONMENTAL MANAGEMENT PLANS

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

1. Emergency Preparedness and Response Plan
 - The Contractor shall be responsible to develop and implement a specific Emergency Preparedness and Response Plan for its work. This plan will be included as Appendix K when approved by the Senior Environmental Assessment Officer.

5.0 ENVIRONMENTAL MITIGATION REQUIREMENTS

Contractors must follow all mitigation measures identified in this DEnvPP 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 decommissioning activities in accordance with **general mitigation measures (Section 5.2)** and **specific mitigation measures (see detailed maps and specific mitigation in the decommissioning Mapbook “Part 2”)**.

General Mitigation Requirements

Considerations is required in planning of decommissioning for all areas are considered general mitigation and are applicable to all decommissioning areas.

General Mitigation Tables

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Access Roads and Trails (PC-1)

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

Access Roads and Trails (PC-1)

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

Aircraft Use (EI-1) [If applicable]

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

Borrow Pits and Quarries (PC-2)

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

Construction Matting (PA-11)

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

Demobilizing and Cleaning Up (PA-4)

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

Emergency Response (EI-2)

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

Erosion Protection and Sediment Control (EI-3)

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

Fish Protection (EC-3)

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

Grading (PA-7)

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

Hazardous Materials (EI-4)

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

Hazardous Materials (EI-4)

EI-4.27	During frozen ground conditions hazardous waste can be stored temporarily for 60 days and only 30 days during non-frozen ground conditions before removal to a licensed or approved disposal site.
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Heritage Resources (EC-5)

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

Management Measures (MM)

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

Marshalling Yards (PC-5) [If applicable]

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

Permafrost (EC-6) [If applicable]

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

Petroleum Products (EI-5)

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

Petroleum Products (EI-5)

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

Potable Water (EI-11)

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

Rehabilitating and Re-vegetation (PA-9)

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

Rights-of-Way (PC-8)

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

Safety and Health (EI-6)

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

Soil Contamination (EI-7)

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

Stream Crossings (PC-9)

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

Transmission Towers and Conductors (PC-10)

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

Vehicle and Equipment Maintenance (EI-9)

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

Waste Management (EI-10)

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

Wastewater (EI-12)

ID	Mitigation
EI-12.01	All sewage haulers will be registered with the Province of Manitoba, Sustainable Development (SD). A copy of the hauler registration will be provided upon request.
EI-12.02	<p>Wastewater holding tanks will be installed as per provincial legislation and regulation:</p> <ul style="list-style-type: none"> • Be registered with Sustainable Development (SD) and installed by a certified installer • Be watertight with a minimum capacity of 4500 L • If prefabricated, conform to Canadian Standards Association Standard B66-00, Prefabricated Septic • Tanks and Sewage Holding Tanks and bear a valid stamp or mark indicating certification by the Association • Be constructed of concrete, fiberglass, polyethylene or other approved material • Be installed in accordance with the manufacturer's recommendation • Be protected from damage by equipment and vehicles by installing barricades • Be protected from freezing. If the tank is located above ground and in a heated building, a temperature alarm is required for winter operation • Be anchored in place when located in areas with a high water table • Be above the one hundred (100)-year flood mark • Be equipped with liquid level monitor and alarms • Have a covered, watertight, perpendicular access shaft that extends above the ground surface • Have a locked access prevention cover
EI-12.03	Wastewater will be removed from holding tanks when they are no more than 90% full by a registered sewage hauler and disposed of at a licenced wastewater treatment facility.

Wetlands (EC-8)

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

Wildlife Protection (EC-9)

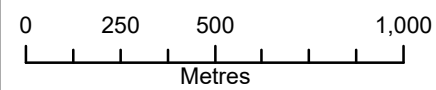
ID	Mitigation
EC-9.01	Any injured or killed wildlife encountered on the transmission line ROWs and associated access roads/trails will be reported to Manitoba Sustainable Development.
EC-9.02	Bird Diverters or aerial markers may be installed in high bird traffic areas.
EC-9.03	Boundaries of important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

6.0 MAP SHEETS AND MITIGATION TABLES

The map sheets and specific mitigation tables are presented in Part 2 in a “map book” format. The map sheets provide an overview of Environmentally Sensitive Sites (ESS), while the associated mitigation tables provide specific mitigation requirements related to these ESS.



Coordinate System: UTM Zone 15N NAD83
 Data Source: MB Hydro, ProvMB, NRCAN
 Date Created: February 10, 2020



1:20,000

Land Base

- Provincial Highway
- Provincial Road
- - - North/South Access Road
- Road (Other)
- + Abandoned Rail
- + Active Rail
- Transmission Line

Project Infrastructure

- ⊗ Existing Tower Location (Salvage)
- ▲ Tower Location
- KR1 Tap (Salvage)
- Project Line
- Right-of-way
- Construction Power Site
- Switching Station

ESS Features

- Water Crossing
- ⬮ Mammals and Habitat
- Permafrost

**Keeyask Transmission Project
Decommissioning Map**

KR1 Tap - Construction Power Line

ESS Group: Water Crossing

**Features represented as points*

ESS ID	ESS Name	Location
KRT-Aqua-100	Nelson River	E-364883 - N-6247023
KRT-Aqua-101	Unnamed Tributary	E-365273 - N-6246274

Potential Effects:

Habitat loss & contamination from structure foundations & installations; Increased erosion & sedimentation of streams; Damage to stream banks; Loss of riparian vegetation; Fish habitat disturbance.

Specification Mitigation (ID# 4860):

- Carry out construction activities on frozen ground to minimize surface damage, rutting and erosion
- Use existing trails, roads or cut lines whenever possible as access routes

ESS Group: Permafrost

**Features represented as polygons*

ESS ID	ESS Name	Site	Start	Stop	Distance (m)
KRT-Soils-100	Permafrost-Extensive Discontinuous	T1 to T2	E-365185 N-6246442	E-365198 N-6246418	26
KRT-Soils-101	Permafrost-Extensive Discontinuous	T3 to T4	E-365279 N-6246263	E-365287 N-6246247	17

Potential Effects:

Melting or loss of permafrost due to disturbance of the active layer

Specific Mitigation (ID# 4001):

- Carry out construction activities on frozen ground to minimize surface damage and rutting
- Use existing trails, roads or cut lines whenever possible as access routes
- Avoid organic soils containing permafrost to the extent possible
- Maintain shrub and herbaceous vegetation to the extent possible
- Confine vehicle traffic to established trails to the extent possible
- Implement erosion protection before commencing decommissioning activities in accordance with Erosion/Sediment Control Plan

ESS Group: Mammals and Habitat

**Features represented as polygons*

ESS ID	ESS Name	Location
KR-Wild-200	Caribou calving habitat	*See Map

Potential Effects:

Potential for sensory disturbance resulting the temporary abandonment of the calving area

Specific Mitigation (ID# 1402):

- Right-of-way clearing within this area will not include shear blading except for areas needed for access, helicopter landing zones (24mx24m max), and tower footprints, Selective Cutting methods will be used in this area
- Maintenance trails will be maintained to a min width to allow for single lane travel. With the objective of reducing line of sight for hunters and predators
- Plan decommissioning activities to occur late in winter season (Feb 15th) to minimize the duration of packed snow trails that facilitate predator use of the ROW

APPENDICES

APPENDIX A: CONTACT LIST

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



APPENDIX B: ENVIRONMENTAL LICENCES, APPROVALS AND PERMITS

List of Potential Approvals required for Decommissioning		
Approval required (Applicable Legislation / Regulation)	Type of Approval needed	Responsibility
Environment Act Licence (Class 3)	Licence	LEA
Crown Lands Act (Work Permit)	Permit	TLCC
Crown Lands Act (General Permit)	Permit	Property Dept.
Wildfires Act (Work Permit)	Permit	TLCC
Wildlife Management Area Permit (Wildlife Act)	Licence	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
Rail line crossing at temporary access road intersections	Permit	Property Dept.
A permit from Manitoba Infrastructure and Transportation (MIT) is required for any construction above or below ground level that falls within 250 ft. of a Provincial Trunk Highway right-of-way edge or within 150 ft. of a Provincial Road right-of-way edge.	Permit	Property Dept.
Note: Permits, Licences and Approvals are the sole responsibility of those groups indicated in this table LEA – Manitoba Hydro Licensing and Environmental Assessment Department TLCC – Transmission Line and Civil Construction Department		

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	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Amphibians/Reptiles	Amphibian Bearing Wetland	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Snakes	Hibernaculum	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Bats	Hibernaculum	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Birds	Breeding and Nesting	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Fish	Spawning Areas	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

 Reduced Risk to Wildlife
 Sensitive Time Period for Wildlife
 (Where Decommissioning activities occur during this period, mitigation 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.

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	
	Decommissioning	30m		30m
	Maintenance	30m		30m
	Access Trail	30m	30m	
Anthropogenic				
Heritage and Cultural	All	Varies	Varies	Varies
Amphibians				
Northern Leopard Frog/Eastern Tiger Salamander (known breeding pond, watering site)	Tower Foundation Siting	30m	30m	
	Decommissioning	30m		30m
	Maintenance	30m		
	Access Trail	30m	30m	
Reptiles				
Garter Snake Hibernaculum	Tower Foundation Siting	200m	200m	
Landforms				
Wetlands	Decommissioning			30m
	Maintenance			30m
	Access Trail			30m
	Hazardous Material Handling/Storage	100m	100m	
	Soil Stockpiles	30m		30m
Mammals				
Mineral Licks	All	120m		120m

Feature	Activity	Non Frozen Ground Setback Distance ²	Frozen Ground Setback Distance ²	Vegetated Buffer Distance ³
Occupied Mammal Dens (Red fox, Gray fox, Coyote, Wolf, Bobcat, American badger, American marten, Fisher, Least weasel and Raccoon)	All	50m	50m	
Occupied Bear Den	All	150m	150m	150m

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.

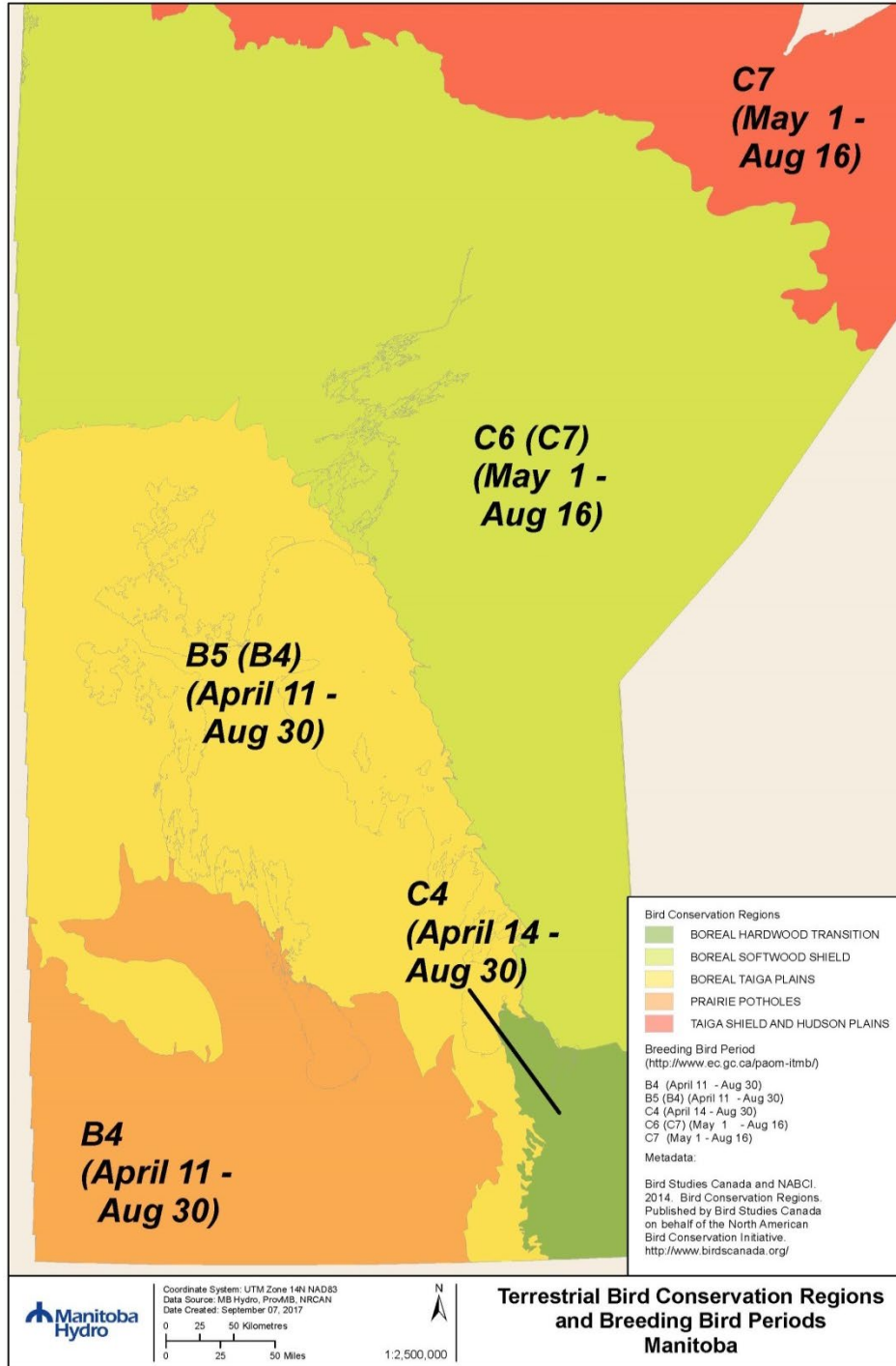
³SHRUB AND HERBACEOUS VEGETATION RETAINED)

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.

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.

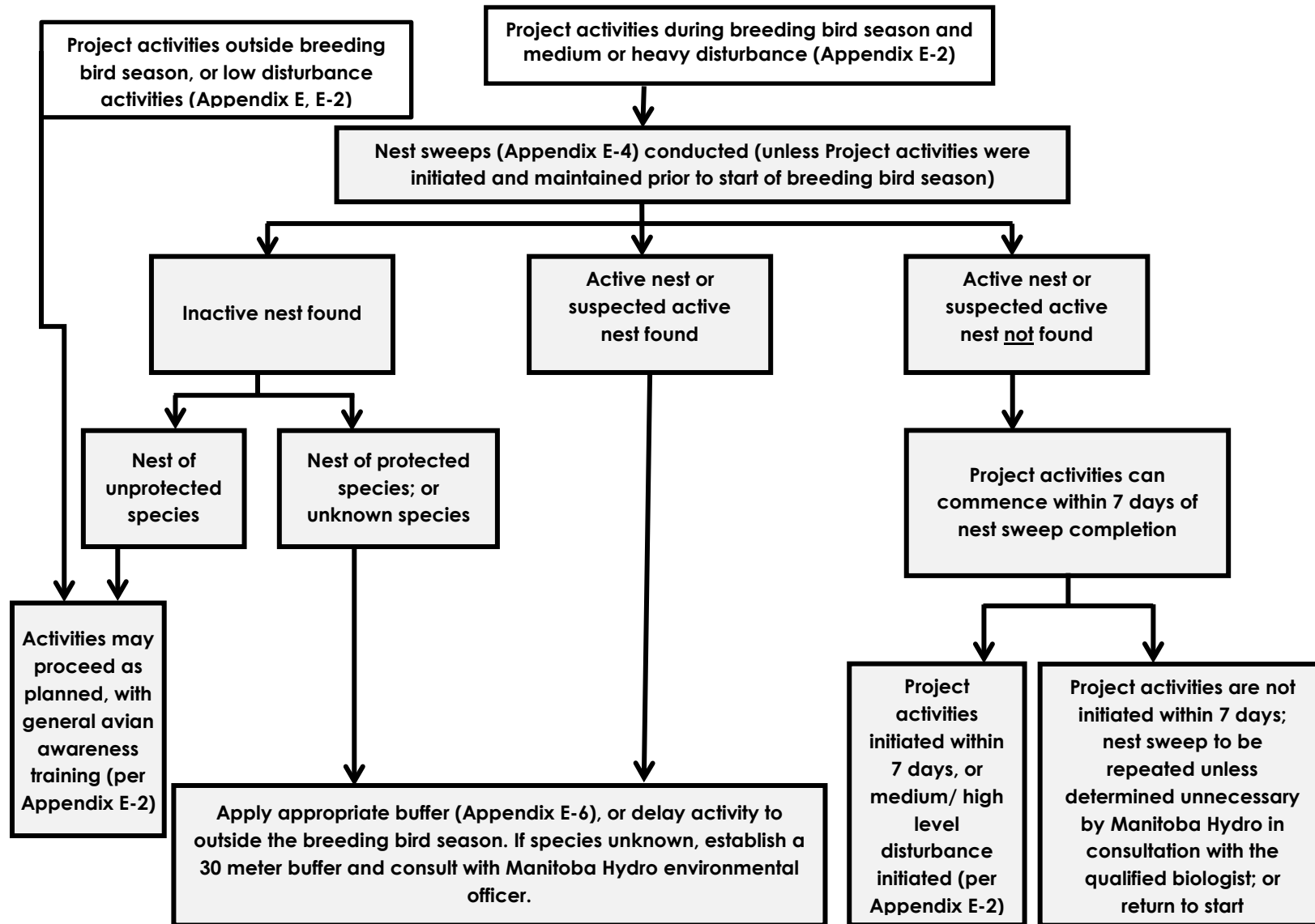
Appendix E-2: Determining Disturbance Level for Nesting Birds during Breeding Bird Season

*General Avian Awareness Training

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 Decommissioning	High		

General avian awareness training is to be provided to all crews and contractors conducting field work. 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.

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. Qualified biologist employed by Manitoba Hydro, a contractor, or consultant are to complete nest sweeps no more than 7 days before disturbance activities. To complete a nest sweep:

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 for submission) and include what actions were taken or what actions are recommended*.
10. Continue nest sweep until the entire area scheduled for Decommissioning activity has been adequately searched.
11. 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 for one additional day for every day a medium or high level disturbance is initiated and/or sustained.

