



MANITOBA – MINNESOTA TRANSMISSION PROJECT
Environmental Impact Statement

ENVIRONMENTAL PROTECTION, FOLLOW-UP AND MONITORING

CHAPTER 22
SEPTEMBER 2015

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- Appendix 22C Environmental Monitoring Plan

ABBREVIATIONS AND ACRONYMS

AM	adaptive management
AMP	Access Management Plan
ATK	Aboriginal traditional knowledge
CEnvPP	Construction Environmental Protection Plan
EA	environmental assessment
EIS	environmental impact statement
EPP	Environmental Protection Program
EPIMS	Environmental Protection Information Management System
ESS	Environmentally sensitive areas
FNMEP	First Nation and Metis Engagement Process
ISO	International Organization for Standardization
IVM	integrated vegetation management
IVMP	Integrated Vegetation Management Plan
MMF	Manitoba Metis Federation
O&MEnvPP	Operations and Maintenance Environmental Protection Plan
PEP	Public Engagement Process
ROW	right-of-way

GLOSSARY OF TECHNICAL TERMS

Aboriginal traditional knowledge	Knowledge that is held by, and unique to, Aboriginal peoples. Section 19 of <i>Canadian Environmental Assessment Act</i>, 2012 includes community knowledge and Aboriginal traditional knowledge as factors that may be considered in the environmental assessment of a designated project. Note: The term “traditional ecological knowledge” is often used interchangeably with “Aboriginal traditional knowledge.” However, traditional ecological knowledge is generally considered a subset of Aboriginal traditional knowledge that is concerned primarily with knowledge about the environment (Canadian Environmental Assessment Agency 2015).
Access	The ability to enter an area or reach a particular location.
Access road	A road that affords access into and out of a construction area.
Adverse effects	Negative effects on the environment and people that may result from a proposed project.
Decommissioning	Planned shut-down, dismantling and removal of a building, equipment, plant or other facilities from operation or usage, and may include site clean-up and restoration.
Environmental assessment	Process for identifying project and environment interactions, predicting environmental effects, identifying mitigation measures, evaluating significance, reporting and follow-up to verify accuracy and effectiveness leading to the production of an environmental assessment report. Environmental assessment is used as a planning tool to help guide decision-making, as well as project design and implementation.

Environmental component	Fundamental element of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use that may be affected by a proposed project, and may be individually assessed in the environmental assessment.
Environmental impact statement (EIS)	A document that presents the findings of an environmental assessment in response to specific guidelines or Terms of Reference. The term is often used in the context of an assessment by a review panel and in the environmental assessment regimes of other jurisdictions.
Environmental Management System	Part of an organization's overall management practices related to environmental affairs. It includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining an environmental policy. This approach is often formally carried out to meet the requirements of the International Organization for Standardization (ISO) 14000 series.
Environmental monitoring	Periodic or continuous surveillance or testing, according to a pre-determined schedule, of one or more environmental components. Monitoring is usually conducted to determine the level of compliance with stated requirements, or to observe the status and trends of a particular environmental component over time.

Environmental Protection Plan	Within the framework of an Environmental Protection Program, an Environmental Protection Plan prescribes measures and practices to avoid and limit potential environmental effects of a proposed project. A user-friendly guide for the contractor and Manitoba Hydro that includes information such as a brief project description; updated construction schedule; summary identifying environmental sensitivities and mitigation actions; listing of federal, provincial or municipal approvals, licenses, or permits that are required for the project; a description of general corporate practices and specific mitigating actions for the various construction and maintenance activities; emergency response plans, training and information; and environmental/engineering monitoring plans and reporting protocols.
Environmentally sensitive sites	Locations, features, areas, activities or facilities that were identified in the EIS to be ecologically, socially, economically or culturally important or sensitive to disturbance and require protection during project construction and operation.
Erosion	A natural process, which is either naturally occurring or anthropogenic in origin, by which the Earth's surface is worn away by the actions of wind and water.
Follow-up program	A program for (1) verifying the accuracy of the environmental assessment of a project, and (2) determining the effectiveness of measures taken to mitigate the adverse environmental effects of the project (Department of Justice 2011a).
Hazardous substance	Any substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing or otherwise harmful, is likely to cause death or injury.

Heritage resource	Any work or assembly of works of nature or of human endeavour that is of value for its archaeological, palaeontological, pre-historic, historic, cultural, natural, scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof (<i>The Heritage Resources Act</i>).
Marshalling yard	An open area used to stock-pile, store and assemble construction materials.
Mitigation	Measures for the elimination, reduction or control of the adverse environmental effects of a project, and includes restitution for damage to the environment caused by those effects through replacement, restoration, compensation or other means (<i>Canadian Environmental Assessment Act</i> , 2012).
Mitigation monitoring	A type of monitoring program that may be used to verify that mitigation measures were properly implemented and that such measures effectively mitigate the predicted adverse environmental effects.
Orthophoto	Images based on air photos but which are true to scale and free of distortion. Orthophotos resemble air photos but, in fact, are maps (Dunster and Dunster 1996).
Project activity	Elements of a project component that may result in environmental effects or changes. Example project activities include clearing, grubbing, excavating, stockpiling and reclamation.
Project infrastructure	A component of the project that may have an effect on the environment. Example project infrastructure components include stations, access road, construction camp and transmission lines.
Recycling	Diversion of materials from the waste stream for reprocessing into new products (e.g., newspapers).

Tailboard meeting

Meetings held at the job site with workers before the work begins and as required during the course of the work to make sure workers understand the hazards, risks and procedures associated with the job.

22 Environmental Protection, Follow-up and Monitoring

22.1 Introduction

Mitigation measures, monitoring and other follow-up actions identified in Chapters 3 through 20 will be implemented through an Environmental Protection Program (EPP). Manitoba Hydro's EPP provides the framework for implementing, managing, monitoring and evaluating environmental protection measures consistent with regulatory requirements, corporate commitments, beneficial practices and public expectations. Environmental protection, management and monitoring plans will be prepared and implemented under the EPP to address environmental protection requirements in a responsible manner.

The purpose of this chapter is to outline how Manitoba Hydro will implement, manage and report on environmental protection measures, monitoring and other follow-up actions as well as regulatory requirements and other commitments identified in this environmental impact statement (EIS).

The environmental protection program was developed in accordance with Manitoba Hydro's vision and environmental policies.

The Corporate vision is:

"To be recognized as a leading utility in North America with respect to safety, reliability, rates, customer satisfaction and environmental leadership" (Manitoba Hydro 2015).

Manitoba Hydro's Corporate Environmental Management Policy (Manitoba Hydro 2014) states that:

"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 regulatory, contractual and voluntary requirements;
- considering the interests and utilizing the knowledge of our customers, employees, communities, and stakeholders who may be affected by our actions;
- reviewing our environment objectives and targets annually to ensure improvement in our environmental performance; and
- documenting and reporting our activities and environmental performance."

22.1.1 Environmental Management

Manitoba Hydro is certified under the International Organization for Standardization (ISO) 14001 Environmental Management System standard and is subject to requirements of the standard, including annual audits to verify its environmental performance. An Environmental Management System is a framework for developing and applying its environmental policy and includes articulation of organizational structure, responsibilities, practices, processes and resources at all levels of the corporation. The Environmental Management System includes commitments to comply with legislation, licenses, permits and guidelines, conduct inspections and monitoring, and review the results for adherence to requirements. The ISO standard ensures quality, performance and continual improvement in the delivery of Manitoba Hydro's Environmental Protection Program.

22.1.2 Adaptive Management

Adaptive management (AM) is an approach that has been around for several decades in which learning and managing natural resources happens collectively (Williams 2011). Adaptive Management has been widely adopted as a promising management practice when considering complex ecological and social systems. The Draft Land Use and Occupancy Interview Project Report (Peguis First Nation 2015) also recommended an adaptive management approach as mitigation measure for traditional land and resource use effects. This planned systematic process is employed with the goal of continually improving environmental management practices by learning from their outcomes. The Environmental Protection Program for the Project has established the principles of AM allowing for flexibility in the mitigation of adverse environmental effects that may result from the Project. Information gathered during follow up and monitoring activities will be used to verify the accuracy of the environmental assessment (EA) effects predictions and the effectiveness of implemented mitigation measures. AM is an iterative process that involves planning, implementation, evaluation and learning, with adjustments made at any stage of the process where needed. McLain and Lee (1996) used three elements of social learning theory to evaluate the application of AM: rapid knowledge acquisition, effective information flow, and processes for creating shared understandings. These elements are considered during the design and implementation of the Environmental Protection Program.

The Environmental Protection Program is designed to be adaptive and responsive throughout the Project lifecycle. Program documents, processes, procedures and mitigation measures will be continuously evaluated by inspection, monitoring and communication programs. Reviews will be conducted to facilitate updates to the program. Within the Environmental Protection Program, AM will take place in two primary areas: at the management level, involving changes with the program structure itself, and at the implementation level, involving individual mitigation measures as management and implementation teams evaluate the onsite effectiveness of mitigation strategies or the program as a whole. Scheduled update meetings between departments, annual reviews of the program and its effectiveness will take place to foster the AM process.

22.1.3 Learnings from Previous Projects

Manitoba Hydro has extensive experience in the development of environment protection, monitoring and follow-up plans for all sizes of projects in many different environments, from small electrical stations, to transmission lines that span over half of Manitoba. Manitoba Hydro's most recent history begins with the Wuskwatim Transmission Project completed in 2010, followed by the Bipole III and Keeyask Transmission Projects, currently under construction. The Bipole III Transmission Project has driven the initial development of an Environmental Protection Program for the Transmission Business Unit, it has since expanded to include six other major transmission projects. The development of the EPP has allowed the standardization and consistent approach to environmental protection, monitoring and follow-up. Through the use of a single EPP, learnings from each project (e.g., monitoring and inspection results, documentation format changes) are shared among all projects. Examples of learnings to date can be described according to six categories:

- Documentation – changing how CEnvPP materials are packaged, making them more efficient, less bulky and more user-friendly; modifying the Environmental Protection Implementation Program (EPIMS) web interface through additional features and design layout to better serve its users when documenting activities
- Monitoring Results – Environmental Inspectors and monitors that were on the ground during construction participate in the summer monitoring by discipline specialists (*i.e.*, aquatics and heritage). This closed the feedback loop, fostering improvement and seeing results from winter construction.
- Inspection Results – Environmental incidents are reviewed by the Senior Environmental Specialist responsible for construction of the Project as well as Licensing and Environmental Assessment department for trends that need to be addressed (*i.e.*, unclear mitigation measures, or the need for a new mitigation measure to be developed for an unforeseen effect).
- Process – increased autonomy for onsite staff to approve onsite bypass trails as per the AMP. Environmental Inspectors for a section attend weekly construction updates between the contractor and Manitoba Hydro staff to notify the group of environmental concerns.
- Implementation – following a color coding system for ribbon flagging ESS sites and stream crossings and other boundaries. Incorporating diagrams into the CEnvPPs to help clarify clearing buffers.
- Communication – identifying the utility of pre-construction meetings with Manitoba Conservation and Water Stewardship to discuss established mitigation measures and license conditions, an opportunity for both sides to provide clarification on expectations for the Project activities; scheduled meetings established between the Manitoba Hydro departments responsible for licensing, construction and design of the Project to keep each other informed of activities and challenges.

22.1.4 Aboriginal Traditional Knowledge

As a component of the First Nation and Metis Engagement Process (FNMEP), Manitoba Hydro offered First Nations and the Manitoba Metis Federation (MMF) the opportunity to conduct self-directed Aboriginal traditional knowledge (ATK) or land use and occupancy studies by providing funding for these studies. Manitoba Hydro offered the studies to help inform the environmental assessment and routing processes, and to develop a better EIS and Environmental Protection Program for the Project.

The ATK that was shared through the studies assisted Manitoba Hydro with:

- developing a greater understanding of the Project development area
- identifying key concerns in the Project development area
- identifying potential Project effects
- planning and designing the Project
- developing potential mitigation measures

The following is a list of studies that have provided knowledge and identified concerns for incorporation into the EPP to date:

- Preliminary Aboriginal Traditional Knowledge Study Community Report Submitted by Black River First Nation, Long Plain First Nation and Swan Lake First Nation, November 2014
- Aboriginal Traditional Knowledge Study Community Report Submitted by Black River First Nation, Long Plain First Nation and Swan Lake First Nation, May 2015
- ATK Report – Roseau River Anishinabe First Nation, 2015
- Draft Report to Peguis First Nation and Manitoba Hydro – Peguis First Nation Land Use and Occupancy Interview Project for the Manitoba-Minnesota Transmission Project, 2015
- Oral History Interview – Eagle Songs - May 19, 2015
- Oral History Interview – Bishew (Lynx) – May 13, 2015

Manitoba Hydro recognizes the unique relationship First Nations and Metis have with their areas of use, and appreciates their sharing of information about their history and culture, and their knowledge about, and perspectives on, the Project.

22.2 Environmental Protection Program

22.2.1 Overview

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 beneficial practices, and input during the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). 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. Roles and responsibilities for Manitoba Hydro employees and contractors are defined, and management, communication and reporting structures are outlined. The Environmental Protection Program includes the “what, where and how” aspects of protecting the environment during the pre-construction, construction, operation and decommissioning of the Project. This program was designed and implemented for the Bipole III Transmission Project (Bipole III), and will be implemented for this Project. Figure 22-1 illustrates the components of the EPP. Each component is described in further detail in the following sections.

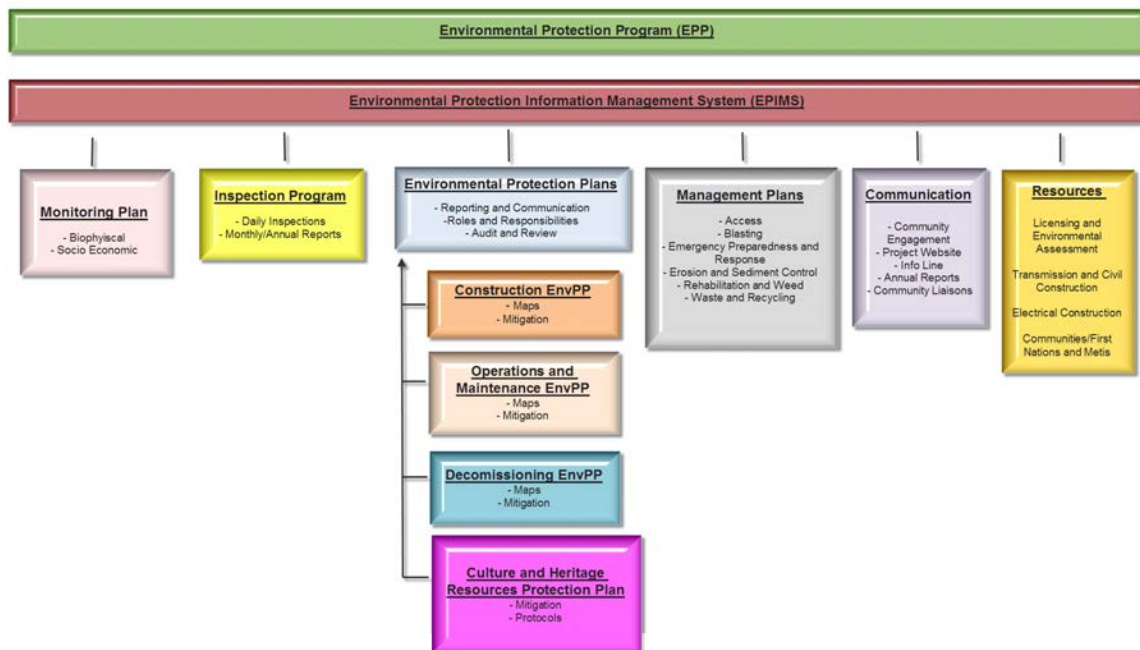


Figure 22-1 Environmental Protection Program Components

22.2.2 Organization

The organizational structure of the Environmental Protection Program includes senior Manitoba Hydro management, Project management and implementation teams that work together to provide timely and effective implementation of environmental protection measures identified in environmental protection plans (Figure 22-2). Manitoba Hydro senior management is responsible for the overall Environmental Protection Program, including resourcing, management and performance, and is accountable for regulatory compliance, policy adherence and stakeholder satisfaction.

The Environmental Protection Management Team is composed of senior Manitoba Hydro staff and is responsible for the management of environmental protection plans, including compliance with regulatory and other requirements, quality assurance and control, consultation with regulators, and related PEP and FNMEP activities. The management team is supported by environmental consultants and advisors.

The Environmental Protection Implementation Team is composed of Manitoba Hydro operational field and office staff, and is responsible for the day-to-day implementation of environmental protection plans, including monitoring, inspecting and reporting. The implementation team works closely with other Manitoba Hydro staff on an as required basis.

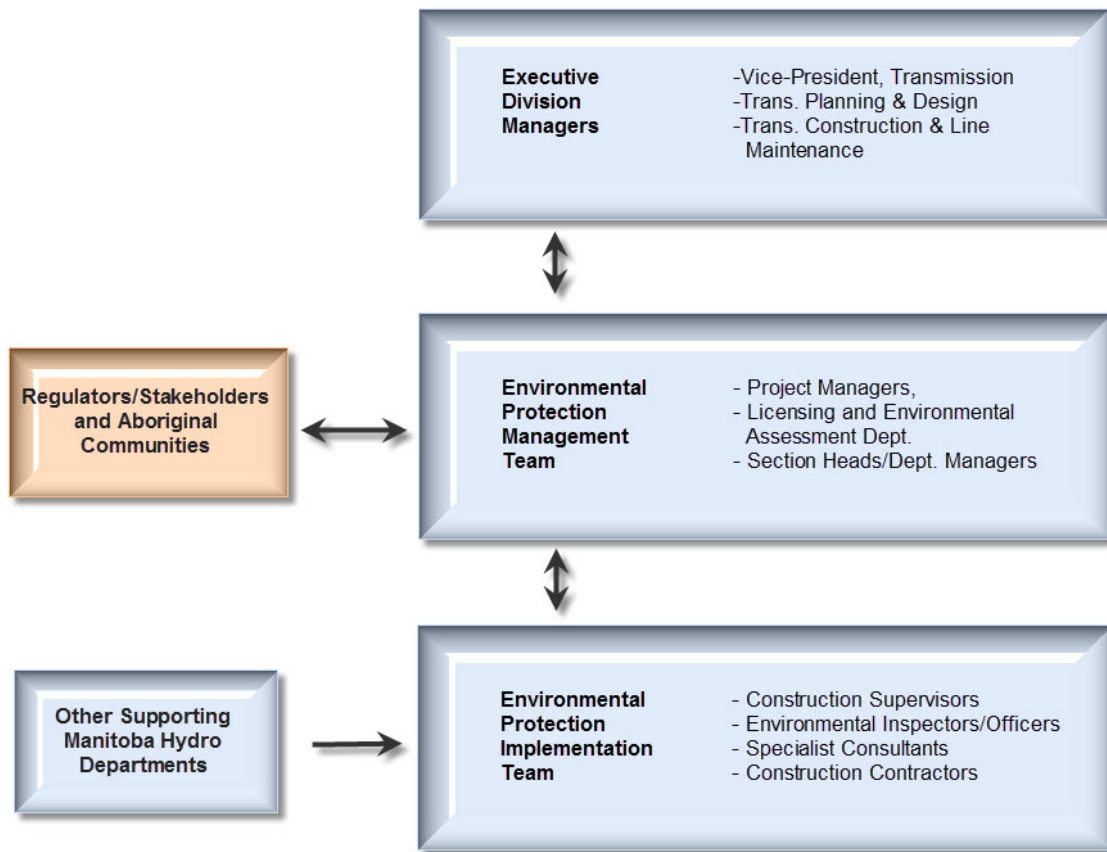


Figure 22-2 Environmental Protection Organizational Structure

22.2.3 Resources

Ensuring that adequate resources are allocated to the environmental aspects of Project planning, development, implementation and operation is key to successful implementation of environmental protection measures and follow-up, including monitoring and other requirements. Manitoba Hydro commits resources early in the planning cycle to provide effective environmental assessment, mitigation and monitoring. Teams of engineers and environmental professionals develop preventative or avoidance mitigation measures that include design, routing and siting alternatives. In addition, there are resource allocations for the delivery and implementation of specific environmental protection measures to meet corporate policy and government regulatory requirements. Manitoba Hydro is committed to staffing the Environmental Protection Program with sufficient Environmental Inspectors and providing required support, including training, financial resources and equipment.

22.2.3.1 Roles and Responsibilities

Roles and responsibilities for delivery of the Project and implementation of environmental protection measures are illustrated in general terms in Figure 22-3.

- The Construction Supervisor has overall responsibility for the implementation of the environmental protection plans and reports to a Section Head or Department Manager.
- The Licensing and Environmental Assessment Department oversees the development of environmental protection documents and associated inspection and monitoring programs, including ongoing PEP and FNMEP activities.
- The construction contractor is responsible for ensuring work adheres to the environmental protection plans and reports to the Construction Supervisor.
- Environmental Inspectors have the primary responsibility to confirm that environmental protection measures and specifications are implemented as per the environmental protection plans as well as provide information and advice to Construction Supervisor.
- Manitoba Hydro Field Safety, Health and Emergency Response Officers are responsible for the development and execution of the safety program and Occupational Health and Safety practices at the various construction sites.

Other Manitoba Hydro employees, including engineers and technicians, provide information and advice to the Construction Supervisor.

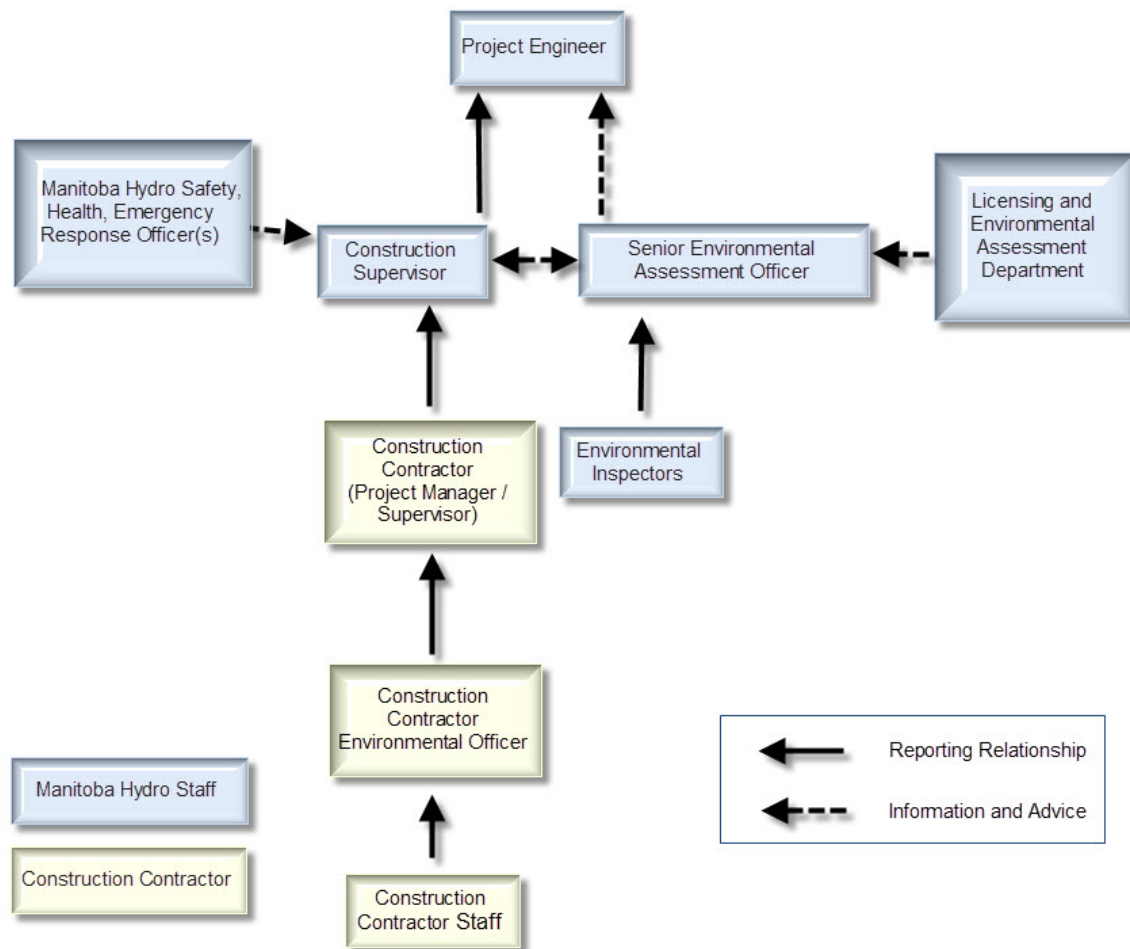


Figure 22-3 Typical Organizational Lines of Reporting and Communications

22.2.4 Communication and Reporting

Manitoba Hydro personnel will maintain ongoing communications with Manitoba Conservation and Water Stewardship, other provincial and federal departments, and First Nation and the MMF as necessary regarding implementation of the Project environmental protection plan. The Construction Supervisor and Environmental Inspectors will maintain ongoing communications with the contractor and contract staff through daily tailboard meetings and weekly or otherwise scheduled construction meetings at the worksite. Inspection reports as well as incident, monitoring and other reports will be prepared and available on site for the regulators, contractors and Manitoba Hydro staff.

To continue to build upon recommendations in the Clean Environment Commission report on Bipole III, Manitoba Hydro will continue its standard practice in preparing an annual report on construction progress, environmental protection measures and monitoring results for the Project. These reports will be designed for a general readership and will provide opportunities for interested parties to provide feedback on the Project as it is constructed.

Manitoba Hydro will provide First Nations, the MMF and the public with ongoing opportunities to review and comment on the Project as it is being developed. A dedicated Project website has been developed to facilitate communication with the public. Formal enquiries or complaints received will be recorded and reviewed by members of the Environmental Protection Management Team for response or action. The Project website and annual reports were also recommended in self-directed ATK studies (Peguis First Nation 2015).

22.2.5 Environmental Protection Plans

Environmental protection plans document environmental protection measures to provide for compliance with regulatory and other requirements, and to achieve environmental protection goals consistent with corporate environmental policies. Manitoba Hydro's environmental protection plans are designed as "user-friendly" reference documents that provide project managers, construction supervisors and contractors with detailed lists of environmental protection measures and other requirements to be implemented in the design, construction and operation phases of a project. Environmental protection measures are organized by construction component and activity, and environmental component and issue to assist project personnel in implementing measures for specific work sites and activities. The following sections describe the environmental protection plans from construction to decommissioning that will be developed.

22.2.5.1 Construction

The draft Construction Environmental Protection Plan (CEnvPP) is a key element in implementing effective environmental protection and limiting the potential adverse environmental effects identified in the EIS. It also outlines actions to identify unforeseen environmental effects and to implement adaptive management strategies to address them. An important component of an environmental protection plan is review and updating, which allows environmental protection measures to remain current and allows for continual improvement of environmental performance.

A CEnvPP is composed of general and specific environmental protection measures that cover all aspects of the work and the environment. General environmental protection measures for the Project include mitigation measures and follow-up actions identified in the EIS, including design mitigation, provincial and federal regulatory requirements, beneficial practice guidelines, Manitoba Hydro environmental policies and commitments, and input during the PEP and FNMEP. The general environmental protection measures are listed for major components and activities associated with the Project. Project components include transmission lines, access roads,

construction camps, marshalling yards, and stations. Project activities include blasting, burning, clearing, draining and drilling.

Specific environmental protection measures are provided for environmentally sensitive sites (ESS) identified during PEP, FNMEP and assessment activities. Environmentally sensitive sites are locations, features, areas, activities or facilities along or immediately adjacent to the transmission line corridor and other Project components that were determined to be ecologically, socially, economically or culturally important and sensitive to disturbance by the Project and, as a result, require site-specific mitigation measures. The sites include sensitive or unique terrain features, waterbodies and wetlands, important mammal, bird, amphibian and reptile habitats, protected species and areas, and heritage resources. Specific environmental protection measures are developed from PEP, FNMEP, regulatory requirements, beneficial practice guidelines, environmental standards and other protection strategies.

Through self-directed ATK reports, ESS were identified, these will be incorporated into the final CEnvPP after review with communities to discuss protection of confidentiality of sites and mitigation measures. The CEnvPP will contain orthophoto map sheets that provide Manitoba Hydro Project managers, construction supervisors and employees, and contractors and contract employees with detailed site-specific environmental protection information that can be implemented, managed, evaluated and reported on in the field. The orthophoto map sheets will be provided in paper and electronic formats to be used by Manitoba Hydro, contractor and regulatory staff.

The CEnvPP (Appendix 22A) has been provided as draft to allow for review and input through the FNMEP and regulatory process; finalization, including incorporation of FNMEP feedback and ESS, will occur subsequent to licensing and prior to construction.

22.2.5.2 Operation and Maintenance

The Operations and Maintenance Environmental Protection Plan (O&MEnvPP) will be prepared prior to completion of construction. Operations and Maintenance Environmental Protection Plans will contain access management plan and ongoing operation monitoring requirements. The O&MEnvPP applies to Project components from in-service to the end of their operational life.

22.2.5.3 Decommissioning

A Decommissioning Environmental Protection Plan will be prepared at the end of the Project's operational life and will contain decommissioning methods, waste and recycling management, and mitigation measures to address environmental effects and legislation that is in effect at that time.

22.2.5.4 Cultural and Heritage Resources

The fact that cultural and heritage resources have intrinsic value to Manitobans is understood by Manitoba Hydro and addressed through a separate protection plan. The Culture and Heritage Resource Protection Plan, to be developed prior to construction, outlines protection measures in the event of the discovery of previously unrecorded cultural and heritage resources during construction and describes the ongoing monitoring of known cultural and heritage resources for disturbance.

Through the FNMEP and self-directed ATK studies and previous projects Manitoba Hydro understands and acknowledges the importance of cultural and heritage resources to First Nations and Metis and have developed mechanisms such as notification of discovery, to involvement in site investigations and sharing of reports, these are further explained in the Culture and Heritage Resource Protection Plan.

Results from the heritage resources monitoring program will be discussed through the FNMEP on an as required basis during construction, as well as annually through a Heritage Resources Impact Assessment to the Manitoba Historic Resources Branch as per the terms of the *Heritage Resources Act* (1986) and Heritage Permit.

22.2.6 Management Plans

Management involves the control or organization of activities and resources to resolve or respond to environmental problems, issues or concerns. Management plans provide reasoned courses of action to achieve pre-defined goals or objectives. Management plans will be prepared to address important management issues, regulatory requirements and corporate commitments identified in the EIS. The management plans will describe the management actions, roles and responsibilities, evaluation mechanisms, updating requirements and reporting schedules. The following management plans will be prepared prior to the start of construction of the Project:

- Access Management;
- Blasting;
- Erosion Protection and Sediment Control;
- Emergency Preparedness and Response;
- Rehabilitation and Weed Management;
- Waste and Recycling; and
- Integrated Vegetation Management.

These plans will be prepared by Manitoba Hydro or the contractor and may be contracted to environmental consultants that possess the necessary expertise and experience. Each plan is discussed in the following sections.

22.2.6.1 Access Management Plan

Because access has the potential to have adverse environmental effects, an Access Management Plan (AMP) has been included in this EIS (Appendix 22B). Self-directed ATK studies also identified concerns related to creating new access, biosecurity and increased predation risk. Manitoba Hydro's AMP outlines the planned use of existing roads and trails to the extent possible during construction along with management objectives and principles. The plan also identifies access management issues and mitigation strategies to address the issues.

- The scope of the AMP includes security of construction sites and facilities, safety of construction workers and the general public, respect for First Nation and Metis rights and resource users, and protection of natural, cultural and heritage resources.
- The AMP provides for security of Manitoba Hydro properties and facilities, and safe access to or through construction areas for authorized employees, land and resource users, and research and monitoring personnel.
- Contact requirements are outlined for municipalities, landowners, resource users and other parties to be consulted prior to accessing lands.
- The AMP outline security requirements, including terms and conditions for access, restrictions on firearms, hunting and fishing, and other resource use activities.
- Environmental protection measures are prescribed related to access, including timing windows, vehicle cleaning and servicing, gate protocols, load restrictions, warning signage, speed limits, sensitive area avoidance, stream crossings and other environmental issues.
- The AMP will be reviewed annually, and results from the reviews will be used to adjust plan provisions to provide continued effectiveness.
- The plan will be provided to the contractor as well as Manitoba Conservation and Water Stewardship, and will be placed on the website established for the Project.

22.2.6.2 Blasting Plans

Blasting Plans will be prepared by the contractor to manage the storage and use of explosives at construction sites for the Project.

- The objective of the plans will be to provide for the effective management of explosives in accordance with environmental protection measures, provincial and federal legislation and guidelines, and corporate policies for explosives.
- Environmental Inspectors will conduct regular inspections of blasting activities and will submit reports to the contractor and Construction Supervisor.
- Blasting Plans will be completed by the contractor prior to commencement of blasting activities for the applicable Project component.

22.2.6.3 Emergency Preparedness and Response Plans

An Emergency Preparedness and Response Plan will be developed by each contractor to prepare for and respond to emergency situations at construction sites for the Project.

