Dorsey to Wash'ake Mayzoon (D83W) Transmission Project

Environmental Assessment Report

Prepared by Manitoba Hydro

Asset Planning and Delivery

Transmission & Distribution Environment and Engagement

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Prepared for:

Environmental Approvals Branch

Manitoba Hydro

Executive summary

This report summarizes the environmental assessment of the proposed Dorsey to Wash'ake Mayzoon (D83W) Transmission Project (the D83W project). This report provides a description of the environmental assessment process; defines the scope of the project and the assessment; provides a description of the proposed project, a characterization of the existing biophysical and socioeconomic environments; provides a summary of project engagement; describes the potential effects of the project, potential mitigation measures and significance of residual effects; and outlines proposed environmental protection measures.

The D83W project requires a licence for a Class II development under *The Environment Act* (Manitoba). The environmental assessment was conducted in accordance with Manitoba Hydro's corporate and environmental policies and satisfies *The Environment Act*.

The project consists of a new 98 km long, 230 kV transmission line that will originate at the existing Dorsey Converter Station and terminate at the Wash'ake Mayzoon Station, a new station that will be built west of Portage la Prairie.

The scope of the environmental assessment included the identification, description, analysis and mitigation of potential adverse environmental effects, identification of any required follow-up actions, and evaluation of any residual environmental effects. The spatial boundaries for the environmental assessment were the project footprint (i.e., project development area [PDA]), a local assessment area (LAA) which was specific to each valued component and a regional assessment area (RAA) which was also specific to each valued component.

The scope of the D83W project includes pre-construction, construction, operation, maintenance, and decommissioning. The temporal boundary of the environmental assessment covers the normal life expectancy of the proposed project, which is estimated to be approximately 75 years.

Manitoba Hydro used a route selection process that was designed to reduce potential effects to the biophysical and socioeconomic environments and traditional use of the area, while considering the technical aspects of the project including cost and constructability.

The D83W project footprint falls within Treaty 1 territory, the traditional territory of Anishinaabe, Cree, Ojibway-Cree and Dakota Peoples, and the traditional Homeland of the Red River Métis. We acknowledge these lands and pay our respects to the ancestors of these territories.

The D83W project footprint falls within the Rural Municipalities of Woodlands, Rosser, St. Francois Xavier, Cartier, and Portage la Prairie, and is found in the Prairies Ecozone, Lake Manitoba Plain Ecoregion and Winnipeg, Portage, Lundar, MacGregor and Gladstone Ecodistricts. The local area presently consists dominantly of agricultural land. Natural habitat is sparse in the area. Wildlife, amphibians, and reptiles expected would be typical of cultivated agricultural areas.

The D83W project falls within the South Interlake Planning District (RM of Rosser and Woodlands); the Whitehorse Plains Planning District in the RMs of St. Francois Xavier and Cartier; and the Portage la Prairie Planning District in the RM of Portage la Prairie. Land use in the region is primarily agricultural with some commercial, industrial, and rural residential land use in the immediate area.

There was extensive engagement for the project including public and Indigenous participants, and Manitoba Métis Federation citizens.

Public engagement consisted of a broad communication process including postcards, webpage, surveys, online feedback portals, virtual information sessions, interested party meetings, social media, project information sheets, and email and telephone communications.

First Nations and Métis engagement included project notification through information packages and follow-up phone calls. Communities most affected were determined and Indigenous Assessment and Community Coordinator positions were created to be embedded in the project team. Virtual and in-person meetings were held. The environmental assessment report incorporates information shared by First Nations and the Manitoba Métis Federation and relevant sections of the report were shared with four nations for review.

The potential environmental effects of the D83W project were identified using interaction matrices and professional judgment. The significance of the residual environmental effects was evaluated using factors adapted from the Impact Assessment Agency and the Canadian Standards Association.

Valued components were used to focus the assessment. Nine valued components were identified for the project, namely, agriculture, economic opportunities, human health, community well-being; property and services; fish and fish habitat; vegetation; wildlife and wildlife habitat; and harvesting and important sites.

Potential effects were mitigated through the routing process and mitigation measures were developed to address effects not avoided by routing.

Potential effects to the natural environment are limited as the area is generally developed. There are a few areas of natural habitat crossed by the D83W project, e.g., shelterbelts, but no riparian habitat is affected by the project.

Three vegetation species of conservation concern, common milkweed, cottonwood, and basswood, as ranked by the Manitoba Conservation Data Centre (S3S4 to S3S5) were observed during field surveys along the proposed D83W transmission line route. No plant communities of conservation concern or species listed federally were found in the project development area.

Five wildlife species of conservation concern (four birds and one mammal) were observed during field surveys for the D83W project and are listed federally. The presence of the transmission line may result in bird-wire collisions, but not at levels that would have measurable effects to regional bird populations.

The D83W project is expected to result in positive economic benefits to the region, through the presence of the workforce. There will be a slight increase in traffic associated with the workforce, but the volume will be low.

The proposed D83W project mainly traverses agricultural land and as a result there will be effects associated with the loss and/or degradation of agricultural land from the presence of towers as well as the inconvenience, nuisance and increased production costs associated with operating farming equipment, crop production and other farming activities (e.g., aerial spraying, irrigation, tile drainage). Even though there will be a loss of agricultural land from tower footprints, the amount in hectares is small compared to the amount of agricultural land in the LAA and RAA.

Mitigation measures were identified to minimize, reduce, or negate the potential effects for each valued component. The effects that would remain following the implementation of the mitigation measures were identified as residual effects and included: loss and/or degradation of agricultural land; inconvenience, nuisance, and increased costs from the presence of towers; impacts from noise and air quality during construction; stress resulting from the perceived risk from EMF; noise annoyance; visual effects; and nuisance effects from dust and vibration.

Cumulative effects were considered for the project in combination with reasonably foreseeable future projects. There were no significant cumulative effects determined for the project's valued components.

Collective effects (a concept adopted from the Mackenzie Valley Review Board) were assessed for two valued components, i.e., agriculture and harvesting and important sites, in pursuit of meaningful assessment considering the importance of these two valued components in the project area.

Summary

Based on the information contained in the environmental assessment report and the planned implementation of mitigation measures and follow-up actions under an environmental protection program, the proposed Dorsey to Wash'ake Mayzoon (D83W) Transmission Project will not result in significant adverse environmental effects.

GLOSSARY

Term	Definition
Adaptive management	The process of updating management practices in response to ongoing observations
Adverse effects	Negative effects on the environment and people that may result from a proposed project.
Agricultural biosecurity	The protection of crops and livestock systems against the threats to production from disease, pests and invasive species.
Areas of least preference	Features to avoid when siting a transmission line due to physical constraints (extreme slopes, long water crossings), regulations limiting development (protected areas), or areas that require extensive mitigation or compensation to minimize impacts
Built environment	An area of existing or proposed development found within the landscape, typically dominated by commercial, industrial, residential, and cultural structures.
CHRPP	Cultural and heritage resources protection plan
Collective effect	The effect on the environment which results from the impacts of a single project across multiple components of the environment.

Cumulative effect	The effect on the environment, which results when the effects of a project combine with those of the past, existing, and future projects and activities (CEAA 2018). OR the incremental effects of an action on the environment when the effects are combined with those from other past, existing and future actions (Cumulative Effects Assessment)
Decommissioning	Planned shutdown, dismantling and removal of a building, equipment, plant and/or other facilities from operation or usage and may include site clean-up and restoration.
Developed	Land that has been altered for residential, commercial or industrial use. Includes buildings, regularly managed green space and associated roads, parking lots, and trails.
Direct effect	An environmental effect that is: • A change that a project may cause in the environment; or • Change that the environment may cause to a project. It is a consequence of a cause-effect relationship between a project and a specific environmental component.
eCampaign	A notification mechanism targeted to self-identified interested parites. Email campaign recipients can unsubscribe from the email campaign service at any time, forward to other individuals, post on Twitter or share on Facebook.
Ecoregion	Characterized by distinctive regional ecological factors, including climate, physiography, vegetation, soil, water, and fauna

Ecozone	An area of the earth's surface representative of large and very generalized ecological units characterized by interactive and adjusting abiotic and biotic factors
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 Protection Plan	Within the framework of an environmental protection program, an environmental protection plan prescribes measures and practices to avoid and minimize potential environmental effects of a proposed project.
Exurban	The transitional area outside of the traditional urban/suburban belts of development but not quite rural.
Heritage sites / objects	Any site, object, work, or assembly of works of nature or human endeavor that is of value for its archaeological, paleontological, pre-historic, historic, cultural, natural, scientific, or aesthetic features.
Interested party	An interested party is someone or a group that would potentially have feedback to provide, may be affected by the decisions made regarding route selection, have a specific interest or mandate in the area, data to share, ability to disseminate information to membership or a general interest in the Project's route selection area.
Linear infrastructure	An existing network or system composed of transportation or utility-based facilities (e.g. roads, highways, railways, pipelines, and transmission lines).