Appendix E-6 Manitoba Hydro Breeding Bird Buffer Guidelines

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

Species	Scientific Name	SARA (schedule & status)	COSEWIC (status & date assessed)	Habitat	Minimum Suggested Buffer (Meters)	Incubation Time (days)	Estimated Time to Leaving Nest or Fledging after hatching (Days)	Jurisdiction for Birds (F=Federal migratory, P=Provincial year-round resident), Nests = Provincial legislation for Herons, Eagles and others
Alder Flycatcher	<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

Appendix E-6 Manitoba Hydro Breeding Bird Buffer Guidelines

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

Species	Scientific Name	SARA (schedule & status)	COSEWIC (status & date assessed)	Habitat	Minimum Suggested Buffer (Meters)	Incubation Time (days)	Estimated Time to Leaving Nest or Fledging after hatching (Days)	Jurisdiction for Birds (F=Federal migratory, P=Provincial year-round resident), Nests = Provincial legislation for Herons, Eagles and others
Bay-breasted Warbler	<i>Setophaga castanea</i>			Forest, coniferous	50	12-14	12-14	F
Belted Kingfisher	<i>Megasceryle 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-breasted 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

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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
Downy 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>Psiloscoops flammeolus</i>	1- Special Concern	Special Concern		50			
Fox Sparrow	<i>Passerella iliaca</i>				25	12-14	12-14	P

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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
Hérons 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

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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>Parus 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

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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

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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

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	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

Appendix F

Reptile and Amphibian protection document

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 decommissioning, and in which amphibians occur, all life stages should be captured and removed to areas outside of the decommissioning 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.

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 decommissioning project. Species of concern can include rare vascular plants, rare non-vascular plants, and rare wildlife species.

Plant Species of Concern Discovery Prior to Decommissioning

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 vegetation specialist and appropriate mitigation measures will be determined prior to decommissioning of the transmission line. Mitigation measures will be determined following an assessment, which will include the following:

- the position of the plant or plant community on the decommissioning 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 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

informing project staff of access restrictions within in the vicinity of flagged or fenced sites;

- temporarily covering the site with geotextile pads, flex net, mats or equivalent;
- adjusting centerline access trail to avoid or limit potential effects on the plant or plant community;
- adjusting tower location to avoid the plant or plant community;
- salvaging and transplanting portions of sod and surrounding vegetation Transplanted materials may be moved to a suitable location off right-of-way;
- other site-specific procedures to avoid disturbance to rare plants or plant communities, as recommended by the vegetation specialist.

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 Decommissioning 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 during future wildlife studies along the transmission line route, the discovery will be assessed and appropriate mitigation measures will be determined. 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 available include, but are not limited to, the following:

- abide by reduced risk timing windows within the recommended setback/buffer distances;
- narrow down the proposed area of disturbance and protect the site using fencing or clearly mark the site using flagging;
- alter or delay construction activities to avoid sensory disturbance (e.g., no burning);
- inform project staff of access restrictions in the vicinity of flagged or fenced sites;
- adjust tower locations to avoid the site;
- 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), 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), 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. 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.

Appendix H

Saturated/Thawed Soils Operating Guidelines

Saturated/Thawed Soils

Operating Guidelines

November 2018

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.

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.

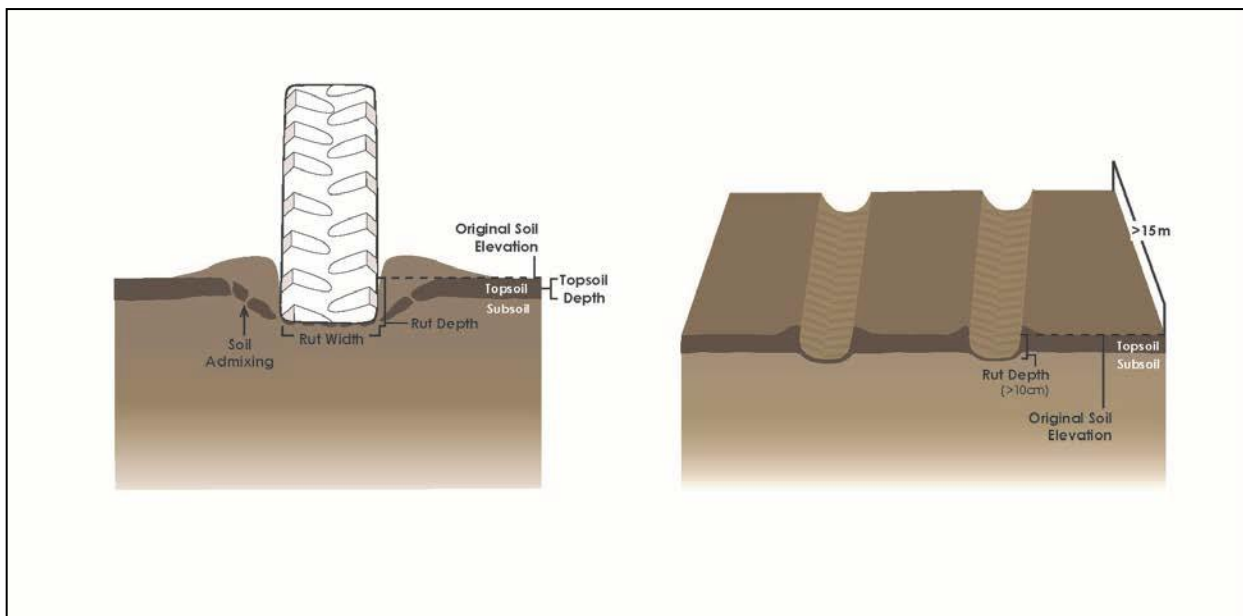


Figure 1: Rut Measurement Guide

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 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.

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)

- | | |
|--|---|
| <ul style="list-style-type: none"> • current and forecasted weather • current ground and aquatic conditions • work schedule | <ul style="list-style-type: none"> • 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)

- | | |
|---|--|
| <ul style="list-style-type: none"> • placement of matting or snow • ice bridge • low(er) ground pressure equipment • reduced scope of work • aerial work methods | <ul style="list-style-type: none"> • closure of access trail within riparian area • 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):

- 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
- current ground conditions
- current crop and farming practices
- depth of topsoil
- salinity
- 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 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
- 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 modification(s) 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
- closure of access route to Project traffic
- 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):

- 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.

Appendix I

Guidance for the identification of contaminated soils or groundwater and disposal

Appendix I: Guidance for the identification of contaminated soils or groundwater and disposal

Objective

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

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

Identifying impacted surface water / groundwater or soils

Surface water, groundwater and soils have known observable characteristics when they come into contact with some hazardous materials. For example water (surface or ground) that has been impacted by petroleum hydrocarbons - PHC's (such as petroleum, fuels – such as diesel or gasoline, and/or lubricants) may have display an obvious hydrocarbon odour and/or multi coloured 'sheen' that is typically visible to the naked eye and appear on the surface of the liquid (like a film or residue) and are typical indications that water has been impacted by PHC's.

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

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

Manitoba Hydro construction activities have the potential to impact work locations through equipment malfunction and or spills. Hazardous materials such as petroleum hydrocarbons (PHC), polycyclic aromatic hydrocarbons (PAHs), and glycols can result

from incidents on a site. Any excavated soils from Manitoba Hydro owned or leased properties must either be sampled prior to disposal at a licensed facility or directly transported to a licensed facility. MH Property and Corporate Environment department or Transmission Line and Civil Construction Soils Remediation section can be contacted to assist in determining a suitable or Licenced disposal facility.



Photo 1: PHC (oil) staining on wood mulch/soil



Photo 2: PHC (oil) staining clay soil

Worker health and safety

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

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

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

Communications / notifications

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

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

Impacted soil and water handling and disposal

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

If possible limit personnel working within or around the impacted area until a further assessment is conducted..

Secure the site or area suspected to be impacted or contaminated and keep unauthorized personnel out of the area (barriers may be required) until further assessment is conducted.

Notify project supervisor and the MH Environmental Officer/Inspector to assist/initiate further site assessment process

If impacted materials have been mobilized as part of the work or prior to identifying the impacts, then the material should be segregated and/or contained if at all possible, and all efforts to prevent further impacts or contamination shall be undertaken.

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

Soil and/or groundwater samples if required will be sent to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for waste characterization. (note MH Selkirk Laboratory has this capacity)

Soils will be characterized for waste disposal and appropriate truck placarding. (as per the corporate policy and as per the MH *Hazardous Materials Management Handbook*)

Contaminated soils and/or groundwater will be transported in accordance with the Manitoba *Dangerous Goods Handling and Transportation Act* and associated Regulations. As per MH - *Hazardous Materials Management Handbook*

<http://hracs.hydro.mb.ca/wshcs/ws/we/Pages/HazardousMaterials.aspx>

Decontamination of equipment, as required

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

Use guidelines and upon approval of the waste disposal ground. However, if soil samples are above these guidelines, soils must be disposed of at a licensed soil treatment facility. Options include the following facilities:

Contaminated Soil Disposal		
MidCanada Soil Treatment Facility	1373 Bernat Road, Grand Pointe, MB	(204) 987-9600
Miller Environmental Corporation	Hwy 14 & 75, Saint Jean Baptiste, MB	(204) 925-9600

City of Brandon Landfill	3300 Victoria Avenue East, Brandon, MB	(204) 729-2281
Virten Municipal & Industrial Waste Facility	236 Wellington Street South, Virten, MB	(204) 204-512-0816 or (204) 748-6033
Contaminated Water Disposal		
A1 Environmental Services	1447 Dugald Road, Winnipeg, MB	(204) 515-2473

All contaminated soils and water will be disposed of in accordance with the *Manitoba Dangerous Goods Handling and Transportation Act*, and the *Manitoba Contaminated Sites Remediation Act*, and associated regulations and guidelines.

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

Appendix J

**Environmental pre-work orientation record
(Attach a signed copy)**

Appendix J: Environmental pre-work orientation record (Attach a signed copy)



**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	<p>Is there an EnvPP, environmental job plan or other environmental plan requirement for the work?</p> <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	<p>Generation and disposal of waste:</p> <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	<p>Generation and disposal of hazardous substances:</p> <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> 			

ITEM #	ITEM	Yes	No	N/A
2.3	<p>Fuel and flammable storage:</p> <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 ordinary high water mark of any waterbody.</i> • <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> 			

	<ul style="list-style-type: none"> • <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> 			
ITEM #	ITEM	Yes	No	N/A
2.5	Construction Traffic and Noise <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	Soil Compaction: <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	Vegetation disturbance or removal: <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> 			
ITEM #	ITEM	Yes	No	N/A
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</i> 			

	<i>the local Sustainable Development Natural Resource Officer.</i>			
2.12	<p>Disturbance to Heritage Resources / Archaeological Features</p> <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	<p>Bio-security</p> <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 requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time.</i> 			
2.14	<p>Clearing</p> <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	<p>Access Management</p> <ul style="list-style-type: none"> <i>Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements</i> 			

	<p>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.</p>			
--	---	--	--	--

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

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

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.

ANITOBA HYDRO REPRESENTATIVE (SIGN) M
YYYY MM DD

CONTRACTOR'S REPRESENTATIVE (SIGN) YYYY MM DD



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 K

Contractor Developed Plans

Appendix K: Contractor Developed Plans

Appendix L

Ice thickness chart

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Appendix L: Ice thickness chart

***Estimated Bearing Capacity of Blue Ice Chart**

Ice Thickness			Estimated Weight Bearing Capacity	Ice Thickness			Estimated Weight Bearing Capacity	Ice Conditions
1 in	2.5 cm	=	100 lbs	21 in	53.3 cm	=	44103 lbs	Blue Ice is clear in texture and has the maximum allowable bearing capacity of all ice
2 in	5.1 cm	=	400 lbs	22 in	55.9 cm	=	48403 lbs	
3 in	7.6 cm	=	900 lbs	23 in	58.4 cm	=	52904 lbs	
4 in	10.2 cm	=	1,600 lbs	24 in	61.0 cm	=	57604 lbs	Flood Ice or White ice is considered to have only 50% of the load bearing capacity of Natural Blue Ice & the maximum flood should not exceed 2"
5 in	12.7 cm	=	2,500 lbs	25 in	63.5 cm	=	62505 lbs	
6 in	15.2 cm	=	3,600 lbs	26 in	66.0 cm	=	67605 lbs	Slush or white ice is white in texture and is considered to have only 50% of the bearing capacity of natural Blue Ice
7 in	17.8 cm	=	4,900 lbs	27 in	68.6 cm	=	72905 lbs	
8 in	20.3 cm	=	6,400 lbs	28 in	71.1 cm	=	78406 lbs	Grey Ice, Crystallized ice or Honeycomb ice indicates the presence of water running thru the ice & should not be trusted as a load bearing surface
9 in	22.9 cm	=	8,101 lbs	29 in	73.7 cm	=	84106 lbs	
10 in	25.4 cm	=	10,001 lbs	30 in	76.2 cm	=	90006 lbs	Imperial & Metric Conversions Inches x 2.54 = cm Lbs x .4535 = kg Cm x 0.3937 = In Kg x 2.205 = lbs
11 in	27.9 cm	=	12,101 lbs	31 in	78.7 cm	=	96107 lbs	
12 in	30.5 cm	=	14,401 lbs	32 in	81.3 cm	=	102407 lbs	
13 in	33.0 cm	=	16,901 lbs	33 in	83.8 cm	=	108908 lbs	
14 in	35.6 cm	=	19,601 lbs	34 in	86.4 cm	=	115608 lbs	
15 in	38.1 cm	=	22,502 lbs	35 in	88.9 cm	=	122509 lbs	
16 in	40.6 cm	=	25,602 lbs	36 in	91.4 cm	=	129609 lbs	
17 in	43.2 cm	=	28,902 lbs	37 in	94.0 cm	=	136910 lbs	
18 in	45.7 cm	=	32,402 lbs	38 in	96.5 cm	=	144410 lbs	
19 in	48.3 cm	=	36,103 lbs	39 in	99.1 cm	=	152111 lbs	
20 in	50.8 cm	=	40,003 lbs	40 in	101.6 cm	=	160011 lbs	

*NOTE: Given the many variables involved in the development of ice crossings and roads, these values are intended to be used as an approximation and Manitoba Hydro assumes no responsibility for loss or damage of property

Appendix M

Rehabilitation and Invasive Species

Management Plan

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Rehabilitation and Invasive Species Management Plan

August 2019

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

Preface

Manitoba Hydro would like to acknowledge that this Project will be located in Treaty One Territory, the traditional territories of the Anishinabe, Cree, and Dakota people and the homeland of the Metis Nation.

This document presents the Rehabilitation and Invasive Species Management Plan (the Plan) for the construction of the Manitoba-Minnesota 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

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

Version – Final 1.01

List of Revisions

Number	Nature of revision	Section(s)	Revised by	Date
Draft	Added to contractor responsibilities “Rehabilitate disturbed areas as soon as practicable or where deemed necessary by Manitoba Hydro , rehabilitation is not to be deferred until construction is complete”	Page 4	Manitoba Hydro	20181114
Draft	Added a sentence regarding site rehabilitation “A combination of promoting natural re-vegetation... ”	Page 20	Manitoba Hydro	20181114
Draft	Updated to include information presented in response to NEB-IR5-5.15	Section 4	Manitoba Hydro	20180522
Draft	Added “Pesticide Application Requirements For Manitoba Hydro Employees And Contractors”	Appendix H	Manitoba Hydro	20181121
Draft	Added acknowledgement to Preface	Preface	Manitoba Hydro	20190211
Draft	Added Engagement Activities	Section 1.1	Manitoba Hydro	20190211
Draft	Add Appendix I – Summary of Consultation	Appendix I	Manitoba Hydro	20190211
1.01	Updated chemical treatment decision making framework	Section 4.5	Manitoba Hydro	20190729

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- 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
- Appendix H: Pesticide Application Requirements For Manitoba Hydro Employees And Contractors
- Appendix I: Summary of Consultation

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1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Manitoba - Minnesota Transmission Project (the Project) Environmental Impact Statement (EIS) 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 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.

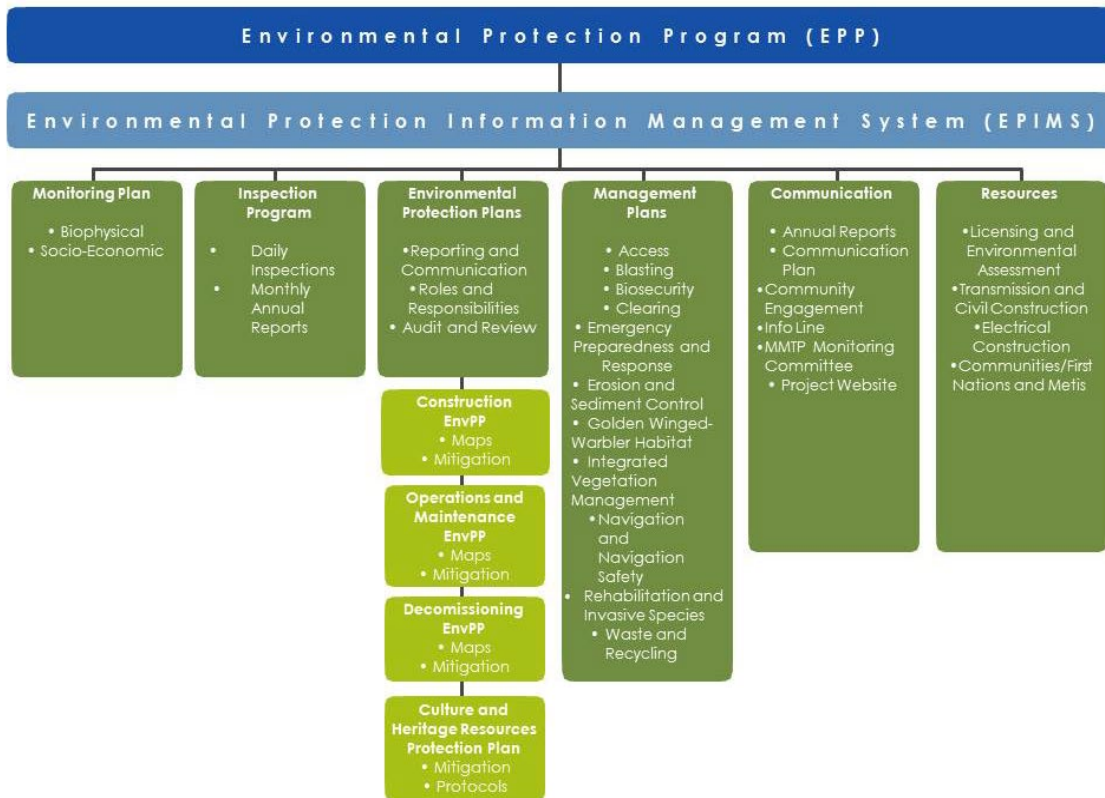


Figure 1: Transmission Environmental Protection Program

1.1 Commitment to environmental protection and indigenous engagement

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 Manitoba Hydro activities.