- The objective of the plan will be to provide for emergency preparation and response in accordance with provincial legislation and guidelines, and corporate policies and procedures for the protection of human health and the environment.
- The scope of the plan will include spills or releases of hazardous substances, including petroleum products, accidents involving hazardous substances, medical emergencies, explosions and fire.
- Environmental protection measures will be prescribed for the provision of emergency response planning, responsibilities, training, exercises, procedures, containment, and clean-up equipment and materials.
- Environmental Inspectors will conduct regular inspections of construction activities, including emergency preparedness and response measures. The plan will be reviewed annually, and results from the reviews will be used to adjust plan provisions to provide continued effectiveness.

The Emergency Preparedness and Response Plan will be completed and implemented by the contractor prior to the commencement of work.

22.2.6.4 Erosion Protection and Sediment Control Plans

An Erosion Protection and Sediment Control Framework has been developed to guide each contractor (where applicable) in preparing an Erosion Protection and Sediment Control Plan.

- The objective of the plan will be to limit adverse environmental effects of sediment releases on the aquatic environment in accordance with provincial and federal legislation and guidelines, and corporate environment policies and guidelines.
- Environmental protection measures will be prescribed for erosion protection and sediment control, including winter construction, establishment of buffer zones, avoidance of sensitive areas and use of bioengineering techniques.
- Environmental Inspectors will conduct regular inspections of construction activities, including erosion protection and sediment control measures.
- The plan will be reviewed after each construction season and annually, and results from the reviews will be used to adjust plan provisions to provide continued effectiveness.
- The Erosion Protection and Sediment Control Plan will be completed by each contractor and implemented prior to construction of each applicable Project component.

22.2.6.5 Rehabilitation and Weed Management Plan

A Rehabilitation and Weed Management Plan will be prepared by Manitoba Hydro to manage rehabilitation and weed management activities at construction sites for the Project.

- The objective of the plan will be to provide for the rehabilitation of completed construction sites and weed management of Project sites during construction, in accordance with environmental protection measures, provincial guidelines, and corporate policies for rehabilitation.
- Environmental protection measures will be prescribed for washing equipment and vehicles prior to entering construction sites, controlling vegetation at construction sites and restoring and re-vegetating disturbed sites.
- Environmental Inspectors will conduct regular inspections of sites for the requirement for weed management and will submit reports to the contractor and Construction Supervisor.
- The rehabilitation activities will be implemented on sites, as they are no longer required for construction of the Project.
- The plan will be completed by Manitoba Hydro and implemented prior to the commencement of construction.

22.2.6.6 Waste and Recycling Management Plans

A Waste and Recycling Management Framework has been developed by Manitoba Hydro to assist contractors (where applicable) to develop Waste and Recycling Management Plans to manage wastes at work and camp locations for the Project.

- The objective of the plans will be to provide for effective waste management in accordance with provincial legislation and guidelines, and corporate policies and procedures for the protection of human health and the environment.
- The scope of the plans will include waste reduction, recycling and reusing initiatives.
- Environmental protection measures will be prescribed for the storage of kitchen wastes, recycling and disposal of construction wastes and disposal of wastes at licenced facilities.
- Environmental Inspectors will conduct regular inspections of construction activities, including waste management.
- The plan will be reviewed after each construction season and annually, and results from the reviews will be used to adjust plan provisions to provide continued effectiveness.
- The Waste and Recycling Management Plan will be completed by the contractor and implemented prior to the commencement of work for the Project.

22.2.6.7 Integrated Vegetation Management Plan

An Integrated Vegetation Management Plan (IVMP) will be developed to manage the vegetation on the rights-of-way (ROWs) during Project operation and maintenance. Through self-directed ATK studies concerns about the use of herbicides were expressed, Manitoba Hydro believes though development of an IVMP, a balanced approach to addressing these concerns through knowledge sharing and mapping of areas of concern. Integrated vegetation management (IVM) involves selecting and combining vegetation treatments to target specific plant species that pose a risk to safety or reliability, while limiting effects on the environment and the public. Implementing IVM using a Vegetation Management Plan is a common practice on utility ROWs, railways, roadways, oil and gas pipelines, forestry plantations, and at electrical and industrial facilities in Manitoba.

- The objective of the plan is to describe the variety of Industry Standard techniques and provide guidance for the development of a prescription of integrated control measures to manage target vegetation on and off the ROWs. This integrated approach to ROW Vegetation Management is implemented in order to maintain safe, reliable and uninterrupted transmission of electric energy.
- The scope of the plans will include a description of vegetation control methods, criteria for the application of control methods as well as communication protocols to the public, First Nations and Metis.
- Environmental protection measures will be prescribed for the use and handling of pesticides, including storage and disposal at licenced facilities.
- Regular patrols of the ROW to monitor vegetation growth and management effectiveness.
- The plan will be reviewed annually, and results from the reviews will be used to adjust plan provisions to provide continued effectiveness.
- The Integrated Vegetation Management Plan will be completed by Manitoba Hydro and implemented prior to the commencement of vegetation management activities for operation and maintenance of the Project.

22.3 Follow-up and Monitoring

Follow-up and monitoring is conducted to verify the accuracy of the environmental assessment of a project, assess the effectiveness of measures taken to mitigate adverse effects and determine compliance with regulatory requirements. Manitoba Hydro implements the follow-up and monitoring activity using two programs called Inspection and Monitoring, which are discussed further in the sections below.

22.3.1 First Nation and Metis Engagement Process

Manitoba Hydro has developed different approaches to its ongoing First Nation and Metis Engagement Process (FNMEP). These approaches for transmission project follow-up and monitoring programs began in 2008–2010 with the Wuskwatim Transmission Project, followed by the Bipole III and Keeyask Transmission Projects in 2013; both projects are planned to continue until 2018/19. Each of these projects had a different approach tailored to the geographic region, scope/scale of project and the number of communities involved. Through these past and current projects, accompanied by the desire to use active adaptive management in its community involvement programs for the construction of transmission projects, Manitoba Hydro has developed a new approach for this Project.

Manitoba Hydro's proposed approach to the ongoing FNMEP is based on experiences of other industries where the project is located within a traditional or current resource use area but not necessarily near the community. The approach is also based on ATK field trips, self-directed reports received to date, and the desire within those reports for further investigation and mapping of sensitive sites, transfer of knowledge from Elders to youth to prevent loss of knowledge, updates on project progress and involvement in follow-up and monitoring.

The ongoing FNMEP will include inviting individual First Nations and MMF representatives to attend regular field trips to the construction areas, with the focus placed on the highly valued undisturbed land or land with little disturbance (Black River First Nation, Long Plain First Nation, Swan Lake First Nation 2015) and areas identified as sensitive sites (Peguis 2015; Roseau River 2015). Field trips with representatives will take place throughout construction and monitoring, and will be guided by various staff depending on topic, including Construction Supervisors, Environmental Inspectors and specialists such as experts in botany, wildlife and traditional medicinal plants. These field trips will be supported by a translator, as required. During the construction field trips, representatives will learn and witness activities associated with various topics, including:

- mitigation measures
- Project schedule
- clearing and construction practices
- inspection results
- monitoring results

During follow-up and monitoring field trips, representatives could participate in monitoring activities such as vegetation, traditional plant, stream crossing, mammal track, bird and camera trap surveys. Construction and follow-up and monitoring trips will allocate time for representatives to share concerns and ask questions of the Project staff along with receiving a materials package and copy of photos/video taken that day to share with their First Nation or the MMF.

To enhance traditional knowledge transfer among generations, educate youth about Manitoba Hydro's EPP, and explain environmental career opportunities for youth, separate field trips involving youth and Elders and a Manitoba Hydro representative could occur during school summer break. These Youth/Elder trips will be similar to the construction and follow-up and monitoring trips but will focus on opportunities for traditional knowledge sharing.

While specific details about the field trips are yet to be determined, Manitoba Hydro is looking forward to working with First Nations and Metis to develop the approach for this Project, which will be guided by the following objectives;

- create awareness about the Project and EPP;
- develop Manitoba Hydro's awareness about community concerns, and communication back on how they are being addressed;
- provide "boots on the ground" field experiences;
- involve multiple First Nations and the MMF; and
- include a Youth and Elder component.

22.3.2 Inspection Program

Inspection is the organized examination or evaluation involving observations, measurements and sometimes tests for a construction project or activity. The results of an inspection are typically compared to specified requirements, drawings and standards for determining whether the item or activity is in conformance with these requirements. Environmental inspection is an essential and key function in environmental protection and implementation of mitigation measures.

Manitoba Hydro has established a comprehensive integrated environmental inspection program to comply with regulatory approvals and meet corporate environmental objectives. The program includes Environmental Inspectors to be onsite during construction activities. Manitoba Hydro's approach to environmental inspection includes:

- compliance with regulatory approvals
- adherence to environmental protection plans
- onsite environmental inspectors
- training and education
- regular monitoring and inspection during construction
- interaction with contractors (e.g., pre-construction meeting, daily discussion)
- regular review of inspection and monitoring information
- quick response to incidents or changing conditions
- monthly summary reports

- regular reporting to regulators
- notification of regulators of emergency or contingency situations

Environmental Inspectors will visit active work sites to inspect for compliance with licence, permit or other approval terms and conditions, and adherence to environmental protection plan general and specific mitigation measures. All instances of non-compliance will be reported to the Construction Supervisor, contractor and applicable regulatory authority (*i.e.*, Manitoba Conservation and Water Stewardship, National Energy Board). All inspection activities will be recorded in a daily journal and daily inspection forms will be completed. Daily and monthly inspection reports will be provided electronically to the Environmental Protection Information Management System for review and viewing by applicable Project staff.

Incidents such as accidents, malfunctions, spills, fires, explosions and environmental damage will be reported immediately to the Construction Supervisor and applicable regulatory authority. Incidents will be dealt with immediately and followed up in subsequent daily inspection reports.

22.3.3 Monitoring Program

Monitoring is the continuing observation, measurement or assessment of environmental conditions at and surrounding a construction project or activity. Two main types of monitoring are typically undertaken for environmental assessments: environmental monitoring to verify the accuracy of the predictions made and the effectiveness of the mitigation measures implemented, and compliance monitoring to verify whether a practice or procedure meets legislated requirements. Monitoring determines if environmental effects occur as predicted, residual effects remain within acceptable limits, regulatory limits, criteria or objectives are not exceeded and mitigation measures are as effective as predicted. Monitoring also allows for AM where monitoring results show there is a need for additional environmental protection or enhancement.

The monitoring plan will describe parameters to be monitored, methods to be used, roles and responsibilities, and reporting schedules. Monitoring will be carried out by Manitoba Hydro and may be contracted to environmental consultants that possess the necessary expertise, equipment and analytical facilities. Reports from monitoring programs will be submitted annually to regulatory authorities, shared with interested First Nations and the MMF and placed on the Project website.

An Environmental Monitoring Plan for the Project (Appendix 22C) has been prepared to address follow-up and monitoring actions identified in the EIS as well as specific environmental protection, beneficial practice and regulatory requirements.

The scope of the monitoring plan includes biophysical and socio-economic components of the environment. Objectives of the monitoring plan are to:

- confirm the nature and magnitude of predicted environmental effects
- assess effectiveness of mitigation measures implemented

- identify unexpected environmental effects of the Project, if they occur
- identify mitigation measures to address unanticipated environmental effects, where required
- confirm compliance with regulatory requirements, including approval terms and conditions
- provide baseline information to evaluate long-term changes or trends

Monitoring will be carried out on selected environmental components using environmental indicators and measurable parameters identified in the EIS. Components to be monitored will be selected based on regulatory requirements, environmental importance, vulnerability and sensitivity, and licence requirements. The monitoring plan describes sampling procedures, quality control and assurance programs, laboratory methods and protocols, laboratory accreditations and reporting requirements. Results from monitoring will be used through and adaptive management process to adjust mitigation measures and to modify the plan on an ongoing basis. Aboriginal traditional and local knowledge will be considered and incorporated into the monitoring plan, where appropriate and applicable. The monitoring reports will be provided annually to the National Energy Board and Manitoba Conservation, shared with interested First Nations and the MMF and placed on the website established for the Project.

22.3.4 Environmental Protection Information Management System

An Environmental Protection Information Management System (EPIMS) is the internal central repository of environmental protection information, including:

- environmental protection documents
- reference information such as regulations and guidelines
- inspection reports
- monitoring field data and reports

The environmental inspection program will employ modern electronic recording, reporting and communication systems using field computers, geographic positioning systems and digital cameras. Field computers will have Project and other reference information needed for effective implementation of environmental protection measures, including regulations, guidelines, licences, permits, engineering drawings, specifications, maps, reports and data.

EPIMS is a tool that helps Manitoba Hydro monitor and report on environmental protection implementation, regulatory compliance and incident reporting. EPIMS will be the mechanism to provide reporting and tracking of environmental protection performance, and the foundation of an auditable EPP.

22.4 Pre-construction Activities

Manitoba Hydro will undertake a number of activities prior to commencing construction of the Project to set the direction for environmental protection and compliance with legislated requirements. Manitoba Hydro will endeavour to meet with interested First Nations and the MMF, in the finalization of the Construction Environmental Protection Plan to discuss, address and mitigate concerns, to the extent possible, with cultural and environmentally sensitive sites identified through the FNMEP and in the Aboriginal traditional knowledge reports.

Manitoba Hydro will obtain licenses, permits, authorizations and other approvals, including property agreements, ROW easements and releases, prior to commencement of construction of each Project component. Additional terms and conditions of these approvals will be incorporated into the Construction Environmental Protection Plan. Additional approval requirements to be obtained by the contractors will be identified and communicated to the successful bidders.

The Licensing and Environmental Assessment Department will typically participate in the tender/direct negotiated contract development process to make sure environmental requirements are included as contract specifications. Bidders are required to list and defend their environmental record and must have an environmental policy, including a commitment to environmental protection.

Meetings will be held with the contractors to review the environmental protection requirements, establish roles and responsibilities, management, monitoring and other plans, inspection and reporting requirements, and other submittals. Prior to the start of construction, contractor employees will be trained and/or oriented on environmental protection requirements.

22.5 Work Stoppage

The duty to stop work rests with everyone encountering situations where the environment, including biophysical, socio-economic and heritage resources, are threatened by an activity or occurrence that has not been previously identified, assessed and mitigated. Work stoppage is also to occur in the event of an environmental accident, extreme weather event or exposed human remains. Individuals discovering such situations are to inform their supervisor who will report the matter to the Construction Supervisor immediately who will issue a stop work order. The contractor is also required to stop work voluntarily where construction activities are adversely affecting the environment or where mitigation measures are not effective in controlling environmental effects. Remedial action plans or other environmental protection measures will be developed and implemented immediately after discussion and prior to resumption of work if previously halted. Work is not to resume until the situation has been assessed and responded to and the Construction Supervisor approves the resumption of work. Stop work orders will be documented, reported to regulatory authorities (if applicable) and reviewed at construction meetings.

22.6 Review and Updating

22.6.1 CEnvPP Annual Reviews

The Construction Environmental Protection Plan will be reviewed annually by Manitoba Hydro and may involve consultation with contractors, regulators and stakeholders. The results of each review will be summarized in a report that documents the issues addressed and provides recommended updates to the CEnvPP.

22.6.2 Incident Reviews

Construction Environmental Protection Plans will be subject to review in the event of an incident, including environmental accidents, fires and explosions, reportable releases of hazardous substances and non-compliance situations.

22.6.3 Auditing

Auditing is a systematic approach to defining environmental risk and/or determining the conformance of an operation with respect to prescribed criteria. An environmental audit typically involves a methodical examination of evidence that may include interviews, site visits, sampling, testing, analysis, and verification of practices and procedures. Environmental protection plans for the Project will be subject to internal and external audits through Manitoba Hydro's ISO 140001 Registration process. The audit results will help to evaluate the effectiveness of environmental protection measures, to learn from inspection and monitoring programs, and to improve Project planning and environmental assessment performance.

22.6.4 List of Revisions

A list of revisions will be maintained at the beginning of each environmental protection plan that identifies the nature of the revision, section revised and dates.

22.7 Summary

This chapter outlined the Environmental Protection Program under which environmental protection commitments, mitigation measures and follow-up actions identified in the Project EIS will be implemented, managed, reported and evaluated. The purpose, organization, responsibilities, management, communication and other aspects of the Environmental Protection Program were described. Environmental protection plans are described as they relate to the construction, operation and decommissioning stages in the Project planning cycle and environmental assessment and licensing process. Implementation of follow-up actions, including inspection, management and auditing are discussed. Specific environmental management and monitoring plans are also identified.

22.8 References

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MANITOBA-MINNESOTA TRANSMISSION PROJECT

Appendix A - Construction Environmental Protection Plan



Appendix 22A

Construction Environmental Protection Plan



MANITOBA-MINNESOTA TRANSMISSION PROJECT

Construction Environmental Protection Plan

**MANITOBA-MINNESOTA
TRANSMISSION PROJECT
CONSTRUCTION ENVIRONMENTAL
PROTECTION PLAN**



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

Version – Draft

List of Revisions

Number	Nature of Revision	Section(s)	Revised By	Date

PREFACE

MANITOBA HYDRO'S ENVIRONMENTAL COMMITMENT

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

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

As stated in the Corporate Environmental Management Policy:

“Manitoba Hydro is committed to protecting the environment by:

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

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

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

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

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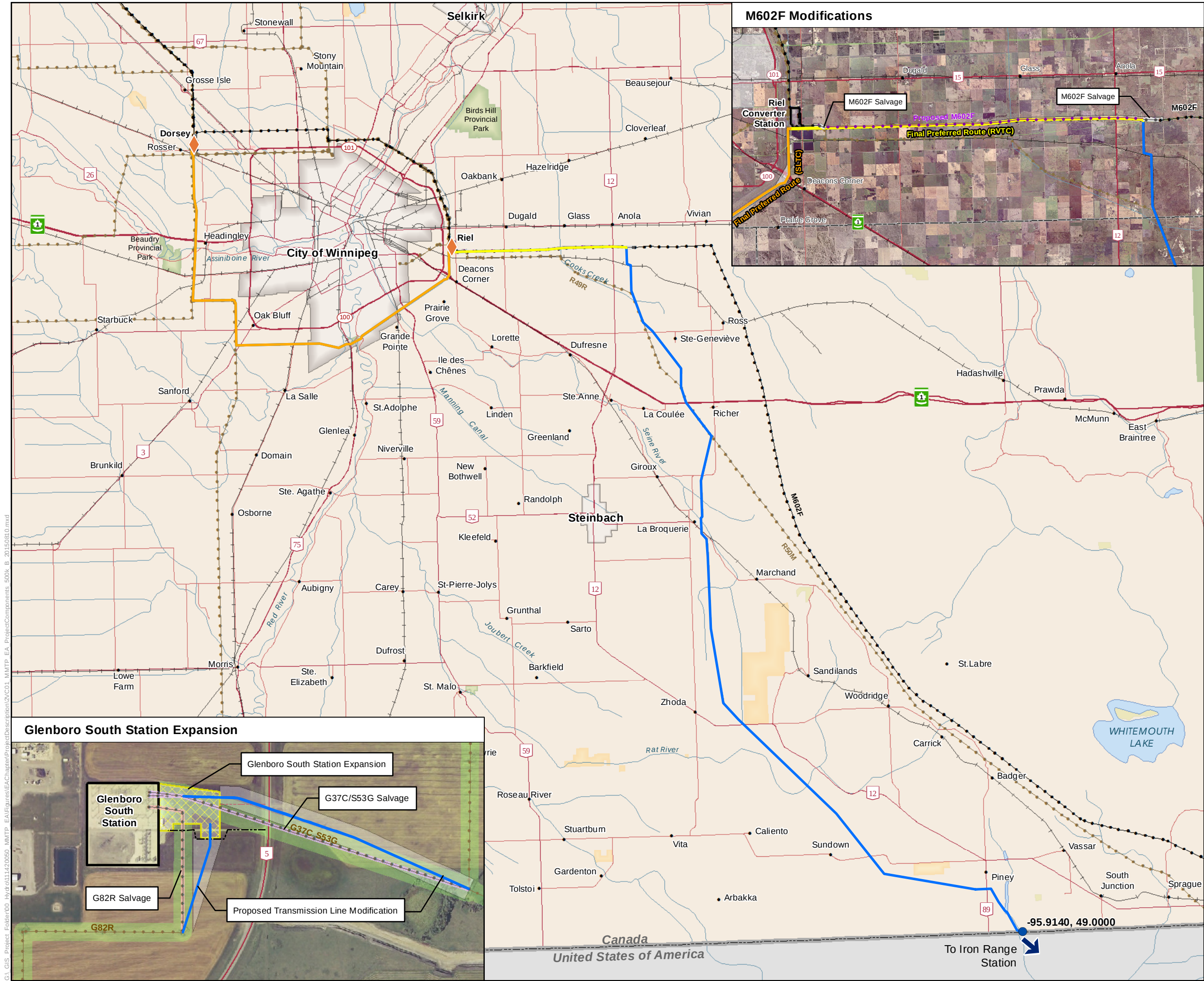
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1.0 INTRODUCTION

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

This CEnvPP provides guidance for the implementation of environmental protection measures for the Project. The Project consists of a 213 km single-circuit, 500 kV AC transmission line starting at the existing Dorsey Converter Station northwest of Winnipeg, connecting at the Manitoba-Minnesota border to a new transmission line proposed by Minnesota Power.

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



Manitoba-Minnesota Transmission Project

Project Infrastructure

- ◆ Converter Station (Existing)
- Border Crossing
- Final Preferred Route (Southern Loop Transmission Corridor - SLTC)
- Final Preferred Route (Riel-Vivian Transmission Corridor - RVTC)
- Final Preferred Route (New Right of Way)
- M602F Modification (Salvage)
- M602F Modification (New)
- G37C Salvage
- G82R Salvage
- Existing/New Glenboro South Station Access
- New Glenboro South Station Access
- Existing ROW
- Station Expansion
- Project Development Area (PDA)

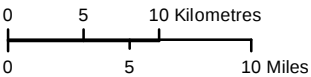
Infrastructure

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

Landbase

- Community
- Railway
- Trans Canada
- Provincial Highway
- Provincial Road
- City
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 19, 2015



1:500,000

Project Components

1.1 Document Amendment Process

To ensure that users are referring to the most up to date and current versions of Environmental Protection documents an amendment process has been established. This amendment process applies to both text and mapping documents. Throughout construction, there will be changes and revisions to documents as new information is discovered or document errors are identified. Should an amendment be required as the result of a field investigation i.e. a sensitive site that was mis-identified or no longer exists (ephemeral stream etc.) that amendment will be discussed with Manitoba Conservation and Water Stewardship (MCWS). In some cases an amendment may have implications to the interpretation of licence conditions or compliance. In these cases MCWS will determine if that amendment can be approved and resolved locally/regionally or if it requires a higher level of review/approval. Figure 1-1 illustrates the document amendment process, including loading amendments into the Environmental Protection Information Management System (EPIMS) so that users are notified of changes and the amendments can be distributed to them through Manitoba Hydro Staff.

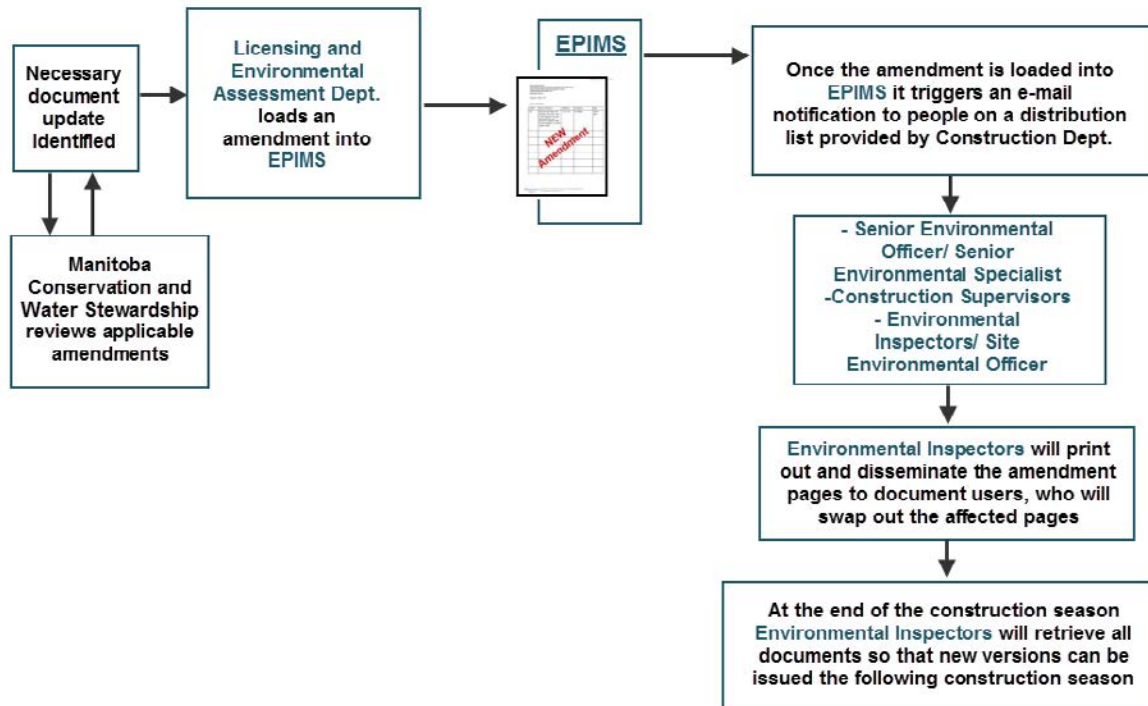


Figure 1-1: Document Amendment Process

1.2 Overview of Environmental Protection Plan

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

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

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

1.3 Roles, Responsibilities and Reporting

This section outlines the major roles and responsibilities of those involved in the implementation of the CEnvPP for the Project. A summary of roles and key responsibilities is found in Table 1-1.

Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 1-3. A contact list for key staff involved in supporting this CEnvPP is found in Appendix A.

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

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

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

Role	Key Responsibilities
Construction Contractor(s) (Project Manager / Construction Supervisor)	- Accountable for all regulatory and environmental prescriptions (i.e., follow CEnvPP and mitigation measures prescribed). - Ensure all contractor project staff are adequately trained/informed of pertinent environmental requirements of the Project related to their position. - Report any discoveries of non-compliance, accidents or incidents to the Construction Supervisor. - Ensure that all remedial actions are carried out as per Manitoba Hydro instruction. - Ensure all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to the Construction Supervisor. - Responsible for other permits as outlined in Appendix C.
Construction Staff	- Accountable for all regulatory and environmental prescriptions (i.e., follow CEnvPP and mitigation measures prescribed). - Ensure adequately trained with respect to, and informed of pertinent, environmental requirements of the Project related to their position. - Report any discoveries of non-compliance, accidents or incidents to the Construction Supervisor. - Ensures that all remedial actions are carried out as per Manitoba Hydro instruction. - Ensures all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to the Construction Supervisor.
Construction Contractor's Environmental Officers	- Responsible for implementation, coordination and verification of pre-project employee environmental orientation. - Ensures that the contractor employees adhere to all aspects of the construction Environmental Protection Plan. - Provides information and advice to the Construction Contractor employees on environmental protection and safety matters. - Responsible for implementation of the emergency response and hazardous materials plans, and other related topics. - Liaises with Environmental Inspector and Hydro Field Safety Officers.

1.3.1 Environmental Protection

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

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

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

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

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

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

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

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

1.3.3 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.

1.3.4 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; or
- That Manitoba Hydro will not be held responsible for delays to the work or be required to compensate the contractor for any matters arising as a result of the Manitoba Hydro issued Environmental Stop Work Order.

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

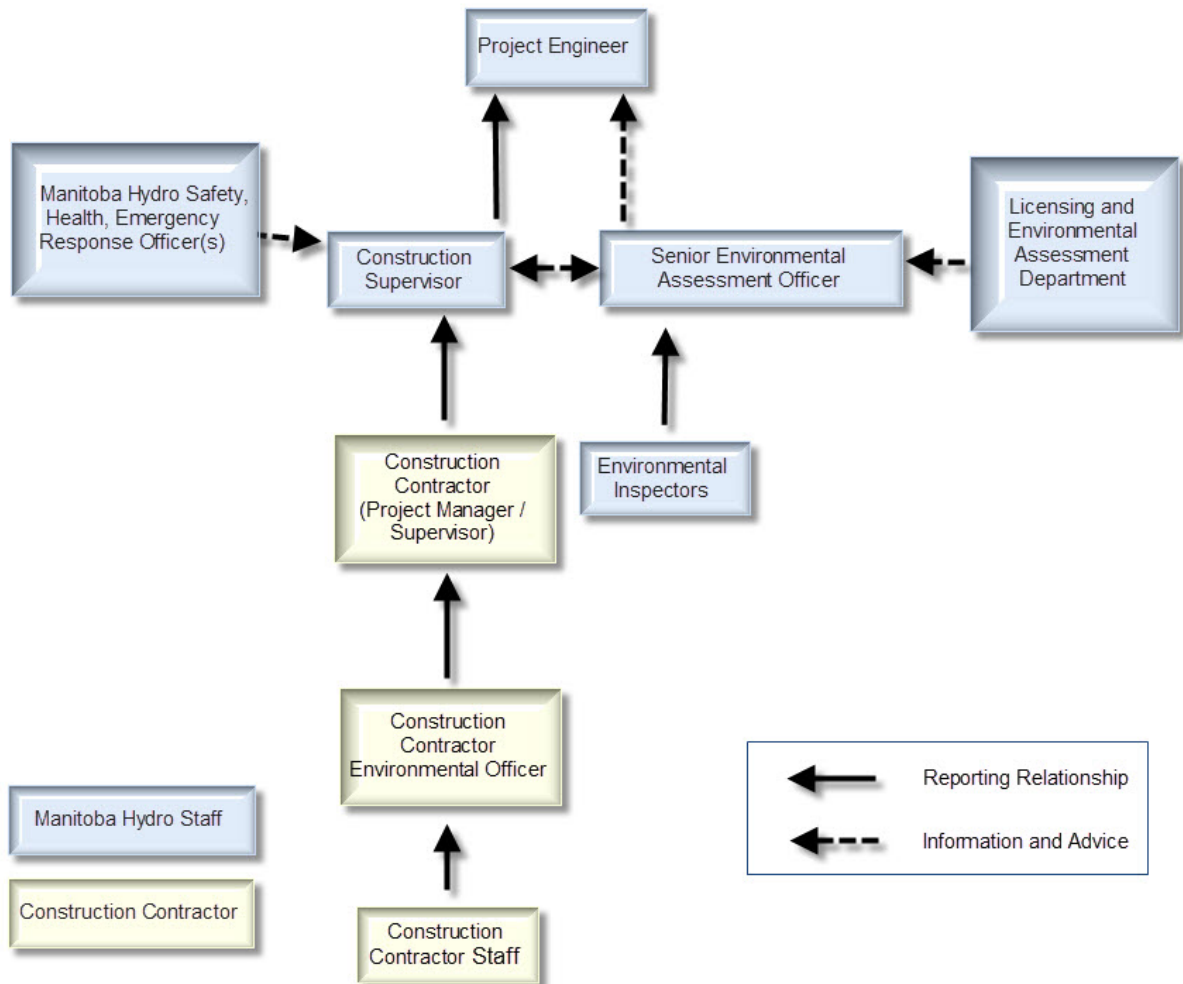


Figure 1-3: Environmental Communication Reporting Structure

1.4 Environmental Protection Information Management System

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

1.5 Regulatory Requirements

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

2.0 ENVIRONMENTAL CONSIDERATIONS

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

2.1 Timing Windows

2.1.1 Wildlife

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

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

2.1.2 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 (ie between April 1st and November 15th) a burning permit application is made to the local Manitoba Conservation and Water Stewardship 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.

2.1.3 Fish

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

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

Timing works to avoid sensitive life history periods or life stages is an effective means of mitigating adverse effects. Although no in-stream activities are anticipated should any be required they will be conducted during a timing window of at least risk to fish and fish habitat. Appendix D contains general recommended timing windows to avoid during construction.

2.2 Setbacks and Buffers for Wildlife and Anthropogenic Features

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

These setback and buffers may be expanded or refined based on further data collection, transmission line final design, regulatory license and work permits to be issued for the project. Setbacks are areas to be maintained from a given environmental feature where no work shall occur unless authorized by Senior Environmental Assessment Officer. Buffers are work areas where restricted activities such as low disturbance clearing are permitted. Where applicable, site specific setback and buffers are prescribed in specific mitigation measures for each ESS.

2.3 Riparian Management

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

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

Table 2-1: Riparian Buffer Distances Based on Slope

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

Machine Free Zones are work areas where restricted activities such as low ground disturbance clearing (i.e hand cutting or feller buncher) are permitted by reaching into zone with equipment but not entering the zone. Where applicable, site specific setbacks are prescribed in specific mitigation measures for each feature.