Marshalling yard	An open area used to stockpile, store and assemble construction materials.
Mitigation	Means measures to eliminate, reduce, control or offset the adverse effects of a project, and includes restitution for any damage caused by those effects through replacement, restoration, compensation or any other means (Impact Assessment Act, 2019).
Natural environment	Naturally occurring physical features of the landscape. These features are represented by the hydrography, flora, fauna, and topography of a given area.
Public engagement process	The process of identifying interested individuals, including interested parties and the public, sharing information about the Project and providing opportunities for them to design how they want to participate and share their feedback and experiences.
Species of Conservation Concern	Species that are rare, disjunct, or at risk throughout their range or in Manitoba and in need of further research. The term also encompasses species that are listed under (Manitoba) *The Endangered Species and Ecosystems Act of Manitoba*, (federal) *Species at Risk Act*, or that have a special designation by the Committee on the Status of Endangered Wildlife In Canada.
Species at Risk (SAR)	Is an extirpated, endangered or threatened species or a species of special concern, as defined by the Species at Risk Act.
Qualtrics	A software used by Manitoba Hydro for online surveys
Wildlife management area	Lands that exist for the benefit of wildlife and for the enjoyment of people including biodiversity conservation, wildlife-related forms of recreation, hunting and trapping.

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1.0 Introduction

The Portage la Prairie to Brandon area has had above-average load growth due to an increase in population as well as the addition of new industrial customers, resulting in the increased demand for electricity. This above-average load growth has contributed to unsustainable stress on the electrical transmission system in the area.

Manitoba Hydro, through the proposed Portage Area Capacity Enhancement Project (PACE) is looking to the future and planning the expansion of the transmission system to better meet the needs of customers, and meet the necessary electricity needs that will occur because of growth in region.

As part of the PACE project, Manitoba Hydro plans to build two key components:

1) The new 230-66 kV Wash'ake Mayzoon station including
    a. Sectionalize the existing 230 kV transmission line P81C tap
    b. Terminate a new 66kV line at the Wash'ake Mayzoon station
    c. Install protection changes at Manitoba Hydro's existing Cornwallis Station
    d. Install protection changes at Manitoba Hydro's existing Portage South Station
    e. Install protection changes at a customer's existing Roquette Station
2) The new 230-kV transmission line that will start at the existing Dorsey Converter Station in the Rural Municipality (RM) of Rosser (northwest of the City of Winnipeg) and terminate at the new, to-be-built Wash'ake Mayzoon Station, located west of Portage la Prairie including:
    a. Terminate the D83W transmission line at the Wash'ake Mayzoon Station
    b. Terminate the D83W transmission line and add a 230 kV Circuit Breaker at the existing Dorsey Converter Station

The Dorsey to Wash'ake Mayzoon transmission line identification number is D83W, hence the naming of the transmission project as the Dorsey to Wash'ake Mayzoon (D83W) Transmission Project. The transmission line and associated station work is the subject of this assessment and is referred to as the D83W project throughout this report.

A separate environmental assessment was previously completed and submitted to regulatory authorities for the proposed Wash'ake Mayzoon Station. Environment Act Licence No. 3369 was issued in December 2021, as approval for the proposed station.

1.1 Manitoba Hydro mission and goals

Established in 1961, Manitoba Hydro is a Crown Corporation that is headquartered in Winnipeg, Manitoba. It is the province's major energy utility, serving electric customers throughout Manitoba and natural gas customers in various communities in southern Manitoba.

Manitoba Hydro is administered by the Manitoba Hydro-Electric Board to which members are appointed by the Lieutenant-Governor in Council. The Board reports to the Minister responsible for the Manitoba Hydro Act (1987) who, in turn, reports to the Manitoba Legislative Assembly.

Manitoba Hydro's Mission is to "Help all Manitobans efficiently navigate the evolving energy landscape, leveraging their clean energy advantage while ensuring safe, clean, reliable energy at the lowest possible cost."

For more than 50 years Manitoba Hydro's projects have primarily focused on the development of renewable hydroelectric power and have played a major role in the development of the provincial economy and the province. Manitoba Hydro operates based on our foundational principles of safety, environmental leadership, respectful engagement with interested parties and communities, and respect for each other. Safety remains our top priority in everything we do.

Manitoba Hydro has a presence right across Manitoba, on Treaty 1, Treaty 2, Treaty 3, Treaty 4, and Treaty 5 lands – the original territories of the Anishinaabe, Cree, Ojibway-Cree, Dakota, and Dene peoples – and the traditional Homeland of the Red River Métis. We acknowledge these lands and pay our respects to the ancestors of these territories.

The energy services that we offer Manitobans rely on natural resources which are of critical importance to us all, and that is why environmental leadership is identified as a key principle of our business.

We will consider the environmental impacts of our activities, products, and services. To deliver on this commitment effectively, we employ an Environmental Management System (EMS) that aligns with ISO 14,001 Standard:

- ensuring that the work performed by our employees and contractors meets environmental, regulatory, contractual, and voluntary commitments
- recognizing the needs and views of its interested parties and ensuring that relevant information is communicated
- assessing its environmental risks to ensure they are managed effectively
- reviewing its environmental objectives regularly, seeking opportunities to improve its environmental performance

- considering the life cycle impacts of its products and services
- ensuring that its employees and contractors receive relevant environmental training, and
- fostering an environment of continual improvement

1.2 Regulatory framework

1.2.1 Provincial regulatory framework

The proposed D83W project involves the construction of a 230 kV transmission line, which requires a provincial licence for a Class II development (i.e., transmission lines of 115 kV and over but not exceeding 230 kV) under the *Environment Act* (Manitoba).

The environmental assessment is conducted in accordance with Manitoba Hydro's corporate and environmental policies and satisfies Manitoba's environmental assessment legislation. It is also consistent with Canadian and international environmental assessment best practices and guidance. This environmental assessment report is submitted as part of the Environment Act Licence Proposal for the Project.

1.2.2 Federal regulatory framework

Federally, the D83W project is not considered a physical activity under the Physical Activities Regulations SOR/2019-285 and therefore does not trigger an environmental assessment under the *Impact Assessment Act*.

1.3 Community involvement in the project

Manitoba Hydro sets a high bar for engagement, assessment, and protection of the environment. We conducted a public engagement process and a First Nation and Métis engagement process for the D83W project to engage those potentially affected by or interested in the project.

Manitoba Hydro sought to continue its efforts to improve project engagement through direct involvement of community representatives on the project team. Detailed information on both public and First Nation and Métis engagement can be found in Chapters 4.0 and 5.0.

1.4 Updates of note based on recent work in the area

Over the last three years, Manitoba Hydro has conducted environmental assessment and engagement work for projects in the Portage la Prairie area, namely the Poplar Bluff Transmission Project, Brandon to Portage la Prairie (BP6/BP7) Transmission

Project, and the Wash'ake Mayzoon Station. These projects included robust public and First Nation and Métis engagement processes. Learnings from these processes include:

- An emphasized understanding of how the Portage la Prairie region has been used as an important travel way for thousands of years, an attribute that is reflected in the incredible heritage and cultural value of the area. Accordingly, First Nation and Métis engagement should be culturally specific and there are benefits to including community-specific archeologists early in the assessment process.
- The creation of positive synergy from working regionally in an area with multiple, planned projects provides an opportunity to support Indigenous Project Coordinators for a longer period, making their role more appealing to potential candidates, and increases knowledge sharing among the Indigenous Coordinators and Manitoba Hydro.
- Understanding that the identification and consideration of the locations and nature of intensive agricultural developments, e.g., irrigation systems and aerial spraying infrastructure is best done early in the routing process.

Elected officials from municipalities and representatives from First Nations and the Manitoba Métis Federation appreciated the opportunity to take part in routing discussions, even if discussions were challenging.

1.5 Purpose of the document

The purpose of this environmental assessment report is to support Manitoba Hydro's application for a Class 2 development licence under *The Environment Act* (Manitoba) for the D83W project. For Class 2 developments, proponents are required to submit a cover letter, an Environment Act Proposal Form, an environmental assessment report, and an application fee to Manitoba Environment, Climate, and Parks' Environmental Approvals Branch. This provides the public, Indigenous and Métis communities, and government agencies with an opportunity to examine the details of the project, from its anticipated impact on biophysical and socio-economic aspects of the environment to the measures that Manitoba Hydro intends to implement to mitigate potential adverse effects.