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

Table 1: Key Roles and responsibilities

Role	Responsibilities
	<p>guidelines</p> <ul style="list-style-type: none"> • 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

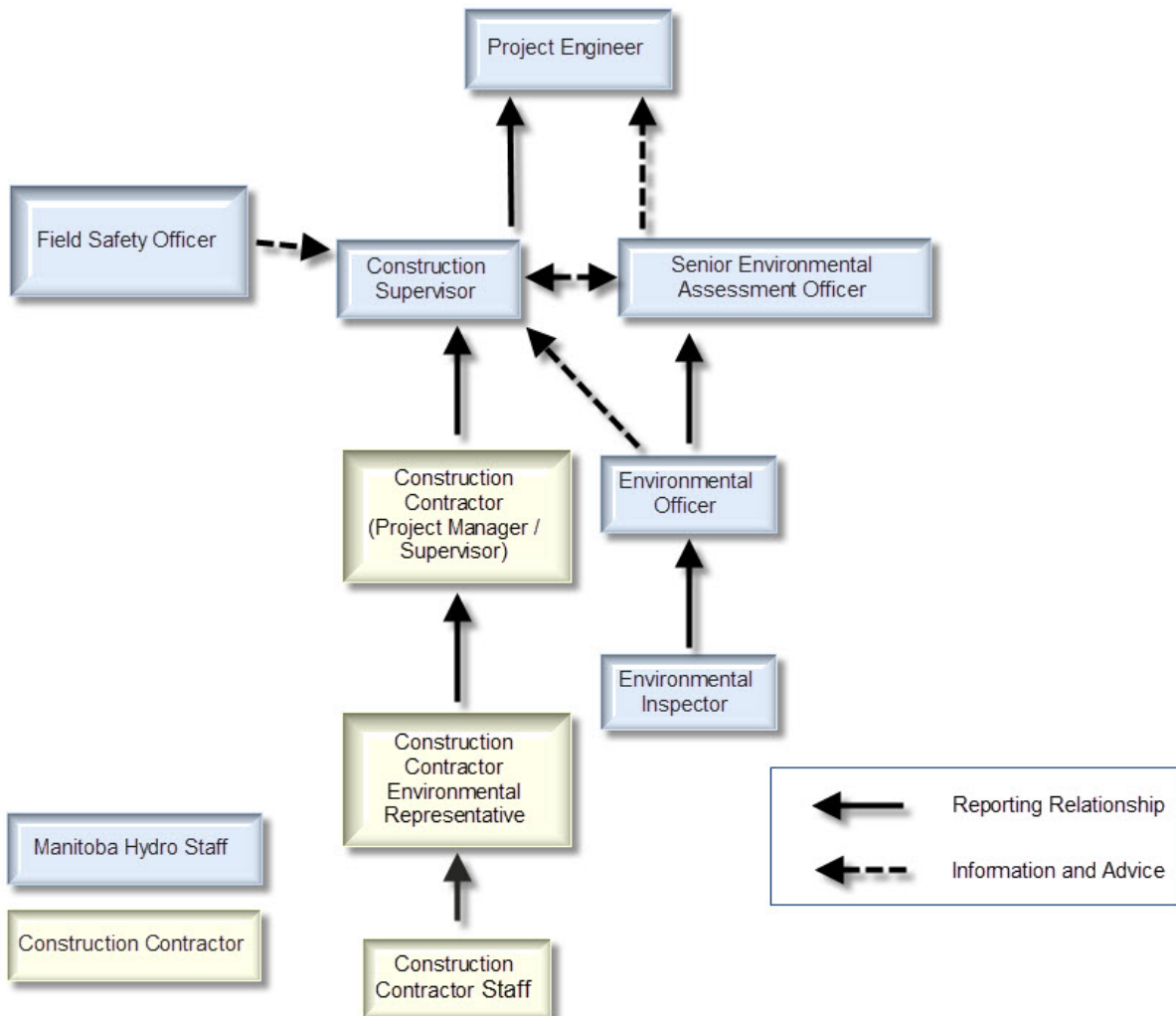


Figure 2: Environmental communication reporting structure

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.

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 understory 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

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
- Construction material and debris removal
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Addition of topsoil
- 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.

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:

- 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.

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. Should chemical control be chosen please refer to the “Pesticide Application Requirements For Manitoba Hydro Employees And Contractors” found in Appendix H for guidance and direction to staff and contractors using pesticides. 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

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.

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. 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.

Chemical Treatment Option

Manitoba Hydro will implement the following decision making framework for chemical treatments for weed control on Crown land, herbicides may be used as a treatment method for an area if the answer is “yes” to any of the questions below:

- Is the area outside of a 30 m “no herbicide buffer” to those Environmentally Sensitive Sites (ESS) that are sensitive to herbicide application, including riparian areas near watercourses or wetlands and areas designated for the protection of plant species of concern and traditional use plant species?
- There are no organic farms within the treatment area?
- Does the weed reproduce by root fragments or root fragments and seed?
- Are mature weed plants that have produced seed present?
- Has weed density and distribution reached levels that other management options are not viable to control the weed infestation?
- Is weed management in an area where mechanical and biological methods are not feasible or practical?
- Is the area accessible in summer for foliar application?
- Has chemical management been directed by a Weed Supervisor as designated under the Manitoba Noxious Weeds Act regulations?
- Have notifications been made through the First Nations and Metis Engagement process, Pesticide Use Permit Notification process?
- Have modifications to the treatment program (herbicide, location, timing, method) been considered to address concerns received from notification process?

Manitoba Hydro will apply a 30m “no herbicide buffer” to those ESS that are sensitive to herbicide application (such as ESS identifying riparian areas near watercourses or wetlands, ESS identifying areas designated for the protection of Plant Species of Concern and Traditional Use Plant Species) unless directed otherwise by a Weed Supervisor as designated under the Manitoba Noxious Weeds Act regulations or the Landowner.

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.

Leafy Spurge

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

Common Tansy

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

Scentsless Chamomile

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) is effective but requires repeat treatment.
- Chemical control is effective. Earlier applications have greater success.
- Biological control has had some success.
- Native species competition has been effective.

- A combination of control measures in an integrated approach is recommended for this species.

Purple Loosestrife

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

Ox-eye Daisy

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

Sweet clover

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

Canada Thistle

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

4.7 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.

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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 (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%)	
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

Note: A list of suppliers is available upon request

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

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Note: A list of suppliers is available upon request

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
<i>Corylus americana</i>	American hazelnut	S4	yes	yes	forest
<i>Corylus cornuta</i>	beaked hazelnut	S5	yes	yes	forest
<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

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Note: A list of suppliers is available upon request

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
<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
<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 hedgesettle	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

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Note: A list of suppliers is available upon request

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
<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
NOTE: 1 Traditional use plant names taken from the <i>Aboriginal Traditional Knowledge Study Community Report</i> submitted by Black River First Nation, Long Plain First Nation, and Swan Lake First Nation (May 2015).					

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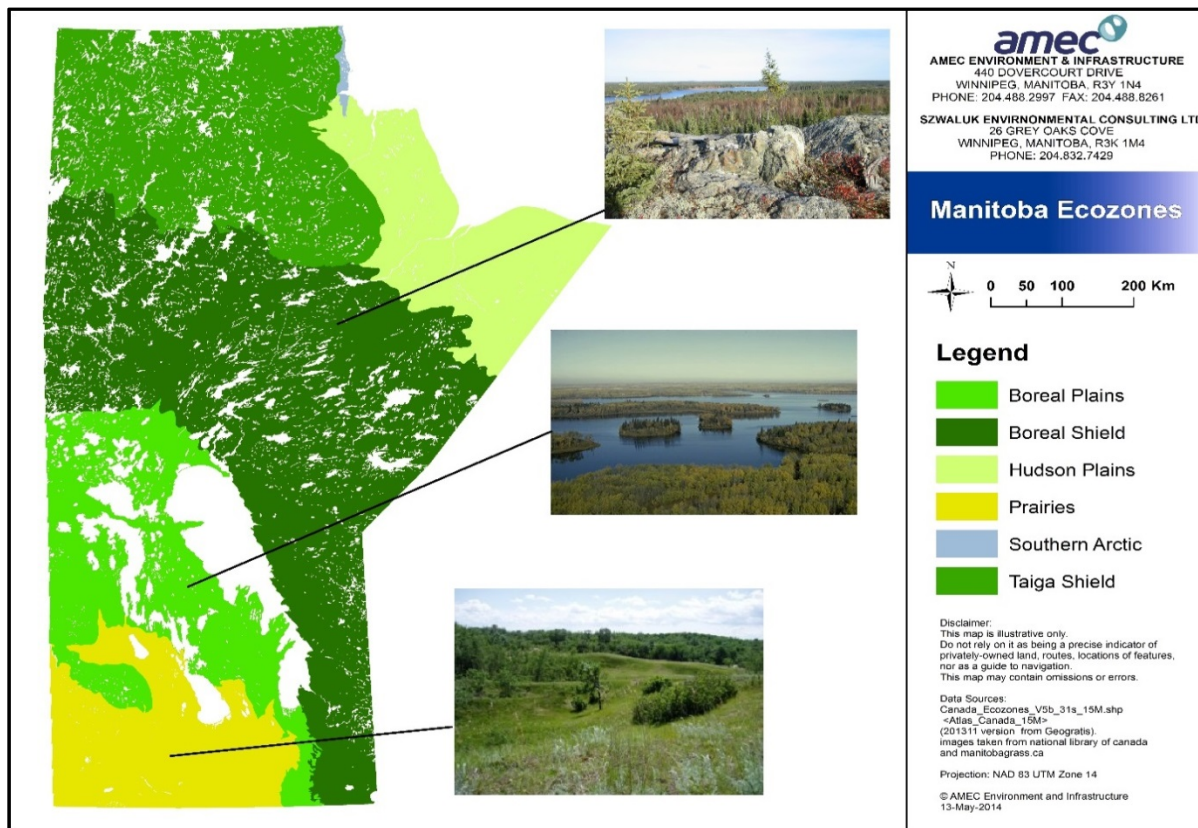
Appendix C

**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
Awed 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		
Awed 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 var. 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 or 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

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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 alakanus ssp. latiglumus</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 ssp. subsecundus</i>	Awned Wheatgrass	X	
<i>Elymus virginicus</i>	Virginia Wild Rye	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 brachyphylla</i>	Short-leaved Fescue	X	
<i>Festuca halii</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 curtisetata</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>	Hydbrid 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 festucacea</i>	Sprangletop	X	
<i>Sorghastrum nutans</i>	Indian 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>Spartina gracilis</i>	Alkali Cord Grass	X	
<i>Spartina pectinata</i>	Prairie Cord Grass	X	
<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

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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
<i>Rhamnus cathartica</i>	European Buckthorn

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>Saponaria officinalis</i>	Bouncing Bet
<i>Saponaria vaccaria</i>	Cow Cackle
<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

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Appendix H

Pesticide Application Requirements For Manitoba Hydro Employees And Contractors

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**Corporate Safety & Health
Division**



**Pesticide Application Requirements For Manitoba
Hydro Employees And Contractors**

For further information, please contact:

Workplace Environment Department 204-474-4811

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For the most up-to-date version, refer to the CS&H website at:
<http://coil.hydro.mb.ca/esh/services/>_____

Forms are available at: <http://coil.hydro.mb.ca/esh/services/>_____

For any concerns or questions, please contact Workplace Environment Department at 204-474-4811

TITLE: Pesticide Application Requirements For Manitoba Hydro Employees And Contractors

DESCRIPTION: This publication is designed to provide regulatory and applicator licensing information; technical guidance; safety requirements and check lists for line managers responsible for pesticide application for the purpose of ensuring compliance with legal requirements and Manitoba Hydro policies. In addition, it will provide information for the purpose of ensuring consistent pesticide management at all Manitoba Hydro facilities thereby ensuring pesticide management is carried out in such a way that resulting environmental impact is minimal.

TRAINING:

- **audience (applicable):** Manitoba Hydro staff using pesticides
- **description:** as per publication items
- **prerequisites:** WHMIS, TDG
- **objectives:** provide guidance and direction to staff and contractors using pesticides
- **topics:**
 - 1 Integrated Pest Management Background
 - 2 Definitions
 - 3 Purpose
 - 4 Scope
 - 5 Ownership And Distribution
 - 6 References
 - 7 Application For Pesticide Use Permit
 - 8 Applicator's Licence
 - 9 Safety And Health
 - 10 Environmental Protection
 - 11 Contractors
 - 12 Roles And ResponsibilitiesAppendix 1. Contractor Checklist
- **duration of training course:** 3 hours
- **HRMS Training & Personal Development Course Name:** Manitoba Hydro Pesticide Application Working Group (PAWG) Pesticide Application Requirements For Manitoba Hydro Employees and Contractors
- **Provider:** Manitoba Hydro Pesticide Awareness Working Group (PAWG)
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PESTICIDE APPLICATION REQUIREMENTS FOR MANITOBA HYDRO EMPLOYEES AND CONTRACTORS

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Pesticide Application Requirements For Manitoba Hydro Employees And Contractors

1 Integrated pest management background

1.1 General

Formal Integrated Pest Management (IPM) plans are encouraged for each unique site or pest scenario. Once generated, the plans should be maintained at site.

IPM is a process that considers the ecosystem to determine pest management strategy. One objective of IPM is to suppress the pest population below the level that causes safety, operational, or economic problems. The overall objective of IPM is to control the pest while minimizing off-target effects, in balance with costs and needs. Pesticide use is one possible component of IPM. IPM strategy is generally designed to enhance natural pest controls, minimizing the need for human-made intervention.

Prevention is a key component of IPM, with the goal of preventing pest problems from developing or worsening. An example of such prevention mechanisms could be focusing on maintaining the health of a plant community that discourages the growth of tall woody species on the rights of way, broadleaf weeds in lawns, etc. The best management practices incorporate mechanical, chemical, biological and/or cultural options depending upon site conditions and the sensitivity of surrounding areas.

Planning for IPM considers many factors:

- Pest tolerance or threshold
- Pest biology
- Site use requirements
- Site landscape characteristics (water, soil, aspect, etc.)
- Landowner concerns (adjacent, local or remote)
- Adjacent land uses
- Alternative control methods or strategies
- Costs of control methods
- Environmental impacts and sensitivities
- Social impacts
- Economic impacts
- Short, medium and long term management objectives
- Applicable legislation
- Follow up plan to ensure success of the program and solicit feedback from stakeholders.

The most effective pest control is typically the result of an integrated approach, using a combination of strategies and methods to guide the natural forces of nature to the manager's advantage and to the detriment of the pest. It balances the direct costs, and the social and environmental implications with the benefits of the pest control.

In accordance with IPM philosophy Manitoba Hydro does not encourage chemical pesticide application to areas other than those where the presence of pests is a threat to safety, equipment integrity, effective equipment operation and/or maintenance. In addition, pesticide use is discouraged when it is not the most sustainable (economic, social and environmental) means to achieving management objectives.

IPM plans are required for pest control in national parks.

The subsequent instructions in this document detail the requirements of Manitoba Hydro facilities and individuals assigned to apply chemical pesticides.

At Manitoba Hydro, the IPM plan *must be* maintained by the responsible party (see Definitions section).

2 Definitions

Applicator Licence

Issued by Manitoba Agriculture and Food under the provisions and requirements of the Pesticides and Fertilizers Control Act and Regulations. Anyone applying pesticides for "a fee, charge or other valuable consideration" must possess a valid Applicator Licence, renewable annually for a fee, and re-certified every 5 years.

Complaint:

A second point of contact within the corporation from an outside party.

Contract Administrator

The Manitoba Hydro individual responsible for seeking out the contractor/contracted services, responsible for providing technical and site advice and responsible for the results of the contractor's actions.

Contractor

A company or person that is being paid by Manitoba Hydro, but is not a status employee, to apply pesticides at Manitoba Hydro locations and/or on behalf of Manitoba Hydro.

Dangerous Good

Product and substances that may be hazardous during transport or when they spill or leak.

A product, substance or organism that meets the criteria for inclusion in one or more of the nine classes of dangerous goods, as per the Dangerous Goods Handling and Transportation Act and Regulations which include Explosives, Gases, Flammable Liquids, Flammable Solids, Oxidizers and Organic Peroxides, Toxic or infectious substances, Radioactive Materials, Corrosives, and Miscellaneous Hazardous Materials.

Integrated Pest Management

IPM is a sustainable approach to pest management, combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health and environmental risks. It anticipates and prevents pests from reaching damaging levels by using all suitable techniques such as natural enemies, cultural management, and the judicious use of pesticides.

On-site Inspector

A Manitoba Hydro representative that oversees a contracted service to ensure compliance with contract requirements.

Pest

A plant, animal, or insect causing or capable of causing damage or interference with the operation of facility or plant.

Pesticide

Any chemical, natural or anthropogenic, used to kill a pest. Includes fungicides (wood preservatives), herbicides, insecticides, etc. All pesticides are registered for specific uses under the Pest Control Products Act, and must have a PCP registration number on its label.

Pesticide Use Permit

Issued by the Environmental Approvals Branch, Environmental Stewardship Division, Manitoba Conservation, under the provisions and regulations of the Environment Act – Pesticides Regulation. Anyone applying pesticides for or on behalf of government departments, crown corporations, municipal corporations, school boards, or on crown lands or rights-of-way on behalf of private corporations, must be in possession of a valid Pesticide Use Permit. The Use Permit process is the vehicle by which regulatory review of the use of pesticides is carried out.

Program Coordinator

The Manitoba Hydro individual responsible for coordinating program activities in a specific area including staffing and sequencing.

Public Notice

A public notice refers to any form of advertising used to fulfill the requirements of the Pesticide Use Permit. In the case of Manitoba Hydro, this usually refers to a newspaper add placed locally prior to application of any pesticides.

PUP Administrator

The Manitoba Hydro individual who has made application for the Pesticide Use Permit.

Responsible Party

The responsible Manitoba Hydro party is the facility or Department that is responsible for pesticide application and/or maintenance of a given area.

3 Purpose

3.1 General

- To provide regulatory & applicator licensing information; technical guidance; safety requirements and check lists for line managers responsible for pesticide application for the purpose of ensuring compliance with legal requirements and Manitoba Hydro policies.
- To provide information for the purpose of ensuring consistent pesticide management at all Manitoba Hydro facilities.
- To provide information with the goal of ensuring pesticide management is carried out in such as way that resulting environmental impact is minimal.