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

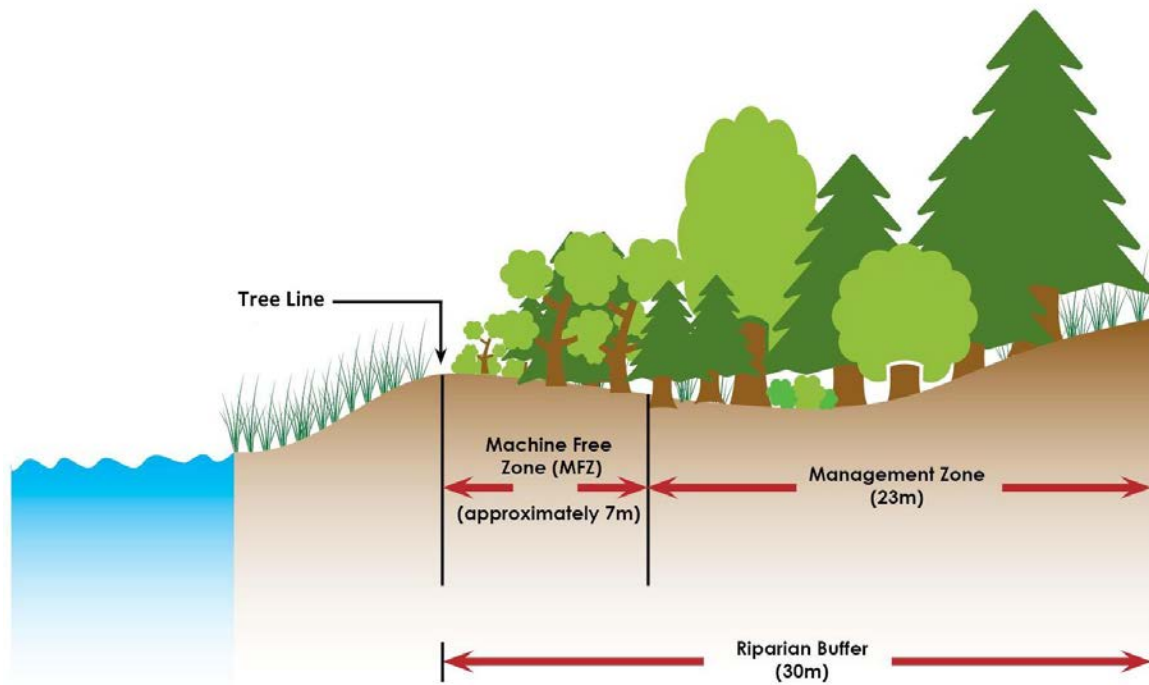


Figure 2-1: Example of Zones in a 30m Riparian Buffer

2.3.1 Riparian Mitigation

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

2.3.2 Tower Foundations within Riparian Buffers

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

2.4 Wildlife and Habitat

2.4.1 Birds and Habitat

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

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

2.4.2 Reptiles/Amphibians

Areas where reptiles and amphibians, such as salamanders, skinks, frogs, and toads, mate and lay eggs (i.e., breed) are sensitive to ground disturbance. Heavy equipment traffic and ground clearing activities that coincide with breeding activities can have a measurable effect on local populations. Further, Manitoba is home to unique and endangered reptiles and amphibians, such as skinks (a lizard found primarily in the Spruce Woods region) and northern leopard frog (found throughout the province) that are protected by legislation and policy.

Potential Project effects on northern leopard frog and common snapping turtle during construction include habitat loss and alteration, which are threats to these populations. As these species are mainly found in riparian areas near large rivers, bodies of water or productive marshes, no habitat effects are anticipated with mitigation such as riparian buffers. Mortality could increase in the Project Study Area during construction due to increased road traffic. Northern leopard frogs are particularly susceptible to road mortality during migration and dispersal.

2.4.3 Mammals

Large-bodied mammals, such as white-tailed deer and elk, are considered sensitive to disturbance. Sensory disturbance from construction activity could result in a temporary loss of effective habitat and disruption of movement, as individuals will likely avoid the construction zone. The risk of wildlife-vehicle collisions could increase due to a greater volume of traffic on roadways, increasing mortality of some mammal species, particularly larger ones such as white-tailed deer and elk. The right-of-way and access trails could facilitate movement and increase hunting efficiency for gray wolves and for other predators.

2.5 Agriculture

2.5.1 Agricultural Biosecurity

Manitoba Hydro's Agricultural Biosecurity Policy

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

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

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

2.6 Soils and Terrain

2.6.1 Soils

As the basis of natural, medicinal, spiritual and commercial vegetation, soils and their quality are an important part of ecosystem health and human well-being. The types of soil considered to be sensitive are topsoil (the thin, nutrient rich surface soil layer), and soils susceptible to wind erosion. Soils are generally sensitive to loss by erosion or mixing with less suitable soils and quality degradation from

compaction. During construction, soil compaction and rutting can result from the movement of vehicles and equipment, storage of materials, and assembly and erection of towers. Effects of soil compaction and rutting can be mitigated by managing equipment traffic routes and activities for clearing of the transmission right-of-way (ROW), and installation of transmission towers to minimize the impact. Existing access routes are planned to be utilized wherever possible to avoid disturbing new areas.

2.6.2 Encountering Unexpected Contamination

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

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

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

2.7 Cultural

2.7.1 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 natural environmental environments, cultural landscapes, and heritage resources affected by the Project to the extent possible. Sites identified as having spiritual or cultural importance through Aboriginal Traditional Knowledge (ATK) or other communications are considered sensitive to disturbance and should be respected for the values they have to local communities.

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

2.8 Access

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

3.0 ENVIRONMENTAL PROTECTION PLAN ORIENTATION AND AWARENESS

3.1 Pre-Job Meeting (environmental component)

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

The environmental portion of this meeting will include the following:

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

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

3.2 Contractor Start-Up Meeting

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

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

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

3.3 Weekly Progress Meetings

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

3.4 Daily Job Planning Meetings

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

4.0 CONTRACTOR-DEVELOPED ENVIRONMENTAL MANAGEMENT PLANS

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

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

5.0 ENVIRONMENTAL MITIGATION REQUIREMENTS

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

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

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

5.1 General Mitigation Requirements

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

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

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

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

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

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

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

5.2 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 Vegetation 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 (ie forestry roads (North/South Jonas roads) will be obtained.
PC-1.13	MCWS 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 Vegetation 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 clean up.

Access Roads and Trails (PC-1)

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.

Agricultural Areas (EC-1)

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

Aircraft Use (EI-1) [If applicable]

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

Blasting and Exploding (PA-1)

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

Borrow Pits and Quarries (PC-2)

ID	Mitigation
PC-2.01	Access to abandoned borrow pits and quarries will be managed in accordance with the Access Management Plan.
PC-2.02	All equipment and structures will be removed from borrow pits prior to abandonment.
PC-2.03	Borrow pits and quarries will be designed, constructed and operated in compliance with provincial legislation and guidelines.
PC-2.04	Borrow pits and quarries will not be located within 150 m of a provincial trunk highway or provincial road unless an effective vegetated berm is provided to shield the area from view.
PC-2.05	Borrow pits and quarries will not be located within established buffer zones and setback distances from identified Environmentally Sensitive Sites.
PC-2.06	Drainage water from borrow pits and quarries will be diverted through vegetated areas, existing drainage ditch(s) or employ a means of sediment control prior to entering a waterbody.
PC-2.07	Erosion protection and sediment controls will be put in place before borrow pit excavation commences, when required as determined by the Environmental Inspector.
PC-2.08	Fuel storage will not be permitted near stockpiles outlined in PC 5.21.
PC-2.09	Garbage, debris or refuse will not be discarded into borrow pits and quarries.
PC-2.10	Only water and approved dust suppression products will be used to control dust on access roads where required. Oil or petroleum products will not be used.
PC-2.11	Organic material, topsoil and subsoil with-in borrow pits and quarries will be stripped and stockpiled for use in future site rehabilitation.
PC-2.12	Previously developed borrow sites and quarries will be used to the extent possible before any new sites are developed.
PC-2.13	Signs will be posted at borrow pits and quarries to warn all persons of safety hazards.
PC-2.14	Surface drainage will be redirected away from the borrow pits and quarries before excavation commences.
PC-2.15	Vegetated buffer areas will be left in place when borrow pits are cleared in accordance with provincial guidelines.
PC-2.16	Vegetation control at borrow pits and quarries will be in accordance with the Vegetation Management Plan.
PC-2.17	Vegetation in active Manitoba Hydro permitted borrow pits and quarries will be maintained as per the Rehabilitation/ and Vegetation 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.

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

ID	Mitigation
EC-2.01	Construction activities and equipment will be managed to avoid damage and disturbance to adjacent properties, structures and operations.
EC-2.02	Mud, dust and vehicle emissions will be managed in a manner that ensures safe and continuous public activities near construction sites where applicable.
EC-2.03	Noisy construction activities where noise and vibration may cause disturbance and stress in built-up areas will be limited to daylight hours.

Burning (PA-2)

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

Clearing (PA-3)

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

ID	Mitigation
PA-3.22	If extreme wet weather or insufficient frost conditions results in soil damage from rutting, and soil erosion is resulting in sedimentation of adjacent waterbodies, a stop work order may be issued.
PA-3.23	Trees containing active nests and areas where active animal dens or burrows are encountered will be left undisturbed until unoccupied.
PA-3.24	Trees will be felled toward the middle of rights-of-way or cleared area to avoid damage to standing trees. Trees will not be felled into waterbodies.
PA-3.25	Vegetation will be removed by mechanical means except where other selective clearing methods are stipulated at identified Environmentally Sensitive Sites.
PA-3.26	Where practical, merchantable timber will be salvaged and brought to market. As per Annual Harvest Plan, timber that is not salvaged will be piled and burned during frozen conditions in accordance with timing windows, or permit conditions.
PA-3.28	If clearing is needed on a Manitoba Infrastructure and Transport (MIT) roadway ROW, clearance must be obtained from MIT in advance.

Construction Camps (PC-3) [If applicable]

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

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 Vegetation Management Plan and/or provincial regulations (i.e. quarries and borrow sites).
PA-4.05	Petroleum product and other hazardous substances 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.

Draining (PA-5)

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

Drilling (PA-6)

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

Emergency Response (EI-2)

ID	Mitigation
EI-2.01	All fires will be reported in accordance with fire reporting procedures in the Emergency Preparedness and Response Plan.
EI-2.02	All spills at construction sites will be reported in accordance with provincial legislation and guidelines, and Manitoba Hydro Guidelines.
EI-2.03	All vehicles hauling petroleum products will carry spill containment and clean-up equipment.
EI-2.04	Clean-up and the disposal of contaminated materials will be managed in accordance with provincial guidelines and Manitoba Hydro guidelines.
EI-2.05	Emergency Preparedness and Response Plans and procedures will be communicated to all project staff and a copy will be made available at the project site.
EI-2.06	Emergency spill response and clean-up materials and equipment will be available at construction sites, marshalling 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	MCWS and Fisheries 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 Conservation and Water Stewardship.
EC-3.06	Project personnel will be prohibited from fishing at project locations or along rights-of-way.

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 marshalling 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 Vegetation Management Plan.
PA-7.04	Grading will not be permitted within established buffer zones and setback distances from waterbodies.
PA-7.05	Grading will only be permitted within rights-of-ways and construction areas.
PA-7.06	Gravel pads will be graded so the surface runoff is directed away from waterbodies, riparian areas and wetlands.
PA-7.07	Required erosion protection and sediment control measures will be put in place prior to grading in accordance with the Erosion Protection and Sediment Control Plan.

Groundwater (EC-4)

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

Grubbing (PA-8)

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

Hazardous Materials (EI-4)

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

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 contact First Nation and Aboriginal community representatives prior to project start-up.
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 Conservation 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.

Petroleum Products (EI-5)

ID	Mitigation
EI-5.01	Aboveground tanks will be equipped with overfill protection and spill containment consisting of perimeter dykes or secondary containment in the tank design.
EI-5.02	All aboveground petroleum product tanks with a capacity greater than 5,000 L will be registered by the contractor with Manitoba Conservation and Water Stewardship 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 oil-filled 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	If dykes are used, the containment areas 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 Conservation 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 protected from vehicle collisions by concrete filled bollards.
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 Conservation and Water Stewardship.
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.

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 Vegetation 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 Vegetation 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 have dry ground conditions alternate products such as construction mats will be used.

Safety and Health (EI-6)

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

Soil Contamination (EI-7)

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

Staging Areas (PC-5)

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

Stream Crossings (PC-9)

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

Stripping (PA-10)

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

Transmission Towers and Conductors (PC-10)

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

Treated Wood (EI-8)

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

Vehicle and Equipment Maintenance (EI-9)

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

Waste Management (EI-10)

ID	Mitigation
EI-10.01	A Contract specific Waste and Recycling Management Plan will be prepared by the Contractor, reviewed by the Construction Supervisor and Environmental Specialist prior to construction and updated annually.
EI-10.02	Bear-proof garbage containers and electric fencing along with regular removal of food waste to approved waste disposal 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 disposal 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.

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 Conservation and Water Stewardship.
EC-9.02	Bird Diverters or aerial markers may be installed in high bird traffic areas.
EC-9.03	Boundaries of important wildlife habitats (ie. Mineral licks and Stick nests) will be identified in mapsheets and flagged prior to clearing.
EC-9.04	Clearing will occur outside breeding bird timing windows. See "Project Wildlife Reduced Timing Windows table" in the Appendix D
EC-9.05	Construction activities will not be carried out during prescribed timing windows for wildlife species.
EC-9.06	Bear-proof garbage containers and electric fencing along with regular removal of food waste to approved waste disposal grounds 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 Conservation and Water Stewardship will be notified if animal traps are encountered and must be removed for project activities.
EC-9.10	MB Conservation 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 Conservation and Water Stewardship.
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 Conservation and Water Stewardship.
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 Conservation and Water Stewardship.

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.

APPENDICES

APPENDIX A: CONTACT LIST

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

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



Transmission Line and Civil Construction Contractor Environmental Pre-job Orientation

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

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

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

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

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

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

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

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

Contractor Information:

Contractor: _____ email: _____

Address: _____

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

Contractor Representative: _____ email: _____

Address: _____

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

Contractor Environmental Representative: _____ email: _____

Address: _____

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

Please list proposed Sub-Contractors:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Construction Site/Designated Work Areas:

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

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

LOCAL OR SITE CONDITIONS:

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

Key Environmental Issues and Requirements Review:

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

Pre-Job Orientation Check List

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

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

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

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

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

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

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

REMARKS:

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

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

OFFICER OR DESIGNATE (SIGN)

MANITOBA HYDRO SENIOR ENVIRONMENTAL ASSESSMENT

YYYY MM DD

CONTRACTOR'S REPRESENTATIVE (SIGN)

YYYY MM DD

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

[illegible]



Contractor Environmental Orientation Procedures

NOTE:

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

1. Environmental Orientation Meeting is to be held with Contractor Supervisory staff prior to starting field work.
2. Ask all present to sign the attendance sheet. Retain attendance sheet and store appropriately.
3. Read each topic of the form out loud. Discuss each topic and answer question as necessary.
4. Fill in blanks as required.
5. Mark the appropriate boxes as either Yes, No, or N/A.
6. Pay particular attention to who shall be designated as Prime Contractor.
7. Sign the form. Have the form signed by the Contractor or delegate.
8. Distribution of Contractor Safety Orientation: Original plus 6 copies.
Signed Original: to be kept in safety folder, on site with all other required documents, permits, etc.
Copies to:
 - Post on site,
 - Project File,
 - Contractor,
 - Contract Supervisor,
 - Environmental Representative (Contractor)
 - Senior Environmental Assessment Officer (Fiona Scurrah)

APPENDIX C: ENVIRONMENTAL LICENCES, APPROVALS AND PERMITS

Table C-1: List of Approvals required for Construction		
Approval required (Applicable Legislation / Regulation)	Type of Approval needed	Responsibility
NOTE: To be developed upon regulatory approval		
LEA – Manitoba Hydro Licensing and Environmental Assessment Department TLCC – Transmission Line and Civil Construction Department		

APPENDIX D: TIMING WINDOWS

Project Wildlife Reduced Risk Timing Windows

Species	Sensitivity	January	February	March	April	May	June	July	August	September	October	November	December
Mammals	Overwinter Den Sites												
Moose/Elk	Calving Sites												
Amphibians/Reptiles	Breeding and Emergence												
Bats	Hibernaculum												
Birds	Breeding and Nesting												
Fish	Spawing Areas												

Reduced Risk to Wildlife

Sensitive Time Period for Wildlife

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

APPENDIX E: BUFFERS AND SETBACKS (ANY MANITOBA HYDRO TRANSMISSION PROJECT)

Table E 1 Setbacks and Buffers

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed ¹)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Rationale
Vegetation					
Plant Species at Risk	Tower Foundation Siting	100m	100m		Protect from disturbance
	Clearing And Construction	30m		30m	Protect from disturbance
	Maintenance	30m		30m	Protect from disturbance
	Access Trail	30m	30m		Protect from disturbance
Anthropogenic					
Heritage and Cultural	All	Varies	Varies	Varies	Protect from Disturbance
Amphibians					
Northern Leopard Frog * (known breeding pond, watering site)	Tower Foundation Siting	30m	30m		Protect from disturbance
	Clearing And Construction	30m		30m	Protect from disturbance
	Maintenance	30m		30m	Protect from disturbance
	Access Trail	30m	30m		Protect from disturbance

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed ¹)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Rationale
Reptiles					
Garter Snake Hibernaculum	Tower Foundation Siting	200m	200m		Protect from disturbance
Birds - Breeding and Nesting Sites					
Nests of Eagles, Ospreys and Heron Rookeries	All	200m			Protect from sensory disturbance during breeding season.
Active Large Stick Nests	All	200m			Protect from sensory disturbance during breeding season.
Least Bittern	All	400m			Protect from sensory disturbance during breeding season.
Yellow Rail	All	350m			Protect from sensory disturbance during breeding season.
Short Eared Owl	All	500m			Protect from sensory disturbance during breeding season.
Common Nighthawk	All	200m			Protect from sensory disturbance during breeding season.
Golden Winged Warbler	All	300m			Protect from sensory disturbance during breeding season.
Loggerhead Shrike	All	400m			Protect from sensory disturbance during breeding season.
Red Headed Woodpecker	All	200m			Protect from sensory disturbance during breeding season.
Rusty Blackbird	All	100m			Protect from sensory disturbance during breeding season.
Olive-sided flycatcher	All	300m			Protect from sensory disturbance during breeding season.
Sprague's Pipit	All	250m			Protect from sensory disturbance during breeding season.
Whip-poor-will	All	200m			Protect from sensory disturbance during breeding season.
Sharp tailed Grouse Leks	All	400m			Protect from sensory disturbance during breeding season.
Canada Warbler	All	300m			Protect from sensory disturbance during breeding season.
Nesting Colonies	All	1000m			Protect from sensory disturbance during breeding season.
Landforms					
Wetlands	Clearing And Construction			30m	Protect from disturbance
	Maintenance			30m	Protect from disturbance
	Access Trail			30m	Protect from disturbance
	Hazardous Material Handling/Storage	100m	100m		Protect from disturbance

Feature	Activity	Non Frozen Ground Setback Distance (No work allowed ¹)	Frozen Ground Setback Distance (No work allowed)	Vegetated Buffer Distance (Shrub and Herbaceous Vegetation Retained)	Rationale
	Soil Stockpiles	30m		30m	Protect from disturbance
Mammals					
Mineral Licks	All	120m		120m	Protect from disturbance
Occupied Mammal Dens	All	50m	50m		Protect from disturbance

All measurements are from edge of feature

Footnote 1: No Work Allowed without Manitoba Hydro Licensing and Environmental Assessment Department review and approval, which may be subject to regulatory approval.

APPENDIX F: AGRICULTURAL BIOSECURITY STANDARD OPERATING PROCEDURE

Agricultural Biosecurity Standard Operating Procedures

Transmission Business Unit

1. PURPOSE OF THE PROCEDURE

This Standard Operating Procedure (SOP) provides guidance and direction to individuals who may be required to enter agricultural land and the levels of cleaning necessary to reduce the likelihood of soil and manure transport of invasive organisms (diseases, pests, and invasive species).

2. SCOPE

This SOP describes the risk, techniques, record, and document controls for activities related to transmission construction and maintenance and its associated infrastructure, on agricultural land in Manitoba.

3. APPLICABILITY

This SOP applies to the following:

- Land zoned as agricultural (e.g. pasture, cropland, livestock areas).
- All employees of Manitoba Hydro as well as external individuals such as contractors or consultants who conduct work on behalf of the Transmission Business Unit.
- Additional measures may be prescribed in a project's Environment Act Licence or in the project's Environmental Protection Plan. These measures will be project specific and will not apply to all departments within the Business Unit.
- Additional measures may be implemented for agricultural areas where there is documented evidence of invasive organisms (diseases, pests, and invasive species).

This SOP **does not** apply to the following:

- Government road allowances.
- Gravel or paved driveways or roadways.

4. GENERAL INFORMATION

Agricultural biosecurity is the protection of crops and livestock systems against the threats to production from invasive organisms (diseases, pests, and invasive species). Human activity is one of the factors in the spread of invasive organisms, and the responsibility for agricultural biosecurity rests with all stakeholders.

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

5. GENERAL CONSIDERATIONS

1. If existing farm level biosecurity measures exist, Transmission staff and contractors will strive to meet the requirements of the agricultural operation when access is required.
2. Activities will try to avoid access through areas that may contain manure.
3. Regular maintenance activities (including patrols) on agricultural lands will typically be scheduled after crops have been harvested and conducted primarily after freeze up.
4. Staff from other Business Units carrying out work for Transmission will be required to follow these procedures during the course of their work.

Agricultural Biosecurity Standard Operating Procedures Transmission Business Unit

6. RESPONSIBILITY

All Transmission staff and contractors who carry out work on agricultural land will:

- Refer to and comply with the requirements of the SOP and the Agricultural Biosecurity Policy.
- If requested, be able to provide a copy of this SOP to the landowner or producer leasing the land.
- Be able to inform a landowner or producer leasing the land about the SOP, if asked.

It is expected that all individuals who require access onto agricultural land and are conducting activities for the Transmission Business Unit, including contractors, will be trained on the Agricultural Biosecurity Policy and this SOP.

Internal Training

A computer based training (CBT) course will be made available for training purposes. All individuals required to undergo training will complete the CBT and will have fulfilled the training requirement.

External Training

The Agricultural Biosecurity Policy and the SOP will be incorporated into the safety and environmental orientation prior to the start of work. Training records will be stored with the individual projects files.

7. ASSESSMENT OF RISK

The Transmission Business Unit elected to use a risk matrix to identify the potential biosecurity risk. The matrix identified the perceived risk to agricultural land from maintenance and construction activities by taking the frequency a hazard may occur and multiplying it by the consequence or severity of the hazard to determine the level of acceptable risk. The following two levels of risk were identified from the matrix; low risk and higher risk.

Low Risk

During the winter season when the ground is frozen and there is snow cover, it is not anticipated that activities conducted during this time will effectively transfer invasive organisms (diseases, pests, and invasive species) to other agricultural lands and therefore the risk can be considered low. When the ground is dry and undisturbed the risk of transferring seeds is minimal, however, avoiding bare ground will also help to reduce the risk. Visible inspections will still be expected to occur and are described in the biosecurity procedures. The risk can be managed and further minimized by avoiding wet areas and cleaning equipment effectively when leaving the field.

Higher Risk

The higher risk will be located in areas where the ground conditions are very wet and the accumulation of heavy soils such as clay may occur on footwear and in the tracks of vehicles or heavy equipment. There are a number of ways this condition can be mitigated such as avoiding the excessively wet areas, additional cleaning procedures, or rescheduling the work until ground conditions are more favourable.

Although the last method is preferred, it is not always possible because the activity may be dependent upon a specific timeline, seasonal changes, or an emergency situation where it is essential to return infrastructure to normal operating conditions.

Agricultural Biosecurity Standard Operating Procedures

Transmission Business Unit

Additional measures may be implemented when there is documented evidence of invasive organisms (diseases, pests, and invasive species) that are of concern to Manitoba Agriculture, Food and Rural Development.

For the majority of activities conducted within the Transmission Business Unit, the level of risk is anticipated to be low risk. With continual educational awareness and effective implementation of biosecurity procedures, the goal is to further minimize the risk to agricultural lands.

8. PRESCRIBED ACTIONS

Emergency

In emergency situations the Manitoba Hydro Act will prevail in order to return services to normal operating conditions. All efforts will be made to assess the risks to agricultural land and personal safety to determine the most appropriate measures to be taken.

Low Risk

Low Risk Activities are those that are typically completed in frozen conditions, or on dry ground with little soil disturbance.

1. Ensure all equipment and clothing is clean prior to entering onto agricultural land.
2. When leaving the field, check clothing, footwear, and equipment for seeds, soil, or manure and if required, brush off prior to leaving the field. The use of a brush will remove most surface soil, plant material, and foreign matter from clothing and equipment.

Higher Risk

This type of risk will involve activities on wet or heavy soils, such as clay, with the potential for large soil accumulations on equipment and footwear.

1. If possible, schedule activities to occur when ground conditions are more favourable.
2. If activities cannot be rescheduled, ensure that proper care and attention is paid to cleaning equipment and footwear prior to leaving the site.
3. Equipment may require fine cleaning to remove remaining soil. This may include pressure washing to rinse off remaining soil or manure. It is preferable at the field approach, but can be completed off site.
4. Use safety footwear that can be easily cleaned. Use a brush to remove visible soil or manure and disinfect or change footwear when leaving the field.
 - Disinfectants such as 1% Virkon may be carried in a household spray bottle or a larger container if required.
 - If washing footwear in the field with disinfectant, ensure wastewater is contained and appropriately disposed of offsite.
5. Fill out the Vehicle and Equipment Cleaning Record and submit with the Biosecurity Checklist.

Agricultural Biosecurity Standard Operating Procedures

Transmission Business Unit

9. PERSONAL PROTECTIVE EQUIPMENT

Safety of the individual will always be of the highest importance at Manitoba Hydro. Corporate safe work procedures and protocols are in place to protect not only the individual(s) directly involved in the activity or work, but also as it relates to public safety.

Personal protective equipment (PPE) will be worn as per the manufacturer's specifications and as directed by Manitoba Workplace Health and Safety Regulation 217/2006, Part 6 Workplace Safety and Health Regulations.

10. CONTACT INFORMATION

If there are any questions or concerns from the public related to biosecurity at Manitoba Hydro, contact the Customer Contact Centre at 1-MB-HYDRO (1-888-624-9376) or via email at environment@hydro.mb.ca.

11. APPROVAL

(Original signed by)

Shane Mailey
Vice President
Transmission

Date

NOTE: This procedure will be reviewed annually by management. As conditions change or new information becomes available, this document may be revised prior to the annual review date. Printed copies are not controlled, so check with management for the latest version.



AGRICULTURAL BIOSECURITY CHECKLIST TRANSMISSION LINE CONSTRUCTION

INSTRUCTIONS

1. Complete Agricultural Biosecurity Checklist (page 1). Required fields indicated with ' * '.
2. If Higher Risk, complete Equipment Cleaning Record (page 2). Required fields indicated with ' * '.
3. Once complete, click 'Email' icon and send to TLC.Agricultural.Biosecurity@hydro.mb.ca (default email address).

If the form cannot be accessed electronically, print and complete the form by hand, then scan the form into an email with the subject line as 'Agricultural Biosecurity Checklist - TLC' and send to TLC.Agricultural.Biosecurity@hydro.mb.ca.

DATE OF FIELD VISIT *	yyyy mm dd
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Name of recorder *	Company (If different from Manitoba Hydro)
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Fill in one of the location identifiers. *

1. Legal land location			
2. GPS (start)	GPS (end)		
3. Transmission line:	Structure # (start):	Structure # (end):	
_____	_____	_____	
_____	Structure # (start):	Structure # (end):	
_____	_____	_____	
_____	Structure # (start):	Structure # (end):	
_____	_____	_____	

Determine your risk and fill out one of the applicable sections below. *

Emergency ☐ (Please check)
Low Risk ☐ (Please check)
If applicable, the following may apply: Brush all visible soil, manure, and seeds from clothing. Rough cleaning of vehicle and equipment. Disinfect footwear when leaving field.
Higher Risk ☐ (Please check)
1. Ensure the Biosecurity Procedures are followed for Higher Risk situations. 2. Complete Equipment Cleaning Record (page 2).

Did the landowner have a biosecurity procedure in place? *	☐ Yes	☐ No
Did the landowner request a copy of the Standard Operating Procedures? *	☐ Yes	☐ No



EQUIPMENT CLEANING RECORD TRANSMISSION LINE CONSTRUCTION

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

Complete at cleaning area.

Unit number *		
Equipment type *	DATE OF CLEANING *	yyyy mm dd
Cleaned by *		
Location of cleaning *	Free of oil leaks? * ☐ Yes ☐ No	
Inspected by *	Signed by *	yyyy mm dd
Remarks		

Complete at destination site.

Destination		
Delivered to site by		
Inspected for cleanliness at site? ☐ Yes ☐ No	Free of oil leaks? ☐ Yes ☐ No	
Inspected by	Signed by	yyyy mm dd
Remarks		

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

Guidance for Contaminated Soils or Groundwater

Identification and Disposal

Identifying Contaminated Soils

Manitoba Hydro properties may be impacted with Petroleum Hydrocarbons (PHC), Polycyclic Aromatic Hydrocarbons (PAHs), Polychlorinated Biphenyls (PCBs), and Glycol due to current and historical activities on-site. Any Manitoba Hydro property should be suspect and excavated soils either sampled prior to disposal at a licensed facility or directly transported to a licensed facility, where the soil will be sampled by the facility and held within their compound prior to their formal acceptance of the soils. Additionally, non-Manitoba Hydro properties may have similar contaminants or other contaminants present.

Soils and groundwater which may have come into contact with transformer oil, diesel, gasoline, and lubricants may have an obvious hydrocarbon odour and/or grey-black “staining” (see Photos 1 to 4) that appears unnatural. Soils exhibiting these characteristics should be segregated for disposal in a licensed facility. Similarly, contaminated groundwater should be removed from the excavation and disposed of at a licensed facility.



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



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



Photo 3: PHC (oil) staining on surface gravel

Photo 4: PHC contaminated water (note sheen on water), and soil staining

Worker Health and Safety

Workers will wear appropriate personal protective equipment (PPE) if they are handling contaminated soils and/or groundwater. Appropriate PPE, depending on the contaminant and contaminant concentration, may include nitrile gloves, half-mask respirator, safety boots, protective clothing, and protective eyewear.

An experienced environmental officer or consultant will confirm, and subsequently characterize and conduct an assessment of the potential impacted soils using appropriate field screening techniques and scientific instruments. The environmental officer or consultant will monitor ambient air in the general area of excavation to ensure worker health and safety.

Communications / Notifications

If contaminated soils are encountered during construction, all personnel would stop work, leave the contaminated area, and notify the on-site environmental officer. Additional notifications would then be made to internal and external personnel as required.

Prior to the disposal of contaminated soils, a Remedial Action Plan is required to be completed and submitted to Manitoba Conservation and Water Stewardship for their approval. At the conclusion of the remedial activities, a closure report will also 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.

Soil and Water Handling and Disposal

In the event that contamination is encountered during construction the following measures to protect worker health and safety, transport and manage excavated soil to designated staging areas, characterize the soils for waste disposal, and ensure that all soils are managed in accordance with provincial and federal regulations and guidelines will be undertaken:

- Limit personnel working within the contamination area during excavation activities.
- Excavation of contaminated soils will be overseen and directed by the environmental officer or consultant.
- If soil is not directly placed into truck, contaminated soils will be stockpiled on impermeable sheeting and roped off to prevent unauthorized entry (at Dorsey Station, soil must not leave the station prior to soil characterization.).
- Soil and/or groundwater samples will be sent to a Canadian Association for Laboratory Accreditation (CALA) accredited Laboratory for waste characterization.
- Soils will be characterized for waste disposal and appropriate truck placarding.
- Contaminated soils and/or groundwater will be transported in accordance with the Manitoba *Dangerous Goods Handling and Transportation Act* and associated Regulations.
- Decontamination of equipment, as required.

Soils will be disposed of at a licensed Municipal Waste Disposal Ground (Landfill) if laboratory analysis indicates that it is below the Canadian Council of Minister of the Environment (CCME) Industrial Land

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:

<i>Contaminated Soil Disposal</i>		
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
Viriden Municipal & Industrial Waste Facility	236 Wellington Street South, Viriden, MB	(204) 204-512-0816 or (204) 748-6033
<i>Contaminated Water Disposal</i>		
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.

APPENDIX H: CONTRACTOR- DEVELOPED ENVIRONMENTAL PLANS

H.1 Emergency Preparedness and Response Plan

Attach Contractor developed Emergency Preparedness and Response Plan

H.2 Waste and Recycling Management Plan

Attach Contractor developed Waste and Recycling Management Plan

H.3 Erosion and Sediment Control Plan

Attach Contractor developed Erosion and Sediment Control Plan

APPENDIX I: FRAMEWORKS FOR CONTRACTOR-DEVELOPED ENVIRONMENTAL PLANS

I.1 Waste and Recycling Management Planning Framework

Introduction

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

Purpose of Framework

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

Objectives

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

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

Definitions

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

The Environment Act definition of waste is:

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

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

“hazardous waste” means a product, substance or organism that

- a) is prescribed, designated or classified as hazardous waste in the regulations, or
- b) by its nature conforms to the classification criteria for one or more classes of hazardous wastes set out in the regulations.

Plan Scope

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

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

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

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

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

Related Environmental Protection Program Documents

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

Waste Management

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

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

Prior to the start of construction, the Contractor must ensure that the waste disposal grounds are willing and have the capacity to accommodate the projected waste volume. Waste disposal grounds must be registered with Manitoba Conservation and Water Stewardship and be in accordance with the Waste Disposal Grounds Regulation (150/91, July 9 1991).