This report identifies and assesses the potential effects of the D83W project and identifies the mitigation measures that will be used to address adverse environmental effects and enhance benefits associated with the project and forms part of The Environment Act Proposal.

1.6 Environmental assessment report outline

The sections of this report that follow begin with a project description in Chapter 2.0 that discusses project planning and the various components of the D83W project as well as summarizes easement procurements and compensation and project activities (e.g., construction and operations and maintenance).

Chapter 3.0 provides a summary of the route selection process used to determine the location of the proposed D83W's footprint. The objectives of the route selection process are also discussed in this chapter (e.g., reducing project effects).

After the route selection process' chapter, the report includes sections on the engagement process, with both the public (Chapter 4.0) and First Nations and Métis engagement (Chapter 5.0). For both sections there is discussion on the purpose, goals and objectives, methods, and a summary of feedback received.

Chapter 6.0 provides an overview of the methods used conduct the environmental assessment for the project. This includes a description of the scope, temporal, and spatial boundaries as well as how valued components were identified. In addition, methods used to determine effects to valued components, mitigation, residual effects, cumulative and collective effects assessment are also outlined in this chapter.

Chapter 7.0 provides a description of the existing physical, biophysical, and socioeconomic environment for the D83W project area. Physical topics include atmospheric environment (climate), noise and air quality, and electric and magnetic fields. Biophysical topics include ecological classification, geology and hydrogeology, terrain and soils, aquatic environment, vegetation, and wildlife. Socioeconomic topics include population, employment, and economy; public safety and emergency services; parks and recreation; regional infrastructure; property ownership; Indigenous lands; commercial and residential development; agriculture; traditional practices and culture; and heritage sites/objects.

Chapter 8.0 assesses the potential project effects on the valued components identified for the D83W project. In addition, this chapter identifies mitigation measures, characterizes residual effects, assesses cumulative effects, assesses collective effects for two valued components (i.e., Agriculture, and Harvesting and Important Sites), presents follow-up and monitoring, and describes sensitivity to future climate change scenarios.

Chapter 9.0 summarizes greenhouse gases and climate change information compiled for the D83W project, while Chapter 10.0 discusses the effects of the environment on the project and Chapter 11.0 outlines unplanned events that may occur from project activities (i.e., accidents and malfunctions).

Chapter 12.0 describes the environmental protection program developed for the D83W project, including the various plans, roles, and communication protocols that will be in place to mitigate project activities and effects.

Chapter 13.0 provides a conclusion for the environmental assessment while Chapter 14.0 is the final chapter and lists the references from which information was drawn.

Following Chapter 14, the document ends with appendices that provide details on the routing process, engagement materials, technical memorandums and documents associated with the environmental protection program.

2.0 Project description

2.1 Introduction

Manitoba Hydro completed a network reliability evaluation study which evaluated 19 transmission enhancement options and recommended 5 development plans for further evaluation (Manitoba Hydro 2019).

One development plan was selected based on analysis of the results, and a new project called the Portage Area Capacity Enhancement (PACE) project was created to implement this plan.

The PACE project includes:

- Stage 1 Projects (In-service-date of March 2025)
  - Build the new 230-66 kV Wash'ake Mayzoon station
  - Sectionalize the existing 230 kV transmission line P81C tap
  - Terminate a new 66kV line at the Wash'ake Mayzoon station
  - Install protection changes at Manitoba Hydro's existing Cornwallis Station
  - Install protection changes at Manitoba Hydro's existing Portage South Station
  - Install protection changes at a customer's existing Roquette Station
- Stage 2 Projects (In-service-date of February 2027)
  - Build a new 230 kV transmission line (i.e., D83W project) from the Wash'ake Mayzoon Station to the existing Dorsey Converter Station
  - Terminate the D83W transmission line at the Wash'ake Mayzoon Station
  - Terminate the D83W transmission line and add a 230 kV Circuit Breaker at the existing Dorsey Converter Station

The environmental assessment presented in this report is scoped to include the Stage 2 projects. Environment Act Licence (*No. 3369*) was received for the Stage 1 projects in December 2021.

2.2 Project need and alternatives

The Brandon/Portage la Prairie area is one of the most stressed areas of the hydro-electric transmission network due to various current and/or potential developments in southwestern Manitoba. These developments include above-average load growth, new industrial customers, and increasing exports to Saskatchewan. Manitoba Hydro performed a comprehensive network reliability

evaluation study to identify potential issues and propose alternatives to enhance the transmission system in the area.

2.2.1 Need for the project

The Brandon/Portage area has various transmission reliability concerns which can be categorized as:

- Insufficient 230/66 kV transformation capacity in the Portage la Prairie area, which requires immediate enhancement (approximately 2 years)
- Low voltages at several 115 kV and 230 kV stations, particularly in winter loading conditions, which requires system improvement in a near term planning horizon (approximately 5 years)
- Low voltages and high thermal loading issues which require significant transmission enhancements including new transmission stations and lines in a longer-term planning horizon (approximately 10 years)

2.2.2 Alternatives considered to meet the need

The insufficient 230/66 kV transformation capacity in the Portage area requires immediate enhancement to prevent overloads. Six different mitigation options were evaluated and compared. These options included:

- the addition of a third transformer bank at Portage South Station
- upgrading of the existing two transformer banks at Portage South Station
- transferring of load from Portage South Station to Stanley Station
- establishment of a new station at Elm Creek
- establishment of a new station at Portage West
- establishment of a new station at Portage East Wash'ake Mayzoon Station

Low voltages at several 115 kV and 230 kV stations require system improvement in a near term planning horizon (approximately 5-10 years). If no improvements are implemented, then violations of North American Electricity Reliability Corporation transmission planning criteria are expected before 2027.

Several different mitigation options were evaluated and compared including:

- Addition of a transmission line
- Establishment of a new station at different locations
- Addition of reactive support in the form of capacitor banks and a static VAR compensator, breaker replacement, enhancement of transmission

capacity by adding series capacitor compensation to several 230 kV lines
- Sectionalization of a transmission line
- Supply of the area load from remote or local generation

The low voltages and high thermal loading issues require substantive transmission enhancements including new transmission stations and lines in a longer-term planning horizon (approximately 10 years).

Considering the near term and long term need of the transmission system, five transmission scenarios were developed to resolve the issues in the area:

1) Portage South Station bank addition and new 70 km 230 kV line from Dorsey Station (D83P)
2) Portage South Station bank upgrade and new 70 km 230 kV line from Dorsey Station (D83P)
3) Portage South Station to Stanley Station load transfer upgrades and new 70 km 230 kV line from Dorsey Station (D83P)
4) New Elm Creek Station and new 30 km 230 kV transmission line from Dorsey Station
5) New Portage West Station and a new 230 kV transmission line from Dorsey Station

The Portage West station (now named Wash'ake Mayzoon Station) and a transmission line from Dorsey Station had the highest net value to Manitobans. This was based on the corporate value framework which considers many factors including financial considerations such as project costs and potential revenue. It also considers system reliability, environmental and safety risks, and corporate citizen considerations such as compliance risks and customer service benefits.

This alternative is expected to provide relief from the current stresses on the transmission network until approximately 2035 based on current load forecasts, system commitments and committed developments for the area.

2.3 Project location

The D83W project footprint occurs in the RMs of Portage la Prairie, Woodlands, Rosser, and St. Francis Xavier (Map 2-1) and within Treaty 1 territory, the traditional territory of Anishinaabe, Cree, Ojibway-Cree and Dakota Peoples, and the traditional Homeland of the Red River Métis.

2.4 Scope

The scope of the D83W project includes the construction, operation, maintenance, and eventual decommissioning of a 98 km long, 230 kV transmission line (Map 2-1). The transmission line starts at Dorsey Converter Station northwest of Winnipeg and terminates at the new, to-be-built Wash'ake Mayzoon Station, located west of Portage la Prairie.

2.5 Design considerations

Transmission line design will meet or exceed the design standards set out by the Canadian Standards Association (CSA 2020) as well as the planning, performance, and reliability standards of the North American Electric Reliability Corporation.

2.6 Transmission line routing

The routing methodology used for this project is based on the EPRI-GTC Overhead Electric Transmission Line Siting Methodology (EPRI-GTC 2006). Details of the routing process are provided in Chapter 3.0.