4 Scope

4.1 General

This guidance document applies to staff and contractors using pesticides, in the interest of Manitoba Hydro, for weeds, trees, poles and landscape maintenance.

This document is intended for all individuals involved in pesticide application, including the planning and execution of application at all levels and locations within Manitoba Hydro.

If you have any questions regarding this document or the referred legislation contact:

- Corporate Safety and Health, Dangerous Goods Officer
- Power Supply, Generation South, Environment Operations Support Section
- Customer Service & Marketing, Forestry Section, Forester
- Transmission & Distribution, Apparatus Maintenance Division, Waste Management Coordinator

In the event of a discrepancy between this document and any of the provincial or federal acts or regulations, the acts or regulations shall take precedence.

5 Ownership and Distribution

5.1 General

Accountability and responsibility for maintenance and revision of this document belongs to the Manitoba Hydro Pesticide Awareness Working Group (PAWG).

The PAWG is comprised of the following:

- Power Supply, Generation South, Environment Operations Support Section
- Corporate Safety and Health, Dangerous Goods Officer
- Customer Service & Marketing, Forestry Section, Forester
- Transmission & Distribution, Apparatus Maintenance Division, Waste Management Coordinator

Corporate Safety and Health Division (CS&H) is responsible for general distribution of this document.

Controlled copies of this document are available through MPower, on CS&Health Website.

6 References

6.1 Provincial

Some of the key provincial regulations are noted in this section, as reference only. The following list should not be assumed to be all inclusive; technical guidance should be sought regarding application and interpretation of legislation.

Environment Act

[Pesticides Regulation \(Man. Reg. 94/88R\)](#)

Pesticides and Fertilizers Control Act

[Pesticides and Fertilizers Licence Regulation \(Man. Reg. 216/87R\)](#)

Dangerous Goods Handling and Transportation Act

[Environment Accident Reporting Regulation \(Man. Reg. 439/87R\)](#)
[Dangerous Goods Handling & Transportation Regulation \(Man. Reg.55/2003\)](#)

Workplace Safety and Health Act

[Workplace Hazardous Materials Information System Regulation \(Man. Reg. 52/88\)](#)

Some provincial legislation is summarized in [Manitoba Hydro Guide to Environmental Legislation.](#)

6.2 Federal

Some of the key federal regulations are noted in this section, as reference only. The following list should not be assumed to be all inclusive; technical guidance should be sought regarding application and interpretation of legislation.

Transportation of Dangerous Goods Act

[Transportation of Dangerous Goods Regulations \(SOR 2008-0244\)](#)

Pest Control Products Act

<http://laws.justice.gc.ca/en/ShowFullDoc/cs/P-9.01///en?noCookie>

Hazardous Products Act

<http://laws.justice.gc.ca/en/ShowFullDoc/cs/H-3///en?noCookie>

Some federal legislation is summarized in the [Manitoba Hydro Guide to Environmental Legislation](#).

6.3 Manitoba Hydro Policies, Procedures and Forms

Manitoba Hydro Hazardous Materials Management Handbook Part 1: Spill Response; Part 2: Hazardous Waste Management; Part 4; Managing Specific Hazardous Materials.

Manitoba Hydro [Chemical Storage publication](#) available through MPower, on CS&H website

Manitoba Hydro Daily Weed Control Applicator's Report, available on MPower (eForms 0643)

Manitoba Hydro Daily Vegetation Control Report, available on MPower (eForms 1157)

7 Application for Pesticide Use Permit

7.1 General

This section applies at the Facility/Station level and is specific to provincial requirements. (Any potential federal requirements will be handled on a case by case basis).

No person shall apply pesticides for Manitoba Hydro unless the responsible Manitoba Hydro party is in possession of a valid pesticide use permit.

The Forestry Section, Customer Service & Marketing (CS&M) shall obtain the necessary permit on behalf of Transmission & Distribution (T&D), Customer Service & Marketing (CS&M) and Corporate Facilities, Operations and Maintenance. The Environment Operations Support Section, Generation South, Power Supply shall obtain the necessary permits on behalf of Power Supply (PS) operations.

Only pesticides approved by the Chief Forester and CS&H will be permitted for use.

Responsible parties must submit information pertaining to Pesticide Use Permit application by the beginning of February for the up-coming application season. This information must be returned to the Forestry Section (for T&D, CS&M and Corporate operations) and the Environment Operations Support Section (for PS Business Unit).

Information required includes:

- Pesticides intended for use (including the Pest Control Products Act Number)
- Location of application
- Name of applicator(s)
- Application method
- IPM plan in the case of application in National Parks or other applicable areas.

The Forestry Section (for T&D, CS&M and Corporate Facilities, Operations and Maintenance) and the Environment Operations Support Section (for PS Business Unit) will prepare the required public notices, on behalf of the responsible party.

Should the public have comments or concerns regarding the terms of the Pesticide Use Permit (as detailed in any public notices) they are to contact Manitoba Conservation directly. Manitoba Hydro personnel (or contractors) that receive comments from the public relevant to the Pesticide Use Permit shall inform the inquirer that comments are to be made directly to Manitoba Conservation. Public

Concerns submitted to Manitoba Conservation are forwarded to the PUP administrator.

Complaints received on site relating to operational issues or during an application operation, shall be dealt with according to local MH business practices. Unresolved issues may be referred to regulating bodies for final judgment through the PUP administrator. All public input received by or forwarded to MH PUP administrators will be kept on file and reported to Environmental Management Advisory Committee if requested.

Copies of permits received from Manitoba Conservation and the applicable Public Notice shall be sent to managers and/or delegates and Program Coordinators by May 1 of the year for which the permit is issued.

A Pesticide Use Permit expires at the end of the calendar year for which it is issued.

Copies of the Pesticide Use Permit must be available at the location of the responsible party and at the work site.

Where pesticide application is planned during the period January 1 to May 31 (e.g. stump, basal applications) appropriate Pesticide Use Permit must be applied for, as detailed in the preceding points of this section.

8 Applicator's Licence

8.1 General

This section applies at the individual applicator level.

The Forestry Section, Customer Service & Marketing (CS&M) shall obtain the necessary licences on behalf of Transmission & Distribution (T&D), Customer Service & Marketing (CS&M) and Corporate Facilities, Operations and Maintenance. The Environment Operations Support Section, Generation South, Power Supply shall coordinate the necessary licences on behalf of Power Supply (PS) operations.

Any person using pesticides in accordance with a pesticide use permit must possess or be under the direct supervision of someone possessing a valid applicator's licence.

The holder of an applicator's licence will train and supervise persons using pesticides in accordance with provisions of the pesticide use permit.

Where deemed necessary by management, non-licenced Manitoba Hydro employees may apply pesticides on Manitoba Hydro property as long as the following conditions are met:

The individual has been trained by a Manitoba Hydro employee who possesses a valid applicator's licence in accordance with Manitoba Regulation 94/88R, and has current spill response training, WHMIS and TDG certification.

The same two individuals have a pre-application meeting to discuss the application (i.e. products to be used, special concerns, terms and conditions of pesticide use permit, etc.).

The same two individuals have a post-application meeting to discuss details of the application and to ensure daily application records are complete.

The names of both the actual applicator and the supervising licenced individual are entered on the daily spray record.

The same two individuals have access to a means of communicating at all times during application (i.e. truck radio, cell phone, etc.).

In situations where no licensed applicator is available, and small quantities of DOMESTIC LABEL products are being used, pesticides may be applied by non-licensed MH employees without meeting the "non-licensed" conditions above.

However, daily application records must be completed and kept on site, and a copy forwarded to the appropriate PUP administrator.

Manitoba Hydro pesticide applicators are required to successfully complete the Manitoba Hydro prescribed training course, as provided in conjunction with Manitoba Agriculture.

All applicators licences expire on December 31 of each year.

Applicators licences will be sent to applicable applicators with the pesticide use permit by May 31. Provisions must be made to renew licenses where pesticide applications are contemplated in the interim period (i.e. January 1 to May 31).

Applicators shall be in possession of their current licence when applying product.

8.2 Application and Reporting Requirements

Applicators must be familiar with and adhere to the terms and conditions of the pesticide use permit, as well as the Manitoba Environment Act, Pesticides Regulation (Man. Reg. 94/88R).

Where applicable, applicators must be familiar with the requirements of the IPM plan.

Applicators must be provided a copy of the Pesticide Use Permit and understand and adhere to all terms and conditions and only apply pesticides listed on the permit. Applicators must also consider the requirements and limitations set out in any public notices regarding application in a specific area.

Applicators must have a copy of the permit and Public Notice on-site when applying product.

Within 24 hours of completion of every pesticide application, licenced applicators must record and report application details as per the Pesticide Application Permit reporting process. This information must also be retained on site for a period of three years.

- The Daily Weed Control Applicator's Report shall be completed for any herbicide application or operations that occur in contained sites, such as switchyards and dykes. The Daily Vegetation Control Report shall be completed for any tree control operations.
- The Daily Weed Control Applicator's Report and the Daily Vegetation Control Report are internal Manitoba Hydro documents used to facilitate the collection of information for submission to Manitoba Conservation. The forms are applicable to herbicide use only.
- Application detail information required by Manitoba Conservation for insecticide, fungicide, wood preservation or other applications not covered by the above forms must be coordinated by the Contract Administrator.

Complaints received on site relating to operational issues or during an application operation, shall be dealt with according to local MH business practices. Unresolved issues may be referred to regulating bodies for final judgment through the PUP administrator. All public input received by or forwarded to MH PUP administrators will be kept on file and reported to Environmental Management Advisory Committee if requested.

The responsible party shall forward the following information to the Forestry Section or Environment Operations Support Section respectively, by October 31:

- Pesticides used (including the Pest Control Products Act Number)
- Quantity used (L)
- Area Treated (ha) (Note: the same hectare sprayed twice in one season equals 2 hectares sprayed.)
- Name of Applicator(s) and their licence numbers
- A map indicating areas where spraying occurred
- A copy of all Daily Weed Control Applicator Reports and Daily Vegetation Control Reports
- Site type (e.g. electric substation, gas regulator station, dykes, switchyards, etc.)
- Site name or designation

All pesticides used by or on behalf of Manitoba Hydro must be reported in the Post Season Report, as specified by Manitoba Conservation.

The Forestry Section, Customer Service & Marketing (CS&M) shall submit the Post Season Report Forms on behalf of Transmission & Distribution (T&D), Customer Service & Marketing (CS&M) and Corporate Facilities, Operations and Maintenance to Manitoba Conservation. The Environment Operations Section, Generation South, Power Supply shall submit the Post Season Report Forms on behalf of Power Supply (PS) operations.

Landowners with properties adjacent to Manitoba Hydro rights of way shall be contacted to obtain consent prior to carrying out the pesticide application program. If landowners do not grant consent then Manitoba Hydro employees or contractors shall not apply pesticides to those areas. Landowner consent or refusal shall be documented (in paper or electronic form) and maintained by the responsible party.

9 Safety and Health

9.1 General

Applicators must have prepared a job planning worksheet.

Applicators shall not use public standpipes to mix pesticides and/or solutions.

Applicators must wear personal protective equipment as prescribed on product label, Material Safety Data Sheet (MSDS) and by Manitoba Hydro CS&H, such as disposable coveralls, chemical resistant gloves, chemical resistant boots, acid splash goggles and respirator with approved cartridges for pesticides.

A copy of the current MSDS and container label for each pesticide to be applied must be with the applicator.

All personnel handling pesticides must have successfully completed the Workplace Hazardous Materials Information System (WHMIS) and TDG training when required prior to application of pesticides.

All applicators, Manitoba Hydro employed or contracted, must be trained in spill response and be familiar with site specific spill response plans prior to application.

10 Environmental Protection

10.1 General

All applicators shall be familiar with the Hazardous Materials Management Handbook, which is available through MPower, on [CS&H](#) site.

Manitoba Hydro Applicators must also have a pesticide spill response kit readily available *at all times*. The applicator should also ensure that a shovel is kept in the vehicle and/or near the site of application and/or product transfer. In the event of a spill, a shovel may be used to construct a barrier around the spill site and remove contaminated soil. The spill kit should contain the following:

- 17" x 19" Absorbent Pads
- Absorbent socks
- Plug n Dike Hole Repair with gloves
- Splash Goggles
- Splash Gloves
- Poly Drain Cover
- Haz Mat Disposal Bag/Tie

A kit containing items, as described in Section 10.1.2, is available from Central Stores (CIIC 02-79-51).

Applicators shall notify the supervisor immediately of any release and complete the Hazardous Materials Incident Report (as per the Manitoba Hydro Hazardous Materials Management Handbook) which will be forwarded to the Hazardous Materials Officer in Corporate Safety and Health. Applicators and supervisors should contact the Area Spill Response Coordinator and the Hazardous Materials Officer if they require any additional resources to deal with the release.

10.2 Empty Pesticide Containers and Waste Pesticide

Excess or waste pesticide, or their solution, must be used as per container label or handled as hazardous waste.

Every pesticide applicator operating under a provincial pesticide use permit shall deposit empty, waste containers at the local pesticide container collection area or waste disposal grounds designated by the municipality.

For water soluble products, the container is to be triple rinsed with water and punctured prior to disposal. Wastewater generated during container rinsing is to be directed back to the tank and subsequently mixed with the pesticide for application. All containers must be kept in a controlled access location until they have been triple rinsed AND punctured.

For non water soluble products, the container is to be visibly scraped clean of residue and deposited at a collection site. The collected residue is to be used as per original label or handled as hazardous waste.

For Manitoba Hydro applicators, if a local pesticide container collection area or waste disposal grounds designated by a municipality is not available, then containers are to be triple rinsed, punctured and forwarded to:

**Manitoba Hydro
Waste Management Coordinator, Transmission and Distribution
1840 Chevrier Blvd, Winnipeg**

10.3 Transportation and Handling

Any person shipping, transporting or receiving a pesticide that is a dangerous good must have a valid Transportation of Dangerous Goods Certificate in their immediate possession.

If there is a dangerous goods incident during transport or handling, the applicator or any person on site shall notify the supervisor immediately of any release and complete the Hazardous Materials Incident Report (as per the Manitoba Hydro Hazardous Materials Management Handbook) which will be forwarded to the Hazardous Materials Officer in Corporate Safety and Health. Applicators and supervisors should contact the Area Spill Response Coordinator and the Hazardous Materials Officer if they require any additional resources to deal with the release.

10.4 Storage

All pesticides must be stored above the floor in their original labeled containers according to manufacturer's recommendations either on pallets or on racks and shelving constructed of non-combustible materials.

The pesticide storage facility should be secured to control access and be located as far away as reasonably practicable from any sensitive areas such as residences, schools, health care facilities, food/feed processing plants, open water ways, drainage systems or drinking water sources.

The pesticide storage facility must have the following signage posted at all pedestrian entrances:



Copies of the above sign are available through Corporate Health and Safety.

The pesticide storage facility must be maintained to housekeeping standards so as to ensure immediate access to fire exits and emergency response equipment such as fire extinguishers, eyewash stations, spill response kits and other personal protective equipment.

Refer to Manitoba Hydro Chemical Storage publication, which is available through MPower, on [CS&H](#) site.

the Manitoba Hydro personnel responsible for the pesticide storage facility shall maintain an up to date inventory of all pesticides kept within the facility.

11 Contractors

11.1 General

At the time of notification that a contractor has been awarded a contract or the extension of an existing pesticide application contract, a copy of this document "*Pesticide Application Requirements for Manitoba Hydro Employees and Contractors*" will be provided to the contractor by the contract administrator.

Contractors hired to perform work under the pesticide use permit must hold a valid applicator's licence with the appropriate classification. A copy of the valid licence must be provided to Manitoba Hydro site manager responsible for application, prior to application of the pesticides.

Contractors must be provided a copy of the Pesticide Use Permit and where applicable, made aware of the IPM plan, and understand and adhere to all terms and conditions. Contractors must only apply pesticides listed on the pesticide use permit.

Within 24 hours of completion of every pesticide application, contractor applicators must record and report application details as per the Pesticide Application Permit reporting process. This information must also be retained for a period of three years.

- The Daily Weed Control Applicator's Report shall be completed for any herbicide application or operations that occur in contained sites, such as switchyards and dykes. The Daily Vegetation Control Report shall be completed for any tree control operations, such as herbicide application.
- The Daily Weed Control Applicator's Report and the Daily Vegetation Control Report in either electronic or hardcopy form are internal Manitoba Hydro documents used to facilitate the collection of information for submission to Manitoba Conservation. The forms are applicable to herbicide use only.
- Application detail information required by Manitoba Conservation for insecticide, fungicide, wood preservation or other applications not covered by the above forms must be coordinated by the Contract Administrator.

The checklist (Appendix A) for contractors applying pesticides must be completed and signed off by the contract administrator (or designate) and contractor prior to pesticide application. A copy of the signed checklist must be maintained by site representative responsible for application.

11.2 Contractor Safety

Applicators must wear personal protective equipment as required by product label and MSDS such as disposable coveralls, chemical resistant gloves, chemical resistant boots, acid splash goggles and respirator with approved cartridges for pesticides,.

A copy of the current MSDS and container label for each pesticide to be applied must be with the applicator.

All contracted applicators must have WHMIS and TDG training when required prior to application of pesticides.

All contracted applicators, must be trained in spill response and be familiar with site specific spill response plans prior to application.

All contractors must complete some form of daily job planning worksheet.

Daily job plans must include a review of all Safety and Environmental issues related to the performance of the work.

The daily job plans must also document that all new employees to the work-site have been made aware of Manitoba Hydro's environmental policies, Environmental Management System (EMS) issues related to the performance of the work and the confirmation that they have "Spill Response Training" and are aware of the on-site spill response plans and familiar with the content of the pesticide product labels and MSDSs.

11.3 Environmental Protection by Contractors

Each Contractor shall have a Spill Response Plan and employee training in place that is appropriate to the type and quantity of chemicals to be used as well as the environment in which they will be used. The Spill Response Plan shall be reviewed and approved by the Manitoba Hydro contract administrator.

Response materials must be in sufficient quantity and adequate to respond to the capture, containment and cleanup of any product in use.

Contractors shall notify the Program Coordinator or On-site inspector immediately of any release, and complete the Hazardous Materials Incident Report (as per the Manitoba Hydro Hazardous Materials Management Handbook) which will be forwarded to the Hazardous Materials Officer in Employee Safety and Health. The On-site Inspector and/or Program Coordinator should contact the Area Spill Response Coordinator and the Hazardous Materials Officer if they require any additional resources to deal with the release.