Waste Management Activities

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

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

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

Other Plan Considerations

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

Waste and Recycling Management Plan Approval

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

Table 1-2: Preferred Waste Management Methods

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

Table 1-2: Preferred Waste Management Methods

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

I.3 Erosion and Sediment Control Planning Framework

Introduction

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

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

Background

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

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

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

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

Purpose

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

Objectives

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

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

Roles and Responsibilities

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

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

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

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

Erosion and Sediment Control Plan Components

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

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

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

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

Monitoring and Inspection

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

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

An effective construction monitoring program should include the following:

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

MANITOBA-MINNESOTA TRANSMISSION PROJECT

Appendix B - Access Management Plan



Appendix 22B

Access Management Plan



MANITOBA-MINNESOTA TRANSMISSION PROJECT

Access Management Plan

MANITOBA-MINNESOTA TRANSMISSION PROJECT

CONSTRUCTION ACCESS MANAGEMENT PLAN



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

Version – Draft

List of Revisions

[illegible]

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List of Acronyms

AC	Alternating current
AMP	Access Management Plan
ATK	Aboriginal Traditional Knowledge
ATV	All-terrain Vehicle
CEnvPP	Construction Environmental Protection Plan
ESS	Environmentally Sensitive Site
kV	Kilovolt
ORV	Off-road Vehicle
PR	Provincial Road
PTH	Provincial Trunk Highway
RCMP	Royal Canadian Mounted Police
ROW	Right-of-way
MH	Manitoba Hydro
MCWS	Manitoba Conservation and Water Stewardship
IRMT	Integrated Resource Management Team

1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the Manitoba - Minnesota Transmission Project Environmental Impact Statement (EIS) to developing an access management plan (AMP) as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects. The AMP is a direct response to recommendations made by Project study team specialists in supporting technical reports, key person interviews, stakeholder, public and Aboriginal engagement and Aboriginal traditional knowledge (ATK) studies. General and site specific access management mitigation strategies are detailed in the Manitoba - Minnesota Transmission Project (the Project) Construction Environmental Protection Plan (CEnvPP).

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

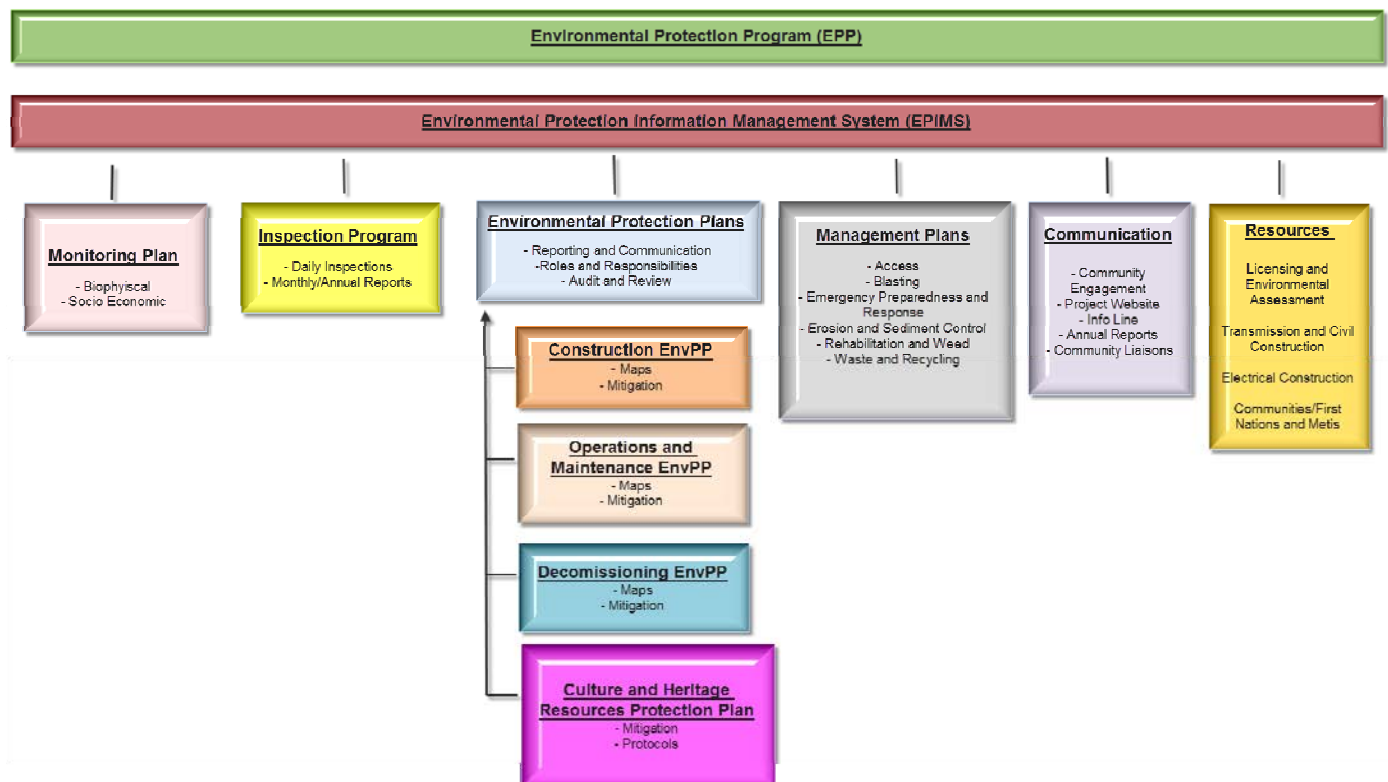


Figure 1-1. Transmission Environmental Protection Program

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

A high level outline of an operations and maintenance phase access management plan is discussed in section 5.0. Manitoba Hydro has committed to the development of the operations and maintenance access management plan with the understanding that much of its content will be dependent on experience and knowledge gained during the construction phase of the development.

2.0 Purpose and Objectives

The purpose of developing the AMP is to address issues of concern expressed by stakeholders, the public, and Aboriginals during Project engagement, and by study team specialists in their EIS supporting technical reports. The AMP is intended to safeguard and support the preservation of environmental, socio-economic, cultural and heritage values within the Projects' area of direct impacts. The focus of this AMP is on the construction phase of the Project. A detailed operations and maintenance access management plan will be developed prior to Project commissioning.

The objectives of the AMP are to:

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

2.1 Construction Access Management Plan Coverage

From a geographic perspective the scope of this AMP includes the Project's transmission construction site (i.e., rights-of-way, camps, marshalling yards, borrow pits and access trails specifically constructed for Project purposes) (Map 1-1). Public access restrictions are primarily limited to the "active" construction site, for reasons of safety, and will generally not interfere with traditional traffic patterns.

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

2.2 Identification of Potential Construction Access Opportunities

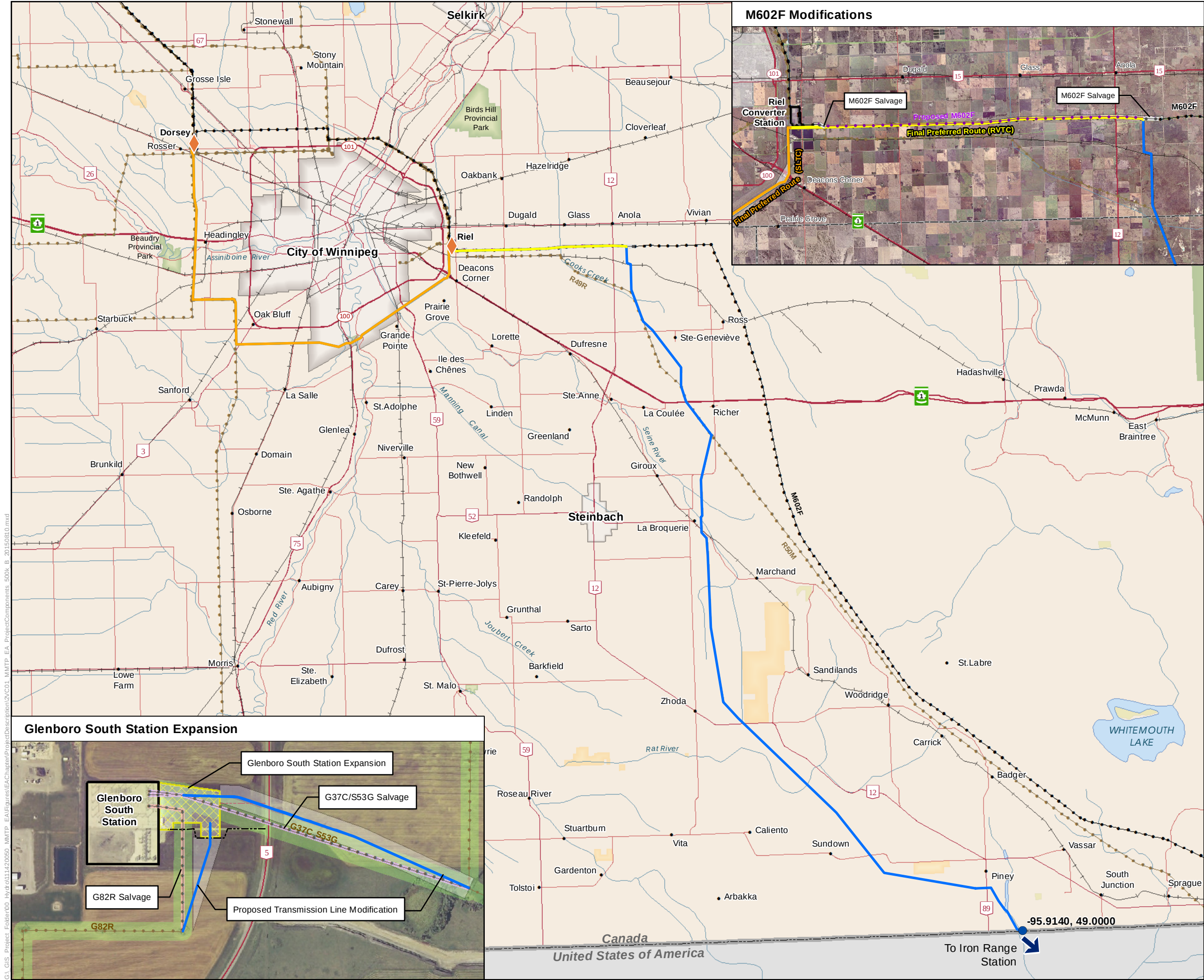
Manitoba Hydro has conducted a survey along the final preferred route to identify all potential construction access opportunities to the ROW using existing roads, trails and transmission ROWs.

The survey was completed in June of 2015. Manitoba Hydro personnel investigated access opportunities along the Final Preferred Route. All data was collected using a tablet that collected location, notes, and pictures of each access opportunity.

These access opportunities outlined in Appendix A have been selected based on the following criteria

- To provide reasonable and safe entrance and egress the Transmission Line ROW while minimizing disruption to Provincial, Municipal and private roads along with trails and private property.
- To ensure that there a minimum of one access point to get to any given location on the ROW.

- To provide good visibility for upcoming traffic at each access point turn off from existing roads and trails.
- To minimize the number of new access ditch crossings and potential culverts where the ROW intersects existing roads or trails by utilizing existing crossings if available within the ROW. If there is an existing crossing outside of the ROW within reasonable distance from the ROW, obtain permission to utilize crossing from owner.
- Minimize the use of existing access routes in heavily populated residential areas.
- Minimize the use of private roads and trails



Manitoba-Minnesota Transmission Project

Project Infrastructure

- ◆ Converter Station (Existing)
- Border Crossing
- Final Preferred Route (Southern Loop Transmission Corridor - SLTC)
- Final Preferred Route (Riel-Vivian Transmission Corridor - RVTC)
- Final Preferred Route (New Right of Way)
- M602F Modification (Salvage)
- M602F Modification (New)
- G37C Salvage
- G82R Salvage
- Existing/New Glenboro South Station Access
- New Glenboro South Station Access
- Existing ROW
- Station Expansion
- Project Development Area (PDA)

Infrastructure

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

Landbase

- Community
- Railway
- Trans Canada
- Provincial Highway
- Provincial Road
- City
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 19, 2015



0 5 10 Kilometres
0 5 10 Miles

1:500,000

Project Components

3.0 Stakeholder Interests and Issues

During the course of the public and First Nations and Metis engagement processes and during environmental assessment studies (biophysical and social), access related concerns were raised. In response, Manitoba Hydro committed to developing access management plans for the construction and operation and maintenance phases of the Project. To ensure full consideration of access related issues and concerns, a review was conducted of all pertinent Project information, including engagement and meeting records, key person interviews, ATK information, regulator input and discipline specific technical reports.

The results of the above review identified potential user groups, stakeholders and discipline specific specialists with a variety of potential issues and concerns related to access. Most issues and concerns relate primarily with the construction phase of the Project while some carry over to the operations and maintenance phase as well.

The primary concerns for most of the user groups, stakeholders, First Nations and study specialists are protection of the environment, wildlife species and interference with resource use practices/activities. Also important are safety to project personnel and the public, security of construction sites and property, minimizing the creation of new access as much as possible, and protection of cultural and heritage resources.

This AMP attempts to address and minimize potential access related effects, issues and concerns identified in Table 3-1; however, Manitoba Hydro recognizes that not all issues and concerns can be fully mitigated through the AMP and will be addressed through other components of the Environmental Protection Program.

Table 3-1 List of Access Concerns/Issues/Opportunities

- Safety of all people
 - Safe access to/from and through construction areas
- Security of property
- Ability to conduct work efficiently
- Unimpeded access to construction site
 - Timely permission to construct/use approaches to existing roads
 - Timely permission to use/construct crossings
- Creation of new access into formerly remote areas
 - Increased number of access routes
 - Access for outsiders
 - Increased off-road traffic
 - Increased pressure on resources (game, furbearers, gathering sites, etc.)
 - Increased animal and bird mortality due to collisions
 - Disturbance to remote trapper cabins
 - Increased risk of vandalism, theft
 - Increased risk of wild fire
- Fragmentation
 - Alter wildlife movement
 - Disruption to migration pathways
 - Reduced range connectivity
 - Loss of wilderness areas
 - Loss of functional habitat
- Increased hunting, trapping, fishing pressure
 - Improved subsistence hunting/harvesting
- Sensory disturbance to wildlife
- Interference with
 - recreational activities
 - resource use activities
 - transportation infrastructure
 - emergency measures routes/delivery
- ROW use as transport corridor
 - Trail network expansion by recreational off-road riding clubs, industry and the general public
- Respect for land (traditional and private)
- ROW as access opportunity
 - Improved/expanded access
 - Improved trapping, hunting success
 - Tourism
- Increased traffic on existing roads
 - Safety
 - Sensory disturbance to people and wildlife
 - Damage to infrastructure
 - Inconvenience (temporary closures)
- Loss/damage to habitat
 - Wildlife
 - Vegetation communities of concern
 - Plants of conservation concern
 - Harvestable plant species/communities

- Introduction/spread of non-native species
- Damage to cultural, heritage, sacred sites
- Increased predation
 - Change in prey/predator dynamics
 - Human use of trails
 - Increased predator rates of travel on packed trails
- Damage to aquatic environment/fish habitat
 - Deleterious materials
 - Stream bed/bank damage
 - Sedimentation
- Vehicle bird/mammal collisions

4.0 Construction Access – Access Management

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

4.1 Roles and Responsibilities

A successful construction program requires commitment and cooperation from all participants. Instrumental for those involved is to fully understand their roles, responsibilities and lines of communication within the Project. For purposes of implementing this AMP, responsibilities rest with Manitoba Hydro's Construction Supervisor, Senior Environmental Assessment Officer, Construction/Environmental Inspectors, and the Construction Contractors' Project Manager/Supervisor, and Environmental Officer/Supervisor. The communication and reporting structure is detailed in Figure 4-1. Their key responsibilities are shown in Table 4-1.

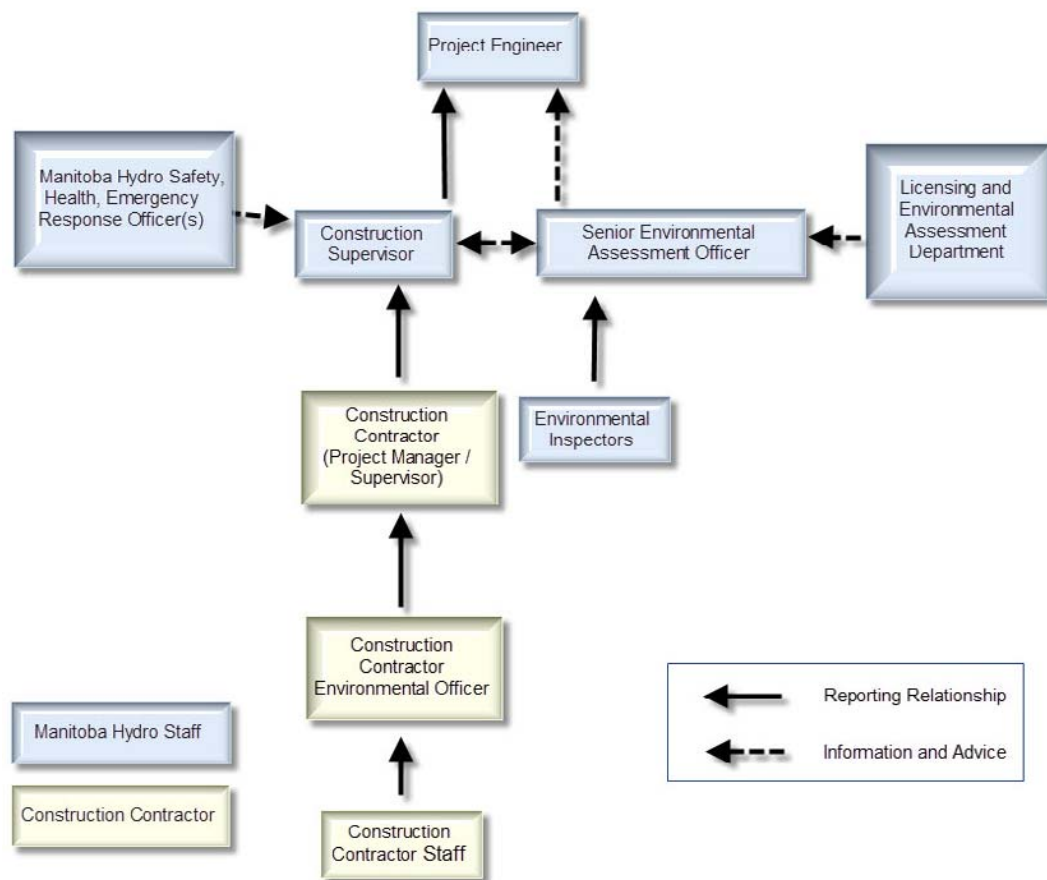


Figure 4-1. Environmental Communication Reporting Structure

Table 4-1. Access Management Roles and Responsibilities of Personnel during the Construction Phase

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

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

Role	Key Responsibilities
Construction Contractor(s) (Project Manager / Construction Supervisor)	- Accountable for all regulatory and environmental prescriptions (i.e., follow CEnvPP and mitigation measures prescribed). - Ensure all contractor project staff are adequately trained/informed of pertinent environmental requirements of the Project related to their position. - Report any discoveries of non-compliance, accidents or incidents to the Construction Supervisor. - Ensure that all remedial actions are carried out as per Manitoba Hydro instruction. - Ensure all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to the Construction Supervisor. - Responsible for permits
Construction Staff	- Accountable for all regulatory and environmental prescriptions (i.e., follow CEnvPP and mitigation measures prescribed). - Ensure adequately trained with respect to, and informed of pertinent, environmental requirements of the Project related to their position. - Report any discoveries of non-compliance, accidents or incidents to the Construction Supervisor. - Ensures that all remedial actions are carried out as per Manitoba Hydro instruction. - Ensures all discoveries of heritage resources, human remains, paleontological finds, environmentally sensitive sites, etc. are reported to the Construction Supervisor.
Construction Contractor's Environmental Officers	- Responsible for implementation, coordination and verification of pre-project employee environmental orientation. - Ensures that the contractor employees adhere to all aspects of the construction Environmental Protection Plan. - Provides information and advice to the Construction Contractor employees on environmental protection and safety matters. - Responsible for implementation of the emergency response and hazardous materials plans, and other related topics. - Liaises with Environmental Inspector and Hydro Field Safety Officers.

4.2 Transmission Line Construction Access Opportunities

Consistent with issues and concerns identified in Section 3.0, Manitoba Hydro and its contractors will use existing roads, trails and linear features where possible for accessing the Project construction site. To facilitate this, Manitoba Hydro has identified existing strategic access routes relative to the construction site and major roads to guide construction planners and contractors.

The Construction Access Opportunities Mapbook (Appendix A) illustrates the existing access opportunities (i.e., intersections between the proposed ROW and existing highways, roads, trails and linear features) that

minimize the need for new access development to access the ROWs. The AMP will restrict Manitoba Hydro and its contractors to use the identified access options, thereby minimizing Project effects as they relate to access.

4.3 Access Mitigation Measures

To address the identified issues and concerns in Section 3.0, Manitoba Hydro, its personnel, contractors and consultants will adhere to the access management measures (AMMs) outlined in Section 6.0 (Table Access Roads and Trails PC-1) in the Construction Environmental Protection Plan (CEnvPP).

4.3.1 Environmentally Sensitive Sites

A number of environmentally sensitive sites (ESS) have been identified on and adjacent to the Project construction site through the public engagement process and biophysical and socio-economic studies. Additional ESS may be identified prior to and during the construction program, including potential heritage resources sites. A full list of specific environmental protection measures is included in the Project's CEnvPP.

4.4 By-pass Routes and Trails

Manitoba Hydro will be accessing the ROW through existing trails and access points to the extent feasible. However, in some instances there may be a requirement for a by-pass trail located outside, but along the ROW, or the creation of a new access route to the ROW. In those situations where a new by-pass trail/access route would be required, Manitoba Hydro would undertake the following process to: 1) site the by-pass trail/access route, 2) evaluate location for environmental and cultural sensitivities, and 3) ensure any new by-pass trails/access routes follow the applicable mitigation measures as outlined in the Construction Environmental Protection Plan (CEnvPP). Figure 4-2 illustrates the process and details of the steps are provided to operationalize the process.

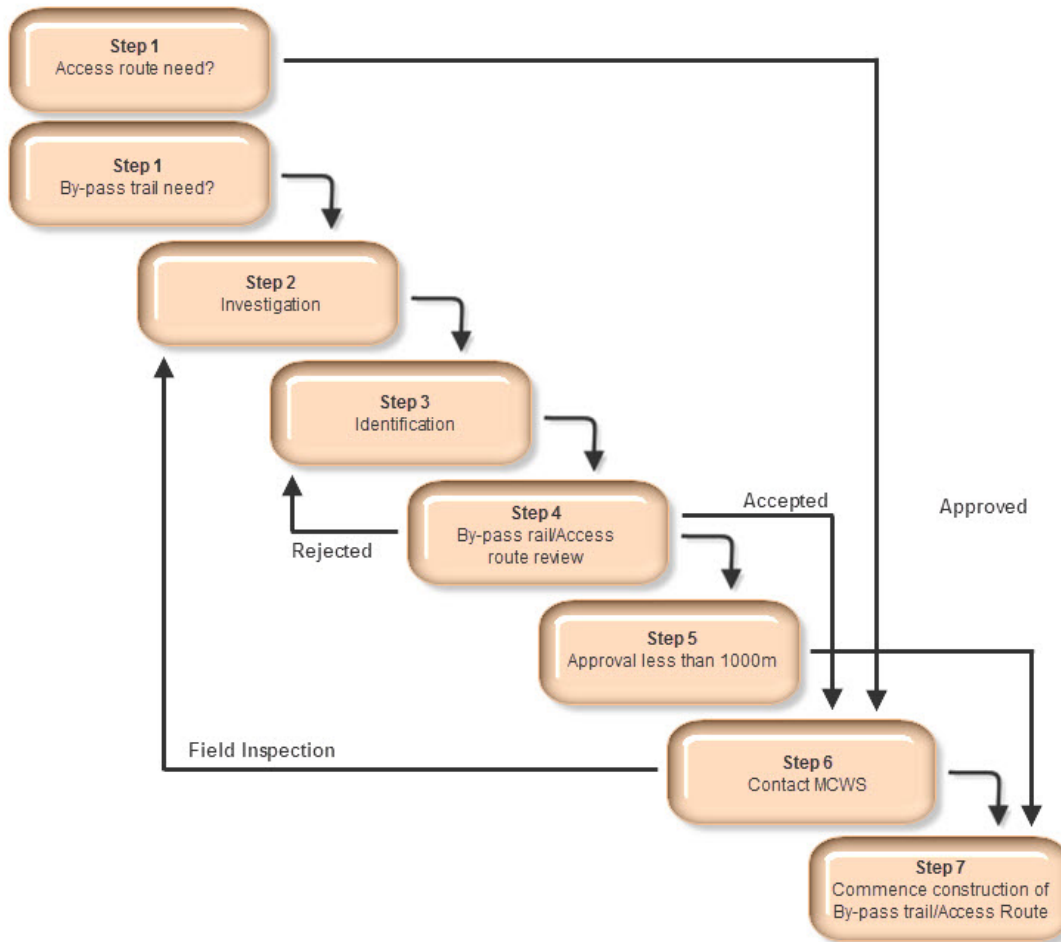


Figure 4-2. By-pass Trail/Access Route Siting and Approval Process

Step 1: Determine by-pass trail/access route need: Manitoba Hydro in conjunction with the Contractor identifies the need for a by-pass trail or new access route (i.e., rock outcrops, impassable terrain). If a new access route is needed, approval will be sought from the local Manitoba Conservation and Water Stewardship Office. If a by-pass trail is needed and it is shorter than 1000m, Manitoba Conservation and Water Stewardship will receive notification. If the new by-pass trail is longer than 1000m, approval will be sought from the local Manitoba Conservation and Water Stewardship Office with regard to location and clearing method.

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

Step 3: Identification: Manitoba Hydro Construction Supervisor/Inspector to identify and verify the location of the by-pass trail/access route by recording GPS coordinates and flagging the centerline and/or boundaries. Furthermore, the Manitoba Hydro Environmental Inspector is to identify and verify any sensitive sites associated with the area. The above information is then submitted to Environmental Protection Information Management System (EPIMS) as “Unplanned Infrastructure” for review.

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

Step 5: Less than 1000m by-pass trail/access route approval: When by-pass trail/access route is approved, it will be: a) added to the appropriate CEnvPP including any ESS sites; and b) Annual Harvest Plan updated (if applicable) and provided to project personnel and local Manitoba Conservation and Water Stewardship (MCWS) Office. Proceed directly to Step 7.

Step 6: Greater than 1000m by-pass trail/access route approval: If by-pass trail/access route is approved in Step 4, the proposed CEnvPP amendment will be submitted to Manitoba Conservation and Water Stewardship office which issued the Work Permit for approval. **If approved**, it will be: a) added to the appropriate CEnvPP including any ESS sites; and b) Annual Harvest Plan (if applicable) updated and provided to project personnel and the local MCWS Office and move to Step 7. **If field inspection is required for approval or alignment change** Step 3 will be conducted with MCWS staff on site, followed by Step 4, 6, and 7.

Step 7: Commence construction of by-pass trail/access route: Implement mitigation and commence construction. Manitoba Hydro will identify and document any by-pass trails/access routes that may be required post construction for line maintenance activities and incorporate into the Operations and Maintenance Environmental Protection Plan. Any by-pass trails on crown land required for operations will be added to the applicable General Permit area, for those no longer required Manitoba Hydro will develop a decommissioning plan for approval by MCWS.

4.5 Traffic Safety and Access Management Mechanisms Overview

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

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

For reasons of safety, options may be examined to relocate sections of off-road vehicle (ORV) trails (e.g. ATV and snowmobile trails) to create separation between Project construction activities and ORV riders. Where and as applicable, Manitoba Hydro will discuss this with Manitoba Conservation and Water Stewardship, local municipal officials and local off-road recreational riding clubs to examine alternatives. Where the construction site intersects with ORV trails, Manitoba Hydro and/or its contractors will advise the local clubs of such intersections, the schedule of clearing and construction activities, and work with the clubs to ensure safe conditions are maintained at such intersections. This will include but not be limited to warning

signage on trails and the active construction site and ensuring, to the extent feasible, that the trails are kept clear of all debris and other impediments.

All Project related personnel and their vehicles will be allowed to access the construction site as required for work purposes. Province of Manitoba and Government of Canada representatives that are engaged in project related inspections, research and monitoring personnel and resource harvesters (e.g. licensed outfitters) whose areas are being crossed by the transmission line will be allowed to traverse the active construction site. No other individuals will be granted access to traverse the active construction site for reasons of safety. The names of licensed outfitters operating within the area will be provided to the Manitoba Hydro Construction Supervisor. Licensed outfitters wishing to traverse the active construction site will be required to check in with the Construction Supervisor to identify themselves (sign in), indicate their business, indicate the location of their business and avail themselves of orientation and safety information. All personnel will have to comply with safety protocols and be required to check out (sign out) with the Construction Supervisor when leaving the active construction site. The number of access points/routes to the construction site will be minimized to facilitate access management issues. Where Manitoba Hydro and its contractor staff encounter non-project related traffic on the active construction site, safety advisory information will be provided and individuals will be asked to vacate the area for reasons of safety.

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

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

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

Manitoba Hydro will determine the type and quantity of signage required, consult with MCWS on wildlife signage when required, produce them, and erect them when required.

4.5.1 Access Allowance

During the construction phase of the Project, one of Manitoba Hydro's concerns is safety for workers and others who may access the active construction site. While non-construction traffic will be limited/restricted in the active construction site, the comings and goings of licensed outfitters will be maintained within the limits of safety as indicated in the previous section. Access and safety issues will be monitored by the Construction Contractor, the Manitoba Hydro Construction Supervisor and the Environmental Inspector.

Manitoba Hydro recognizes that those who access Crown land adjacent to the active construction site via means other than the Project ROWs (e.g., existing trails in the area) have the right to be there. All intersecting trails/roads will be kept clear of debris so as not to impede existing travel routes. Manitoba Hydro will limit/restrict access to the active construction site as safety is a primary consideration.

Those authorized to access the active construction site (including work camps) are noted in Table 4-2. Manitoba Hydro and its contractors will carefully monitor for safety and security issues and, if problems warrant, are prepared to limit access to only those directly associated with the Project.

Table 4-2 Access Allowance and Authorization in Active Construction Areas

User	Type of User	Authority
Project Traffic	Manitoba Hydro staff	No conditions
	Contractor personnel	
	Government (provincial & federal) personnel	Construction Supervisor or delegate
	Research & monitoring personnel	
	Emergency vehicles/personnel	No conditions
Resource Harvesters	Licensed outfitters	Construction Supervisor or delegate
Non-Project Traffic	Public/Aboriginal peoples	Restricted
Others	Community officials, Manitoba Hydro staff/officials/contractors/consultants, employee family members	Construction Supervisor or delegate
	School and public tours, media, etc.	

4.5.2 Recreational Vehicles

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

4.5.3 Weapons Restrictions

Restrictions will be in place regarding firearms (e.g., rifles, hand guns, shotguns) and other weapons (bows, crossbows) on the construction site for reasons of safety. All Manitoba Hydro and contractor personnel will not be permitted to transport, store or use weapons on the construction site (including camps) or utilize construction access for hunting. This will be a condition of employment and all workers will be informed of this at the time of hire. Breach of this condition by any worker will constitute grounds for dismissal from employment.

An exception to the above may be made where the need arises to have firearms on the construction site for protection purposes (e.g., bears). In such instances the Construction Supervisor will assign such responsibilities to trained individuals who will be the only ones with the responsibility to possess and handle firearms on the construction site.

4.5.4 Outfitters

Licensed outfitters and their clients who are directly affected by Project construction activities may require firearms or other weapons to carry out their normal harvesting activities. Manitoba Hydro will work with outfitters to promote safe access practices and provide updated safety information and the location(s) of construction activities during their active harvesting periods. All licensed outfitters wishing to traverse the active construction site must meet with the Manitoba Hydro Construction Supervisor to inform the supervisor of their intentions, their destination(s) and avail themselves of safety information.

With respect to outfitters (their clients), weapons (including long bows or cross bows) are permitted while traversing the active construction site under the following conditions:

- Firearms (including long bows and cross bows) must be unloaded, locked and cased while on the active construction site.

In addition, frequent safety information bulletins will be provided to all surrounding communities. Resource harvesters will be updated regularly on the location and timing of construction activities within the construction site.

4.5.5 Temporary Work Camp Sites, Marshalling Yards and Borrow Pits

Temporary work camp sites, marshalling yards and borrow pits used for Project purposes form part of the construction site. All Project related access management measures shall apply to these sites. When any of the new sites are no longer required for Project purposes, and if not required by other non-project parties (e.g. Manitoba Conservation and Water Stewardship, Manitoba Infrastructure and Transportation, etc.), access into such sites may be decommissioned and all Project personnel will be restricted from entering such sites. Access decommissioning could include the placement of impediments (e.g., berms, boulders, debris, etc.) to restrict public access.

4.5.6 Compliance

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

- Signage at access points and on the construction site;
- Orientation of all workers;
- Information sessions with resource harvesters, outfitters and Aboriginal communities; and
- General information dissemination to the public and recreational organizations.

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

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

4.6 Education and Communication Strategy

An education and communication strategy for the AMP is vital to ensure successful implementation of the Plan. Manitoba Hydro Transmission Line and Civil Construction will be meeting with affected communities prior to construction. Early, effective and frequent communication with project personnel and non-project parties is critical:

- To ensure the safety of workers and the public at large;
- To protect the environment from access related effects;
- To create an understanding among specific relevant groups and the public at large regarding what access management measures are being used and why;
- To gain the cooperation and support of parties (including leaders in neighbouring communities and Aboriginal communities and government agencies) in encouraging citizens to respect the intent of the Plan and abide by its measures;
- To provide clear information about the mechanisms by which access management will be implemented; and
- To foster a sense of trust between stakeholders, Aboriginal communities, municipalities, landowners, the public and Manitoba Hydro.