2.7 Project components

This section describes each component of the project including:

- Transmission structures
- Conductor and insulators
- Ground wire
- Right-of-way
- Line termination at Dorsey Station
- Line termination at Wash'ake Mayzoon Station

2.7.1 Transmission structures

A combination of self-supporting steel lattice transmission structures will be used including suspension, angle, and dead-end towers.

The height of typical suspension towers (Figure 2-1) will be 29 to 47 m. The structure footprint will range from 6 to 14 m in width. The typical spans between the structures will be 385 m.

The height of typical heavy angle and dead-end structures will be 23 m and 47 m. The structure footprint will be 10 to 19 m (Figure 2-2). Angle and dead-end

structures are required at specific locations to accommodate line redirection and to terminate the transmission line into the stations.

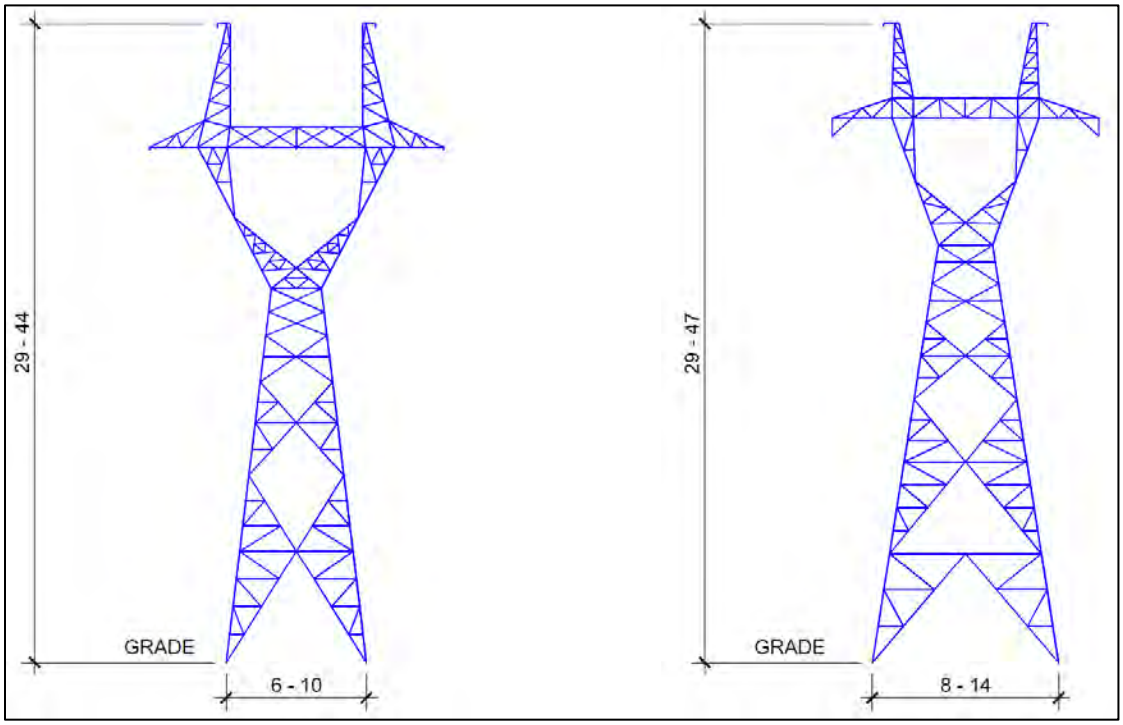


Figure 2-1: Typical self-supporting steel lattice suspension tower

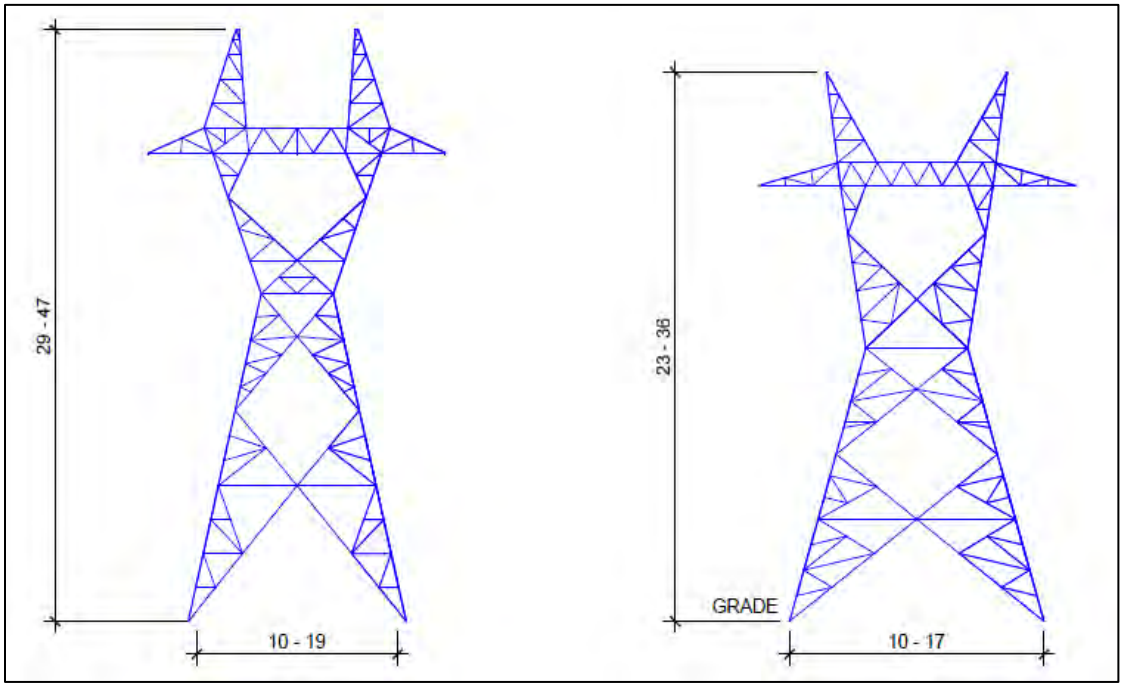


Figure 2-2: Typical self-supporting steel lattice angle / dead-end towers

2.7.2 Conductors and insulators

D83W is a single-circuit line configuration consisting of three ACSR (Aluminum Conductors, Steel Reinforced) conductors. Each conductor consists of aluminum strands wrapped around a center core of steel strands and will be suspended from each structure by insulator strings. The ground clearance will meet or exceed the requirements of Overhead Systems, C22.3 Standard No. 1-20 (CSA 2020).

2.7.3 Ground wire

Two ground wires (sky wires) will be strung parallel to the transmission line and along the tower apices to provide grounding and lightning protection. The ground wires will be constructed of galvanized steel strands and/or aluminum-coated steel strands as required for fault currents.

2.7.4 Transmission line right-of-way

The right-of-way widths are determined to allow safe conductor swing or blow-out. The right-of-way width also provides adequate lateral distance under wind conditions to limit flashovers onto objects near the edge of the right-of-way. The typical right-of-way will be 60 m (Figure 2-3). Along road allowance, the right-of-way will be 42 m, 12 meters offset from the edge of the road allowance (Figure 2-4). The right-of-way will be 47.5 m, with a 35 m center line offset to parallel lines (Figure 2-5).