All pesticides must be stored above the floor in their original labeled containers according to manufacturer's recommendations either on pallets or on racks and shelving constructed of non-combustible materials. Containers should be stored in a spill or leak containment system and in an upright position.

The pesticide storage facility should be secured to control access and be located as far away as reasonably practicable from any sensitive areas such as residences, schools, health care facilities, food/feed processing plants, open water ways, drainage systems or drinking water sources.

The pesticide storage facility must have signage similar to the following posted at all pedestrian entrances:



Copies of the above sign are available through Corporate Health and Safety.

The pesticide storage facility must be maintained to housekeeping standards so as to ensure immediate access to fire exits and emergency response equipment such as fire extinguishers, eyewash stations, spill response kits and other personal protective equipment.

The contractor personnel responsible for the pesticide storage facility shall maintain an up to date inventory of all pesticides kept within the facility.

Refer to Manitoba Hydro Chemical Storage publication, which is available through MPower, on [CS&H](#) site.

Disposal of all un-used and waste product, as well as waste containers, is the responsibility of the contractor. The Contract Administrator or On-Site Inspector must take steps to be reasonably assured that the contractor is handling waste and containers in an environmentally responsible and legal manner.

12 Roles and Responsibilities

12.1 Applicator

The pesticide applicator is responsible for the following:

- Ensuring possession of a valid applicator licence prior to application of any pesticides.
- Adhering to the terms and conditions of both of the pesticide use permit and the public notice for the specific location or station.
- Discarding out of date applicator licence.
- Training other non-licenced applicators, as required.
- Keeping the valid applicators licence on their person during pesticide application.
- Complete Weed Applicator's Report and/or Vegetation Control Report within 24 hours of completion of the application.
- Wearing necessary personal protective equipment.
- Ensuring knowledge of product risks.
- Properly disposing of pesticide containers.
- Ensuring familiarity with Manitoba Hydro spill response documents and procedures.
- Ensure the Spill Response Kit is available for use prior to applying pesticides.
- Be knowledgeable of the requirements of applicable IPM plans.
- Ensuring those under supervision adhere to all components of this guidance document, legal requirements and other applicable Manitoba Hydro policies and procedures.

12.2 Responsible Manitoba Hydro Manager

The senior manager (or designate) of the facility, site or station responsible for pesticide application in a given area is responsible for the following:

- Provide requested information to the respective environmental support staff (the Forestry Section, CS&M for CS&M, T&D and Corporate Facilities, Operations and Maintenance operations; the Environment Operations Support Section, Generation South, for Power Supply).
- During the public notification period public comments regarding planned pesticide application should be referred to Manitoba Conservation.
- Provide necessary support and training to Manitoba Hydro applicators.
- Maintaining out of date Pesticide Use Permits and all documentation applicable to that Pesticide Use Permit on site for a period of 3 years.
- Facilitate applicators completion of necessary training.
- Ensure completion of post season report forms.
- Ensure availability of spill kit.
- Ensure contractors are provided with the terms of the pesticide use application, and are applying pesticides in an environmentally safe manner.
- Ensure applicators are in possession of valid applicator licence.

12.3 Chief Forester

The Chief Forester, in conjunction with CS&H, is responsible for approving all pesticides used at Manitoba Hydro facilities.

12.4 Contract Administrator/or Designate

The Manitoba Hydro Contract Administrator is responsible for:

- Ensuring that contractors meet all regulatory and Manitoba Hydro requirements.
- Due diligent inspection of contractor storage facilities if storage is on Manitoba Hydro property, or if contractor is storing significant quantities on Manitoba Hydro's behalf
- Provide Contractors with a copy of this document prior to commencement of work.
- Completing the Checklist in Appendix A of this document.
- Verify appropriate applicator licence classification and validity.
- Obtain and retain a copy of the applicator licence
- Obtain and maintain a copy of the Daily Application report.
- Document public complaints and forward them to PUP administrator

12.5 Power Supply, Generation South, Environment Operations Support Section

The Power Supply Environment Operations Support Section is responsible for providing the following support to Power Supply facilities:

- Application for of necessary Pesticide Use Permits.
- Preparation of necessary public notices.
- During the public notification public comments regarding proposed pesticide application should be referred to Manitoba Conservation.
- Maintaining renewals for applicators in conjunction with Forestry Section.
- Preparation of Post Season Report for Power Supply facilities for submission to Manitoba Conservation.
- Document and maintain file of public complaints as received/reported from field administrator or provincial regulators. Report this information to Environmental Management Advisory Committee as requested.

12.6 Customer Service and Marketing, Forestry Section

The Forestry Section is responsible for providing the same support as the Power Supply Environment Operations Support Section (as per section 12.5 of this document) to Customer Service & Marketing and to Transmission and Distribution.

12.7 Non-licenced Manitoba Hydro employees

Manitoba Hydro employees that apply pesticides, but that are not licenced as per Manitoba Agriculture must be trained according to Manitoba Hydro health and safety requirements (WHMIS and TDG). They are responsible for ensuring that pesticide application is done in conjunction with a licenced applicator, as per Section 8.1 of this document.

12.8 Contractors

Contractors applying pesticides on behalf of Manitoba Hydro have the following responsibilities:

- Holding a valid applicator licence.
- Adhering to all terms and conditions of pesticide use permit.
- Adhering to all terms and conditions of all applicable Manitoba Hydro procedures. .
- Have a spill response plan and equipment in place for each area of application.
- Complete Hazardous Materials Incident Report when there is an incident involving a dangerous good.
- Conforming to all relevant sections of this document.
- Conformance to all Manitoba Hydro and legal health and safety requirements.

12.9 Corporate Safety & Health

Corporate Safety and Health (CS&H) is responsible for the following:

- Workplace Environment Department will provide technical expertise and assistance that facilitates the practice of due diligence, in accordance with safety, occupational health and environmental legislation that affects all employees of Manitoba Hydro.
- Interpret legislation related to hazardous materials.
- Evaluate and approve all pesticides used at Manitoba Hydro facilities, in conjunction with the Chief Forester.
- Train all employees in Hazardous Materials Management, including Transportation of Dangerous Goods, Workplace Hazardous Materials Information Systems (WHMIS) and Spill Response.
- Provide expertise and assistance in the event of a release of hazardous materials and facilitate the reporting to regulatory agencies.
- Publication and distribution of this document to the appropriate personnel.

12.10 Manitoba Hydro Pesticide Awareness Working Group

The Manitoba Hydro Pesticide Awareness Working Group is responsible for periodically reviewing and revising this document when appropriate.

Appendix 1. Contractor Checklist

This checklist must be completed and signed off by the program coordinator and MH applicators prior to a pesticide application program annually. A copy of the signed checklist must be maintained at site.

	YES	NO
1. Did you receive and reviewed the Pesticide Application Requirements for Manitoba Hydro Employees and Contractors Publication?	<input type="checkbox"/>	<input type="checkbox"/>
2. Does the contractor hold a valid applicator's licence from Manitoba Agriculture with appropriate classification?	<input type="checkbox"/>	<input type="checkbox"/>
3. Has the contractor provided the contract administrator with a copy of valid licence?	<input type="checkbox"/>	<input type="checkbox"/>
4. Have the terms of the Pesticide Use Permit, Public Notice, and IPM plan (if applicable) been reviewed with the contractor?	<input type="checkbox"/>	<input type="checkbox"/>
5. Are all terms and conditions of the Pesticide Use Permit, Public Notice, and IPM plan (if applicable) understood by the contractor?	<input type="checkbox"/>	<input type="checkbox"/>
6. Does the contractor have appropriate personal protective equipment, as required by the product label, MSDS and Manitoba Hydro CS&H?	<input type="checkbox"/>	<input type="checkbox"/>
7. Does the contractor have electronic forms or hardcopies of the Weed Control Applicator's Report or the Vegetation Control Report or Wood Maintenance Pesticide Report?	<input type="checkbox"/>	<input type="checkbox"/>
8. Does the contractor have a copy of the current MSDS for each pesticide to be applied? (Note: Download from supplier's website annually)	<input type="checkbox"/>	<input type="checkbox"/>

- | | | |
|---|--------------------------|--------------------------|
| 9. Has the content and intended use of the Manitoba Hydro Hazardous Materials Incident Report been reviewed with the contractor? | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Has the contractor provided documentation of spill response training and demonstrated that they have a spill response plan and equipment in place that meets Manitoba Hydro requirements? | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Have site details, including treatment areas, been reviewed with the contractor? | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Has the contractor provided a copy of the TDG card (if required) and provided documentation verifying that WHMIS training is up to date. | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. Does the contractor provide adequate pesticide storage and inventory control? | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Does the contractor have a plan for removal and final disposal of waste and empty containers? (triple rinse and puncture) | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. Has Manitoba Hydro's environmental policies and Environmental Management System (EMS) issues related to the performance of the work been reviewed? | <input type="checkbox"/> | <input type="checkbox"/> |

Special Concerns or Comments:

Contract Administrator:

Contractor:

Name (please print)

Name (please print)

Signature

Signature

Date

Date

**Appendix 2. Manitoba Hydro
Pesticide Applicator Checklist**

This checklist must be completed and signed off by the program coordinator and MH applicators prior to a pesticide application program annually. A copy of the signed checklist must be maintained at site.

	YES	NO
1. Do the applicators hold valid applicator's licence from Manitoba Agriculture with appropriate classification?	<input type="checkbox"/>	<input type="checkbox"/>
2. Do the applicators have a copy of the valid licence?	<input type="checkbox"/>	<input type="checkbox"/>
3. Have the terms of the Pesticide Use Permit, Public Notice and IPM plan (if applicable) been reviewed with the applicators?	<input type="checkbox"/>	<input type="checkbox"/>
4. Are all terms and conditions of the Pesticide Use Permit, Public Notice, and IPM plan (if applicable) understood by the applicators?	<input type="checkbox"/>	<input type="checkbox"/>
5. Do the applicators have appropriate personal protective equipment as required by the product label, and MSDS and Manitoba Hydro CS&H?	<input type="checkbox"/>	<input type="checkbox"/>
6. Do the applicators have copies of the Weed Control Applicator's Report or the Vegetation Control Report?	<input type="checkbox"/>	<input type="checkbox"/>
7. Do the applicators have copies of the current Labels and MSDS for each pesticide to be applied (Note: Download from supplier's website annually)?	<input type="checkbox"/>	<input type="checkbox"/>
8. Has the content and intended use of the Manitoba Hydro Hazardous Materials Incident Report been reviewed with the applicators?	<input type="checkbox"/>	<input type="checkbox"/>
9. Do the applicators have spill response training and spill response kits?	<input type="checkbox"/>	<input type="checkbox"/>

- 10. Have the applicators reviewed the spill response plan?
- 11. Have site details, including treatment areas, been reviewed with the applicators?
- 12. Have the pesticide storage and inventory control requirements been reviewed?
- 13. Has a plan for removal and final disposal of waste and empty containers been reviewed? (triple rinse and puncture)

Special Concerns or Comments:

Program Coordinator:

Name (please print)

Signature

Date

Applicators:

Name (please print)

Name (please print)

Signature

Signature

Date

Date

Appendix N

Erosion and Sediment Control

Management Plan

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Erosion and Sediment Control Plan

April 2019

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

Preface

This document presents the Erosion and Sediment Control Plan (ESCP; the Plan) for construction. 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 construction, maintenance or decommissioning activities. More importantly it presents an implementation plan and actions required to prevent and mitigate erosion and sedimentation as a result of construction. 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

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
Draft	Added Engagement activities	Section 1.1	Manitoba Hydro	20190211
Draft	Added acknowledgement to Preface	Page ii	Manitoba Hydro	20190211

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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*).

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed 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 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. 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.

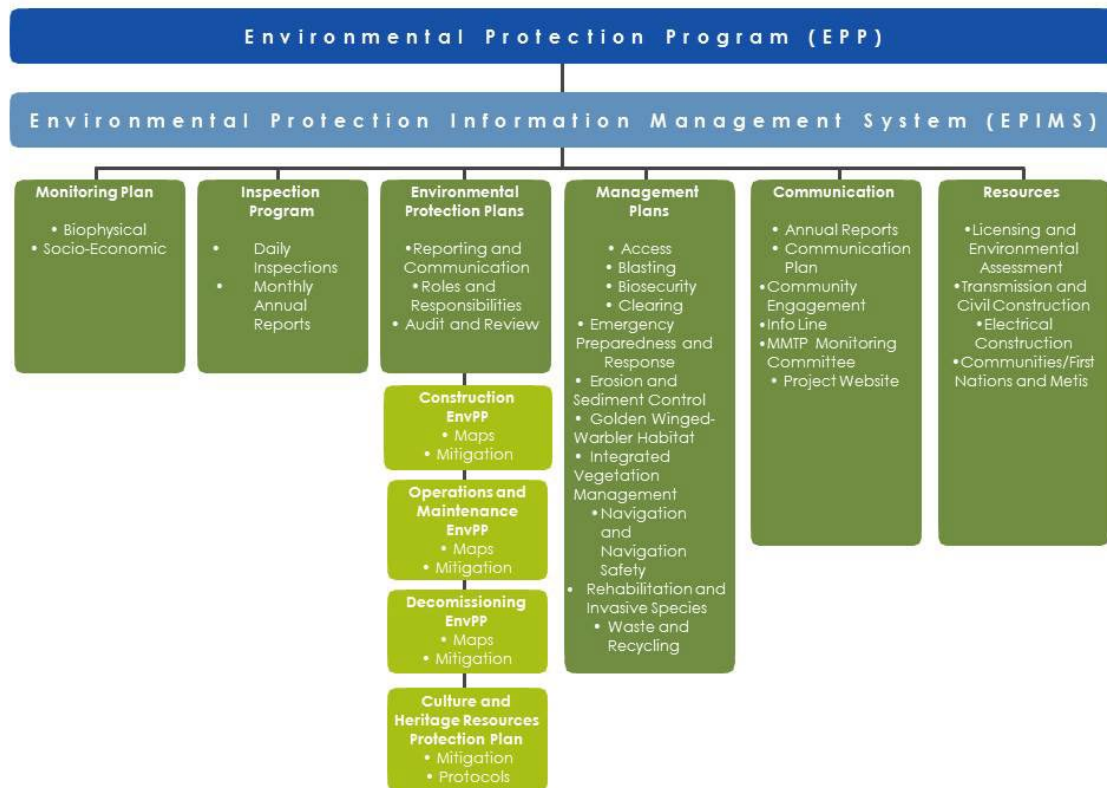


Figure 1: Transmission Environmental Protection Program

1.1 Commitment to environmental protection and indigenous engagement

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.

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 its activities.

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 may 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 the contractor. • Appoints an Environmental Inspector/Officer or delegate to confirm that regulatory criteria are being met by the ESCP.

Table 1: Key roles and responsibilities

Role	Key responsibilities
	<ul style="list-style-type: none"> • 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

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.

3.0 Implementation

The intent of this section is to provide implementation instructions to the Contractor. The key steps to implementing the plan are (Figure 2):

- 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 in 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

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>.

Appendix A

EC_01 Vegetation Retention and Replacement

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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.

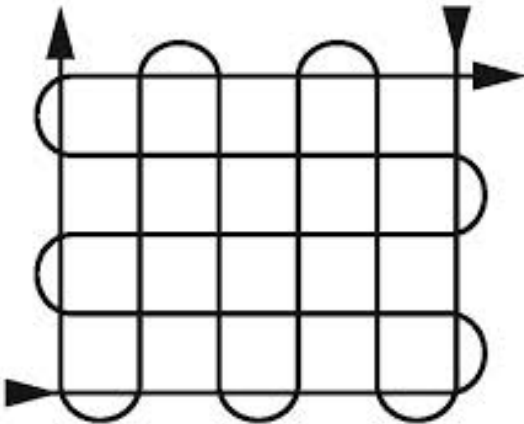
Application

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

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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

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Appendix C

EC_03 Erosion Control Blankets

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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	

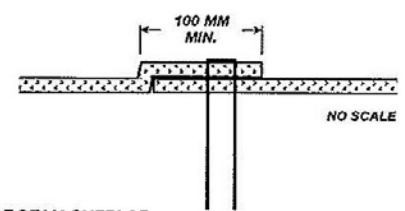
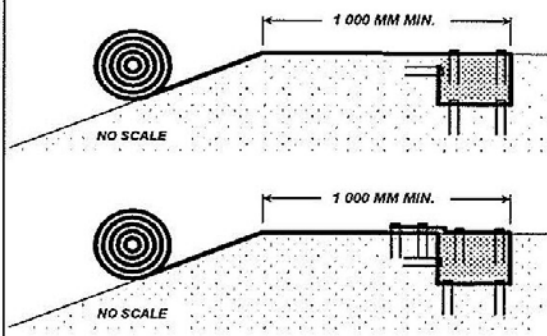
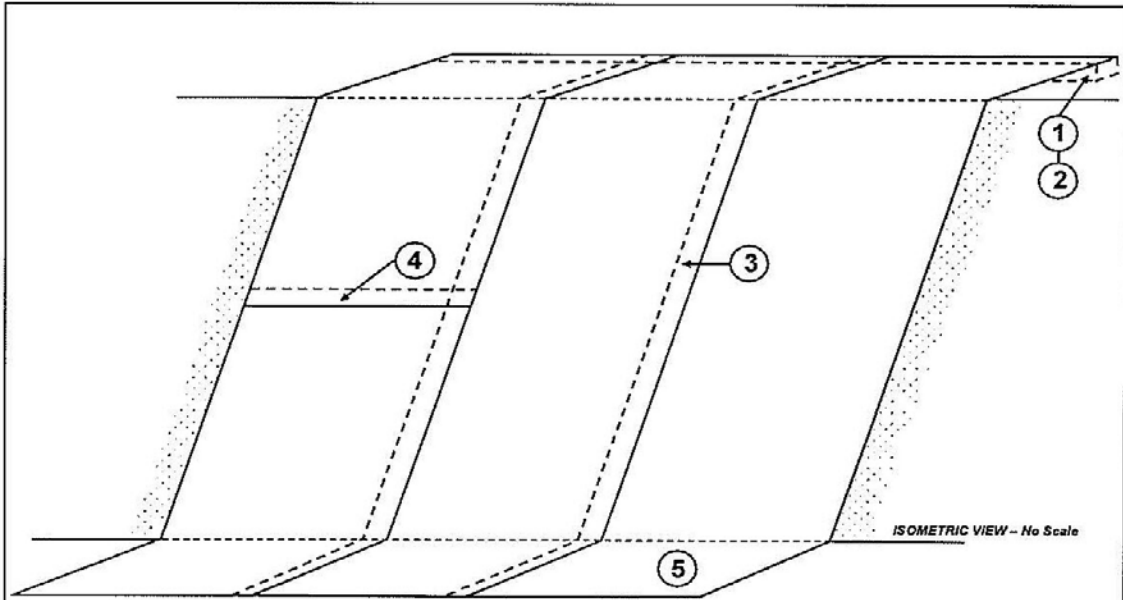
Implementation

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

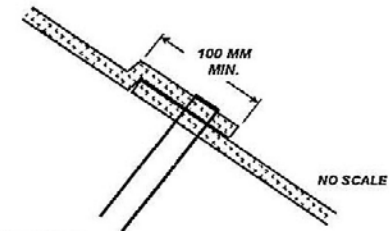
Installation

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.