4.7 Monitoring and Follow-up

Access related monitoring shall occur for the following purposes:

- To determine whether the measures set out in this AMP are effective; and
- To adapt and improve measures in this AMP in response to actual experience (adaptive management).

Sources of monitoring information may include the following:

- Construction supervisor, senior environmental assessment officer, environmental inspector and contractor personnel, documentation and reports;
- Manitoba Conservation and Water Stewardship resource officers and Manitoba Workplace Safety and Health inspectors and RCMP (as applicable);
- Input from resource harvesters, outfitters, Aboriginals, stakeholders, municipal leaders, landowners and the general public.

The following factors are intended for monitoring during construction:

- Issues and concerns raised by resource harvesters/outfitters;
- Non-construction related traffic on the construction site (type, volume, purpose, date, location, safety issues);
- Incidents or problems with access on the construction site (all traffic); and
- Incidents or problems with non-construction traffic on the construction site (circumstances, timing, and location).

Access management monitoring will be undertaken and compliment other biophysical and socio-economic monitoring conducted during the construction phase of the Project. Access related issues will be summarized by Environmental Inspectors and the Construction Supervisor in their respective monthly reports. Monitoring information will be acted upon, as necessary, by the Construction Supervisor.

4.8 Access Rehabilitation

Transmission development on the landscape often requires the creation of or improving of existing access roads and trails to facilitate construction and operation of the development. Manitoba Hydro's preference is to utilize existing roads and trails to the extent possible prior to development of any new access routes. The use of existing access routes may result in vegetation removal and road base improvements. Where access is not required for operations those access routes may require decommissioning activities such as trenching and mounding and/or vegetation rehabilitation to ensure that areas previously inaccessible are returned back to that state. Prior to access route development the route will be assessed for existing access restrictions, including details such as trail width, vegetation, presence of previous decommissioning activity. This information in consultation with the local MCWS Region's Integrated Resource Management Team (IRMT) will be considered for each access road or trail on Crown land requiring decommissioning and/or rehabilitation. The consultations will result in the development of a route specific decommissioning and rehabilitation prescription for each access route. Where the access route is on private land Manitoba Hydro will consult with the landowner(s) in developing the decommissioning and rehabilitation prescription.

As the characteristics of each access route are unique, there are numerous factors that need to be considered in the development of an access route decommissioning and rehabilitation prescription. Those factors include but are not limited to:

- Access route type (ie road, trail, Transmission ROW),
- Previous use (ie forestry, resource use, trapping, recreation),
- Surrounding vegetation (ie forested vs shrubs vs grass),
- Length,
- Next closest access route,
- Existing terrain and soils (ie. Is it a wetland, rock walls, suitability for revegetation),
- Duration of use (ie. how many construction seasons is access route required for),
- Level of access restriction (ie. Complete closure, seasonal closure, truck closure),
- Existing resource extraction concerns (ie moose, elk, medicinal plants), and
- Proximity to communities

Below is a list of possible techniques Manitoba Hydro would consider in the development of its access route decommissioning and rehabilitation prescriptions:

- Gates – Install lockable gate at the beginning of the access route.
- Trench and berm – The access route is dug out and usually a culvert removed, the cut is then extended for up to 100 meters on each side of the route to discourage travel. The berm is on the main access side of the cut usually piled 10 feet high. This is usually done at 2 or more sites along the route in the first 3-5 kilometers from the main point of access.
- Rock placement – Large rocks placed on access route in places where a vehicle could not get around them. Option typically used in areas where trench and berm or v-plowing would not work. Usually placed between 2 walls of rock where the route went through or in a wet area as a temporary route closure.
- Culvert removal – Remove most of the culverts from the access route and pile debris on main access side of the cut. Usually done for entire length of the route.
- Debris spreading – Typically done on less travelled access routes such as winter roads or spur roads. Debris piles are left at the beginning of the road and are spread over the roadway for the first 200 meters. The spreading is typically not to exceed 2 feet in height. The debris could be deadfall, tops of trees, limbs of trees etc.
- Replant the entrance of the access route – Willow or other native tree species can be replanted at the entrance of the road for about 20 meters to encourage quicker growth. Vegetation can be sources from the general area and moved from the ditch to the roadbed or ROW or from nurseries. Typically used in conjunction with V-plow or Trench and berm.
- ATV access route decommissioning – Holes are dug and piled on the route to allow access for ATV down the center of route. The width between holes and piles did not exceed 6 feet and was to deter truck traffic but allow for ATV's through for specified reasons.

Where applicable, Manitoba Hydro will develop access route decommissioning and rehabilitation prescriptions for each of its access routes utilized on a seasonal basis and at the end of construction for access routes not required for operations and maintenance. Those access routes required for operations and

maintenance will be reviewed with the local MCWS IRMT or landowner and incorporated into an Operations and Maintenance Access Management Plan.

5.0 Operations and Maintenance Access Management Plan Development

The Operations and Maintenance Access Management Plan (O&MAMP) will be a component of the Operations and Maintenance Environmental Protection Plan. Experience gained during the construction phase of the Project will contribute to a more effective O&MAMP through the process of adaptive management. The Operations and Maintenance Access Management plan will consist of an access route mapbook identifying and any specific access restrictions and/or access management mitigation measures.

Appendix A

Construction Access Opportunities

Appendix A

Sample of Access Route Photos



5RT- Facing W, ROW intersection with PR 302. Will need to cross steep ditch. To access the N side, existing crossing is located 380m E of the ROW. S side, existing crossing is located 70m W of ROW.



36RT- Facing West. Proposed new trail off Hallama Dr. Good access from both directions. Good visibility from upcoming vehicle.



51RT- Facing West. ROW intersection with PR 206. Will need to cross shallow ditch on both sides of the road to access the ROW. Fence on both sides of the road. Shelter belt on the East side will need to be cleared.



54T- Facing South. Existing mile road off PTH 15 (Dugald Rd). Culvert needed to cross steep ditch on the East side of the road to access the ROW. Farm land on both sides of the ROW. Distribution line on the West of the road.



56T- Facing South. Access along Edgewood Road 32E. Culvert needed to cross steep ditch on both sides of the road to access the ROW. Existing narrow crossing 50m South of the ROW that could be used.



57T- Facing North. Access along Millbrook road 33E. Culvert needed to cross steep ditch on the East side of the road to access the ROW. There is an existing narrow crossing 50m S of the ROW that could be used.



58T- Facing S. Access along Brier Cliff road 34E. Will need to cross shallow ditch on the W side of the road and culvert req. for steep ditch on E side of the road to access the ROW. Some clearing req. on the E side of road.



59T- Facing N. Access along Stoneridge road 35E. Will need to cross shallow ditch on the E side of the road and culvert req. for steep ditch on West side of the road to access the ROW. Some clearing required on E side of ROW.



60T- Facing S. ROW intersection with Hwy 12. Will need to cross shallow ditch on the East side of the road and culvert needed for steep ditch on the West side of the road to access the ROW.



63T- Facing South East with steep ditch on both sides that will require a culvert to cross to access ROW. Distribution line on the North side of the road. Clearing required on both sides.



64RT- Facing . Steep ditch on both sides. Existing crossing to access N side of ROW leading to a natural grass land & distribution line. Culvert required to cross S side to crop land on S side.



66T- Facing NE Access along Monominto road off PR501. Culverts required to cross steep ditch on both sides of the road to access the ROW. Clearing req. both sides of ROW.



67T- Facing NE, Access along Monominto road off PR501 (Rosewood road). Will need to cross shallow ditch and clear on both sides of the road to access the ROW. Fence and distribution line on the E side of the road.



68RT- Facing East, ROW intersection with PR501. Culverts needed to cross steep ditch on both sides of the road to access ROW. Clearing required on both sides the ROW.



69T- Facing W. Existing gravel off PR 501. Will need to cross shallow ditch on the North side and culvert needed for steep ditch on the South side to access the ROW. Clearing required on the North and South side of ROW.



70RT- Facing West. ROW intersection with Hwy 1 (Trans Canada Hwy). Use service road to access the North side of the ROW. Some Clearing required on the North side.



71T- Access along Mun. 42E off Dawson road. Culverts to cross steep ditch on and clearing required on both sides of the road to access the ROW. Wet land on both sides of the ROW accessible under frozen ground conditions.



71T- 50m north of 71T on R49R ROW facing Northeast towards wetland area



72RT- Facing E, ROW intersection with Dawson rd. Culvert needed to cross steep ditch on both sides of the road to access the ROW. Some clearing req. on both sides of ROW.



76T- Facing NW, Access along road 38N off PR 302. Culvert needed to cross steep ditch on the S side of the road to access the ROW. Existing crossing with gates on the N side of the ROW and a fence on each side of road.



78T- Facing E, Access along road 37N off PR 302. Culverts needed to cross steep ditch on both sides of the road to access the ROW. Fence on the N side of the road. Clearing required on the S side of the ROW.



83T- Facing W, Access along road 32N off PR 210. Will need to cross shallow ditch on the N side and culvert required for Steep ditch on the South side of the road to access the ROW. Clearing required on both sides of the ROW.



85T- Facing E, Access along Marchand road off PR 210. Will need to cross shallow ditch on the N side and culvert needed to cross steep ditch on the S side of the road to access ROW. Clearing required on both sides of ROW.



87T- Facing S, Access along Moose Meadow Rd 24N off PR 302. Culverts needed to cross steep ditch on both sides of the road to access the ROW. Fence on the N side of road. Some clearing required on both sides of ROW.



88T- Facing SE. Partially developed trail off PR 302.



89T- Facing SW. Possible existing trail extends 3.8 km from PR302, clearing required. Distribution line and fence on N side. Steep ditch on S side requires culvert to cross.



90T- Facing N. Access along Chopyk Road off Marynowski road. Culverts and clearing needed to cross steep ditch on both sides of road to access ROW. Trail contains standing water in locations where there is rutting.



92RT- Facing S. ROW intersection with Wells road. Culvert needed to cross steep ditch on both sides of the road to access ROW. Existing crossing 30m N of ROW that can be used to access E side of ROW.



93T- Facing S. Existing access road off Hwy 12. Will need to cross steep ditch on both sides of the road to access the ROW. Culverts required. Clearing required on both sides of the ROW.



94T- Facing S. Existing access Lonesand road off Hwy 12. Culvert needed to cross steep ditch on both sides of the road to access the ROW. Clearing required on both sides of the ROW. There are some salvageable timbers.



95T- Facing South. Existing access Sundown road off Hwy 12. Clearing kept to a min, community concerns with trees surrounding cemetery. Distribution line to E of the road. Clearing req. on both sides of road



97RT- Facing East. ROW intersection with PR 201. Will need to cross steep ditch on both sides of the Road to access the ROW. Culverts required. Clearing required on both sides.



99RT- Facing S. ROW intersection with PTH 89. Culverts needed to cross steep ditch on both sides of road to access ROW.. Clearing req. on E side of ROW.



101T- Facing North. Access along existing mile road. Will need to cross steep ditch on both sides of the road to access the ROW. Culverts required. Clearing required on the North side of the ROW.



103T- Facing NW. Existing trail on the bank of a drainage ditch. Will require permission to use this trail.



104T- Facing West. Steep ditch on both sides of road. Will need culvert to cross. Crop land on both sides of the road. Contact Pineland colony to discuss access route.

MANITOBA-MINNESOTA TRANSMISSION PROJECT

Appendix C - Environmental Monitoring Plan



Appendix 22C

Environmental Monitoring Plan



MANITOBA-MINNESOTA TRANSMISSION PROJECT

Environmental Monitoring Plan

Manitoba-Minnesota Transmission Project Environmental Monitoring Plan

Draft



2/9/2015

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ACRONYMS

AC	Alternating Current
ATK	Aboriginal Traditional Knowledge
ATKS	Aboriginal Traditional Knowledge Studies
EMP	Environmental Monitoring Plan
CEC	Clean Environment Commission
CEAA	Canadian Environmental Assessment Agency
CEAA 2012	Canadian Environmental Assessment Act 2012
CEnvPP	Construction Environmental Protection Plan
CHRPP	Cultural and Heritage Resources Protection Plan
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EIS	Environmental Impact Statement
EnvPP	Environmental Protection Plan
EPIMS	Environmental Protection Information Management System
EPP	Environmental Protection Program
ESS	Environmentally Sensitive Site
FNMEP	First Nation and Metis Engagement Process
FRI	Forest Resource Inventory
GPS	Global Positioning Unit
km	Kilometre
kV	Kilovolt
LAA	Local Assessment Area

MBCA	Migratory Birds Convention Act
MBCDC	Manitoba Conservation Data Centre
MCWS	Manitoba Conservation and Water Stewardship
MESEA	Manitoba Endangered Species and Ecosystems Act
MMF	Manitoba Metis federation
MMTP	Manitoba-Minnesota Transmission Project
NEB	National Energy Board
PDA	Project Development Area
PEP	Public Engagement Process
RoW	Right-of-way
SARA	Species at Risk Act
SOCC	Species of Conservation Concern
TSS	Total Suspended Solids
VC	Valued Component
VES	Visual Encounter Surveys

1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Manitoba Hydro is proposing to construct and operate a 500 kilovolt (kV) alternating current (AC) international transmission line in southeastern Manitoba that includes additions and upgrades to three associated transmission stations at Dorsey, Riel and Glenboro South. (Map 1-1) The proposed project is called the Manitoba-Minnesota Transmission Project (the Project) and consists of approximately 213 km of single circuit, 500 kV AC transmission line (D604I) that will start at the existing Dorsey Converter Station northwest of Winnipeg, in the RM of Rosser, and will connect at the Manitoba-Minnesota border to a new transmission line proposed by Minnesota Power, called the Great Northern Transmission Line. The proposed project is required for the following reasons:

- Export power to the United States based on current sales agreements
- Improve reliability and import capacity in emergency and drought situation; and
- Increase access to markets in the United States

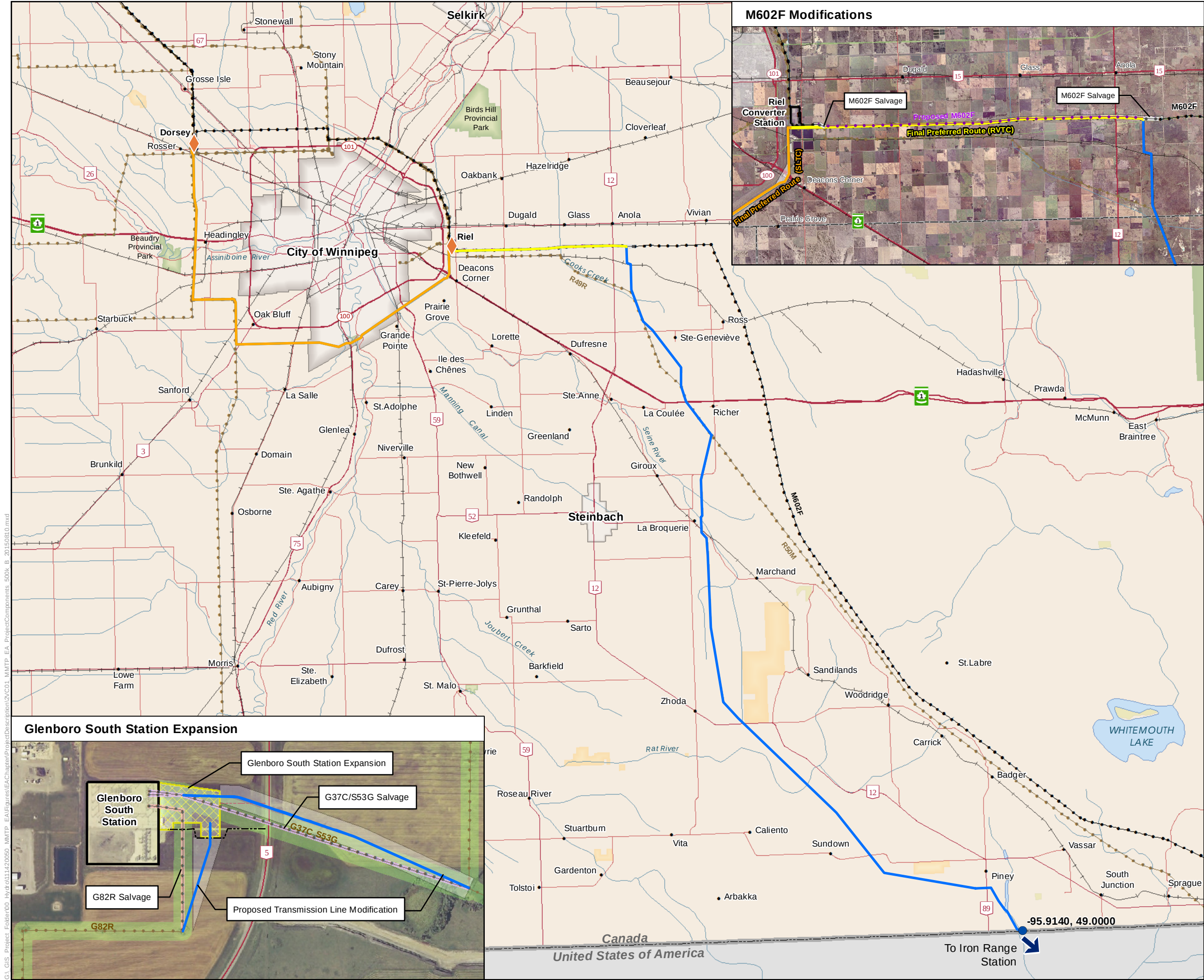
Clearing and construction of the Project is expected to take approximately 2 ¾ years to complete with activities starting in the Q3 of 2017 and ending in Q1 2020. Subject to regulatory approvals, the in-service date of the project is 2020.

1.1.1 Regulatory Requirement

The Project is subject to environmental regulatory review and approval. The project is defined as a Class 3 Development (under the Classes of Development Regulation) that will be reviewed by Manitoba Conservation and Water Stewardship (MCWS) and require an Environment Act License under *The Environment Act* (Manitoba).

Authorization for the construction and operation of the transmission line is also required under the *National Energy Board Act* and the project is subject to an environmental assessment by the National Energy Board (NEB) under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012).

This Environmental Monitoring Plan (EMP) has also been included in the Manitoba-Minnesota Transmission Project Environmental Impact Statement (EIS) submission to be reviewed and approved by regulatory authorities.



Manitoba-Minnesota
Transmission Project

Project Infrastructure

- ◆ Converter Station (Existing)
- Border Crossing
- Final Preferred Route (Southern Loop Transmission Corridor - SLTC)
- Final Preferred Route (Riel-Vivian Transmission Corridor - RVTC)
- Final Preferred Route (New Right of Way)
- M602F Modification (Salvage)
- M602F Modification (New)
- G37C Salvage
- G82R Salvage
- Existing/New Glenboro South Station Access
- New Glenboro South Station Access
- Existing ROW
- Station Expansion
- Project Development Area (PDA)

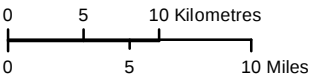
Infrastructure

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

Landbase

- Community
- Railway
- Trans Canada
- Provincial Highway
- Provincial Road
- City
- First Nation Lands
- Ecological Reserve
- Wildlife Management Area
- Provincial Park

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 19, 2015



1:500,000



Project Components

1.2 ENVIRONMENTAL PROTECTION PROGRAM

Part of Manitoba Hydro's commitment to environmental protection includes the development of a comprehensive Environmental Protection Program (EPP), this is further described in chapter 22 of the EIS. The purpose of the EPP is to provide the framework for implementing, managing, monitoring and evaluating environmental protection measures that are consistent with regulatory requirements and environmental guidelines. This EMP is a component of the EPP as illustrated in Figure 1-1.

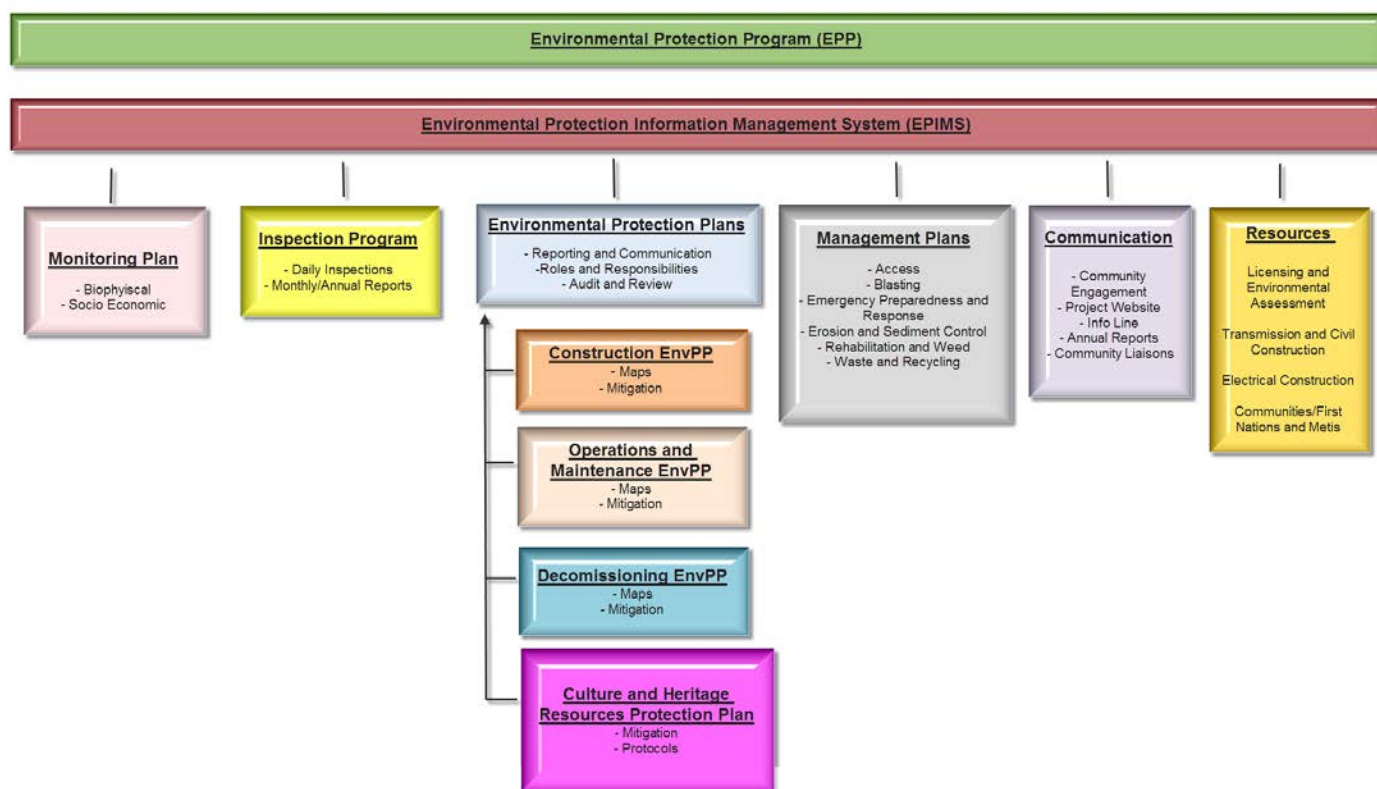


Figure 1-1 Transmission Environmental Protection Program

2.0 ENVIRONMENTAL MONITORING PLAN

This document describes the Environmental Monitoring Plan, which outlines the various monitoring activities that will occur to address follow-up requirements identified for the valued components included in the environmental assessment. Monitoring activities will be considered during all phases of Project development (i.e. pre-construction, construction and post construction). Follow-up requirements include actions implemented to assess the effectiveness of the environmental assessment and to confirm compliance with regulatory requirements.

This EMP is intended to describe how and provide assurance to regulators, environmental organizations, First Nations and Metis and the general public that potential environmental effects caused by the Project will be monitored, evaluated and reported on in a responsible and accountable manner.

An Environmental Protection Information Management System (EPIMS) was developed that will manage, store and facilitate the transfer of Environmental Protection Program data and information amongst the Project team. EPIMS will facilitate the transferring of knowledge and experiences encountered on a daily basis during construction activities from Environmental Inspectors to the Specialists that are responsible for monitoring project effects. EPIMS is an essential tool that manages vast amounts of data and information that will be generated through the implementation of this plan, allowing for Manitoba Hydro to adapt from its experiences on this project and apply that knowledge to future developments.

2.1 PURPOSE

The purpose of this EMP is to outline the potential effects identified in the EIS and the key activities that will be conducted as part of the monitoring and follow-up component of the EPP. The intended goal of this plan is to provide details on monitoring activities and how monitoring results will be used to trigger actions that lead to adaptive management decisions to further minimize the effects of the Project on the environment.

2.2 OBJECTIVES

The objectives of this monitoring plan are to:

- Confirm the nature and magnitude of predicted environmental effects as stated in the EIS;
- Assess effectiveness of mitigation measures implemented;
- Identify unexpected environmental effects of the project, if they occur;

- Identify additional mitigation measures to address unanticipated environmental effects, if required;
- Confirm compliance with regulatory requirements including approval terms and conditions; and
- Provide baseline information to evaluate long-term changes or trends.

2.3 SCOPE OF WORK

The scope of this EMP will include the biological and socio economic components of the environment. A Cultural and Heritage Resources Protection Plan (CHRPP) will also be compiled which outlines Manitoba Hydro's commitment to safeguard cultural and heritage resources and provide information on how to appropriately handle human remains or cultural and heritage resources discovered or disturbed during construction of the Project.

2.4 MANAGEMENT AND COORDINATION

As part of the EPP, Manitoba Hydro will have staff comprised of senior Manitoba Hydro management, as well as implementation teams committed to the implementation of the EMP for the Project. The Environmental Project Management Team will be responsible for the management of the environmental protection plans including compliance with regulatory and other requirements, quality assurance and control, consultation with regulators and activities related to the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). The Environmental Protection and Implementation Team, which is comprised of Manitoba Hydro operational and office staff, will be responsible for the day to day implementation of environmental protection plans developed for the project which include monitoring, inspecting and reporting.

Manitoba Hydro will ensure that resources are allocated to the environmental aspects of project planning, development, implementation and operation for the successful implementation of environmental protection measures and follow-up including monitoring and other requirements. Manitoba Hydro will commit resources early in the planning cycle to ensure effective environmental assessment, mitigation and monitoring including an Environmental Monitor from the Licensing and Environmental Assessment Department that will lead the field monitoring program during the construction of the Project and provide field level support to the ongoing FNMEP.

2.5 PUBLIC COMMUNICATIONS AND ENGAGEMENT

In addition to extensive public engagement efforts that have occurred to date throughout the development of the Project, Manitoba Hydro welcomes all members of the public to contact the

corporation with questions or comments throughout the construction process. Manitoba Hydro's Manitoba-Minnesota Transmission Project website site (https://www.hydro.mb.ca/projects/mb_mn_transmission) will be maintained and updated regularly throughout the project with the summary of results of this EMP. As noted on the Project website, additional information is always available to the public upon request via a toll-free phone number, dedicated project e-mail address or by mail.

2.6 ABORIGINAL ENGAGEMENT & TRADITIONAL KNOWLEDGE

2.6.1 Traditional Knowledge

As of August 2015, the ATKS Management Team (Black River First Nation, Swan Lake First Nation, Long Plain First Nation), Peguis First Nation and Roseau River Anishinabe First Nation submitted ATK reports for the proposed Project. Dakota Plains Wahpeton First Nation began their ATK study in October 2014 in which their ATK report is pending and Sagkeeng First Nation began ATK studies in February 2015. First Nations, the Manitoba Metis Federation (MMF) and Aboriginal Organizations who chose to participate or conduct ATK studies in the later stages of the engagement process for the Project were information that their information would be used to inform the Environmental Protection Program.

More detailed information regarding Aboriginal Traditional Knowledge Studies completed can be found in Chapter 4.0 of the project EIS.

2.6.2 Ongoing First Nations and Metis Engagement Process

Manitoba Hydro has developed different approaches to its ongoing First Nation and Metis Engagement Process. These approaches for transmission project follow-up and monitoring programs began in 2008-2010 with the Wuskwatim Transmission Project, followed by the Bipole III and Keeyask Transmission Projects in 2013, both projects are planned to continue until 2018/19. Each of these projects had a different approach tailored to the geographic region, scope/scale of project and the number of communities involved. Through these past and current projects, accompanied by the desire to use active adaptive management in its community involvement programs for the construction of transmission projects, Manitoba Hydro has developed a new approach for this Project.

Manitoba Hydro's proposed approach to the ongoing FNMEP is based on experiences by other industries where the project is located within a traditional or current resource use area but not necessarily in close proximity to the community itself. The approach is also based on ATK field trips, self-directed reports received to date, and the desire within those reports for further investigation and mapping of sensitive sites, transfer of knowledge from elders to youth to

prevent loss of knowledge, updates on project progress and involvement in follow-up and monitoring.

The ongoing FNMEP would include inviting interested First Nations and MMF representatives to attend regular field trips to the construction areas with the focus being the highly valued undisturbed land or land with little disturbance (Black River First Nation, Long Plain First Nation, Swan Lake First Nation, 2015) as well as areas identified as sensitive sites (Peguis, 2015 and Roseau River, 2015). Field trips with representatives would take place throughout both the construction and monitoring and would be guided by various staff depending on topic, including Construction Supervisors, Environmental Inspectors and Specialists such as experts in botany, wildlife, and traditional medicinal plants. These field trips would be supported by a translator as required. During the construction field trips, representatives would learn and witness activities associated with various topics including:

- Mitigation measures;
- Project schedule;
- Clearing and construction practices;
- Inspection results; and
- Monitoring results.

During follow-up and monitoring field trips, representatives could participate with the Environmental Monitor in monitoring activities such as vegetation, traditional plant, stream crossing, mammal track, bird and camera trap surveys. Both construction and follow-up and monitoring trips would allocate time for representatives to share concerns and ask questions of the Project staff along with receiving a materials package and copy of photos/video taken that day to share with their First Nation or the MMF.

To enhance traditional knowledge transfer amongst generations, educate youth about Manitoba Hydro's EPP, and explain environmental career opportunities for youth, separate field trips involving youth and elders and a Manitoba Hydro representative could occur during school summer break. These Youth/Elder trips would be similar in nature to the construction and follow-up and monitoring trips described above but would focus opportunities for traditional knowledge sharing.

While specific details about the field trips are yet to be determined, Manitoba Hydro is looking forward to working with the First Nation and Metis to develop the approach for this Project, which will be guided by the following objectives;

- Awareness of the Project and EPP;
- Manitoba Hydro awareness of community concerns and communication back on how they are being addressed;
- "Boots on the ground" field experiences;

- Multiple First Nations and the MMF working together; and
- A Youth and Elder component.

Manitoba Hydro is committed to an ongoing engagement process to incorporate traditional knowledge within components of its Environmental Protection Program.

3.0 PAST, PRESENT AND FUTURE MONITORING PROGRAMS

Monitoring programs allow us to see how predicted effects from environmental assessments compare to the actual outcome from construction activities.

Good project planning in combination with effective monitoring is a major component for enhancing the effectiveness of development programs and projects. Monitoring and evaluation of projects help in the understanding and learning from past project successes and challenges which in turn helps to inform decision-making so that current and future monitoring programs for projects can be improved.

In order to ensure continual improvement of monitoring programs for future projects, information and results from past monitoring programs were reviewed to better understand the effects of transmission line construction on the biophysical and socio-economic components of the environment. This results in a reduction of project specific residual effects through project-based mitigation which demonstrates a commitment to continual improvement and sustainable development.

Past and current Manitoba Hydro projects that have implemented extensive monitoring programs include the Wuskwatim Transmission Project (2008 to 2012) and the Bipole III Transmission Project (currently one year of monitoring completed). Recently, the Environmental Monitoring Plan for the Keeyask Transmission project was approved by MCWS.

Appropriate methods accepted by Manitoba Hydro and MCWS were used to monitor environmental components, such as access, aquatics, mammals, birds, and vegetation, identified for both the Wuskwatim and Bipole III Projects and are also outlined in the Keeyask Transmission Project EMP.

Manitoba Hydro manages all its projects monitoring programs in a coordinated fashion so that knowledge gained from one program is combined with other programs for a more informed understanding of transmission line environmental effects.

4.0 MONITORING REQUIREMENTS

As defined under the *Canadian Environmental Assessment Act (CEAA) 2012*, monitoring and follow up is required to verify the accuracy of the environmental assessment of a project and determine the effectiveness of measures taken to mitigate potential adverse environmental effects (CEAA, 2012). The National Energy Board (NEB) through their Regulatory Framework also requires “Lifecycle Compliance Monitoring” in which the NEB monitors and enforces compliance with requirements concerning the safety and protection of employees, the public and the environment as they may be affected throughout the life of the project (NEB, 2015). In addition the NEB will monitor and verify compliance with requirements during construction, operation and decommissioning through the use of audits, inspections, compliance meetings, investigations and response to concerns and complaints.

Through monitoring and follow up, EIS outcomes are realized, communicated and managed through refinement and improvement of mitigation strategies.