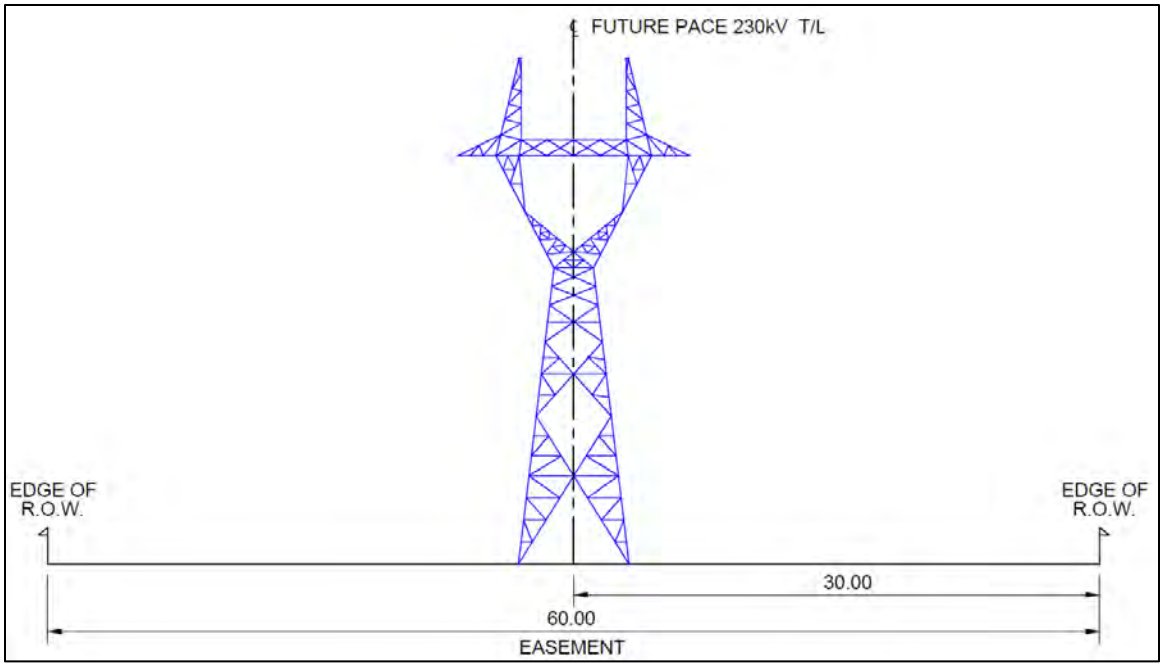


Figure 2-3: Typical right-of-way requirements

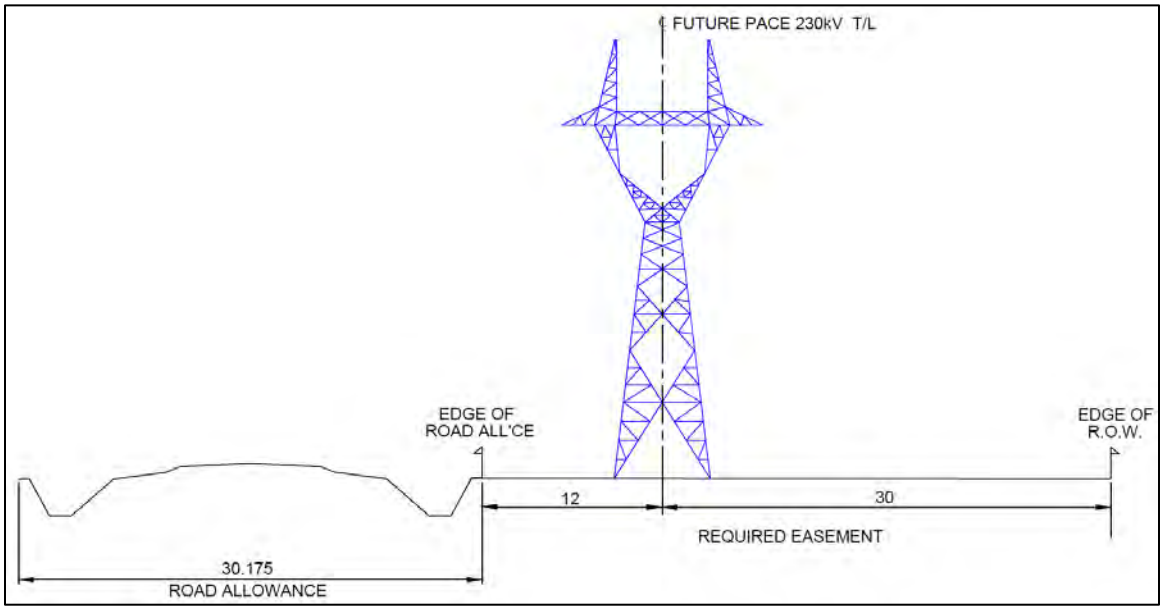


Figure 2-4: Typical right-of-way requirements along road allowance

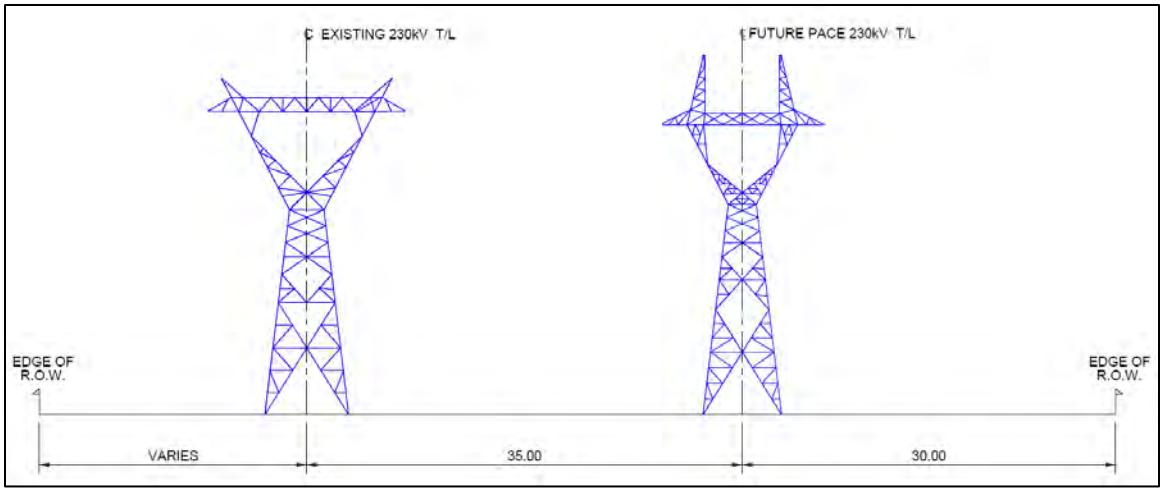


Figure 2-5: Typical right-of-way requirements along parallel lines

2.7.4.1 Easement procurement and compensation

This section outlines the easement and procurement process for obtaining rights to construct and operate the transmission line. It will cover private and Crown land easement as well as compensation including:

- Land compensation
- Construction damage compensation
- Structure impact compensation
- Ancillary damage compensation

Once the final preferred route is selected, Manitoba Hydro begins the process of acquiring easements from the landowners or the Crown.

The conventional terms of the right-of-way easement agreement provide that: Manitoba Hydro obtains the legal right to construct, operate, maintain, repair, and replace their transmission lines within a right-of-way. This right is obtained through easement of privately owned lands, or initially by a Crown land reservation, pending easement, for right of use on provincial Crown land.

The landowner can continue to use the land within the right of way (e.g., for farming, grazing, recreation, or other compatible uses) if the activity will not compromise safety requirements or hamper line operation. Landowners cannot plant trees, construct buildings, or place other structures within the easement area without prior approval from Manitoba Hydro.

Manitoba Hydro personnel are permitted to enter and use the right-of-way for construction, inspection, maintenance, repair, or replacement of the transmission line facilities.

Land compensation is a one-time payment to landowners for granting of an easement for a transmission line right-of-way.

Construction damage compensation is provided to landowners who experience damage to their property due to the construction, operations, and maintenance of the transmission line. A one-time payment for construction damage is negotiated on a case-by-case basis. Manitoba Hydro will:

- Compensate or be responsible for repairing, to the reasonable satisfaction of the landowner, any damage to a landowner's property
- Compensate a landowner for damages such as the reapplication or rejuvenation of compacted topsoil where the remedial work requires farm machinery and the expertise of the landowner

In the instance of damage to cultivated agricultural lands, compensation is provided to a landowner for loss due to damage if crops were in place prior to the construction of the transmission line.

Structure impact compensation is a one-time payment to landowners for each transmission tower placed on land classed as agricultural. Structure impact compensation covers:

- Crop losses on lands permanently removed from production
- Reduced productivity and over-input in an area of overlap around each tower structure
- Additional time required to manoeuvre farm machinery around each structure

Structure impact compensation takes into consideration:

- The agricultural use of the land (e.g., whether annual crop rotation, forage)
- The location of the tower structure in relation to property lines
- The ground dimensions of tower structure placed on the land

Manitoba Hydro prepares a compensation schedule for a project based on the above factors.

Ancillary damage compensation is a one-time payment (for each occurrence) when Manitoba Hydro's use of the right-of-way directly or indirectly affects the use of the property in a unique manner. Ancillary damage compensation is negotiated directly with the landowner. Landowners may be compensated for effects to irrigation and drainage, limiting options for chemical application, access restrictions, and limiting options for crop selection.

2.7.5 Dorsey Converter Station line termination

The line termination at Dorsey Station involves adding a new 230kV circuit breaker and supporting equipment (Transformers and Disconnects) (Figure 2-6).