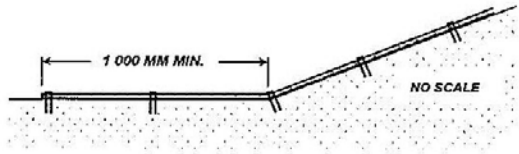
The following installation instructions should be followed in the absence of manufacturer's installation instructions. VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual provides the following two diagrams provide recommended specification for installing Erosion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



- ③ SIDE SEAM OVERLAP**
1. ANCHOUR THROUGH BOTH RECPs
 2. ANCHOURS 150 MM O.C.



- ④ END ROLL OVERLAP**
1. ANCHOUR THROUGH BOTH RECPs
 2. ANCHOURS 150 MM O.C.

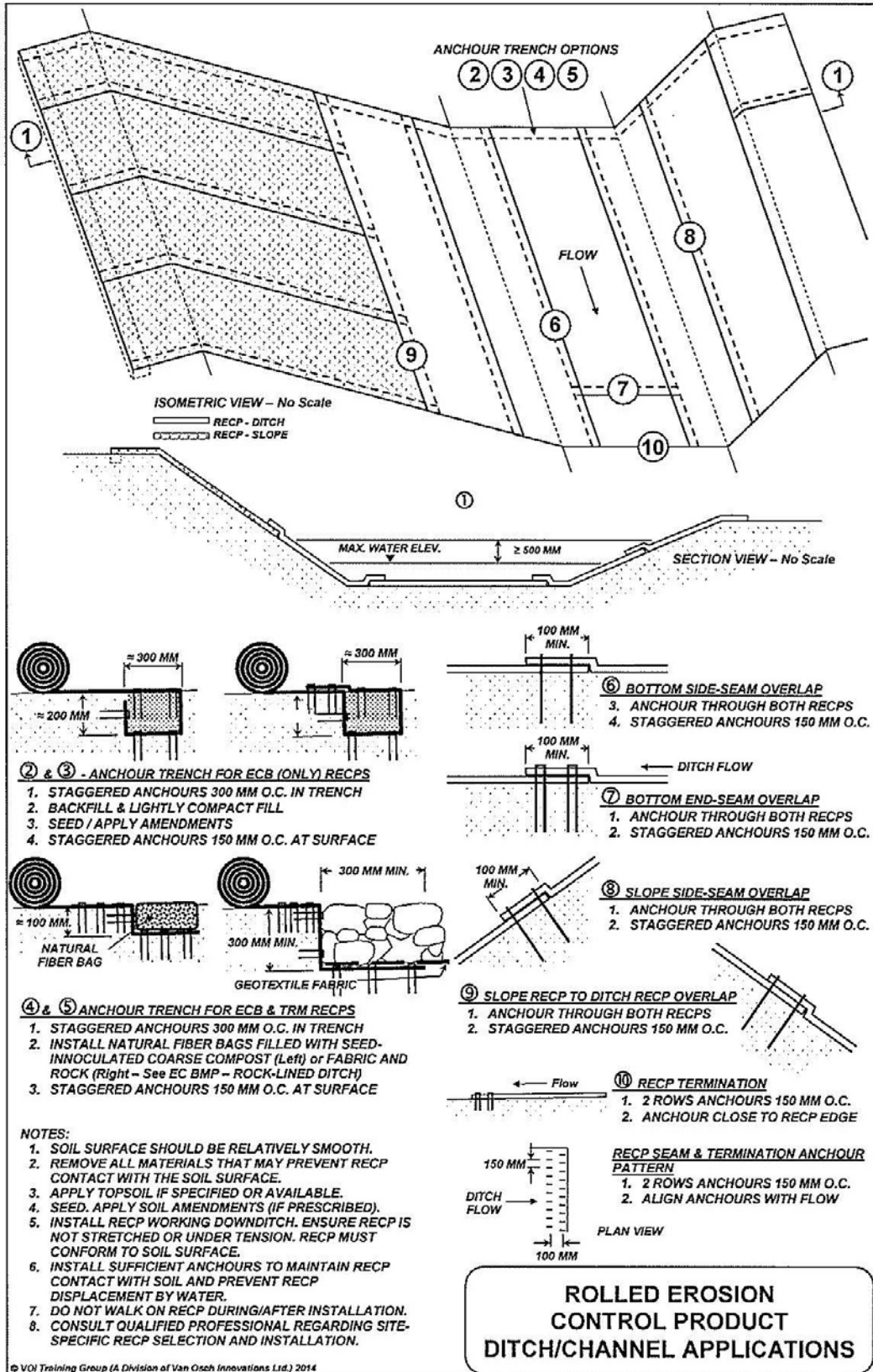


- ⑤ BOTTOM OF SLOPE TERMINATION**
1. ANCHOURS 150 MM O.C. AT TERMINAL END OF RECP
 2. ANCHOURS 150 MM O.C. AT SLOPE TRANSITION

- ① & ② TOP SLOPE ANCHOUR TRENCH**
1. EXCAVATE 300 MM X 200 MM TRENCH
 2. LAY RECP THROUGH TRENCH
 3. STAGGERED ANCHOURS 300 MM O.C. IN TRENCH
 4. BACKFILL & LIGHTLY COMPACT FILL
 5. SEED / SOIL APPLY AMENDMENTS
 6. STAGGERED ANCHOURS 300 MM O.C. AT SURFACE

- NOTES:**
1. PREPARED SOIL SURFACE SHOULD BE RELATIVELY SMOOTH (NO SHARP DEPRESSIONS OR HUMMOCKS).
 2. REMOVE ALL MATERIALS THAT MAY PREVENT RECP CONTACT WITH THE SOIL SURFACE.
 3. APPLY TOPSOIL IF SPECIFIED OR AVAILABLE.
 4. SEED AREA WITH SPECIFIED SEED MIXTURE AT SPECIFIED SEEDING RATE. APPLY SOIL AMENDMENTS, IF PRESCRIBED.
 5. INSTALL RECP WORKING DOWNSLOPE. ENSURE RECP IS NOT STRETCHED OR UNDER TENSION. RECP MUST CONFORM TO SOIL SURFACE.
 6. DO NOT WALK ON RECP DURING OR FOLLOWING INSTALLATION.
 7. RECP SHOULD NOT BE INSTALLED ACROSS SLOPE.
 8. INSTALL SUFFICIENT ANCHOURS TO MAINTAIN RECP CONTACT WITH SOIL AND PREVENT RECP DISPLACEMENT BY WATER / WIND.
 9. ANCHOR DENSITY SHOULD BE DETERMINED BY SITE SPECIFIC CONDITIONS. CONSIDER GENERIC ANCHOR DENSITY / SPACING RECOMMENDATIONS TO BE MINIMUM ANCHOURING REQUIREMENT.
 10. CONSULT QUALIFIED PROFESSIONAL REGARDING SITE-SPECIFIC RECP SELECTION AND INSTALLATION.

**ROLLED EROSION CONTROL PRODUCT
OPEN SLOPE APPLICATIONS**



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

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Appendix D

EC_04 Impermeable Sheeting

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

Description

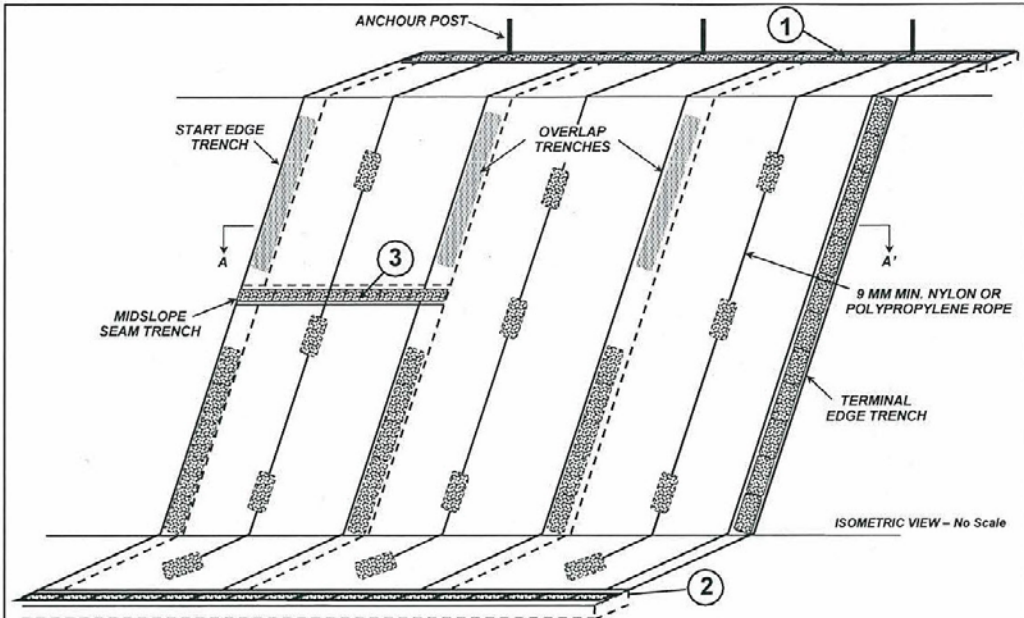
Impermeable sheeting can be used to cover erosion prone areas that require immediate and temporary short term protection, such as a stock pile or erodible soil prior to use or re-vegetation. Typically polyethylene (plastic) sheets or impermeable tarps which will later be removed and reused or recycled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

Implementation

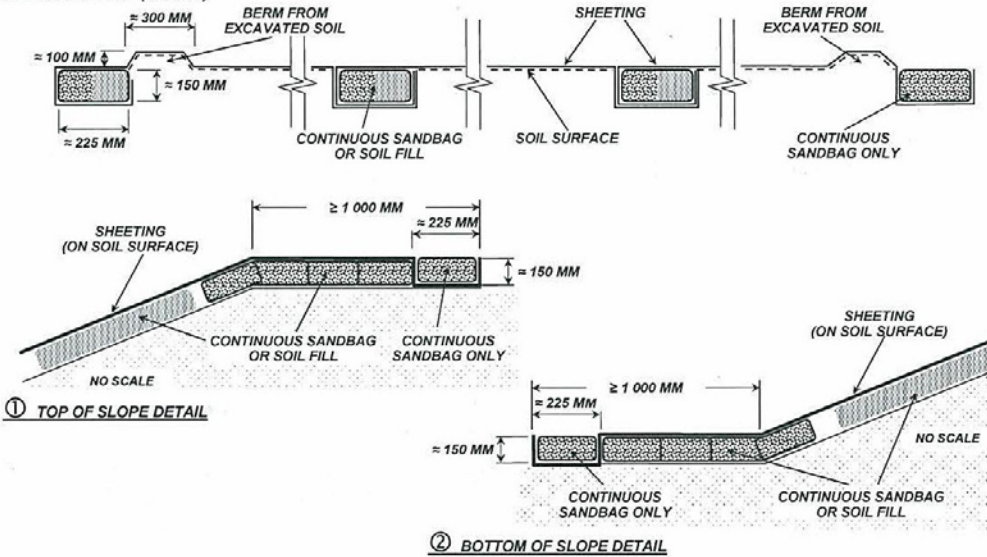
Used for short term protection from erosion, and can be applied in most applications. Caution has to be exercised when using this method as the downslope side of the impermeable sheeting can receive high velocity and concentrated flows resulting in erosion. Precautions may have to be taken to prevent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



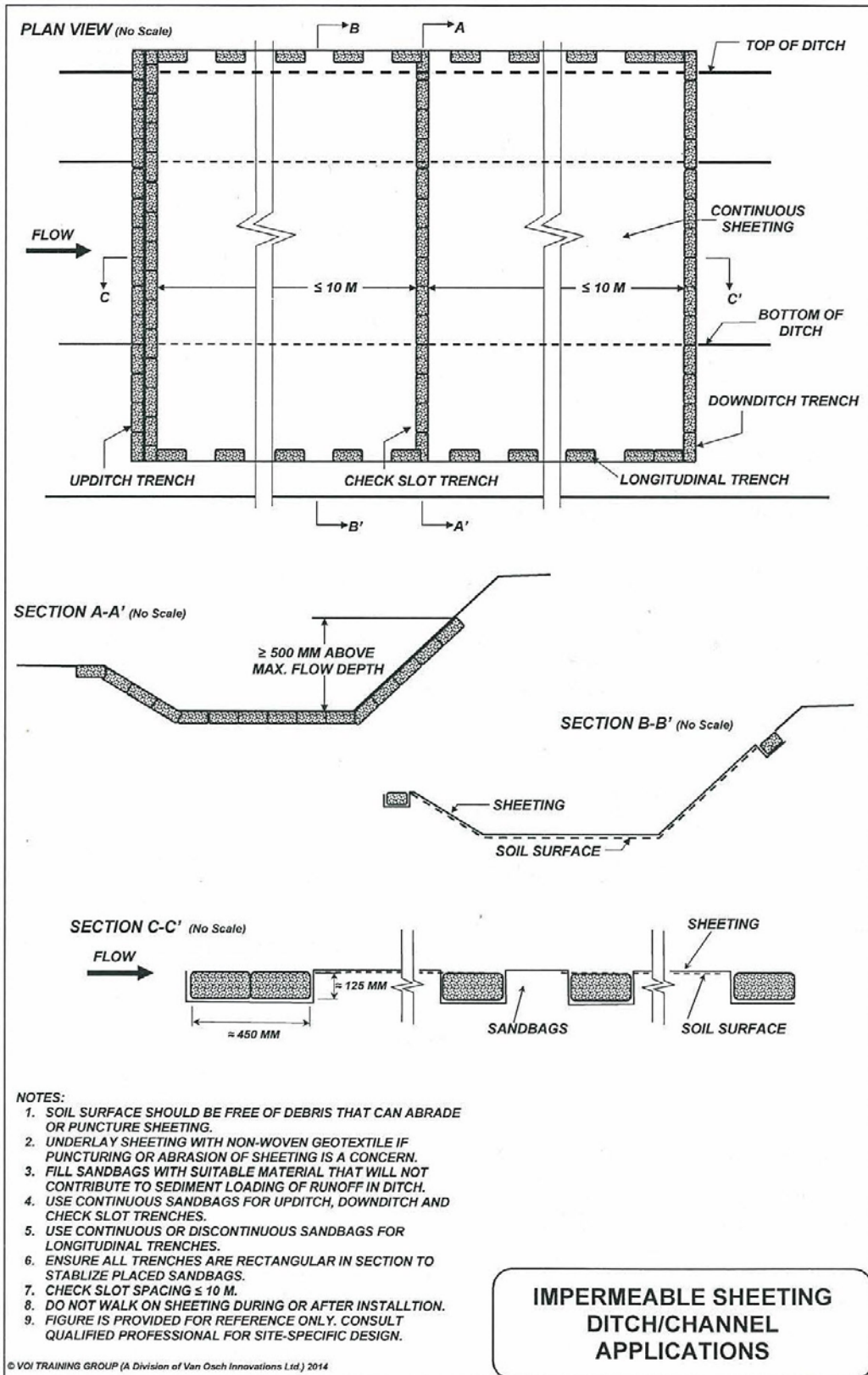
SECTION A - A' (No Scale)



NOTES:

1. SOIL SURFACE SHOULD BE FREE OF DEBRIS THAT CAN ABRASE OR PUNCTURE SHEETING.
2. USE CONTINUOUS SANDBAGS FOR TOP, BOTTOM, TERMINAL EDGE AND MIDSLOPE SEAM TRENCHES.
3. USE CONTINUOUS SANDBAGS FOR SLOPE TRENCHES IF BACKFILL SOIL WILL SLIDE DOWN TRENCH DURING BACKFILLING AND DISPLACE SHEETING.
4. BACKFILL OR PLACE SANDBAGS IN SLOPE TRENCHES STARTING FROM BOTTOM OF SLOPE.
5. DO NOT WALK ON SHEETING DURING OR AFTER INSTALLATION.
6. PLACE SUFFICIENT SURFACE WEIGHTS.
7. FIGURE IS PROVIDED FOR REFERENCE ONLY. CONSULT QUALIFIED PROFESSIONAL FOR SITE-SPECIFIC DESIGN.

**IMPERMEABLE SHEETING
OPEN SLOPE
APPLICATIONS**



**IMPERMEABLE SHEETING
DITCH/CHANNEL
APPLICATIONS**

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)

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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.