The EPP includes two main types of monitoring:

- Environmental monitoring – periodic or continuous surveillance or testing, according to a predetermined schedule, of one or more environmental indicators to establish/enhance knowledge of baseline conditions or to verify the accuracy of an environmental assessment and the effectiveness of mitigation measures. Pre and post disturbance and control-impact monitoring are the preferred approaches to monitoring environmental effects.
- Compliance monitoring – observation or testing conducted to verify whether a practice or procedure meets the applicable requirements prescribed by legislation, licence conditions, and/or Environmental Protection Plans.

Environmental monitoring is addressed through this EMP. Compliance monitoring is accomplished through the Inspection Program which will involve the use of dedicated Environmental Inspectors to observe and verify the implementation of the environmental protection plans. Information generated from these programs will be used within an adaptive management approach to improve both mitigation measure effectiveness and monitoring program design. A summary of compliance monitoring results will be presented in the annual report.

4.1 VALUED COMPONENT MONITORING

This section identifies the Valued Components that were selected for the environmental assessment that will be monitored including rationale for their selection. Additional information in this section includes key monitoring activities, task descriptions, duration, frequency and

timing of activities, Environmental Monitor input, Manitoba Hydro commitments and specialist and MCWS roles. Manitoba Hydro has developed the plan to address concerns expressed by stakeholders, local communities, First Nations and Metis, and regulators.

Where applicable, Decision Trigger(s)/Threshold(s) for Action have been identified for each valued component. These decision triggers or thresholds for action are mechanisms to promote adaptive management that cause Manitoba Hydro and its Specialists to stop and further evaluate the monitoring results and, if required, adapt mitigation measures or monitoring activities. Decisions triggers/thresholds cannot be identified for all situations, there are too many parameters and variables and lack of scientific data. It is for this reason why many government agencies, including Manitoba, have not yet published definitive thresholds for action for different wildlife management scenarios. Manitoba Hydro will continue to fund applicable research and contribute monitoring information from projects to the regulators.

4.1.1 Valued Component Selection

An initial step of the environmental assessment for the proposed project was the identification of Valued Components (VCs) that may be adversely affected by the Project this is fully discussed in Chapter 7 of the EIS).

VCs are environmental elements that have the potential to interact with the Project and that met one or more of the following criteria:

- represent a broad environmental, ecological or human environment component that might be affected by the Project;
- are a part of the heritage of First Nations and Metis or a part of their current use of lands for traditional purposes;
- are of scientific, historical, archaeological importance;
- have been identified as important issues or concerns by stakeholders or by other effects assessments in the region.

Valued Components that require monitoring and follow-up were identified in each applicable chapter within the EIS. For each VC, one or more environmental indicators were selected to focus monitoring and follow up efforts.

Environmental indicators were selected to represent the valued components in the table below if the component had one or more of the following attributes:

- Scientific/regulatory importance (rare/endangered or protected status);
- Environmental importance;
- Socio-economic importance;

- Cultural importance (important to communities or society as a whole); and
- Vulnerable and sensitive to change.

Table 4-1 below provides a list of valued components and their environmental indicators that will require monitoring as well as the parameters being measured and rationale for their selection.

Table 4-1 Valued Components and Environmental Indicators			
Valued Component	Environmental Indicator	Parameter	Rationale¹
Fish and Fish Habitat	Stream Crossings	Riparian buffers, ground cover, erosion;	Environmental importance; protection of aquatic life; Regulatory importance
Vegetation and Wetlands	Wetlands	Species occurrence and area of wetland affected by the project	Environmental importance; protection of aquatic life, no net loss
	Plant Species of Conservation Concern	Species occurrence	Regulatory importance – MBESEA and SARA
	Invasive Plant Species	Species occurrence	Environmental importance
	Traditional Use Plant Species	Species occurrence	Cultural and environmental importance
Wildlife and Wildlife Habitat	Amphibians	Presence of northern leopard frogs and habitat	Regulatory importance –SARA
	Common Garter Snakes	Presence of garter snake hibernacula	Regulatory importance – Manitoba <i>Wildlife Act</i>
	Bird-Wire Collision	Abundance and Mortality	Environmental and cultural importance; Regulatory importance – MBCA, Manitoba

Table 4-1 Valued Components and Environmental Indicators

Valued Component	Environmental Indicator	Parameter	Rationale¹
			<i>Wildlife Act</i>
	Sharp-tailed Grouse Lekking Sites	Lek abundance Disturbance Mortality	Vulnerable and sensitive to change
	Bird Species of Conservation Concern	Presence /Absence Abundance	Regulatory importance - MESEA; SARA; MB CDC, designated Golden-winged Warbler critical habitat
	Birds of Prey	Raptor observations and recordings	Environmental importance
	Ungulates and Predators	Occurrence and/or seasonal distribution, vehicle collision related mortality	Environmental and cultural importance
	Black Bear	Occurrence, annual prevalence	Environmental and cultural importance
Employment and Economy	Project Employment	Total person years of employment Total number of hires. Total number of employees. Type (job classifications) of work available.	Socio-economic and cultural importance
	Direct/Indirect Business Effects	Direct project expenditures Indirect business opportunities	Socio-economic importance
	Direct Labor	Direct labour	Socio-economic and

Table 4-1 Valued Components and Environmental Indicators

Valued Component	Environmental Indicator	Parameter	Rationale¹
	Income and Taxes	income. Project taxes generated (non-labour).	cultural importance
Infrastructure and Services	Transportation	Increase in traffic volumes and accidents on key roadways.	Cultural importance
Land and Resource Use	Outfitter Resource Use	Change in occurrence of black bears frequenting bear bait sites	Socio-economic importance

4.1.2 Valued Component Monitoring Tables and Schedule

Table Figure 4-1 illustrates the proposed schedule of monitoring activities. The following tables 4.2 thru 4-17 summarize the key monitoring activities that will be conducted for each of the Valued Components and Environmental Indicators identified in Section 4.1.1 above. Detailed methodologies for each key monitoring activity are outlined in Section 7.0 of this report.

Figure 4-1 Proposed Monitoring Activities Schedule

Valued Component	Key Monitoring Activity	Pre-Construction Surveys	Clearing and Construction of the Transmission Lines and station modifications				Post Construction	
		Fiscal Year(s) (April-March)						
		2017/18 (1 st -3 rd Quarters)	2017/2018 (3-4 th Quarters)	2018/2019	2019/2020	2020/2021	2021/2022	
Fish and Fish Habitat	Stream Crossing Assessment							
Vegetation and Wetlands	Wetland Surveys							
	Rare Plant Surveys							
	Invasive Species Survey							
	Traditional Use Plant Species Survey							
Wildlife and Wildlife Habitat	Wetland Amphibian Survey							
	Snake Hibernacula Survey							
	Bird-Wire Collision Survey							
	Sharp-tailed Grouse Lek Survey							
	Bird Species of Conservation Concern Survey (5 th yr. in 2025 not shown)							
	Raptor Nest Survey							
	Distribution / Occurrence Mapping Survey							
	Camera Trap Survey							
	Vehicle Collision Statistic Gathering							
	Mineral Lick Survey							
Employment and Economy	Project Employment Reporting							
	Direct/Indirect Business Opportunities Reporting							
	Direct Labor Income and Taxes Reporting							
Infrastructure and Services	Traffic Monitoring Survey							
Land and Resource Use	Black Bear Bait Site Camera Trap Survey							

Valued Component Monitoring Table Description Key

Environmental Indicator

Brief description of the environmental indicator in the context of the Project, and the potential effects of the Project on the environmental indicator.

Objectives

- *List of objectives the monitoring program is designed to fulfill.*

Applicable Project Component(s): *List of Project components that are being monitored due to the potential interactions between the project component and environmental indicators*

Monitoring Activities

Table x-x Name of Environmental Indicator

Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
<i>Name of key monitoring activities (i.e. Bird Point Count Survey)</i>	<i>The phase of the project the activities will take place (i.e., construction)</i>	<i>Description of the task being conducted (i.e. upstream/downstream water quality monitoring).</i>	<i>Identification of the parameters being measured by the task (i.e. species counts)</i>	<i>Locations in which the measurements of the parameters will be conducted (i.e. Assiniboine River)</i>	<i>How many years the activities will take place (i.e. three years)</i>	<i>How many times per year will the activity take place (i.e. annual – once a year)</i>	<i>The time of year the activity will take place (i.e. Spring and fall)</i>	<i>Units by which the parameters are being measured (total number of bird species observed) Or qualitative observations of effects (bird behaviours)</i>

Manitoba Hydro Commitment

- *This section will describe the activities the Manitoba Hydro is committed to conducting and resources it will provide to execute the monitoring plan.*

Responsibilities of Environmental Monitor include:

- *This section will describe the activities the Environmental Monitor will conduct and resources they will provide to execute the monitoring plan.*

Specialist will:

- *This section describes the activities the Specialist will conduct and resources it will provide to execute the monitoring plan, the specialist may be Manitoba Hydro staff or external consultants.*

Decision Trigger(s)/Threshold(s) for Action

- *Describes the scenarios which will trigger the requirement for adaptive management to be implemented. This section does not provide how Manitoba Hydro will respond to a particular action as there are an indefinite amount of possible scenarios and responses, Manitoba Hydro is committed to an adaptive management process as describe in Section 5 to fully evaluate the options and develop an appropriate response.*

4.2 FISH AND FISH HABITAT

4.2.1 Water Course Crossings

As outlined in Chapter 8 of the EIS, the Project will require overhead line crossings of 78 water courses of which 20 are fish bearing. There are no water courses in close proximity to the station upgrades. Habitat sensitivity was assessed as high at six water courses, moderate-high, moderate and low-moderate at one water course each and low at nine water courses. Two water courses were not assigned habitat sensitivity ratings.

A potential effect of the Project to fish habitat is the loss of riparian vegetation (vegetation along the water's edge) during construction. Riparian vegetation functions as fish habitat by providing bank stability, food and nutrient inputs (e.g., leaf litter and insect drop), and shading. The loss of riparian vegetation can result in increased sediment in water due to decreased bank stability, increased water temperature and decreased cover for fish. Increased suspended sediments can decrease light penetration resulting in decreased photosynthesis. Sedimentation of streams can bury or create unsuitable habitats for aquatic invertebrates, infill spawning habitats and reduce the spawning and feeding success of fish. In water construction activities have the potential to negatively affect fish health through changes in water quality. To validate EIS predictions, and to allow for adaptive management, construction monitoring will verify effectiveness of prescribed mitigation.

Objectives:

- To verify the implementation and effectiveness of mitigation prescribed for areas adjacent to watercourses including: riparian buffers, erosion control, and temporary stream crossings.

Applicable Project Component(s): D604I Transmission Line

Monitoring Activities:

Table 4-2 Fish and Fish Habitat								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Stream Crossing Assessment	Construction	Stream Crossing Survey	Riparian buffers, ground cover and erosion	ESS	During construction	Annual	Spring	Riparian buffer width (m), Vegetative cover (% cover : % bare ground), Bank stability and erosion (%), Re-vegetation where soil was disturbed (% ground cover: % bare ground.
	Post-construction	Stream Crossing Survey	Riparian buffers, ground cover and erosion	ESS	1 yr.	Annual	Spring	Riparian buffer width (m), Vegetative cover (% cover : % bare ground), Bank stability and erosion (%), Re-vegetation where soil was disturbed (% ground cover: % bare ground.

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report;*
- *Report immediately to MCWS any unanticipated project effects on stream crossing and encroachment areas discovered through monitoring activities and consult on any remediation plans; and*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of mitigation performance at ESS sites within project footprint or access routes.*
- *Record observations with photo and waypoint and store in EPIMS*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of stream crossing requiring site survey and assessment of ROW effects;*
- *Review Environmental Inspector and Monitor daily reports for the performance and implementation of prescribed mitigation measures at each stream crossing site;*
- *Design and conduct specific survey methods that sample aquatics ESS sites and at sites where documentation by Environmental Inspectors is insufficient or site conditions warrant follow-up to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on stream crossings discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Thresholds for Action/Decision Triggers

- *Bank stability and erosion – equal to pre-construction stability, if not equal prescribe site specific rehabilitation measures as required.*

4.3 VEGETATION AND WETLANDS

4.3.1 Wetlands

Wetlands perform many important functions which include water storage, flood control, ground water recharge, sediment trapping, shoreline protection, nutrient cycling and carbon sequestration. Wetlands also provide valuable habitat for wildlife and plant species, and may support species of conservation concern. Wetland conservation is a priority under The Federal Policy on Wetland Conservation (Government of Canada 1991).

Wetland function includes three major components: habitat, hydrological and biogeochemical function (Halsey et al. 1997, Hanson et al. 2008). Wetland alteration can result in a loss of wetland function. Threats to wetlands include drainage, erosion and degradation, lowered water tables, increased run-off, and reduced plant productivity of adjacent areas.

Large intact wetlands are present in the Local Assessment Area (LAA) in addition to smaller degraded wetlands in cultivated areas. As described in Chapter 10 of the EIS, the Project LAA intersects approximately 1884 ha of wetlands, of which 56 ha are within the Project Development Area (PDA). Wetland classes occurring along the PDA include bog, fen, swamp, marsh, shallow open water and dugout. Main effects to wetlands as a result of the project include site disturbance or loss of plants from construction, maintenance and decommissioning activities. To validate EIS predictions, verify implementation of mitigation measures, and to allow for adaptive management, preconstruction, construction and post-construction monitoring will identify any changes to wetland area affected (ha), and species composition and abundance.

Objectives:

- *Pre-construction wetland surveys to confirm location and collect baseline vegetation information;*
- *Monitoring to document disturbance, and species composition and abundance of wetland vegetation at selected sites; and*
- *Verify the implementation and effectiveness of wetland protection measures.*

Applicable Project Component(s): *New ROW for the D604I Transmission Line*

Monitoring Activities:

Table 4-3 Wetlands								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Wetland Surveys	Pre-construction	Ground surveys to confirm location and record baseline wetland information	Area of wetland intersected by the project, vegetation characterization	PDA	Pre-construction	Once	Summer	Area intersected by project footprint (ha); species composition and abundance
	Construction	Ground surveys to identify wetland changes not discernible from habitat mapping and to monitor wetland protection measures	Area of wetland affected by the project, vegetation characterization	PDA	During construction	Annual	Summer	Area affected (ha); species composition and abundance
	Post-construction	Ground surveys to identify wetland changes not discernible from habitat mapping	Area of wetland affected by the project	PDA	2 yrs.	Annual	Summer	Area affected (ha); species composition and abundance

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Map cleared project footprint;*
- *Summarize results of key monitoring activities in an annual monitoring report; and*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of mitigation performance at Environmentally Sensitive Sites (ESS) within project footprint or access routes.*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of potential wetland sampling sites and assessment of ROW effects;*
- *Review Environmental Inspector and Monitor daily reports for identification of potential wetland sampling sites;*
- *Design and conduct specific survey methods that sample vegetation composition and abundance to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Adhere to Manitoba's Hydro's Biosecurity procedures;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on wetlands discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Thresholds for Action/Decision Triggers

- *Wetlands have been excessively disturbed by construction activities (i.e. rutting)*
- *Actual disturbance footprint exceeds the expected disturbance footprint.*

4.3.2 Plant Species of Conservation Concern

Species of conservation concern include species of plants that are protected under *The Endangered Species and Ecosystems Act* (MBESEA) in Manitoba, the federal *Species at Risk Act* (SARA), The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or are listed by the Manitoba Conservation Data Centre (MBCDC) as plants that are very rare to uncommon. These species generally exist in low numbers, play a role in helping to preserve species diversity, and/or have limited distributions.

As described in Chapter 10 of the EIS, three historical locations for plant species of conservation concern were previously known to occur along the Project Development Area (PDA); 15 were known to occur along the LAA and 660 along the Regional Assessment Area (RAA) (MBCDC records). No historical occurrences of protected plants or designated critical habitat occur within the Project PDA or LAA. Three protected species have historical occurrences within the RAA, Great Plains ladies' tresses (*Spiranthes magnicamporum*), Riddell's goldenrod (*Solidago riddellii*), and rough purple false-foxglove (*Agalinis asper*).

Field assessments in 2014 identified four species of conservation concern in the PDA at 10 locations. None of these species are listed under MBESEA, SARA or COSEWIC. Preconstruction field assessment will help identify any other locations where species of conservation concern may exist and ensure appropriate mitigation measures are implemented. Construction activities can potentially negatively affect plant species of conservation concern through the use of heavy equipment (crushing plants) and from clearing and grubbing (removal of roots) of vegetation. Herbicide use during maintenance activities can also negatively affect desirable species. So to validate EIS predictions, verify implementation of mitigation measures, and to allow for adaptive management, preconstruction, construction and post-construction monitoring will identify any impact to vegetation species of conservation concern.

Objectives:

- *Pre-construction surveys to identify species of conservation concern;*
- *Monitoring to document presence/absence of species post construction; and*
- *Verify the implementation and effectiveness of protection measures.*

Applicable Project Component(s): *New ROW for D604I Transmission Line*

Monitoring Activities:

Table 4-4 Plant Species of Conservation Concern								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Rare Plant Surveys	Pre-construction	Ground surveys to record species of concern	Species occurrence	PDA	Pre-construction	Once	Summer	Species presence/absence
	Construction	Ground surveys to monitor species of concern and protection measures	Species occurrence	ESS	During construction	Annual	Summer	Species presence/absence
	Post-construction	Ground surveys to monitor species of concern not discernible from habitat mapping	Species occurrence	ESS	1yr	Annual	Summer	Species presence/absence

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report; and*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of rare plants and mitigation performance at ESS sites within project footprint or access routes;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of potential rare plant habitat sampling sites and assessment of ROW effects;*
- *Conduct pre-clearing rare plant surveys for project areas not previously surveyed;*
- *Review Environmental Inspector and Monitor daily reports for identification of potential rare plant sampling sites;*
- *Design and conduct specific survey methods that sample known rare plant sites for presence/absence to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Adhere to Manitoba's Hydro's Biosecurity procedures;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on rare plants discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Manitoba Conservation and Water Stewardship may be requested to:

- *Provide historical and current data of species of concern to inform ongoing analyses related to biophysical monitoring (e.g. population survey data, observations, reports); and*
- *Provide guidance regarding mitigation strategies should unanticipated effects occur as a result of the project.*

Decision Trigger(s)/Threshold(s) for Action

- *Species of conservation concern has been disturbed by construction activities*
- *Discovery of new location of species of conservation concern*

4.3.3 Invasive Plant Species

As outlined in Chapter 10 of the EIS, the prevalence of non-native and invasive plant species (including noxious species) may increase as a result of the Project. Non-native species are plants that grow outside of their normal range while invasive species are plants that out-compete native species when introduced outside of their natural setting. Noxious species are invasive plants designated by regulation, The *Noxious Weed Act* (Manitoba).

Construction equipment and vehicles can introduce non-native and invasive plants. During the field assessments in 2014, nine noxious non-native species were observed at 35 different locations in the PDA. Twenty-seven of the occurrences were located in the Existing Corridor and four were located in the New RoW. About half of the species were encountered in areas of disturbance (i.e., cleared areas, gravel pits, roads, quad trail edges) or near agricultural fields (cultivated and pasture). Most common were Canada thistle (*Cirsium arvense*), common dandelion (*Taraxacum officinale*), quackgrass (*Elymus repens*), and field sow-thistle (*Sonchus arvensis*).

Non-native and invasive species are problematic for one or a number of reasons: these plants are capable of growing under a wide range of climatic and soil conditions; they produce abundant seeds that are easily disseminated and seeds that are long lived or can remain dormant through the winter season; they can continue to persist even after the removal of vegetative portions of the plant, and they often have vigorous growth and produce seeds under conditions adverse for other plants, and can therefore outcompete native species. So to validate EIS predictions, verify implementation of mitigation measures, and to allow for adaptive management, preconstruction, construction and post-construction monitoring will identify changes in baseline composition and structure of invasive species.

Objectives

- *Pre-construction surveys to identify non-native and invasive species;*
- *Monitoring to document the composition and abundance of non-native and invasive plant species at selected sites; and*
- *Recommend appropriate control and eradication programs, if there is a spread of species.*

Applicable Project Component(s): *New RoW for the D604I Transmission Line*

Monitoring Activities:

Table 4-5 Invasive Plant Species								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurable Parameter(s)
Non-native and Invasive Species Survey	Pre-construction	Ground surveys to record non-native and invasive species	Species occurrence	PDA	Pre-construction	Once	Summer	Species composition and abundance
	Construction	Ground surveys to identify and measure occurrence of invasive species on ROW	Species occurrence	PDA	During construction	Annual	Summer	Species composition and abundance
	Post-construction	Ground surveys to identify and measure occurrence of invasive species on ROW	Species occurrence	PDA	1yr	Annual	Summer	Species composition and abundance

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report; and*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of invasive plants within project footprint or access routes, and equipment cleaning stations;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of invasive and non-native species sampling sites and assessment of ROW effects;*
- *Review Environmental Inspector and Monitor daily reports for identification of potential invasive and non-native species sampling sites;*
- *Design and conduct specific survey methods that sample invasive and non-native species sites for composition and abundance to verify accuracy of EIS predictions and effectiveness of mitigation and control measures implemented;*
- *Adhere to Manitoba's Hydro's Biosecurity procedures;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on invasive and non-native species discovered through monitoring activities;*
- *Prescribe vegetation management options for invasive species control where required;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Decision Trigger(s)/Threshold(s) for Action

- *Establishment and spread of invasive species along ROW.*

4.3.4 Traditional Use Plant Species

As outlined in Chapter 11 of the EIS, a change in traditional plant species abundance and distribution is a concern to First Nations and Metis. Plants and plant communities have been identified as being particularly important to First Nations and Metis. These areas are valued for their provision of resources used by Aboriginals including gathering of food and medicines and harvesting plants and trees.

An Aboriginal Traditional Knowledge Study Community Report submitted by the Black River First Nation, Long Plain First Nation, and Swan Lake First Nation (May 2015) identified 76 traditional use plant species along the PDA at six locations. During the plant surveys for the project, 39 traditional use plant species were observed at 106 locations in the PDA. There were 529 occurrences of 63 traditional use species in the LAA.

First Nations have identified plant harvesting among the current use of land and resources for traditional use purposes throughout the region, including harvesting native plants for food, medicinal and cultural purposes. To validate EIS predictions, verify implementation of mitigation measures, and to allow for adaptive management, preconstruction, construction and post-construction monitoring will identify changes in baseline composition and structure of traditional use plant species.

Objective(s):

- Document the composition of vegetation;
- Confirm actual Project effects on vegetation; and
- Verify the implementation and effectiveness of protection measures.

Applicable Project Component(s): New RoW for D604I Transmission Line

Monitoring Activities:

Table 4-6 Traditional Use Plant Species								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurable Parameter(s)
Traditional Use Plant Species Survey	Pre-construction	Ground surveys to identify traditional use plant species	Species occurrence	PDA	Pre-construction	Once	Summer	Species composition and area
	Construction	Ground surveys to confirm traditional use plant species presence	Species occurrence	ESS	During construction	Annual	Summer	Species composition and area
	Post-construction	Ground surveys to confirm identify traditional use plant species presence	Species occurrence	ESS	2 yrs.	Annual	Summer	Species composition and area

Manitoba Hydro will:

- Provide digital ortho-rectified imagery or georeferenced digital video/photo products;

- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report;*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of traditional use plant species and mitigation performance at ESS sites within project footprint or access routes;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of sampling sites for plant communities important to First Nations and Metis and assessment of ROW effects;*
- *Conduct pre-clearing vegetation surveys for baseline composition and structure within plant communities important to First Nations and Metis;*
- *Review Environmental Inspector and Monitor daily reports for identification of potential traditional use plant species sampling sites;*
- *Design and conduct specific survey methods that sample known locations of traditional use plant species for composition and to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on traditional use plant species discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

First Nations and Metis will be asked to:

- *Provide historical and current data of traditional use plant species important to First Nations and Metis people to inform ongoing analyses related to biophysical monitoring; and*
- *Provide guidance regarding mitigation strategies should unanticipated effects occur as a result of the project.*

Decision Trigger(s)/Threshold(s) for Action

- *Measurable significant decrease in traditional use plant species.*

4.4 WILDLIFE AND WILDLIFE HABITAT

4.4.1 Amphibians

As outlined in Chapter 9 of the EIS, herptiles favoring wetland habitat for part or all of their life cycle may be vulnerable to changes in habitat availability as a result of Project activity. The Northern Leopard Frog (*Lithobates pipiens*) is a Species of Conservation Concern (SOCC) found in wetlands within the Project's Regional Assessment Area (RAA).

Wetland monitoring, including water quality data collection and amphibian surveys, help characterize baseline habitat conditions and identify sensitive sites at permanent and semi-permanent ponds. Wetland water-quality information aids in providing baseline conditions or 'benchmark' data for comparison of pre-Project water quality to future construction-phase water quality conditions. Amphibian surveys also aid in providing benchmark data, as related to SOCC abundance and richness, as well as breeding and wintering staging activity for pre- and post-construction conditions.

To establish a robust benchmark for wetland condition prior to construction, further amphibian surveys and water quality parameters will be measured at wetlands known to support northern leopard frogs. To validate EIS predictions and verify implementation of mitigation protocols, construction-phase wetland monitoring will take place during the amphibian breeding period immediately following construction activity with the goal of detecting any changes in water quality following construction activity and breeding activity. Sites examined will include wetlands and waterbodies previously surveyed (Wildlife and Wildlife Habitat TDR 2015) and found to support northern leopard frogs. Construction phase monitoring would be conducted at wetlands within 500 m of locations where Project activity had occurred. This buffer represents the maximum activity restriction setback for northern leopard frog breeding ponds (Environment Canada 2009).

Establishing baseline conditions at wetlands is essential for future monitoring of potential changes in wetland breeding, summering, and overwintering habitat. Pre-construction wetland amphibian surveys will also be conducted on additional wetlands and watercourses on or adjacent to the Project Development Area (PDA) not previously surveyed during baseline environmental surveys to identify any additional sensitive northern leopard frog breeding and/or overwintering sites.

Objectives:

- To monitor the presence of amphibians (as represented by the Northern Leopard Frog) and water quality conditions at wetlands located within the PDA; and
- To verify the implementation and effectiveness of prescribed mitigation.

Applicable Project Component(s): New ROW for the D604I Transmission Line and Glenboro Station South Transmission Line Modifications

Monitoring Activities:

Table 4-7 Wetland Amphibians								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Wetland Amphibian Survey	Pre-construction	Assess water quality & presence of northern leopard frogs at wetland sites located on or adjacent to the PDA	Water quality; Presence of northern leopard frogs	Suitable wetland habitat on or adjacent to PDA	Pre-construction	Biannual	Spring and Fall	pH, electrical conductivity, TDS, TSS, water temperature, turbidity; Presence/absence of breeding activity & individual frogs
	Post-construction	Revisit wetland sites to monitor presence of northern leopard frogs and assess whether wetlands mitigation was successful	Water quality; Presence of northern leopard frogs	Suitable wetland habitat on or adjacent to PDA	2 yrs.	Biannual	Spring and Fall	pH, electrical conductivity, TDS, TSS, water temperature, turbidity; Presence/absence of breeding activity & individual frogs

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report; and*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of northern leopard frogs and mitigation performance at ESS sites within project footprint or access routes;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use FRI habitat classifications, digital ortho-rectified imagery, and/or georeferenced video/photo products provided by Manitoba Hydro for identification of wetland habitat;*
- *Conduct pre-construction surveys during peak breeding activity in spring and during overwintering staging in the fall to identify important wetland Sensitive Sites and to monitor possible changes to wetland habitat post construction;*
- *Review Environmental Inspector and Monitor daily reports for identification of additional northern leopard frog habitat;*
- *Design and conduct specific survey methods to verify effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on northern leopard frog discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Thresholds for Action/Decision Triggers

- *Significant decline of wetland water quality within or adjacent to PDA.*
- *Decline of breeding activity of northern leopard frog near proposed infrastructure.*

4.4.2 Common Garter Snakes

As outlined in Chapter 9 the EIS, the dependency of common garter snakes on overwintering den sites leaves snake populations vulnerable to disturbance, degradation and local extirpation (Kendell 1998). Common garter snakes overwinter in hibernacula or dens which are located in specific substrates, including limestone bedrock. No hibernacula were identified during desktop review, field studies or Key Person Interviews (Wildlife and Wildlife Habitat TDR). For this project, disturbance to snake hibernacula was identified as a key Project-related potential effect. Transmission line tower installation at or near suitable garter snake habitat could negatively impact local garter snake populations.

Potential garter snake habitat occurs within and adjacent to the PDA. Areas around Lonesand and Sundown, MB have the highest potential to support hibernacula based on surficial limestone mapping and abundance of snakes observed crossing roads and highways. In order to reduce the potential for Project-related disturbance, pre-construction (i.e. prior to RoW clearing) surveys for snake hibernacula at tower sites will occur in areas where the PDA overlaps with Sundown Road (near Lonesand Lake). If snake hibernacula are found, the effectiveness of mitigation applied (i.e. 200 m buffer) will be verified through follow-up monitoring.

Objectives:

- To identify common garter snake hibernaculum sites located near proposed tower sites; and
- To verify the implementation and effectiveness of mitigation measures.

Applicable Project Component(s): New ROW for the D604I Transmission Line.

Monitoring Activities:

Table 4-8 Common Garter Snakes								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Snake Hibernacula Survey	Pre-construction	Investigate specific areas of the PDA having high potential to support snake hibernacula	Presence of garter snake hibernacula	Suitable garter snake hibernacula habitat within 200 m of proposed tower sites.	Pre-construction	Biannual	Spring and Fall	Presence/absence of hibernacula
	Post-construction	Revisit any identified snake hibernacula to monitor presence	Continued use of hibernacula by garter snakes	ESS	2 years	Biannual	Spring and Fall	Presence/absence of garter snakes in hibernacula

Manitoba Hydro is committed to:

- Provide digital ortho-rectified imagery or georeferenced digital video/photo products;
- Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;
- Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;
- Summarize results of key monitoring activities in an annual monitoring report; and
- Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of potential snake hibernacula and mitigation performance at ESS sites within project footprint or access routes;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use FRI habitat classifications, digital ortho-rectified imagery, and/or georeferenced video/photo products provided by Manitoba Hydro for identification of garter snake sampling sites and assessment of ROW effects;*
- *Where suitable garter snake habitat occurs, conduct pre-construction surveys for garter snake hibernacula during peak breeding activity in spring and/or possible movements back to hibernacula in the fall;*
- *Based on pre-construction survey results, provide recommendations for tower placement adjustments and/or mitigation measures to limit or avoid disturbance to hibernacula;*
- *Review Environmental Inspector and Monitor daily reports for identification of additional garter snake sampling sites;*
- *If suitable hibernacula habitat is identified, design and conduct specific survey methods that sample garter snake presence/absence to verify effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on common garter snake discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Thresholds for Action/Decision Triggers

- *Presence of hibernacula within 200 m of tower siting foundation*

4.4.3 Bird – Wire Collision

As outlined in Chapter 9 of the EIS, the presence of transmission lines in proximity to areas of high bird activity may lead to bird – wire collisions which result in the injury and death of birds. In these areas, larger-bodied species such as waterbirds (ducks and geese), cranes and herons, are particularly vulnerable to collisions due to their daily movement patterns, which peak during low light periods around sunrise and sunset. The degree of risk is influenced by several factors relating to transmission line design, location, and mitigation, as well as physical characteristics of the bird (species, size) and flight behavior (flocking, aerial courtship displays). Manitoba Hydro has committed to installing bird diverters along transmission line sections which transect areas of high bird activity. Pre-construction surveys will serve to verify Environmentally Sensitive Sites (ESS) for birds and will gauge the level of bird activity at these sites at biological important times such as during migration and the rearing of offspring. The monitoring program will involve construction phase and post-construction phase studies to quantify any mortality to birds caused by the transmission line and will direct adaptive mitigation strategies to reduce or prevent any future mortality events.

Objectives:

- Monitor avian mortality caused by transmission line infrastructure using a control-impact study design; and
- Determine the effectiveness of mitigation measures and, if appropriate, propose revisions to the existing plans or develop new mitigation options should high levels of avian mortality occur as a result of the transmission line.

Applicable Project Component(s): D604I Transmission Line

Monitoring Activities:

Table 4-9 Bird – Wire Collision								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Bird- Wire Collision Survey	Post-construction	Bird wire collision survey to evaluate diverter effectiveness	Mortality	Bird ESS sites	2 yrs.	Biannual	Spring and Fall	Mortality Presence/Absence

Manitoba Hydro is committed to:

- Provide digital ortho-rectified imagery or georeferenced digital video/photo products;
- Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows access to daily inspection and monitoring reports from construction period;
- Summarize results of key monitoring activities in an annual monitoring report; and
- Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.

Responsibilities of Environmental Monitor include:

- During construction phase daily activities, record observations of high bird activity areas within project footprint;
- Record observations with photo and waypoint and store in EPIMS; and
- Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.

Specialist will:

- *Review Environmental Inspector and Monitor daily reports for identification of bird-wire collision sampling sites;*
- *Design and conduct specific survey methods that sample bird presence/absence, abundance, mortality and flight paths to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on birds discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Thresholds for Action/Decision Triggers

Bird mortality statistics are above expected based on pre-construction abundance/flightpath surveys

4.4.4 Sharp-tailed Grouse Lekking Sites

As identified in the EIS, grassland birds have experienced widespread habitat loss through most of the prairies, including Sharp-tailed Grouse (*Tympanuchus phasianellus*). Three active sharp-tailed grouse leks supporting approximately 25 Sharp-tailed Grouse were identified in the Regional Assessment Area (RAA) during the 2014 surveys. All three leks occur adjacent to the New ROW in areas southwest of Ste. Genevieve, MB and north and south of La Broquerie, MB. Sharp-tailed Grouse may be affected by the temporary loss of some habitat at tower sites and the compaction of vegetative concealment cover along the New ROW. Sharp-tailed Grouse are particularly vulnerable to increased rates of predation if birds of prey (raptors) use transmission line towers as perches when hunting or nesting, near lek sites. This monitoring program will validate EIS predictions and work to determine any project-related effects to sharp-tail grouse (pre- versus post-disturbance).