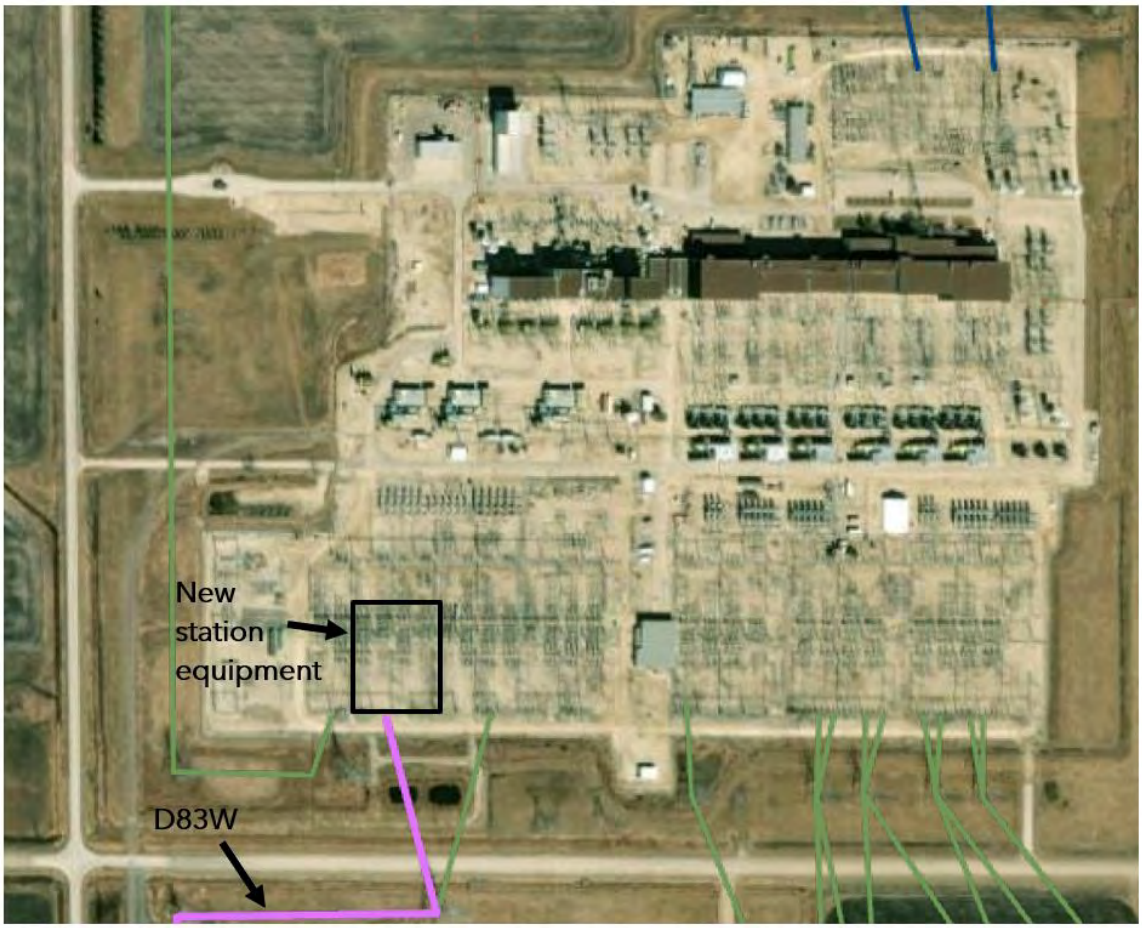


Figure 2-6: Dorsey Station termination

2.7.6 Wash'ake Mayzoon Station

Wash'ake Mayzoon Station is being developed as part of Stage 1 of the PACE project. The proposed D83W transmission line will terminate at this new station. A separate environmental assessment was previously completed and submitted to regulatory authorities for the proposed Wash'ake Mayzoon Station and was approved via the issuance of *Environment Act Licence No. 3369* for the station, in December 2021.

2.8 Project activities

Project activities cover the full life of the project including construction, operation and maintenance, and decommissioning. Each of these is discussed in the following sections.

2.8.1 Construction

Construction activities include scheduling, right-of-way clearing, vehicle and equipment use, marshalling or fly yards, tower construction, and construction wrap up. Each of these is discussed in the following subsections.

2.8.1.1 Construction Schedule

Table 2-1 shows the planned construction schedule.

The fall/winter of 2023/2024 will be used for property appraisal / acquisition, completion of detailed engineering design and procurement of construction materials and contractor(s). Construction is scheduled to start in Summer 2025. Construction will take approximately eighteen months. The in-service date for the D83W project is planned for Spring 2027.

Table 2-1: Construction schedule

Construction Phase	2025 to 2027 construction schedule						
	Summer 2025	Fall 2025	Winter 2025/26	Spring 2026	Summer 2026	Fall 2026	Winter 2026/27
Mobilization and staff presence							
Right-of-way Clearing							
Vehicle / equipment use							
Marshalling and fly yards							
Tower construction							
Helicopter use							
Implodes							
Construction wrap-up							

2.8.1.2 Mobilization and staff presence

The first step in project construction is mobilizing a workforce to an area. Mobilization includes the movement of Manitoba Hydro and contractor staff, vehicles, and equipment to the job site. It also includes the presence of the workforce at accommodations in the local community and their commute to and from the work site. No construction work camps are planned for the D83W project.

Mobilization will be ongoing throughout the construction phase as different types of equipment will be required for the various specific activities like clearing, foundation installation, tower assembly and erection, and conductor stringing.

2.8.1.3 Right-of-way clearing

Since most of the D83W project's transmission line route is on developed lands, only minor clearing activities will be required in a few locations. Clearing and disposal of trees on the proposed right-of-way will be undertaken in advance to facilitate construction activities. Right-of-way clearing will be subject to standard environmental protection measures, which have been established in association with Manitoba Hydro transmission line construction practices, as well as the environmental protection plan (EPP) (Chapter 12.0). Final clearing methods will be determined based on detailed surveys of the transmission line route, and site-specific identification of environmentally sensitive features.

2.8.1.4 Watercourse crossings

Access for construction and subsequent line maintenance activities will generally occur along the right-of-way using existing public access roads or trails wherever possible. This enables maximum use of existing road access and limits the requirement for the development of new temporary access, and the associated environmental effects.

At waterway crossings, structures will be located as far back from the water's edge as possible, to enhance stability and prevent bank erosion. Construction procedures used at each required crossing will be based on site-specific considerations, such as existing soil and subsurface conditions, biophysical sensitivities, and operational requirements. Site-specific construction techniques will be developed where necessary for difficult terrain or steep slope conditions.

Contractors will be required to develop sediment and erosion control plans. Equipment access and construction activities will be carried out in a manner that will limit disturbance to shorelines.

Vegetative buffer zones will be retained along the shorelines. The precise character and extent of buffer zones will be determined on a site-specific basis. In general, existing (and potential future) tree heights will govern the amount of clearing.

2.8.1.5 Vehicle and equipment use

Clearing and construction equipment can include the following:

- Materials delivery trucks and trailers
- Mulchers and feller bunchers for tree clearing
- Drill rigs and concrete trucks for cast-in-place piles
- Excavators with attachments for mat foundations and for installing screw piles
- Loaders and cranes for installing re-bar cages for piles and erecting towers
- Excavators with specialized heads for installing screw piles
- Welding trucks and equipment
- Stringing equipment such as tensioners, pullers, and boom trucks
- Other smaller equipment for transportation and other minor tasks as required
- Helicopters for transporting and erecting towers

2.8.1.6 Marshalling or fly yards

Marshalling yard(s) or fly yards may be established near the D83W project's transmission line route for the storage and assembly of construction materials and equipment for eventual deployment to the construction site.

Fly yards are used to assemble towers that are flown to site using a helicopter. The location of the marshalling or fly yard(s) will be determined while developing detailed construction specifications and contract arrangement. The intent will be to place the marshalling or fly yards as close to the right-of-way as possible to minimize additional noise and traffic.

2.8.1.7 Transmission tower construction

2.8.1.7.1 Foundation installation

Self-supporting lattice steel structures will be supported by either mat, cast-in-place, or helical pile foundations. Helical pile foundations will involve individual piles or pile groups, for each leg of the structure. Granular backfill materials required for construction will be purchased from local suppliers. It is not anticipated that any new borrow areas would be developed for the D83W project.

2.8.1.7.2 Structure and conductor installation

Tower structure assembly can be done at each tower site after which the tower would be erected by crane, or alternatively, the tower could be assembled at a central marshalling yard and then trucked to the site and erected by crane. A helicopter may be used as an alternative to a truck and crane for transporting and erecting towers.

Once the towers are erected, insulator strings will be attached to the structure cross-arms. The insulators will separate the conductors from the structures. Conductors will be transported to the site in reels, then suspended from the insulator strings and tensioned by machine to provide the ground to conductor design clearances required for the mid-span points of maximum sag.