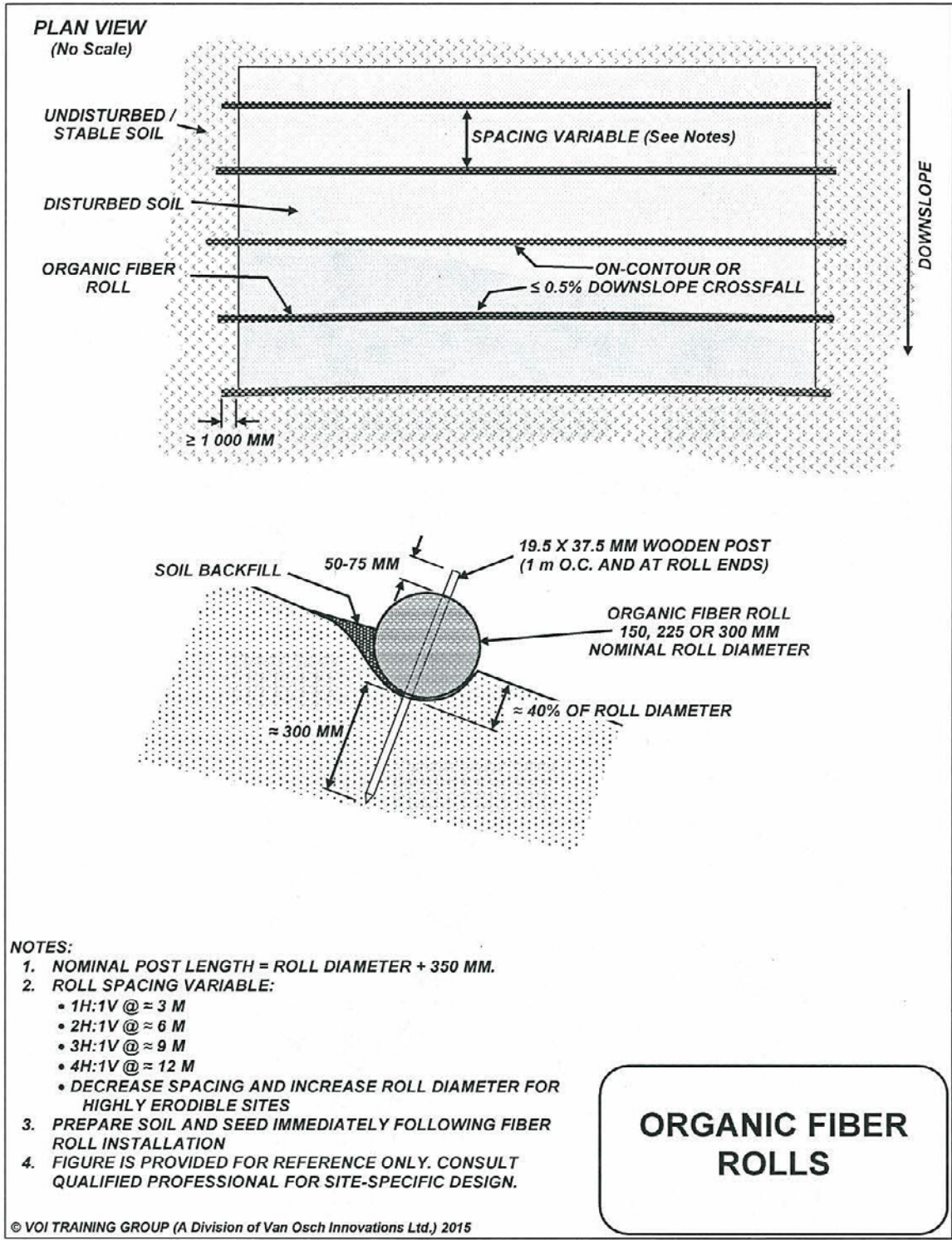
Implementation

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

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Appendix F

EC_06 Ditch Check Dams

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

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.

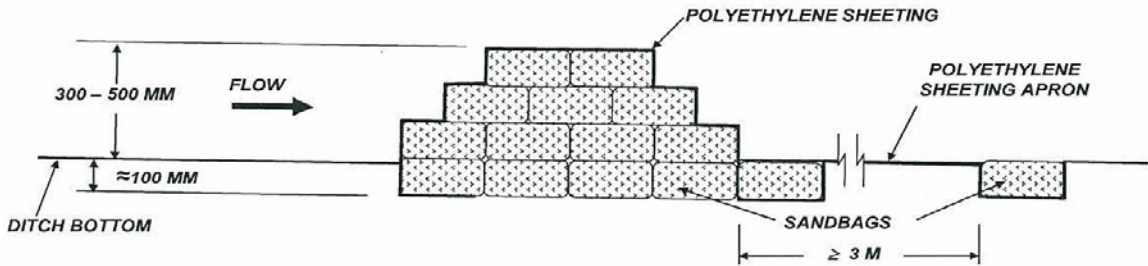
Application

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

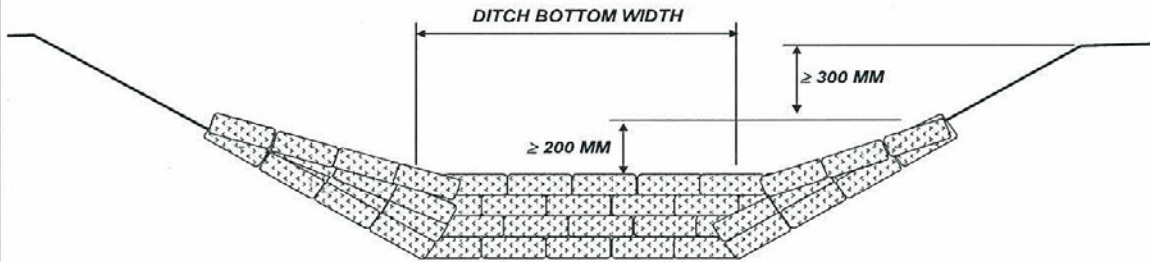
Implementation

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.

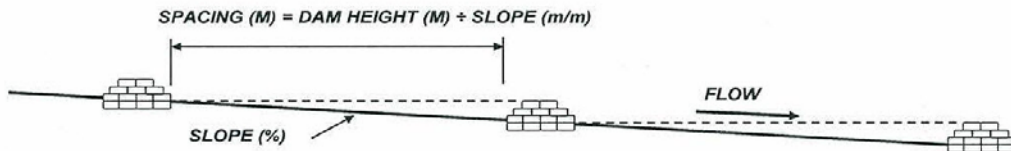
SECTION VIEW THROUGH DAM (No Scale)



SECTION VIEW ACROSS DITCH (No Scale)



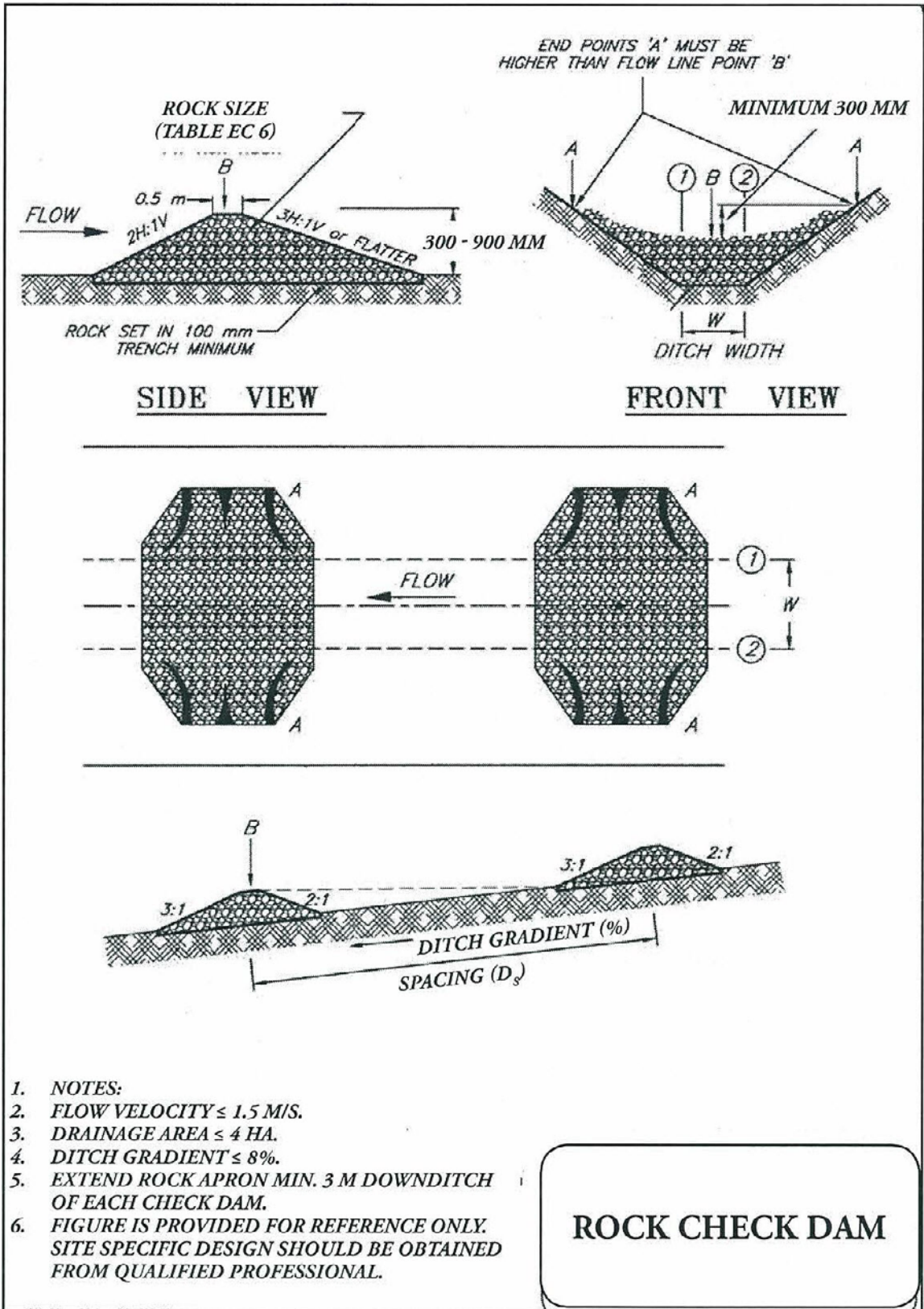
PROFILE VIEW AND TYPICAL SPACING FOR SANDBAG DAMS IN DITCH (No Scale)



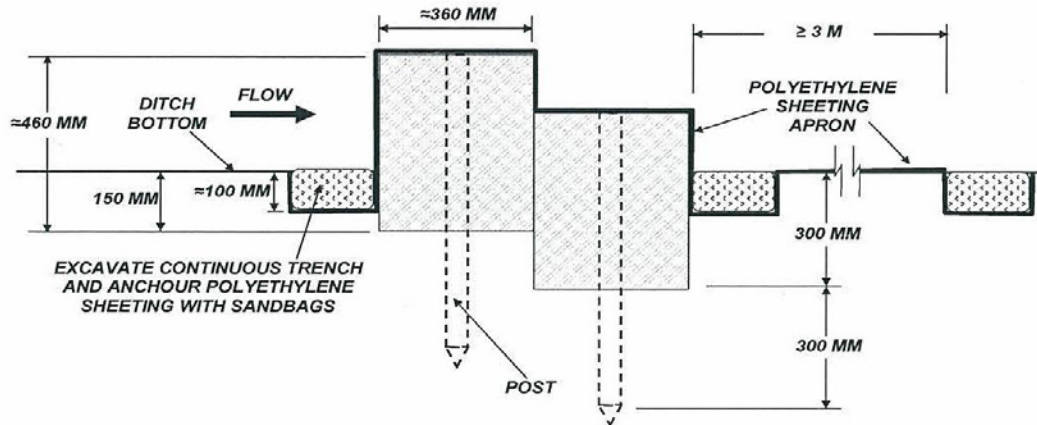
NOTES:

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 $\leq \frac{1}{4}$ OF DAM HEIGHT.
9. FIGURE IS PROVIDED FOR REFERENCE ONLY. SITE SPECIFIC DESIGN SHOULD BE OBTAINED FROM QUALIFIED PROFESSIONAL.

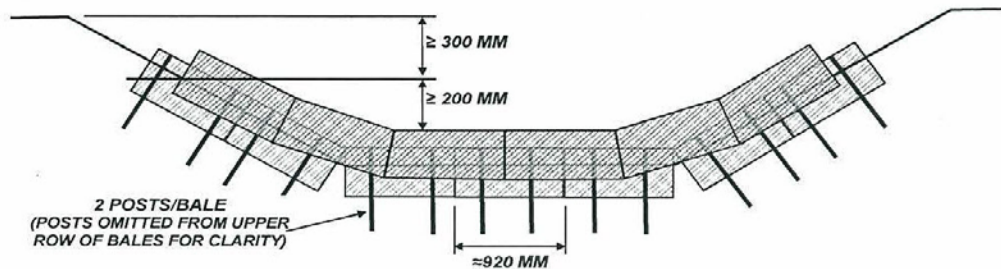
**SANDBAG
CHECK DAM**



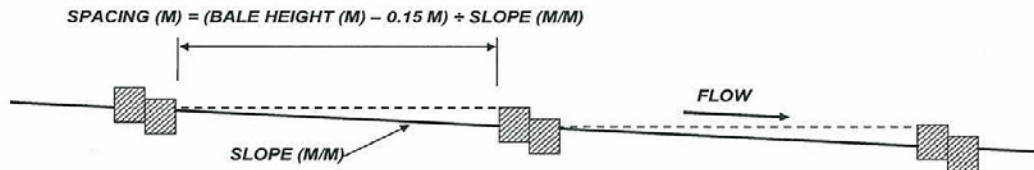
SECTION VIEW THROUGH DAM (No Scale)



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 ≤ 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**

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

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

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Appendix G

EC_07 Water Diversion

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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

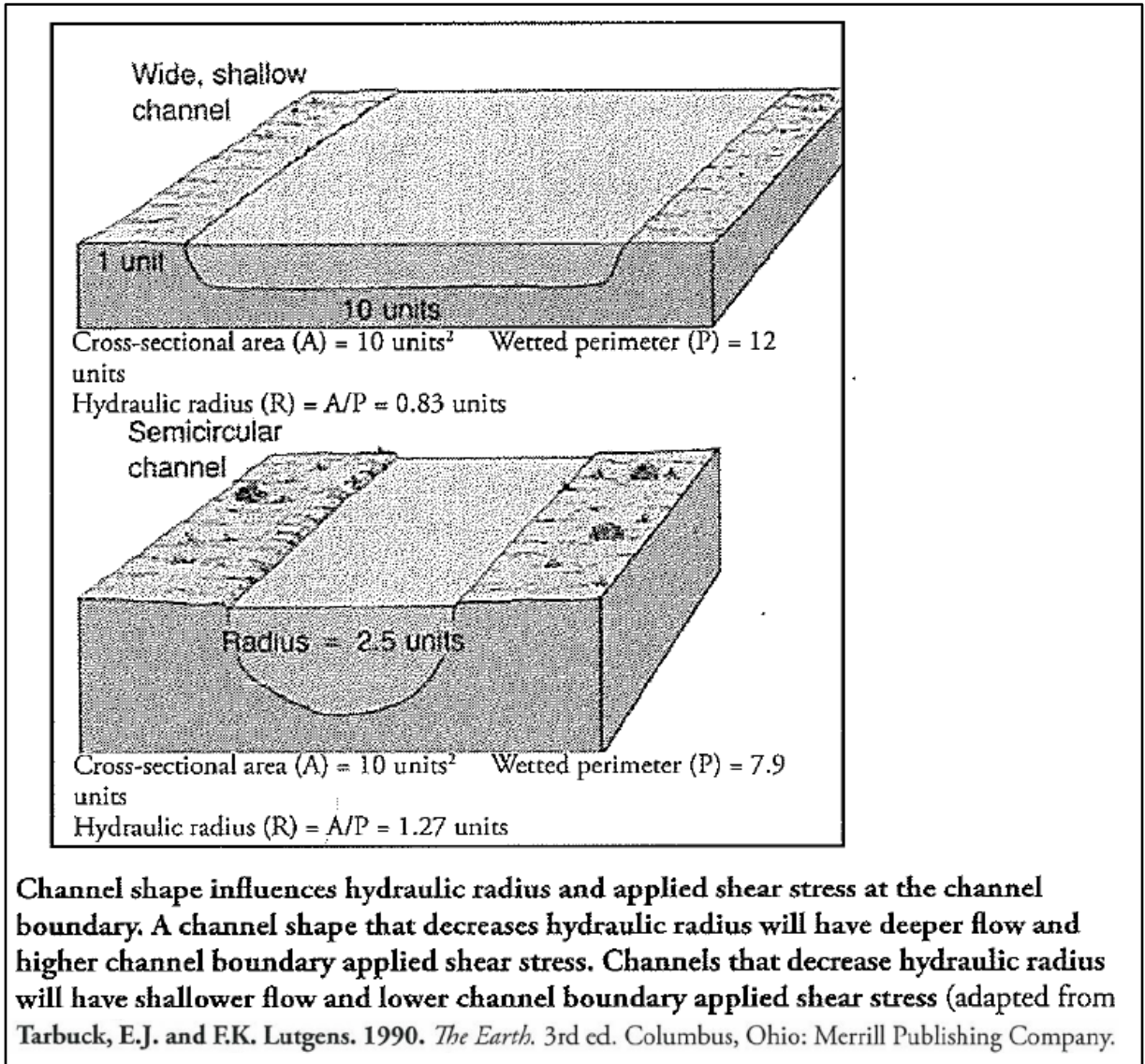
Ditching-

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-

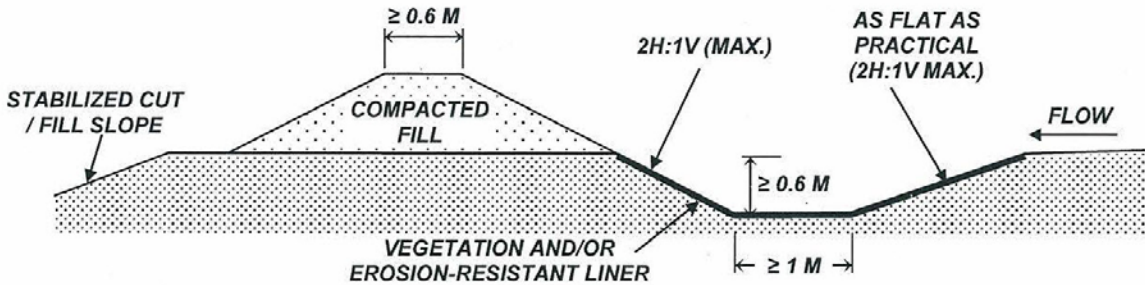
Constructed using compacted lifts from soil or materials found on site, using heavy equipment. Must be inspected on a regular basis (or after rainfall) to identify any failure points that need repair. Berms must be stabilized after construction and should not be used as the primary erosion control measure,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

Installation

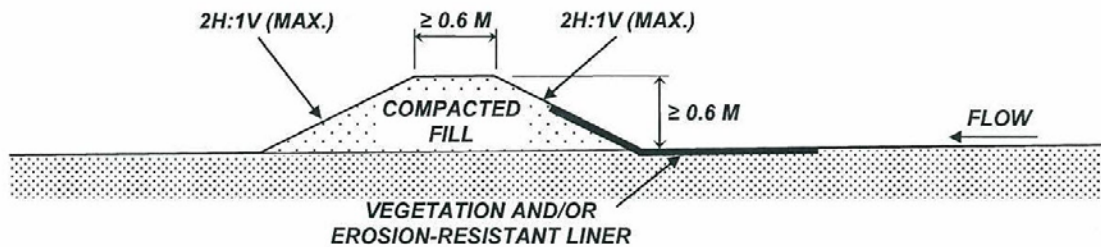


Channel design instructions diagram provided by: VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

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 ≤ 2 HA.
5. FIGURE IS PROVIDED FOR REFERENCE ONLY. SITE-SPECIFIC DESIGN SHOULD BE OBTAINED FROM QUALIFIED PROFESSIONAL.