Objectives:

- Identify the presence of lekking sites along the transmission line;
- Monitor predation of grouse near lekking sites in proximity to the transmission line compared to that at control sites; and
- Determine the effectiveness of mitigation measures and, if appropriate, propose revisions to the existing plans or develop new mitigation options should unexpected impacts to Sharp-tailed Grouse occur as a result of the transmission line.

Applicable Project Component(s): New ROW for the D604I Transmission Line

Monitoring Activities:

Table 4-10 Sharp-tailed Grouse Lekking Sites								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Sharp-tailed Grouse Lek Survey	Pre-construction	Lek site identification	Lek abundance	Where suitable breeding habitat overlaps with Project components (e.g., towers).	Pre-construction	Once	April 1 – May 31	Presence/Absence Abundance
	Construction	Lek disturbance monitoring	Disturbance	Leks found within 500 m of right-of-way (ROW) where construction activities overlap lekking activity.	During construction	Annual	April 1 - May 31	Presence/Absence Abundance
	Post-construction	Lek disturbance monitoring	Mortality	Raptor perching or nesting activity on towers near lek sites	2 yrs.	Annual	April 1 - May 31	Presence/Absence Abundance

Manitoba Hydro is committed to:

- Provide digital ortho-rectified imagery or georeferenced digital video/photo products;
- Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows access to daily inspection and monitoring reports from construction period;
- Summarize results of key monitoring activities in an annual monitoring report;
- Share results of key monitoring activities with interested local stakeholders, First Nations and Metis; and

- *Participate as a stakeholder in committees or working groups whose purpose is for the ongoing conservation of wildlife.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of lekking sites and mitigation performance at ESS sites within project footprint;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of potential lekking sites;*
- *Conduct pre-construction surveys for lekking sites within 500m of ROW;*
- *Review Environmental Inspector and Monitor daily reports for identification of lekking sites;*
- *Design and conduct specific survey methods that sample bird presence/absence, abundance, mortality and behaviour to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on lekking sites discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Manitoba Conservation and Water Stewardship will:

- *Provide guidance regarding mitigation strategies should unanticipated effects occur as a result of the project.*

Thresholds for Action/Decision Triggers

- *Lekking sites near project footprint have significant reduction in abundance compared to pre-construction baseline and control lekking sites away from the project.*
- *Lekking sites are disturbed by construction activities.*
- *Raptor nests or perching on transmission towers near lekking sites*

4.4.5 Bird Species of Conservation Concern

Species of conservation concern (SOCC) include species of that are protected under MESA, SARA or are listed as rare by the MBCDC. These species generally exist in low numbers and are sensitive to changes in habitat. As described under SARA (subsection 79(2)), monitoring of potential adverse project effects on SARA-listed wildlife species is required (SARA 2011). Fourteen bird species of conservation concern were identified in the RAA during the 2014 surveys; however, the only bird species within the RAA to have defined critical habitat is the Golden-winged Warbler (*Vermivora chrysoptera*). Critical habitat overlaps with the eastern part of the RAA near Ross, MB, south through Richer, La Broquerie, Marchand, and continues to the border near Sundown and Piney. Six golden-winged warblers were detected during the 2014 breeding bird surveys; three were observed along the FPR in areas southwest of Marchand and south of the Watson P. Davidson WMA, two were observed north of Marchand along the existing 230 kV transmission line, and one was observed south of Richer. Information from the recent *Manitoba Breeding Bird Atlas* survey effort was also used to understand the spatial distribution of golden-winged warblers in the LAA and RAA. Manitoba Hydro has been a strong supporter of the Manitoba Breeding Bird Atlas since its inception and considers it efforts very valuable to the ongoing monitoring of species of conservation concern. Field observations from this project as with all Manitoba Hydro major projects will continue to be shared and incorporated into the atlas.

ROW clearing is the primary project activity that may result in a direct and measurable change in habitat for bird species of conservation concern, particularly for Golden-winged Warbler, because it involves clearing in forested and successional areas of the ROW and grubbing at transmission tower sites. Indirect effects on habitat are those that reduce the effectiveness of existing or remaining habitat for wildlife. Indirect effects may occur through sensory disturbances (e.g., noise, light) causing temporary displacement of some wildlife from otherwise suitable habitat. One of the objectives of the Integrated Vegetation Management Plan will be to manage ROW vegetation at prescribed locations to enhance habitat suitability for golden-winged warbler. Therefore, the monitoring program will validate EIS predictions, verify implantation of mitigation measures, and concentrate on determining any project-related effects to bird species of conservation concerns (pre- versus post-disturbance).

Objectives:

- *Identify the location of bird species of conservation concern within or in close proximity to the Project footprint with the purpose of establishing a Control-Impact monitoring program for known individuals and/or groups;*
- *Monitor species of conservation concern in close proximity to the transmission line and compare annual site fidelity and abundance to nearby control sites; and*
- *Determine the effectiveness of mitigation measures and, if appropriate, propose revisions to the existing plans or develop new mitigation options should unexpected impacts to birds occur as a result of construction or operation activities.*

Applicable Project Component(s): All Project Components

Monitoring Activities:

Table 4-11 Bird Species of Conservation Concern								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Bird Species of Conservation Concern Survey	Pre-construction	Bird Point Counts	Presence/Absence Abundance	Select areas of PDA known to support SOCC	One-time	Once	April 1 - July 31	Presence/Absence Abundance
	Post-clearing	Bird Point Counts	Presence/Absence Abundance	Select areas of PDA known to support SOCC	1,3,5 yrs.	Annual	April 1 - July 31	Presence/Absence Abundance

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*

- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows access to daily inspection and monitoring reports from construction period;*
- *Summarize results of key monitoring activities in an annual monitoring report;*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis; and*
- *Participate as a stakeholder in committees or working groups whose purpose is for the ongoing conservation of wildlife.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of bird species of concern and mitigation performance at ESS sites within project footprint;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use the digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of potential species of concern habitat;*
- *Review Environmental Inspector and Monitor daily reports for identification of bird species of concern;*
- *Design and conduct specific survey methods that sample site fidelity and abundance and compare to controls sites to verify accuracy of EIS predictions and effectiveness of mitigation measures implemented;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on species of concern discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Manitoba Conservation and Water Stewardship will:

- *Provide updated data of species of concern populations to inform ongoing analyses related to biophysical monitoring (e.g. population survey data, observations, reports); and*
- *Provide guidance regarding mitigation strategies should unanticipated effects occur as a result of the project.*

Thresholds for Action/Decision Triggers

- *Species of concern point count sites within project footprint have significant reduction in abundance compared to pre-construction baseline and control point counts away from the project.*

4.4.6 Birds of Prey

As described in Chapter 9 of the EIS, raptor nests are considered important habitat features as they can be used year after year by different species. While land clearing of the ROW has the potential to destroy raptor nests, the resulting transmission towers have shown to provide suitable nesting habitat where electrical safety concerns are not an issue. Only one raptor nest (unknown species) was identified near, but outside of the ROW during the 2014 aerial surveys (northwest of Ste-Genevieve, approximately 140 m west of the FPR); however, the absence of evidence of nests within the ROW does not preclude the possibility that a cryptic nest was overlooked or that a new nest has not appeared prior to clearing of the ROW. As such, ongoing ROW surveys for raptor nests are proposed for the purpose of determining removal or relocation once nest has been abandoned.

Objectives:

- Identify raptor nests in Project footprint that require removal or relocation

Applicable Project Component(s): D604I Transmission Line and Glenboro South Station Transmission Line Modifications

Monitoring Activities:

Table 4-12 Birds of Prey								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurable Parameter(s)
Raptor Nest Survey	Pre-construction	Raptor Nest Search	Nest site locations	PDA	Pre-construction	Once	Fall	Presence/Absence of nests# of Nests requiring removal or relocation

Manitoba Hydro is committed to:

- Supply nest site, nest removal or relocation activities and any mortality locations observed to MCWS; and
- Supply an Environmental Protection Information Management System (EPIMS) that manages project monitoring data and allows access to daily inspection and monitoring reports from construction period and a Transmission Line Maintenance System that records raptor nest observations and nest relocations during operation period.

Responsibilities of Environmental Monitor include:

- During construction phase daily activities, record observations of raptor nests, mortality and mitigation performance at ESS sites within project footprint;
- Record observations with photo and waypoint and store in EPIMS; and
- Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.

Specialist will:

- Conduct pre-clearing non-invasive nest surveys;

- *Based on pre-clearing survey results flag buffer zones around active bird nests;*
- *Review Environmental Inspector and Monitor daily reports for identification of raptor nests;*
- *Report immediately to Manitoba Hydro any unanticipated project effects on raptors discovered through monitoring activities;*
- *Analyze, evaluate and report on monitoring findings including mitigation effectiveness on an annual basis; and*
- *Through an adaptive management framework, make recommendations for ongoing improvements to the mitigation measures, monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analysis.*

Manitoba Conservation and Water Stewardship may be requested to:

- *Provide guidance regarding mitigation strategies should unanticipated effects occur as a result of the project.*

Thresholds for Action/Decision Triggers

- *Active nest site identified in pre-construction survey.*

4.4.7 Ungulates and Predators

White-tailed deer are the predominate ungulate in the Project area. Transmission line corridors create habitat edges for white-tailed deer that provide an ecotone with high quality forage resources and accessible hiding cover in adjacent forest (Reimers *et al.* 2000). Disturbed vegetation is favoured by white-tailed deer because of the high diversity of plants in those areas (Stewart *et al.* 2011). Riparian areas, edge habitats, and linear features function as important habitats for travel and forage. Therefore, white-tailed deer are not particularly susceptible to the effects of habitat fragmentation, but may be susceptible to increased mortality associated with moving through higher risk areas created as a result of habitat loss and degradation of matrix quality (Stewart *et al.* 2011). The ROW and project-related access development may enhance predator mobility into areas that were previously secure habitat for prey species, decrease predator search times for prey, and/or make prey escape more difficult. Predators such as wolves and coyotes may benefit from enhanced access, leading to increased predation of ungulates.

Chapter 9 of the EIS identified a potential project effect of increased mortality risk from hunters and predators as a result of enhanced access of white-tailed deer habitat in eastern portions of the project, however the effect is expected to be minimal with no measurable effect on abundance anticipated. In that portion of the project, deer concentrations were noted in areas near Ste. Genevieve, Richer, Sundown and Piney, MB, and in the Watson P. Davidson and Spurwoods WMAs. The deer population in the area is considered to be stable. Habitat loss and sensory disturbance effects from ROW clearing are considered minimal and short-term, ultimately resulting in a positive effect of enhanced deciduous browse forage and increased edge habitat during the operation phase.

As described in Chapter 9 of the EIS, the Vita elk population in Manitoba (fall/winter range) is shared with Minnesota (summer range) and is the only elk population with potential to interact with the Project. Long-term census data in Manitoba for this elk population are limited, with a stable population estimate of 100-150. Annual surveys (2004-2008) conducted in Minnesota estimated the population at 112 – 215 elk (MDNR 2009). The Vita elk range in Manitoba may overlap an eastern portion of the Project RAA in areas near Vita and Caliento, however, EIS field studies did not detect elk occurrence within the ROW or Local Assessment Area (LAA; a 1 km buffer around the project footprint), or Regional Assessment Area (RAA; a 15 km buffer around the project footprint). The closest observations during baseline surveys were 20 km from the final preferred route. The ROW avoids the core areas known to support elk near Vita and Arbakka, with no anticipated significant adverse project effects on the population.

Moose were a common ungulate species in southeastern Manitoba prior to the late 1990s but populations in the region have since collapsed (Dettman 2015, pers. comm.; Leavesley 2015, pers. comm.; Rebizant 2015, pers. comm.). Despite the presence of suitable moose habitat (e.g., shrubby wetlands, alder swamps, sub-climax deciduous forest; Banfield 1974), moose are rare in southeastern Manitoba due to a combination of factors such as habitat fragmentation, predation by wolves, parasites, fires suppression, and unregulated harvest (Leavesley 2015, pers. comm.; Rebizant 2015, pers. comm.). The areas south of the Watson P. Davidson Wildlife Management Area heading southeast to the Spur Woods WMA and south of Piney, in the RAA was identified as containing moose habitat, especially near Piney (Black River First Nation, Long Plain First Nation and Swan Lake First Nation 2015). No specific monitoring for moose is being proposed, however moose observations in all aerial survey and camera trap surveys will be documented.

White-tailed deer, elk and moose are highly valued by resource users, First Nations and Metis. White tailed deer are an important livelihood for local outfitters. There is public concern that the Project may increase white-tailed deer vulnerability to mortality (hunting and predation) resulting from increased access. Change in habitat availability associated with ROW clearing and mortality resulting from increased access is anticipated to be negligible for the Vita elk population because routing of the ROW avoids the core areas known to support them.

Monitoring will focus on validating EIS predictions, verifying the implementation of mitigation measures, and assist in determining if project-related access has altered distribution and occurrence of ungulates and predators, resulting in altered mortality-risk from hunters and predators, relative to baseline state (pre- versus post-disturbance).

Objective(s):

- *Expanding the baseline knowledge of occurrence, distribution and abundance of ungulates and predators interacting with the Project;*
- *Investigating the influence of the Project on white-tailed deer at two scales:*
 - a. *Local Scale: Spatial dynamics using indicators such as occurrence and distribution patterns relative to Project-related access development before and after construction in relation to predator occurrence and project-related linear disturbance. Mortality risks will be assessed as they pertain to predicted Project effects if sufficient and suitable data can be acquired.*
 - b. *Range Scale: Population occurrence and distribution in relation to project-related changes in habitat availability (fragmentation/increased edge habitat) and access.*

Applicable Project Component(s): New ROW for the D604I Transmission Line

Monitoring Activities:

Table 4-13 Ungulates and Predators								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Distribution / Occurrence Mapping Surveys and Camera Trap Survey	Construction	Winter aerial surveys and remote IR camera traps	Change in occurrence and / or seasonal distribution relative to project infrastructure and wolf distribution	Survey blocks on eastern portion of RAA extending from Hwy 1 intersection with the ROW to the Manitoba-Minnesota border	During construction	Annual (aerial component)	Winter (aerial component)	Range scale change in population occurrence and seasonal distribution
						Continuous (ground component)	Year-round (ground component)	
Distribution / Occurrence Mapping Surveys and Camera Trap Survey	Post-construction	Winter aerial surveys and remote IR camera traps	Change in occurrence and / or seasonal distribution relative to project infrastructure and wolf distribution	Survey blocks on eastern portion of RAA extending from Hwy 1 intersection with the ROW to the Manitoba-Minnesota border	2 yrs.	Annual (aerial component)	Winter (aerial component)	Range scale change in population occurrence and seasonal distribution
						Continuous (ground component)	Year-round (ground component)	
Vehicle Collision Statistic Gathering	Construction	Gather statistics on project-related vehicle collisions	Deer/Moose vehicle collisions	RAA	During construction	Continuous	Year-round	Number of project related deer/moose vehicle collisions
Mineral Lick Survey	Pre-construction	Locate mineral licks within the project footprint	Location of mineral licks	LAA	Pre-construction	Annual	Fall	Location of mineral licks

Manitoba Hydro is committed to:

- *Provide digital ortho-rectified imagery or georeferenced digital video/photo products;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report;*
- *Share results of key monitoring activities with interested local stakeholders , First Nations and Metis; and*
- *Participate as a stakeholder in relevant committees or working groups whose purpose is for the ongoing conservation of wildlife.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of deer/moose and tracks, mineral licks, human access, and mortality sites within project footprint or access routes;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use existing habitat suitability model to predict suitable ungulate habitat and to assess project footprint effects on habitat suitability and occurrence (pre-disturbance vs post disturbance)*
- *Design and conduct specific survey methods to collect ungulate occurrence and distribution data during the disturbance and post-disturbance project phases, in relation to project linear disturbance and predator occurrence*
- *Collect and analyze ungulate and predator data to assess if there are project-related effects at the local (LAA) or landscape (RAA) scale on occurrence or seasonal distribution.*
- *Report on monitoring efforts, including identification to Manitoba Hydro of any unanticipated effects on ungulates discovered through monitoring activities*
- *Through an adaptive management process, make recommendations for ongoing improvements to the monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analyses*

Manitoba Conservation and Water Stewardship may be requested to:

- *Provide guidance regarding mitigation strategies should unexpected impacts occur as a result of the transmission line*

Decision Trigger(s)/Threshold(s) for Action

- *More than five ungulate project- related vehicle collisions per year*
- *Increased presence of predators within LAA*
- *Elk observed within the LAA*
- *Identification of mineral lick within LAA*
- *Significant project-related change in population occurrence, distribution or abundance relative to pre-disturbance state*

4.4.8 Black Bear

Black bears favor high landscape connectivity and are sensitive to significant habitat changes and disturbances that affect access to, and availability of, food resources (Gunson 1993, Kindell & Van Manen 2007, Rogers & Allen 1987). They are widely distributed as a consequence of food resource availability both spatially and seasonally (Costello & Sage 1994, Gunson 1993, Pelton *et al.* 1999, Pelton 2000), but local abundance may be variable depending on annual severity of weather and food availability. Bears may avoid linear development with active human activity with typical avoidance distances of >200m (Forman *et al.* 1997). Denning black bears are particularly sensitive to noise disturbance within 1 km of dens (especially within 200m of dens), and may abandon the den in response to disturbance, especially early in the denning period (Linnell *et al.* 2000).

The EIS indicates the black bear population within the RAA is stable (possibly increasing), with common occurrence and widespread distribution throughout areas supporting forest habitat; particularly at the forest-agricultural habitat interface, primarily east and south of the Watson P. Davidson WMA. Field studies identified bear activity within the vicinity of the proposed D604I ROW, along existing transmission line M602F, and other forested parts of the RAA, occupying forested areas near the communities of Richer, Marchand, Sundown, and Piney.

Black bears are an important species to subsistence users (First Nations and Metis) and to the livelihood of local commercial outfitters. The Project footprint will contribute to habitat fragmentation of natural habitat patches that may affect bear habitat availability, occurrence, and distribution. Measurable changes in abundance are not anticipated as a result of Project activities or disturbance because of routing and scheduling of construction activities. Monitoring will focus on validating EIS predictions, verifying the implementation of mitigation measures, and assist in determining if project-related disturbance has significantly impacted habitat availability, or altered occurrence and distribution relative to baseline state,

Objective(s):

- *Expand the baseline knowledge of distribution, abundance, and population characteristics of black bears interacting with the Project*
- *Investigating the influence of the Project on black bear at two scales:*
 - a. *Local Scale: Monitor the influence of the Project on black bear prevalence in areas along the ROW using remote IR cameras to examine spatial dynamics using indicators such as local occurrence and distribution patterns relative to Project-related access development before and after construction, where pre-existing baseline data permits.*
 - b. *Range Scale: Habitat suitability modelling to assess population occurrence and distribution in relation to project-related changes in habitat availability (fragmentation/increased edge habitat) and access.*

Applicable Project Component(s): *New ROW for the D604I Transmission Line*

Monitoring Activities:

Table 4-14 Black Bear								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Camera Trap Survey	Construction	Monitor black bear prevalence using remote IR cameras	Change in prevalence and occurrence in relation to the project footprint	LAA	During construction	Continuous	Year- round	# of Black bears observed, Change in prevalence
Camera Trap Survey	Post-construction	Monitor black bear prevalence using remote IR cameras	Change in prevalence and occurrence in relation to the project footprint	LAA	2 yrs.	Continuous	Year- round	# of Black bears observed, Change in prevalence

Manitoba Hydro is committed to:

- *Provide camera trap equipment;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Provide qualified Environmental Inspectors to conduct regular inspections of mitigation measure implementation;*
- *Summarize results of key monitoring activities in an annual monitoring report;*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis; and*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of bear, dens and tracks, ungulate mortality sites within project footprint or access routes;*
- *Record observations with photo and waypoint and store in EPIMS; and*
- *Work with Specialist during field visits to assess mitigation effectiveness, and provide first hand overview of site conditions during construction phase.*

Specialist will:

- *Use digital ortho-rectified imagery and geospatial datasets provided by Manitoba Hydro to develop a habitat suitability model to predict suitable black bear habitat, to predict project footprint effects on black bear habitat suitability and occurrence (pre-disturbance vs post disturbance), and to inform survey design*
- *Design and conduct camera trap survey to collect black bear occurrence and distribution data*
- *Collect and analyze black bear data to assess if there are project-related effects at the local or regional scale on occurrence and distribution.*
- *Report on monitoring efforts, including identification to Manitoba Hydro of any unanticipated effects on black bear discovered through monitoring activities*
- *Through an adaptive management process, make recommendations for ongoing improvements to the monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analyses*

Manitoba Conservation and Water Stewardship may be requested to:

- *Provide guidance regarding mitigation strategies should unexpected impacts occur as a result of the transmission line*

Decision Trigger(s)/Threshold(s) for Action

- *Bear den location is detected within LAA by project staff*
- *Project footprint exceeds predicted area within range*
- *Significant project-related change in occurrence and prevalence*

4.5 SOCIO-ECONOMIC AND RESOURCE USE

4.5.1 Employment and Economy

The economic monitoring activities that will occur during construction include employment, income and business outcomes associated with the project. The estimates of the economic impact of the project are documented in the EIS, and the intent is to compare predictions made in the EIS to actuals.

The EIS estimated the workforce for all project components. Estimates vary by project component and year depending on the activity. The majority of employment opportunities will occur during the construction phase of the project with fewer opportunities during the operations phase of the project. Due to seasonality constraints for some aspects of the work certain project components will have activities concentrated at specific times of the year, while other project construction components will occur throughout the entire year. Monitoring employment results will provide data on actuals incurred on the project and will provide an indication of the overall economic impact of the project.

Construction of the project will result in business opportunities locally, regionally and throughout the province and Canada. Manitoba Hydro has policies in place to promote local businesses on its projects. The goal is to enhance business relationships with the communities and to assist them in building capacity and competitiveness of their businesses through involvement in Manitoba Hydro contracts. Monitoring both direct and indirect business effects will provide data on the success and effectiveness of efforts to enhance local business participation, as well as an indication of the general economic impact of the project in communities in the vicinity of the Project.

Labour income is an important indicator of direct economic impact of a project. Income levels also affect the general standard of living of individuals and families by influencing the acquisition of basic human needs including housing, food and clothing. Consequently, monitoring income levels can provide a general indication of a project's contribution to the overall standard of living. The estimate of labour income reflects the direct income of wages and salaries associated with direct person-years employment. Regarding taxation, direct taxes paid reflect incremental revenue sources generated for governments as a result of the project. The incremental revenues, in turn, contribute to societal programs and general well-being.

Objective(s)

- *The objective of economic monitoring is to gather project information relating to economic parameters and compare to predictions made in the EIS regarding employment and workforce, business opportunities, labour income and tax revenue.*

Applicable Project Component(s): *All Project Components*

Monitoring Activities:

Table 4-15 Employment and Economy

Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Project Employment Reporting	Construction	Determine project employment associated with the project	Collect and report using Construction Employment Database.	All project components	During construction	Annual	April	Total person years of employment for each project component, Total number of hire, Total number of employees, Type (job classifications) of work available.
Direct/Indirect Business Opportunities Reporting	Construction	Determine direct/indirect business opportunities	Collect and report using Manitoba Hydro's existing accounting and tracking system and purchasing reports.	All project components	During construction	Annual	April	To determine the extent of direct/indirect business effects associated with the project.
Direct Labor Income and Taxes Reporting	Construction	Determine direct labor income and taxes generated by the project.	Manitoba Hydro's existing accounting and tracking system and labour reports.	All project components	During construction	Annual	April	To determine direct labor income and contribution of the project to tax revenue.

Manitoba Hydro is committed to:

- Summarize results of key monitoring activities in an annual monitoring report; and
- Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.

4.5.2 Infrastructure and Services

4.5.2.1 Transportation

The construction of each major component will have distinct effects on the existing road network. The road network consists of provincial highways and municipal roads in southeast Manitoba. Each Project component has unique traffic generation, vehicle mix, travel patterns and mode choices, which are variable throughout the life of the Project. Traffic accidents will be obtained through Manitoba Hydro reporting to the extent possible. This data will be used to potentially link project related incidents to certain conditions, whether it be related to the traffic volume, truck load size, time of collision, weather or road conditions.

Objective(s)

- The objective of traffic monitoring is to track the number of accidents/potential near misses associated with the project and to track traffic volumes at key locations and to compare to baseline volumes*

Applicable Project Component(s): All Project Components

Monitoring Activities:

Table 4-16 Transportation

Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Traffic Monitoring Survey	Construction	Determine the increase in traffic volumes, near misses and accidents on key roadways potentially as a result of the project.	Increase in traffic volumes, near misses and accidents on key roadways.	All project components	During construction	Annual	Continuous	Traffic volumes – compare actual traffic volumes from estimates in the EIS on key roadways. Traffic accidents and near misses in the project area on key roadways through Manitoba Hydro incident reports as available.

Manitoba Hydro is committed to:

- Summarize results of key monitoring activities in an annual monitoring report;*
- Share results of key monitoring activities with interested local stakeholders, First Nations and Metis; and*

Specialist will:

- Design and conduct traffic monitoring survey to collect traffic volume, near misses and accidents as a result of the Project*
- Report on monitoring efforts, including identification of any unanticipated effects on traffic volumes and accidents discovered through monitoring activities*
- Through an adaptive management process, make recommendations for ongoing improvements to the monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analyses*

Decision Trigger(s)/Threshold(s) for Action

- *If project related traffic volumes on key roadways exceed predictions in EIS*
- *If project related traffic accidents on key roadways exceed predictions in the EIS*

4.5.3 Land and Resource Use

4.5.3.1 Outfitter Resource Use

Manitoba Hydro is planning to continue its work with the local black bear outfitter in the project area to further understand development effects on their operations. In 2014, camera traps were established at bait sites within the Project Development Area and in control areas to understand baseline conditions of bear occurrence and prevalence. As some bait sites are in close proximity to the Final Preferred Route, it is possible that their continued use may be affected by the Project. Manitoba Hydro is proposing to work with the outfitter to establish new bear bait sites prior to construction and include them in a continued camera trap survey along with the baseline locations.

Objective(s)

- *The objective of the Black Bear Bait Site Camera Trap Survey is to analyse bear occurrence and prevalence at bait site locations prior to, during and post construction of the Project*

Applicable Project Component(s): *New ROW for the D604I Transmission Line*

Monitoring Activities

Table 4-17 Outfitter Resource Use								
Key Monitoring Activity	Phase	Task Description	Parameter(s)	Site Location	Duration	Frequency	Timing	Measurements/Observations
Black Bear Bait Site Camera Trap Survey	Pre-construction	Camera Trap survey to measure use of bear bait sites prior to development	Number of black bears frequenting bait sites	Bear Bait Sites	Pre-construction	Biannual	Spring and Fall	Occurrence and Prevalence
	Construction	Camera Trap survey to measure use of bear bait sites during to development	Number of black bears frequenting bait sites	Bear Bait Sites	During construction	Biannual	Spring and Fall	Occurrence and Prevalence
	Post-construction	Camera Trap survey to measure use of bear bait sites post development	Number of black bears frequenting bait sites	Bear Bait Sites	2 yrs	Biannual	Spring and Fall	Occurrence and Prevalence

Manitoba Hydro is committed to:

- *Provide camera trap equipment;*
- *Supply an Environmental Protection Information Management System (EPIMS) that manages all project monitoring data and allows Specialist access to daily inspection and monitoring reports from construction period;*
- *Summarize results of key monitoring activities in an annual monitoring report; and*
- *Share results of key monitoring activities with interested local stakeholders, First Nations and Metis.*

Responsibilities of Environmental Monitor include:

- *During construction phase daily activities, record observations of bear, dens and tracks, ungulate mortality sites near bait sites within project footprint or access routes;*

- *Record observations with photo and waypoint and store in EPIMS.*

Specialist will:

- *Work with local outfitter to conduct camera trap survey to collect black bear occurrence and prevalence data*
- *Collect and analyze black bear data to assess if there are project-related effects on outfitter operations.*
- *Report on monitoring efforts, including identification to Manitoba Hydro of any unanticipated effects on black bear bait sites discovered through monitoring activities*
- *Through an adaptive management process, make recommendations for ongoing improvements to the monitoring plan, methods, analysis and implementation in response to knowledge gained through ongoing monitoring and associated analyses*

5.0 ADAPTIVE MANAGEMENT

The Canadian Environmental Assessment Agency (CEAA) defines adaptive management as “the implementation of new or modified processes, procedures and or mitigation measures over the construction and operation phases of a project to address unanticipated environmental effects” (CEAA, 2015). Adaptive management is considered a planned and systematic process used to continuously improve environmental management practices by learning about their outcomes. The use of an adaptive management process allows for the flexibility to identify and implement new mitigation measures or to modify existing ones during the life of a project (CEAA, 2015). Although definitions of adaptive management vary depending on the source, there are fundamental concepts of adaptive management that are universal and fundamental (British Columbia Ministry for Forests and Range, 2015) which include the following:

- Learning and reducing key uncertainties
- Using what is learned to change policy and practice
- Focus is on improving management
- Adaptive management is formal, structured and systematic

Manitoba Hydro has accumulated information and lessons learned from previous monitoring programs. The successes of those programs have been reviewed and considered in the development of this plan. Previous weaknesses have been adapted and improved upon to further enhance this plan’s approach, methods and key environmental monitoring activities.

The Environmental Protection Program, of which the Manitoba-Minnesota Transmission Project Environmental Monitoring Plan is part of, will be designed to be adaptive and responsive throughout the Project lifecycle. The management of any low to moderate levels of uncertainty can be achieved for the proposed project by the implementation of an adaptive management process which will help to facilitate actions if any unforeseen effects occur and will result in the identification of new or modified mitigation (British Columbia Environmental Assessment Office, 2013).

Program documents, processes, procedures and mitigation measures will be continuously evaluated by inspection, monitoring and communication programs. Audits and reviews will be conducted to facilitate updates to the program through an adaptive management process (Manitoba Hydro, 2013). Within the Environmental Protection Program, adaptive management will take place in two primary areas: at the management level, involving changes with the program structure itself; and at the implementation level, which will involve individual mitigation measures as management and implementation teams evaluate the on-site effectiveness of mitigation strategies or the program as a whole. Scheduled update meetings between

departments, annual reviews of the program and its effectiveness will take place to foster the adaptive management process.

Annual reviews will be conducted by Licensing and Environmental Assessment in consultation with Contractor and Manitoba Hydro personnel, regulators and stakeholders. The results of each annual season review will be summarized in a report that documents the issues addressed and provides recommended updates to applicable components of the Environmental Protection Program.

6.0 REPORTING

Reports detailing results of monitoring activities will be submitted to MCWS on an annual basis. Reports will be generated annually, and provided to Manitoba Conservation and Water Stewardship. Notifications of new reports on the website will be communicated to relevant federal and provincial regulatory agencies.

In addition to annual reports summarizing activities and general findings, technical reports will be prepared at appropriate intervals during the construction and post construction phases of the Project. These reports will on a cumulative basis compile and analyze monitoring results during the relevant period, and based on those results, make recommendations concerning the need for any changes to the mitigation or monitoring approach. Manitoba Hydro will present and discuss monitoring results with MCWS, First Nations and Metis on request as the project proceeds.

Any significant unanticipated project effects discovered through monitoring activities or where regulations dictate will be reported immediately to MCWS.

7.0 MONITORING METHODS

This section provides detailed information on the methods to be used to monitor the Valued Components and environmental indicators identified in Section 4.0.

7.1 FISH AND FISH HABITAT

7.1.1 Stream Crossing Assessments

Stream crossing sites will be evaluated for adherence to prescribed mitigation and effectiveness of mitigation.

Field studies will be undertaken at all stream crossings assessed as fish habitat during active construction and in the first spring following construction. Riparian buffers will be evaluated by measuring their width from the stream or floodplain and comparing to the width prescribed, as well as evaluating the amount of vegetation left in the buffer and the clearing method used. Stability of stream banks and floodplain will be evaluated visually and rutting, slumping, or other damage to the ground noted. The presence of slash or disturbed sediment within the buffer will be recorded, as well as any evidence of erosion. Road crossings will be evaluated for appropriate grade and angle across the stream, and the presence of any organic debris remaining from a temporary bridge. If any erosion control measures were in place (blankets, silt fences) their effectiveness will be evaluated. Tower locations will be assessed to determine if they adhered to prescribed mitigation. Any further reclamation needed to meet the prescribed mitigation will be recommended.

7.2 VEGETATION AND WETLANDS

Information collected and prepared for the Project that will assist with environmental monitoring will be reviewed prior to fieldwork. Review documents include the vegetation and wetlands technical report and the Project Environmental Impact Statement. Applicable regulatory documents will also be referred to for environmental monitoring requirements including the Environment Act Licence and the Transmission Project Report on Public Hearing.