2.8.1.8 Implodes

The ends of conductor reels are spliced together by use of implosive sleeves to create a continuous conductor. The implodes create a flash and a loud boom like the sound of a 12-gauge shotgun blast (about 110 decibels; (CapX2020 2012)).

2.8.1.9 Helicopter use

Contractors will have different preferences with respect to tower structure assembly. Some will choose to assemble structures at each tower site and then erect them by crane. Others will choose to assemble the structures at a central marshalling yard and then truck the structures to site and erect them by crane or use a helicopter to fly the towers to the site and erect them.

2.8.1.10 Construction wrap-up

The final step in construction is demobilizing the workforce from an area. Demobilization includes the movement of Manitoba Hydro and contract staff, vehicles, and equipment from the job site, as well as the clean-up (and if required rehabilitation) of the right-of-way, marshalling or fly yards, and access routes.

Once the D83W transmission line is constructed, all excess materials and equipment including debris, and unused supplies will be dismantled, if required, removed from the site, and disposed according to provincial and municipal regulations.

Rehabilitation of any disturbed sites will be undertaken as required. All cleanup and rehabilitation activity will be subject to the requirements of the environmental protection program, described in Chapter 12.0.

Demobilization will be ongoing throughout the clearing and construction phase as different types of equipment will be required for specific activities such as clearing, tower construction and conductor stringing.

2.8.2 Operation and maintenance

2.8.2.1 Transmission line operation

The D83W transmission line will be designed to operate continuously, though the actual flow of electricity will vary with electrical load requirements. To maintain the line in a safe and reliable operating condition, regular inspection and maintenance will occur.

2.8.2.2 Inspection patrols

Manitoba Hydro conducts periodic inspections of all its transmission lines and rights-of-way. Maintenance procedures are well established and are the subject of continuously updated corporate guidelines for maintenance and construction activities. The patrols typically include visual inspections of vegetation management status, structures, foundations, and insulators.

2.8.2.3 Maintenance

Maintenance activities include instances where crews are required to obtain access to specific areas to repair deficiencies on the transmission system. Non-scheduled patrols may be conducted if the Manitoba Hydro System Control Center identifies a fault on the line that requires visual inspection. Crews also

triage infrastructure during emergencies to address line outages and tower damage.

Maintenance repairs are typically done during winter, after frost has entered the ground, using heavier soft track equipment to gain access. When summer access is required in agricultural areas, related maintenance activities are planned, wherever possible, to avoid conflict with farm activities.

The annual patrol is conducted either by ground or by air depending on access, geographic conditions, and time of year. Patrols are normally undertaken by snow machine, all-terrain vehicles, light trucks, or helicopter, depending on the geographical location and ease of access.

Workforce requirements associated with the operations and maintenance of a transmission line involve deployment of established regional operations and maintenance personnel, and contractor staff as required. Maintenance would include repairs as required. The workforce for regular maintenance activities could be between three and five workers. During emergencies, the size of the workforce is dictated by the work required.

2.8.2.4 Vegetation management

Vegetation management within the transmission line right-of-way is required for public and employee safety, as well as the reliable operation of the line. Regular vegetation management is required to make sure that re-growth in the cleared rights-of-way does not interfere with transmission line operations.

Related management procedures extend to periodic review and removal of danger trees in the immediate vicinity of the right-of-way.

The D83W project's transmission line right-of-way will be maintained on an ongoing basis throughout operation. However, since the D83W project will predominantly traverse agricultural land, the extent of vegetation management will be relatively small.

The method and timing of vegetation maintenance depends on several factors such as the species present, growing conditions and density of non-compatible species. It may also depend on the existing plant community, terrain, economic feasibility, environmental sensitivity and the ownership for the right-of-way and adjacent property. The vegetation maintenance brushing cycle for transmission line rights-of-way typically ranges between 8 and 10 years.

This type of integrated vegetation management approach is used to maintain a safe, reliable, and uninterrupted transmission of electric energy. The focus of vegetation management is on the tall growing tree species that have the potential to grow or fall into, or within, the arcing distance of the transmission lines and or facilities and cause an outage.

The management practices that may be used to control vegetation incorporate mechanical, chemical, biological, or cultural options depending upon several factors including site conditions and the sensitivity of surrounding areas.

Herbicide treatments are formulated to target undesirable tall growing trees but are also effective on broadleaf weeds, leaving grasses unaffected. Foliar applications of herbicides are applied during the warmer months while dormant stem applications are typically applied in the fall and winter.

Permits for pesticide use are obtained as required through a process that involves public notification as part of the formal permit application to Manitoba Environment, Climate and Parks' Pesticide Approvals Branch.

All herbicide applications are completed and supervised by licensed applicators and in accordance with conditions specified in the Pesticide Use Permit. Manitoba Hydro's Forestry Department establishes herbicide application rates in accordance with product label instructions. Manitoba Hydro only uses herbicides that have been listed in the Pesticide Use Permit.

Manitoba Hydro is responsible for obtaining the necessary pesticide use permits and submitting post seasonal control reports per Manitoba Regulation 94-88R under *The Environment Act*.

Manitoba Hydro has developed a pesticide applicator requirements document for their employees to provide:

- Regulatory and applicator licensing information
- Technical guidance
- Safety requirements and checklists for line managers responsible for pesticide application for ensuring compliance with legal requirements

In addition, it provides information so that consistent pesticide management is conducted at all Manitoba Hydro facilities; thereby ensuring pesticide management is conducted in such a way that the resulting environmental effect is minimal.

In addition to tree control, weed control on the rights-of-way may be required under *The Noxious Weeds Act* (C.C.S.M. c. N 110). In agricultural areas, continued cultivation will reduce the need for weed control. Alternative

techniques for the uncultivated portions of the right-of-way include mowing and herbicide spraying. Spraying equipment includes backpack sprayers, truck-mounted power sprayers equipped with a broadcast applicator system, hose and handgun, and all-terrain vehicle mounted power sprayers.

Prior to any vegetation management work on private land under easement agreement with Manitoba Hydro, the landowner will be notified.

2.8.3 Decommissioning and restoration

When the D83W project reaches its end of life or is no longer required, it will be decommissioned. The following sections describe the decommissioning process.

2.8.3.1 Preparation activities

The transmission line will be disconnected from the grid to allow for the safe dismantling of the D83W project. To disconnect, Manitoba Hydro will:

- Trip the breaker(s) at Dorsey and Wash'ake Mayzoon Stations
- Open the 230 kV disconnects
- Disconnect the conductors at the substations

2.8.3.2 Removal of facilities

The disassembly and removal of the equipment will be the same as the installation described in Section 2.8.1.7 but in reverse order.

Salvage will involve removing and salvaging the conductor onto spools under tension then removed from site. The towers will be disassembled and lowered using a crane onto flatbed trucks for transport.

Soil will be excavated surrounding the tower foundations allowing them to be cut off 1.5 meters below grade, in consultation with the landowner and in accordance with the land agreements. Surrounding soil will be used to backfill the excavation and graded to allow for re-vegetation.

2.8.3.3 Disposal

After dismantling the D83W project, high value components will be removed for re-use or recycling. The remaining materials will be reduced to transportable size and removed from the site for disposal.

Waste handling and disposal will be subject to conventional Manitoba Hydro codes of practice and relevant provincial and federal legislation.

2.8.3.4 Restoration

Following removal of the line, the right-of-way will be restored to the surrounding land use. Disturbed areas will be graded to original contours and the soils will be restored to a condition consistent with the intended land use.