**TEMPORARY
DIVERSION DITCH
AND BERM**

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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

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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

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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

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Appendix J

SC_01 Sediment Fencing

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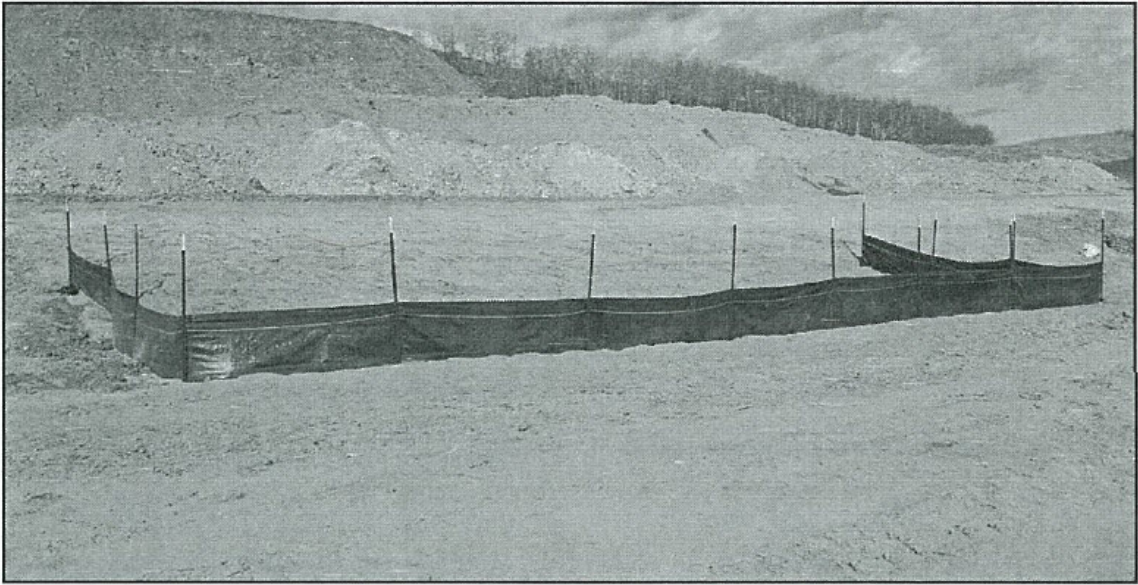


Photo Credit: VOI Training Group's Erosion and Sediment Control Practitioner (ESCP) Participant's Manual

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.

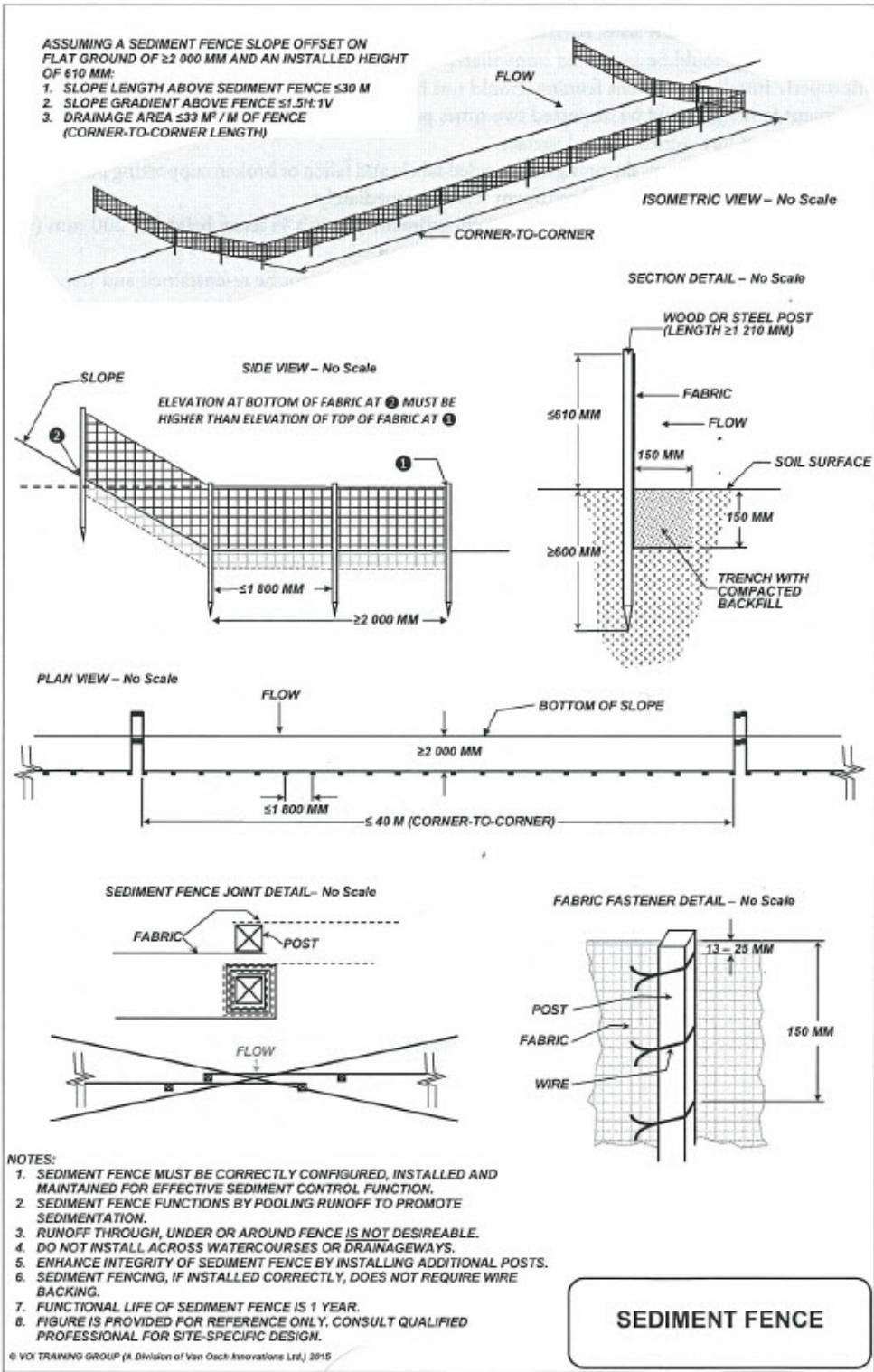
Implementation

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

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Appendix K

SC_02 Sediment Retention Berm

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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.

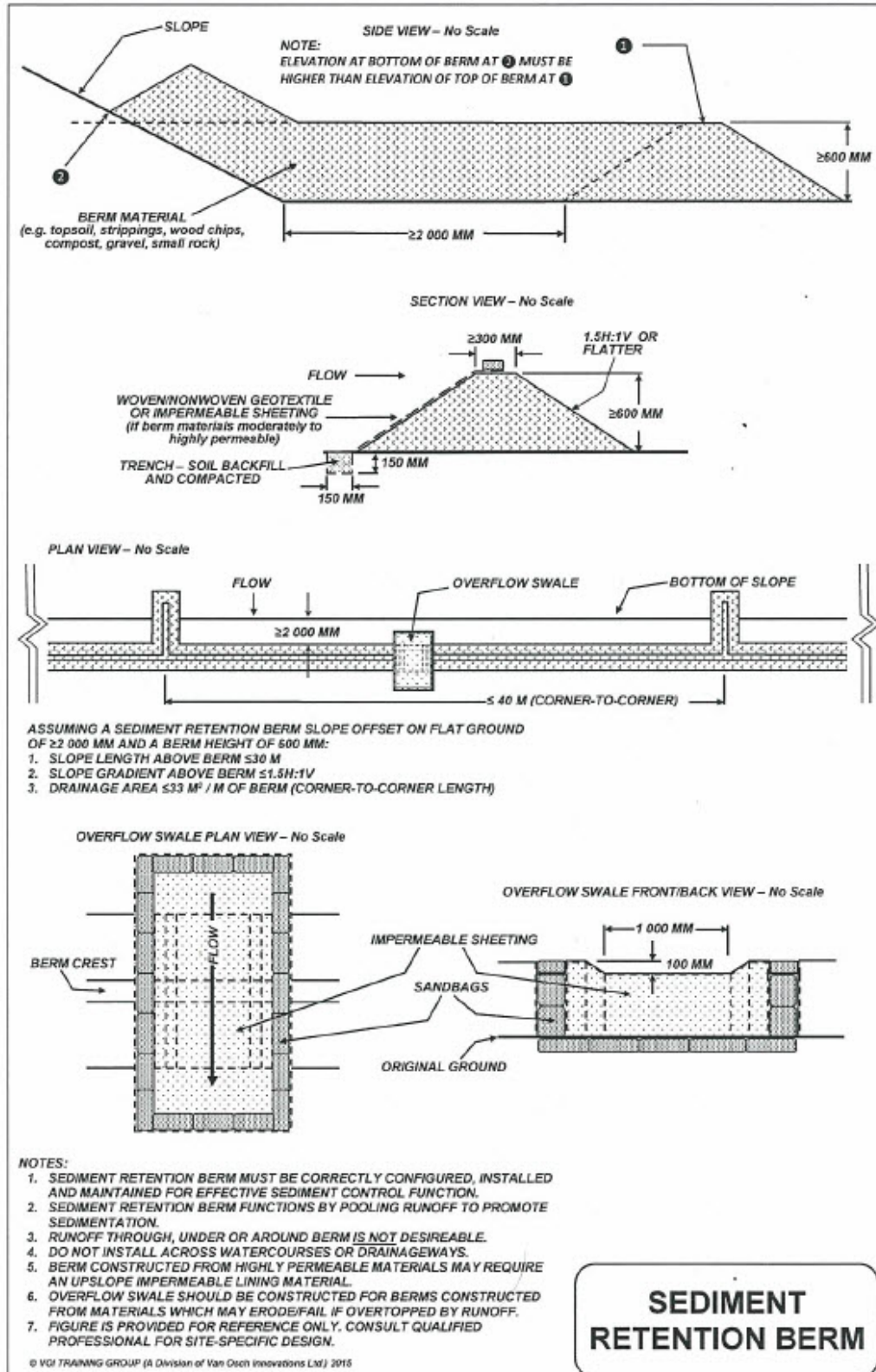
Implementation

Located on the downslope of construction activities where a sediment pond or catch basin has been designed to contain site runoff. 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**

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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

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Appendix O

Waste and Recycling Management Plan

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Waste and Recycling Management Plan

April 2019

Prepared by:

Licensing and Environmental Assessment Department

Manitoba Hydro

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Preface

This document presents the Waste and Recycling Management Plan (WRMP; the Plan) for Manitoba Hydro Transmission Construction, Maintenance and Decommissioning activities. 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

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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
Draft	Added "WR_06 Biosecurity waste" to the EMPs	Sec 6 page 10	Manitoba Hydro	20181121

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1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Manitoba - Minnesota Transmission Project (the Project) Environmental Impact Statement (EIS) 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 and indigenous engagement

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.

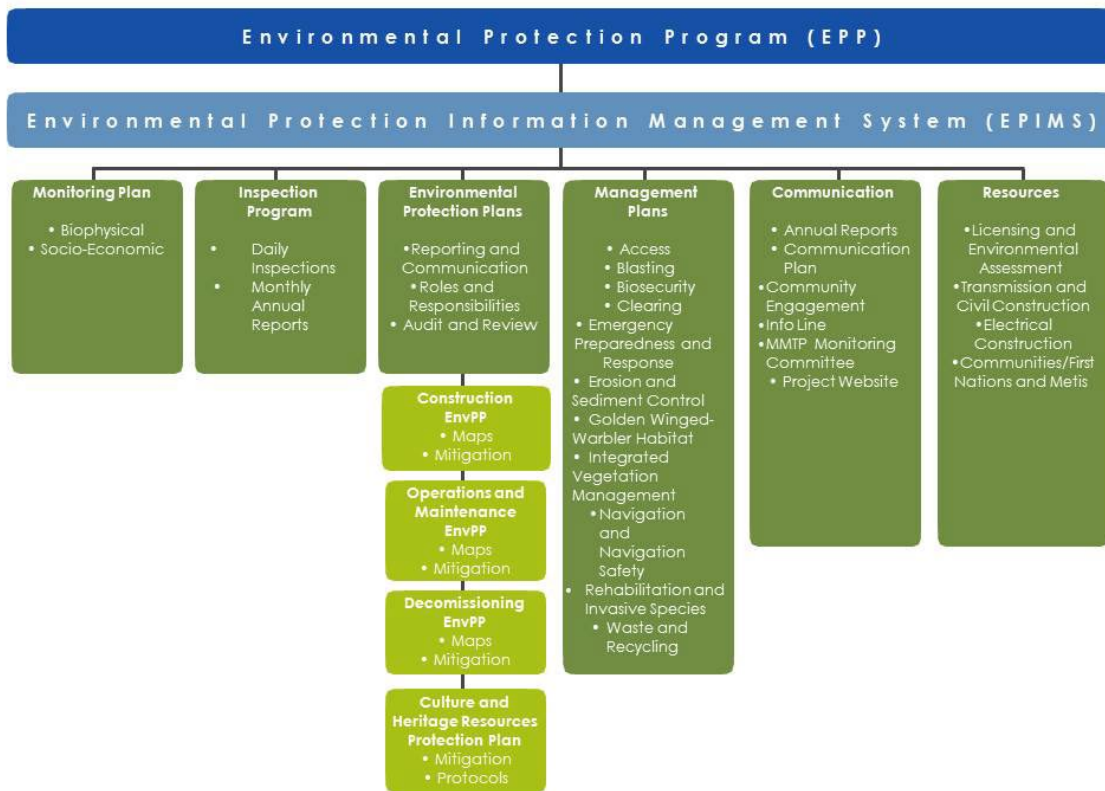


Figure 1: Transmission Environmental Protection Program

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 • 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.

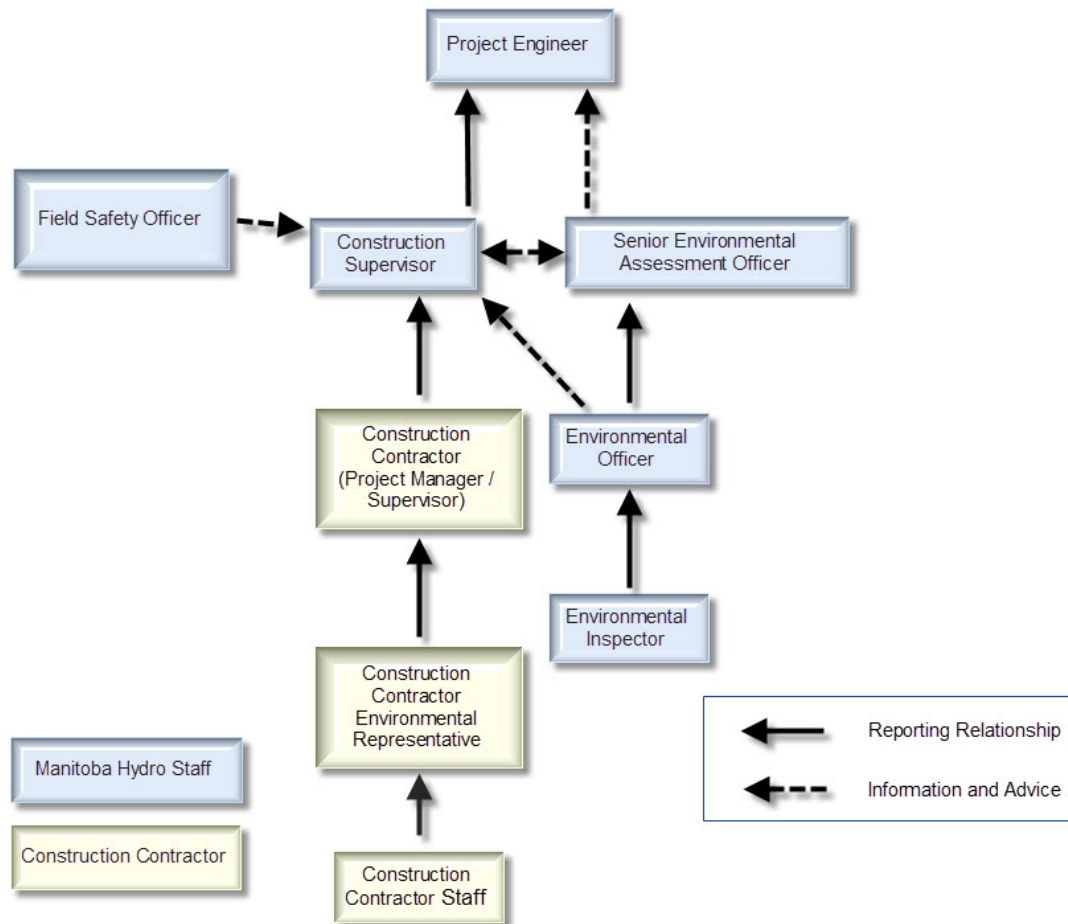


Figure 2: Environmental communication reporting structure

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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

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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.

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.

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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

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Appendix A

Environmental Management Practices

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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)

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<p>Material examples</p>	<ul style="list-style-type: none"> • Sewage or grey water
<p>Waste management method</p>	<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.
<p>Applicable legislation</p>	<ul style="list-style-type: none"> • On-site waste disposal systems regulation (MR 83/2003).

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<p>Material examples</p>	<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
<p>Waste management method</p>	<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.



<p>Material examples</p>	<ul style="list-style-type: none"> • Remaining cured or partially cured concrete
<p>Waste management method</p>	<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.
<p>Waste Reduction Technique</p>	<ul style="list-style-type: none"> • Minimize waste by producing only the amount necessary.
<p>Applicable legislation</p>	<ul style="list-style-type: none"> • Fisheries and Oceans Regulations and Legislation • Waste Management Facilities Regulation 37/2016, Feb 23, 2016)



<p>Material examples</p>	<ul style="list-style-type: none"> • Waste disinfectants, waste water from biosecurity cleaning
<p>Waste management method</p>	<p>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 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.
<p>Waste Reduction Technique</p>	<ul style="list-style-type: none"> • Minimize waste by producing only the amount of disinfection solution necessary to be used prior to solution expiry.