To select monitoring sites for the Project, Manitoba Hydro's Environmental Protection Information Management System (EPIMS) map viewer will be used to view recent project footprint imagery (pre-clearing digital ortho-rectified imagery). Previous sampled sites and environmentally sensitive sites, identified from the Project Environmental Assessment, will be considered for potential sampling locations. Suitable sites will also be selected based on vegetation type, accessibility, disturbance, landowner permission, and whether invasive and non-native species may establish and proliferate. Sites selected on private lands will be

submitted to Manitoba Hydro to determine property ownership and contact information. Landowners will be contacted to request permission for access to their properties.

Components of the biophysical environment to survey and monitor for the Project include wetlands, species of conservation concern, non-native and invasive species, and traditional use plants.

7.2.1 Wetlands

Wetland vegetation will be sampled, and the accuracy of EIS predictions and effectiveness of mitigation measures implemented will be verified. Digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of wetlands and potential sampling sites for assessment of RoW effects will be used. Pre-construction surveys will involve quantitative native vegetation surveys in selected wetlands along the transmission line RoW.

Sites selected for native vegetation surveys will have plots established for future vegetation monitoring. The native vegetation survey will consist of establishing sample plots on sites with relatively homogenous vegetation. Vegetation will be sampled for composition, abundance and structure. Sampling of selected sites will follow methods outlined by Redburn and Strong (2008) and involve the establishment of five 2.5 m by 2.5 m quadrats with a 1 m by 1 m nested quadrat spaced at 5 m increments along a 30 m transect for wetland shrubs 1 - 2.5 m tall and herbs and low shrubs ≤ 1 m tall, respectively. Transects will be located on sites considered representative of the stand being sampled. The first quadrat will be placed at the 5 m mark. The composition of wetland tree cover > 2.5 m tall will be estimated using a 20 m by 30 m plot centered on each transect. Transects will be permanently located along the transmission line RoW, longitudinally, and approximately in the centre of the RoW, but off the equipment path. Plant cover will be estimated to the nearest 1% for species $< 15\%$ cover and nearest 5% for those with higher cover. Other incidentally observed species will be recorded. GPS coordinates and photographs will be taken at each sampling site. Wetlands will be classified according to the Canadian Wetland Classification System (National Wetlands Working Group 1997).

Environmental monitoring of wetlands will occur on cleared portions of the RoW. Environmental monitoring will involve vegetation monitoring using the identical quantitative methods described above (native vegetation survey). Wetlands will be sampled for herbaceous and shrub cover along the RoW to assess the vegetation. Incidental species observations will be recorded. All sites will be photographed.

Permanently located sampling areas will be used to record the change in vegetation that can be systematically monitored through time. The collection of wetland vegetation information will occur at a similar time during the growing season to maximize the comparability of data. A

sample size will be accomplished that will allow for the detection of differences statistically in vegetation over time, that will consider size of area and accessibility.

7.2.2 Plant Species of Conservation Concern

Surveys for species of conservation concern, and the accuracy of EIS predictions and effectiveness of mitigation measures implemented will be verified. Pre-construction surveys for species of conservation concern will be conducted in portions of the project footprint that were not previously surveyed and have the greatest potential for supporting these plants along the transmission line RoW. Digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro will be used for the identification of potential survey sites and assessment of RoW effects.

Rare plant surveys initially will involve the review of species observed previously along the transmission line RoW, as well as the database compiled by the Manitoba Conservation Data Centre for species of conservation concern, which includes species that are rare, disjunct, or at risk throughout their range or in Manitoba. Species of conservation concern encompasses plants ranked very rare to uncommon by the Manitoba Conservation Data Centre, and those listed under the provincial *Endangered Species Act*, the federal *Species at Risk Act*, or listed by the Committee on the Status of Endangered Wildlife in Canada. Flowering times and preferred habitat for species of conservation concern known to occur in the Project area will be reviewed.

Surveys will be conducted on foot by experienced vegetation ecologists. Survey transects are anticipated to be 100 m in length, with one or two parallel transects per quarter section located perpendicular to the ROW. Transects will begin at the edge of the PDA and continued perpendicular across the ROW to the opposite end of the PDA. Transect survey speed will range from approximately 0.5 km per hour to 5 km per hour depending on vegetation density at each site. Each transect will be placed at least 100 m away from any disturbance (e.g. roads). Transect locations will be determined in the field. All vascular plant species observed will be identified and recorded until no new species were found. Survey methods follow the *Species Detection Survey Protocols for Rare Prairie Plant Surveys* from the Government of Saskatchewan (2014). Rare plant locations will be recorded using a GPS receiver. Rare plant individuals will be counted, phenology will be recorded and population extent will be estimated. Additional information collected will include associated plants observed. Photographs will be captured in the field.

Environmental monitoring for species of conservation concern will occur after clearing of the RoW. Monitoring for species of conservation concern will involve the review of species previously observed during pre-construction surveys. Monitoring will occur at selected sites along the RoW to investigate the presence/absence of the plants which were observed prior to clearing and construction. Species of concern observed in the field will have the following

information recorded: GPS coordinates verification, individuals counted, population extent estimated, phenology recorded, and associated plants recorded. Photographs will be captured in the field.

7.2.3 Invasive Plant Species

Sampling will occur for invasive plant species introduction, and the accuracy of EIS predictions and effectiveness of mitigation measures implemented will be verified. Initially, digital orthorectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of potential sampling sites and assessment of RoW effects will be used. Pre-construction surveys will involve quantitative native vegetation surveys at selected sites along the transmission line RoW.

Sites selected for native vegetation surveys will have plots established for future vegetation monitoring. The native vegetation survey will consist of establishing sample plots on sites near roads, rail lines, rivers or disturbances, which may provide pathways for these species. Vegetation will be sampled for composition, abundance and structure. Sampling of selected sites will involve the establishment of five 2.5 m by 2.5 m quadrats with a 1 m by 1 m nested quadrat spaced at 5 m increments along a 30 m transect for shrubs 1 - 2.5 m tall and herbs and low shrubs ≤ 1 m tall, respectively. The first quadrat will be placed at the 5 m mark. The composition of tree cover >2.5 m tall will be estimated using a 20 m by 30 m plot centered on each transect. Transects will be permanently located along the transmission line RoW, longitudinally, and approximately in the centre of the RoW, but off the equipment path. Plant cover will be estimated to the nearest 1% for species $<15\%$ cover and nearest 5% for those with higher cover. Other incidentally observed species will be recorded. Ground cover estimates (%) will be recorded and include exposed soil, litter, rock, water and wood. Site condition measurements will include slope and aspect. GPS coordinates and photographs will be taken at each sampling site.

Environmental monitoring will occur after clearing, and along the RoW. Environmental monitoring will involve vegetation monitoring using the identical quantitative methods described above (native vegetation survey). Vegetation will be sampled for herbaceous and shrub cover along the RoW to assess the vegetation. Incidental species observations will be recorded. Relative population densities and extent will be recorded for incidental invasive species observed. All sites will be photographed.

Permanently located sampling areas will be used to record the change in vegetation that can be systematically monitored through time. The collection of vegetation information will occur at a similar time during the growing season to maximize the comparability of data. A sample size will be accomplished that will allow for the detection of differences statistically in vegetation over time, that will consider size of area and accessibility.

7.2.4 Traditional Use Plant Species

Vegetation will be sampled for traditional use plant species important to First Nations and Metis. The accuracy of EIS predictions and effectiveness of mitigation measures implemented will be verified. Digital ortho-rectified imagery and/or georeferenced video/photo products provided by Manitoba Hydro for identification of potential sampling sites for assessment of RoW effects will be used. Pre-construction surveys will involve native vegetation surveys at selected sites along the transmission line RoW.

Sites selected for surveys will have plots established for future vegetation monitoring. Vegetation will be sampled for composition, abundance and structure. Sampling of selected sites will involve the establishment of quadrats spaced at 5 m increments along a 30 m transect for shrubs and herbs. The composition of tree cover will be estimated using a plot centered on each transect. Transects will be permanently located along the transmission line RoW, longitudinally, and approximately in the centre of the



RoW, but off the equipment path. Plant cover will be estimated to the nearest 1% for species <15% cover and nearest 5% for those with higher cover. Other incidentally observed species will be recorded. Ground cover estimates (%) will be recorded and include exposed soil, litter, rock, water and wood. Site condition measurements will include slope and aspect. GPS coordinates and photographs will be taken at each sampling site.

Environmental monitoring will occur after clearing, and along the RoW. Environmental monitoring will involve vegetation monitoring using the identical methods described above. Vegetation will be sampled for herbaceous and shrub cover along the RoW to assess the vegetation. Incidental species observations will be recorded. All sites will be photographed.

Permanently located sampling areas will be used to record the change in vegetation that can be systematically monitored through time. The collection of vegetation information will occur at a similar time during the growing season to maximize the comparability of data. A sample size will be accomplished that will allow for the detection of differences statistically in vegetation over time, that will consider size of area and accessibility.

7.3 WILDLIFE AND WILDLIFE HABITAT

7.3.1 Herptiles

7.3.1.1 Amphibians

To establish a benchmark for wetland condition prior to construction, wetland surveys will be conducted at wetlands supporting northern leopard frogs. Pre-construction wetland surveys will include water quality measurements and amphibian surveys in the spring and fall, at wetlands that are within or are adjacent to the Project Development Area (PDA). Spring surveys (late-April through mid-May) will overlap the northern leopard frog breeding period; fall surveys (late-August to late-September) will overlap their overwintering congregation period. Any additional sites within or adjacent to the PDA not previously examined during baseline environmental surveys will be identified through land cover mapping and ortho-photo interpretation and will be included in the wetland surveys.

Water quality data to be collected will include: pH, electrical conductivity, total dissolved solids, total suspended solids, temperature, and turbidity. Measurements will be taken at three locations in the shallow water zone at the edge of each wetland at approximately 30-50 cm depth and 2-5 m from the shoreline. Measurements from the three locations will be averaged to estimate site composite values at each wetland. Additional site characteristics will be recorded, including vegetation community (e.g., dominant plant species, presence of emergent and submergent vegetation) and weather conditions (e.g., temperature, wind direction and speed, cloud cover and precipitation).

Amphibian surveys during the spring survey period will include daytime call surveys during water quality monitoring, nocturnal call surveys, and incidental detections. Fall surveys will include visual encounter surveys (VES) and incidental detections.

Call surveys consist of a 5 minute listening period following a 2 minute waiting period to allow disturbance associated with observer access to subside. Relative abundance and call rank will be recorded, based on the widely accepted protocol by Mossman et al. (1998) and Saskatchewan Ministry of Environment (2014a, 2014b). In the case of nocturnal call surveys, surveys will be conducted between 0.5 hrs after sunset and 0100h and in weather conditions with winds <20km/hr, ambient temperature $\geq 5^{\circ}\text{C}$, water temperature $\geq 10^{\circ}\text{C}$, and/or rain no heavier than a drizzle (Kendell 2002; USGS 2012). Visual encounter surveys will consist of two biologists walking side by side 5 m apart along wetland margins or stream banks while documenting any amphibians observed within the waterbody 1 m from shore, in a 1 m strip of the shoreline, and within 3 m upland from the shoreline/water's edge. The VES will be conducted for a prescribed amount of time (20 minutes) and under seasonal air temperatures. Surveys will be suspended if precipitation exceeds a light rain or ambient air temperatures drop

below 15°C. Incidental observational data will be collected opportunistically throughout the survey periods.

Construction phase wetland monitoring will take place during the amphibian breeding and overwintering congregation periods immediately following construction activity. Water quality readings will be taken at similar times of day to pre-construction readings. Construction phase monitoring would only take place within wetlands where Project activity had occurred.

7.3.1.2 Common Garter Snakes

Pedestrian surveys will occur within 200 m of select portions of the New ROW tower locations prior to ROW clearing where potential suitable habitat or hibernacula is identified. The pedestrian survey will be conducted by two biologists, and will include a grid-like walk of the area while 10 m apart. Where suitable habitat or hibernacula are identified (i.e. rock piles, rock outcrops, or pits), the effectiveness of applied mitigation (i.e., setback distances) will be verified through follow-up monitoring. Follow-up monitoring will consist of a walk-through of the known suitable habitat or hibernacula area immediately following construction to determine whether mitigation measures were adhered to.

7.3.2 Birds

7.3.2.1 Bird – Wire Collisions

Bird diverter monitoring will test the hypothesis that bird diverters are sufficient in reducing mortality of birds due to collisions with the transmission line to a level that is negligible in areas determined to have a high risk of collision. As such, the null and alternate hypotheses state:

- H_0 (null): The mortality of birds at high-risk areas with bird diverters will not be different than the mortality of birds at low-risk areas without bird diverters.
- H_1 (alternate): The mortality of birds at high-risk areas with bird diverters will be greater than the mortality of birds at low-risk areas without bird diverters.

To test this hypothesis, a Control-Impact study design will be implemented. The Before-After Control-Impact study cannot be implemented for this study as mortality of birds is not expected prior to the installation of the transmission lines. For the purpose of this study, control sites will consist of ESS's considered to be 'low-risk' and impact sites will consist of ESS's considered to be 'high-risk', as identified in the EIS.

If transmission lines containing diverters yield negligible avian mortality, then the mortality of birds relative to the number of bird passes at high-risk transmission lines with diverters should be comparable or lower than those at low-risk transmission lines with no diverters. Using the ratio of mortality to number of bird passes instead of simply the numbers of avian mortality

allows correction for differences in bird activity between 'high-risk' and 'low-risk' sites.

Statistical analysis will be conducted using Generalized Linear Models to compare estimated mortality rates at high-risk versus low-risk sites. Assumptions of parametric testing will be determined and data transformations applied where necessary and/or appropriate. Non-parametric testing will be applied where assumptions were violated and/or data could not be transformed. Analyses will be conducted separately for each season and then with data from all seasons pooled. If no significant difference is observed between high-risk versus low-risk sites, then mitigation measures (placement of diverters) will be considered effective in maintaining low avian mortalities due to collisions with wires. Additionally, mortality studies may allow for the determination of the biological, environmental and engineering factors important in influencing collisions as well as the circumstances (e.g., weather, time of day, season) under which birds are most likely to collide with the wires.

Flight Activity Surveys

Before every mortality survey, biologists will monitor flight activity of birds across the transmission line right-of-way (ROW) section being searched that day. Biologists will count the number of birds that fly across the ROW within each of the paired spans within a period of three hours (three one-hour intervals). Mortality searches will be conducted directly after these visual flight surveys. All birds will be recorded to allow for collision rate estimates (CRE). CRE will be calculated as the estimate of total collisions (based on carcass surveys and correction factors described below) divided by the estimated number of possible bird-wire interactions per day.

Carcass Searches

To estimate the mortality of birds along the transmission line per year at the Project site and test the adequacy of diverters, carcass searches will be conducted at select ESS's. Due to the many confounding variables involved in monitoring avian mortality at transmission lines, no standardized protocols have been developed for post-construction mortality searches for transmission lines. The Avian Power Line Interaction Committee (APLIC, 2012) and methodology proposed by De la Zerda and Rosselli (2002) and by Barrientos *et al.* (2011) provide valuable guidance and considerations for designing mortality studies and these will be included in this proposed monitoring plan.

Searches for dead or injured birds will be performed at high-risk sites and an equivalent number of low-risk sites. Each of the mortality monitoring sites will consist of the area under one span of hydro wires. A span is defined as the length of ROW between two transmission towers. The spans closest to the location where monitoring is desired will be surveyed. Surveys will be focused during peak activity seasons which will include spring migration (April and early May), late breeding season when adults will be feeding chicks (mid-

June and July) and fall migration (late August to late September). During each of the three survey seasons, four rounds of carcass searches will be conducted at each ESS.

Carcass searches will be conducted by two trained biologists. Every morning, biologists will conduct both mortality searches and bird passage monitoring. Teams will note environmental conditions at the start and end of each survey day including notable weather events during the previous seven days (high winds, storms, fog) based on Environment Canada historical data, where available. Surveyors will position themselves at opposite ends of a linear transect running from one of the transmission towers to the other. Using a rope to maintain position along the transect, biologists will maintain a distance of 3 m from the rope and walk parallel to the rope at a constant pace toward each person's opposite tower. At completion of the linear transect, the guiding rope will be moved 12 m beside the previous line and the biologists will survey a second transect line. This procedure will be repeated until five linear transects have been searched which will approximately cover the width of the ROW under each span. While conducting searches, biologists will search for any dead birds within a 6 m field of view. Upon finding an avian carcass, the following data will be recorded:

- GPS position of the carcass;
- Location of the carcass with respect to the transmission line;
- Species;
- Sex;
- Age;
- Date or approximate time of death;
- Physical injuries and general body condition;
- Probably cause of death; and
- Evidence of scavenging.

Sampling Biases

Several factors affect the accuracy of mortality estimates recorded in the field. Four sampling biases are of particular importance in estimating the number of birds killed by a section of transmission line:

- Searcher efficiency;
- Scavenger removal;
- Habitat differences; and
- Crippling loss.

Searcher Efficiency Trials

Biologists conducting mortality searches within the ROW may not find all of the carcasses

present. Carcasses may be overlooked depending on a number of factors including the density and height of vegetation in the ROW, the route walked by the searcher, the state of the carcass, etc. As such, searcher efficiency trials aid in correcting this bias. During the course of the mortality search studies, a known number of carcasses will be placed by a tester at locations within the search area unknown to searchers being tested. The proportion of purposefully placed carcasses found by searchers will represent their searcher efficiency and will be used to correct for this bias when estimating avian mortality at the Project site. To account for differences in searcher efficiency between different sized birds, birds of all major size categories will be represented in searcher efficiency trials.

Scavenger Removal Trials

Scavenger removal trials are used to estimate the rate at which carcasses are removed from the ROW by other wildlife. Scavenger removal trials will consist of placing carcasses at known locations within the ROW and checking these locations periodically to determine if and when they are removed. Trials will continue until all carcasses are removed or have completely decomposed. Scavenger removal trials may be conducted concurrently with mortality searches. To account for differences in scavenging rates between different sized birds, birds of all major size categories will be represented in the scavenger removal trials.

Habitat Differences

Due to a variety of factors, some portions of a PDA may not be searchable. Most of the unsearchable habitats will be avoided to the extent possible during the initial selection of ESS's. For sites where this is not possible, the total area searched at those sites will be calculated and search area will be corrected in the calculated mortality estimates.

Crippling Loss

Crippling loss is the percentage of birds killed or injured by striking a component of a transmission line, yet may fall or move beyond the Study Area. Crippling loss may be studied by monitoring the number and behaviour of birds flying past a section of transmission line or may be implied from other studies.

7.3.2.2 Sharp-tailed Grouse Lekking Sites

Sharp-tailed grouse have a reproductive system known as lekking, where males form large groups and vocalize and display at the same time in attempts to attract females. Leks are generally elevated sites associated with sparse or disturbed vegetation and are typically used for many years. Sharp-tailed grouse nesting usually occurs in shrub habitat located close to the lek.

The construction and installation of the transmission line has the potential to adversely affect the abundance of Sharp-tailed grouse at lekking sites by way of habitat loss or disturbance during construction. It also has the potential to increase rates of predation if birds of prey (raptors) nest on nearby transmission line towers. As such, the Sharp-tailed grouse lek monitoring will test two hypotheses: 1) that the installation of the transmission line affects the abundance of male Sharp-tailed grouse displaying at lekking sites, and 2) that the installation of the transmission line increases Sharp-tailed grouse predation by raptors. As such, the null and alternate hypotheses state:

Hypothesis 1:

- H_0 (null): The installation of the transmission line does not affect the abundance of male Sharp-tailed grouse at lekking sites.
- H_1 (alternate): The installation of the transmission line does affect the abundance of male Sharp-tailed grouse at lekking sites.

Hypothesis 2:

- H_0 (null): The installation of the transmission line does not increase Sharp-tailed grouse nest predation by raptors.
- H_1 (alternate): The installation of the transmission line does increase Sharp-tailed grouse nest predation by raptors.

To test these hypotheses, a BACI study design will be implemented. Monitoring for Sharp-tailed grouse will require conducting searches for leks in the vicinity of Sharp-tailed grouse habitat and grouse observations as presented in the EIS. Due to the large area of habitat for this species along the proposed transmission line route, an aerial survey for groups of Sharp-tailed grouse will be undertaken in early spring to scope for potential lekking locations. Aerial surveys offer an efficient means of covering a large area and locating individuals of a species that is secretive yet flushes easily. Sharp-tailed grouse stay close to breeding sites all year-round, meaning baseline observations may indicate the nearby presence of a lekking site. The location and number of flushed grouse will be recorded on a GPS and the lek will be subsequently surveyed from the ground. Impact and control sites will be selected in areas within and beyond the predicted zone of impact, respectively.

Once leks are identified, ground surveys will consist of scanning candidate lekking sites with binoculars and a spotting scope and listening for sounds of displaying grouse. Surveys will be conducted on foot or by driving along roads and stopping near candidate sites. When a lek is located, it will be monitored using the Sharp-tailed Grouse Survey Protocol (WDNR, 2013) and Sensitive Species Inventory Guidelines (Government of Alberta, 2010) or other applicable monitoring protocols. Following the WDNR (2013) protocol, surveys will begin 45 minutes before

sunrise and will end 1 - 2 hours after sunrise. All lekking activities will be recorded as well as the number of males and females present. Weather conditions will be recorded and surveys will only be conducted on clear, calm mornings with winds less than 15 km/hr. Other environmental conditions such as anthropogenic noise, nearby infrastructure or the presence of other wildlife (particularly nesting or perching raptors) will also be recorded. All efforts will be made by surveyors to minimize disturbance to all birds present at the lekking sites.

7.3.2.3 Birds of Species of Conservation Concern

Species of conservation concern, which includes SAR and provincially rare species, have the potential to be adversely affected by the construction of the transmission line. Such impacts may include displacement of birds and/or decreased nesting success due to habitat disturbance. The species of conservation concern monitoring will test the hypothesis that the development of the transmission line adversely affects the density and diversity of species of conservation concern in the vicinity of the Project, particularly golden winged warbler. As such, the null and alternate hypotheses state:

Hypothesis 1:

- H_0 (null): The construction and installation of the transmission line does not affect the density and diversity of species of conservation concern.
- H_1 (alternate): The construction and installation of the transmission line does affect the density and diversity of species of conservation concern.

To test these hypotheses, a BACI study design will be implemented to evaluate Project-related effects on species of conservation concern. Permanent monitoring plots (point count stations) will be established along transects throughout the transmission line route and will be stationed at areas identified in the EIS as supporting species of conservation concern, including those areas not predicted to be impacted by the Project (control sites). Non-species of conservation concern will also be recorded during these surveys to document changes in overall species density and diversity. Permanent plots (both impact and control plots) will be established and monitored using protocols established by Bird Studies Canada (BSC) which includes a minimum of two site visits spaced approximately ten days apart, and will be distributed in the southern of Manitoba (Prairies and Boreal Plains). Where feasible, efforts to pair permanent monitoring plots with baseline survey stations, as identified in the Bird Technical Report, will be incorporated into the design.

Permanent monitoring plots will include a mixture of early morning breeding bird surveys completed between sunrise and no later than five hours after sunrise, marsh monitoring surveys using playback devices completed within three hours of sunset, and crepuscular bird surveys completed after sunset. The number of monitoring plots may vary depending on

accessibility, weather constraints and/or logistical constraints.

Morning breeding bird surveys and marsh bird surveys will be conducted as ten minute point counts located at least 250 m apart in which all birds are recorded at intervals of 0-50 m, 50-100 m, >100 m and flyovers to allow for the calculation of abundance, density and species diversity (based on birds per unit area). Crepuscular bird surveys (e.g., for Eastern Whip-poor-will, Common Nighthawk and Short-eared Owl) will be based on methodology provided in BSC's Whip-poor-will Roadside Survey Participant's Guide. Crepuscular bird surveys will consist of six minute point counts along a predetermined route where surveyors listen for calling nighthawks or use binoculars to scan for flying nighthawks or owls. Surveys will conclude at the onset of complete darkness. All crepuscular bird surveys will be conducted from roadside locations due to health and safety concerns relative to work at night in remote areas.

Statistical analysis will be conducted using Generalized Linear Models and/or non-parametric techniques to evaluate the effects of the Project on the density and diversity of breeding birds, with an emphasis on species of conservation concern.

7.3.2.4 Birds of Prey

An aerial survey for raptor nests will be conducted in the year prior to construction to locate any raptor stick nests within the proposed footprint, or within 500 m of the proposed footprint. Surveys will occur on calm, clear days with good viewing conditions and will be flown at an altitude of 150 feet and at a speed of 100 km/hr. One observer skilled in identifying raptor species and their nests will be positioned on both sides of the helicopter.



During construction, crews will be given instructions on how to look for large raptor stick nests while clearing vegetation for the ROW and other project components, in order to prevent destroying these nests. Post-construction, incidental surveys for raptor nests will be conducted by maintenance staff and during asset inspection surveys.

7.3.3 Ungulates and Predators

Natural wildlife habitat in the Project EIS was assessed using the Forest Resource Inventory (FRI), a linear disturbance and protected areas. Project effects were predicted by overlaying the proposed project footprint on to the habitat map. Habitat suitability models for elk and white-tailed deer geospatial coverage, and MCWS provided spatial boundaries of designated lands were developed using pre-existing models, to aid in assessment and monitoring of project effects.

A combination of remote sensing imagery, as well as aerial and ground surveys will be used to document Project-related clearing, disturbance, roads and trails. This data will be spatially referenced and stored in GIS for ongoing analyses during the mammals monitoring effort. The information will be used to generate a terrestrial habitat map for construction, for habitat suitability modelling of select mammal VC's, and to determine if there are any impacts outside of the designated project footprint.

The terrestrial habitat map developed for the monitoring program will be used for comparison to the baseline habitat map developed for the EIS. The comparison will facilitate estimation of habitat loss for each mammal VC.

Habitat suitability models will be used to assess and monitor project effects on habitat, occurrence and distribution for elk, white-tailed deer and black bear.

7.3.3.1 Elk

Distribution and occurrence mapping of the Vita elk population will be conducted using a combination of systematic aerial track surveys, incidental observations (during white-tailed deer surveys, project staff and public), and remote IR camera trap arrays (Kays *et al.* 2009) situated along the ROW and adjacent suitable habitat where the RAA and the Vita elk range overlap. In Manitoba, the Vita elk range is considered to be fall/winter range, therefore monitoring effort will largely be concentrated during the fall and winter period, during the construction and initial operation stages of the Project. Annual spring pellet group transects (Kie 1988) will be considered as a supplemental or alternative method (if needed based on the initial year of data collection using other methods) to monitor occurrence and distribution during construction and operation phases. Pre-disturbance historical occurrence and distribution data, and elk-crop damage reports will be compiled.

Change in elk habitat suitability will involve habitat modelling and delineation of elk location data plotted relative to an elk habitat suitability model to assess project effects on habitat suitability (pre- versus post-disturbance). Pre-disturbance elk occurrence data will be used to validate the habitat suitability model. Post-disturbance elk occurrence data will be compared to pre-disturbance data to assess project effects on elk distribution and habitat use. Rigour of this assessment will be dependent on whether Vita elk occurrence data demonstrates elk occurrence within the Project area during the pre-construction, construction or post-construction project phases.

Mortality-risk will mainly be assessed by monitoring incidents of elk-vehicle collisions (construction phase) related to project access and activities. Change in hunter and predator accessibility to suitable elk habitat will be assessed by comparing elk occurrence to project-related access. Occurrence of predators (i.e. wolves utilizing project disturbance) will be compared to elk location data to qualitatively assess overlap and potential predation-risk to elk

from pre-disturbance state. Elk-vehicle collisions will be monitored during the construction phase using incident reports from Project workers.

7.3.3.2 White-Tailed Deer

Distribution and occurrence mapping of white-tailed deer will involve systematic winter aerial surveys of monitoring blocks along the project ROW to assess change in occurrence and/or seasonal distribution relative to project infrastructure and wolf distribution. Monitoring will focus on suitable habitat on the eastern portion of the RAA extending from the intersection of HWY 1 and the Project ROW, to the Manitoba-Minnesota border. The survey blocks will be consistent with those used in 2015 for the EIS so that direct comparisons can be made between baseline state and project disturbance states (construction and initial operation phases) (pre- versus post-disturbance). More information on how baseline data was collected can be found in the Wildlife and Wildlife Habitat TDR. Annual spring pellet group transects (Kie 1988) may be considered as a supplemental or alternative method (if needed based on the initial year of data collection using other methods) to monitor occurrence and distribution during the construction and initial operation phases.

Change in white-tailed deer habitat suitability will be assessed using a habitat suitability model. Baseline habitat suitability will be compared to post-disturbance suitability, including use of white-tailed deer distribution and occurrence data integrated with the habitat suitability model predictions. Pre-disturbance white-tailed deer occurrence data will be used to validate the habitat suitability model. Post-disturbance white-tailed deer occurrence will be compared to habitat suitability strata to assess if there is a project effect on white-tailed deer habitat suitability, availability, and use.

Mortality-risk will mainly be assessed by monitoring incidents of deer-vehicle collisions (construction phase) related to project access and activities. Change in hunter and predator accessibility to suitable deer habitat will be assessed by comparing winter deer occurrence (pre- versus post-disturbance) relative to project-related access. Occurrence of predators (wolves/coyotes) utilizing project disturbance will be compared to deer location data to assess overlap and potential predation-risk to white-tailed deer. Deer-vehicle collisions will be monitored during the construction phase using incident reports from Project workers.

7.3.3.3 Black Bear

Distribution and occurrence mapping of black bears will concentrate on monitoring changes in occurrence and prevalence of bears relative to the project ROW and adjacent areas using remote IR camera trap arrays (Kays *et al.* 2009). Use of cameras is a non-invasive and effective method to collect occurrence and distribution data. During the construction phase Project workers will also record incidental sightings of bears. A habitat suitability model will be used to compare habitat suitability before and after project disturbance. Baseline bear

occurrence data will be used to validate the habitat suitability model. Occurrence data will be used to assess change in habitat availability before and after project disturbance using the habitat model.

7.4 EMPLOYMENT AND ECONOMY

7.4.1 Project Employment

The EIS estimated the workforce for all project components. Estimates vary by project component and year depending on the activity. The majority of employment opportunities will occur during the construction phase of the project with fewer opportunities during the operations phase of the project. Monitoring parameters for employment/workforce include employment data to be collected for all project components during the construction phase could include:

- Total person years of employment for each project component – Person years of employment are defined as the amount of work that one worker could complete during twelve months of full-time employment;
- Total number of hires – Refers to the number of people hired on the project site for any duration;
- Total number of employees – Refers to the number of individuals hired. The variance between hires and employees can be attributed to an individual being hired to the project more than once;
- Average duration of work on the project; and
- Type (job classification) of work available

Employment data will be collected on-site by contractors through an employee self-declaration form designed for the project. All completed forms will be provided by on-site contractors to Manitoba Hydro and stored in a central database. Analysis of data will occur on an annual basis and reported in the annual report.

7.4.2 Business Opportunities

Monitoring both direct and indirect business effects will provide data on the success and effectiveness of efforts to enhance local business participation, as well as an indication of the general economic impact of the project in communities in the vicinity of the Manitoba – Minnesota Transmission Complex. The following parameters will be monitored in conjunction with the project:

- Direct project expenditures; and
- Indirect business opportunities.

Purchasing data of supplies and services will be collected through Manitoba Hydro's existing accounting and tracking systems. Data will be collected on the total number and value of purchases made.

7.4.3 Labour Income and Tax Revenue

Labour income is an important indicator of direct economic impact of a project. Income levels also affect the general standard of living of individuals and families by influencing the acquisition of basic human needs including housing, food and clothing. The following parameters will be monitored during the construction phase:

- Labour income – direct income earned by workers from employment on the project
- Taxes paid:
 - o Provincial sales tax
 - o Payroll tax
 - o Corporate capital tax
 - o Fuel tax

Labour income that will be calculated using aggregate information on wages paid to employees based on information provided by contractors and Manitoba Hydro. Taxes paid will reflect Manitoba Hydro's actual payments to government associated with the project - examples include sales tax, payroll tax, corporate capital tax and fuel tax.

7.5 INFRASTRUCTURE AND SERVICES

7.5.1 Transportation

The construction of each major component will have distinct effects on the existing road network. The road network consists of provincial highways and municipal roads in southeast Manitoba. Each Project component has unique traffic generation, vehicle mix, travel patterns and mode choices, which are variable throughout the life of the Project.

Parameters to be monitored during the construction phase will include:

- Traffic volumes – compare actual traffic volumes from estimates in the EIS on key roadways in the Manitoba – Minnesota Transmission Project area;
- Traffic accidents and near misses on key roadways through Manitoba Hydro reporting processes.

Existing Manitoba Infrastructure and Transportation traffic counters will be used to acquire monitoring information relating to traffic.

Traffic accidents and near misses will be obtained through Manitoba Hydro reporting processes.

7.6 LAND AND RESOURCE USE

7.6.1 Outfitter Resource Use

The objective of the Black Bear Bait Site Camera Trap Survey is to analyse bear occurrence and prevalence at bait site locations prior to, during and post construction of the Project.

Manitoba Hydro is planning to continue its work with a local black bear outfitter in the project area to further understand construction effects. Camera traps were established at bait sites within the Project Development Area and in control areas to understand baseline conditions of bear occurrence and prevalence. As some bait sites are in close proximity to the Final Preferred Route, it is possible that their use may be affected by the Project. Manitoba Hydro is proposing to work with the outfitter to establish new bear bait sites prior to construction and include them in a continued camera trap survey along with the baseline locations.

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