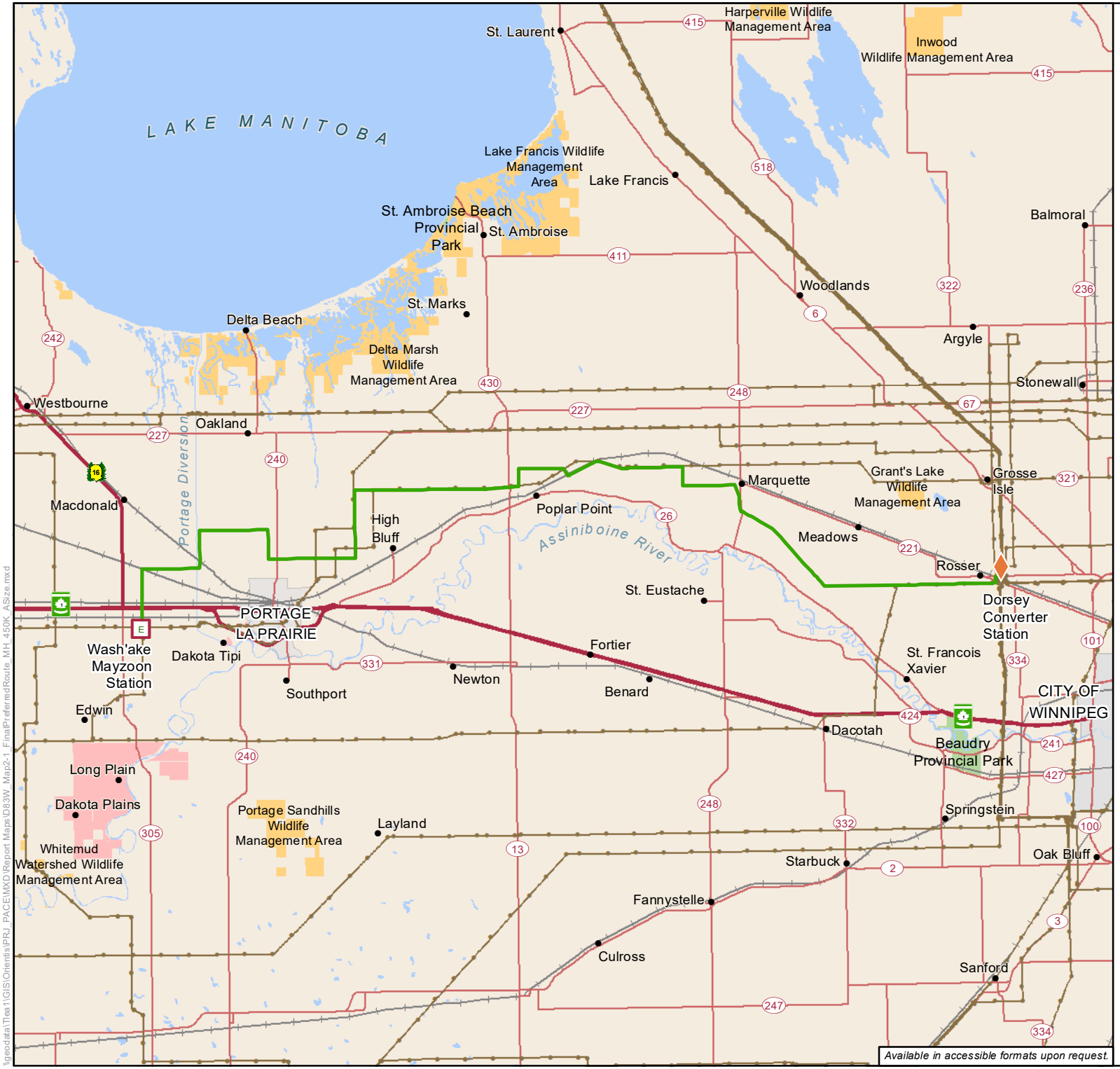
Disturbed areas will be rehabilitated consistent with the rehabilitation and invasive species management plan developed for the project. This will include the restoration of any access areas along the right-of-way.

If seed is applied, any erosion and sediment control measures required on-site would be left in place until seed is fully established, as determined by an environmental officer.

If project components are sited on industrial properties or those that are no longer under agricultural production or in a natural state, different methods would be used.

2.9 Funding

Funding is currently being provided entirely by Manitoba Hydro. However, Manitoba Hydro has applied for funding under the Federal Government of Canada's Investing in Canada's Infrastructure Program, administered by Infrastructure Canada, which if received would cover a portion of total project costs. A suite of documents was prepared in support of this funding application, including a Business case, a Climate Resilience Assessment, a Gender Based Analysis Plus and a Greenhouse Gas Mitigation Assessment. Should Manitoba Hydro be successful in receiving federal funding any funds received will be used to offset the total project costs.



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 03, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

D83W Transmission Line

Draft: For Discussion Purposes Only

Map 2-1

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3.0 Route selection

3.1 Introduction

This chapter outlines the route selection process used to determine the location of the proposed D83W transmission line. Details on the route selection process can be found in Appendix A.

The routing methods used for this project are based on those developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) for overhead electric transmission line siting (EPRI-GTC 2006).

For each step in the EPRI-GTC process, route evaluation criteria are grouped into three perspectives:

- the natural environment (e.g., forest, wetlands)
- the built environment (e.g., residences, agricultural land use)
- the engineering environment (e.g., cost, accessibility).

As discussed in Chapter 2.0, the D83W transmission line is part of a larger project called the PACE project and will run from the Dorsey Converter Station to the Wash'ake Mayzoon Station.

Selection of a preferred D83W transmission line route started after the selection of a preferred station site for Wash'ake Mayzoon Station as detailed in the Wash'ake Mayzoon Station Environmental Assessment Report (Manitoba Hydro 2021).

The routing process involved the following general steps:

- Establish the route planning area
- Generate routing corridors
- Develop and analyze transmission line routes
- Select and finalize the preferred route

Each step, described in more detail in the following sections, involves a process of narrowing and refining the geographic area under consideration to get to a specific preferred route.

3.2 Route planning area

The purpose of establishing a route planning area (Map 3-1) is to focus the transmission line routing process. Data is gathered within the bounds of the route planning area and all route planning is limited to those bounds.

Development of the route planning area was informed by the process of selecting the location for Wash'ake Mayzoon Station. The northern boundary was drawn to include the existing 115kV t-line UP80 (Rockwood to Portage) and the existing 230kV t-line D54N (Dorsey to Neepawa). The western boundary was drawn to stay east of the existing Bipole III 500kV t-line to avoid having to cross over and back. The southern boundary was drawn to allow some paralleling of the existing D12P line. The eastern boundary includes the eastern limits of Dorsey station and follows the existing D12P corridor to include potential paralleling.

The route planning area includes a small number of land cover classifications. Agriculture (pasture and cultivated) is the most common land cover class covering over 90% of the area in the route planning area. Forest covers only 4% with the rest being primarily developed (roads, rail etc.).

3.3 Routing corridors

The next step in the routing process is to produce four corridors that represent the different perspectives (i.e., built, natural, engineering, and simple average) within the route planning area. Corridors map the suitability for locating a transmission line and further narrow the geographic area under consideration for route development.

Creating the corridors involved the following:

- determining areas of least preference
- developing the corridor model
- gathering data
- creating geospatial data layers
- creating suitability surfaces
- developing corridors

Details on the above steps are provided in Appendix A.

The combination of the four corridors (built, natural, engineering, simple average) results in the composite corridor (Map 3-2). The composite corridor depicts the most suitable areas, based on the criteria used in the model, in which to develop routes for the transmission line.

3.4 Transmission line routes

The next phase of the routing process involved:

- Developing routes
- Presenting the routes through public and First Nation and Métis engagement
- Analyzing the routes

- Developing mitigative segments
- Evaluating the routes
- Selecting a preferred route

Each of these steps is described in more detail in the following subsections.

3.4.1 Develop the routes

Once corridors were identified, the routing team developed routes within those corridors. The routes are potential, preliminary centerline routes for the proposed transmission line that can be analyzed and evaluated by the project team and presented through the engagement process for feedback.

The routes are composed of individually numbered route segments that connect to form contiguous routes from the start (Dorsey Converter Station) to end point (Wash'ake Mayzoon Station).

3.4.2 Present the routes

The route segments (Map 3-3) were presented for feedback through public (Chapter 4.0) and First Nation and Métis (Chapter 5.0) engagement.

Information received during engagement (either general comments or specific segment suggestions) may lead to additional segments being added to the process (see mitigative segments, Section 3.4.4).

3.4.3 Analyze the routes

Project team discipline specialists gather data (through desktop studies, consideration of existing databases, and field surveys) and analyze the routes / segments from the perspective of potential effects.

Recommendations are made by project team members for segment adjustments to mitigate concerns.

3.4.4 Develop mitigative segments

Mitigative segments may be proposed during engagement or by project team members. Mitigative segments are evaluated by the routing team for technical feasibility and cost. Consideration is also given to whether the mitigative segment results in net-minimization of effect (e.g., does not shift potential effects from one landowner to another or one area/land type to another). Segments that meet this are retained and move forward for consideration in the next step of evaluation.

Map 3-4 presents the mitigative segments (routes) developed from consideration of the feedback received from Round 1 engagement.

3.4.5 Route evaluation

All routes were then compared against each other and evaluated with the use of criteria that represent the four perspectives (i.e., natural, built, engineering and simple average).

The route evaluation model is used to help evaluate the routes. Route statistics are developed, using the model, that allow route comparisons using substantial amounts of data. Details of the model and development of route statistics are provided in Appendix A.

The full set of routes were evaluated at a workshop (details in Appendix A). The goal was to use the route statistics as well as expert judgement to reduce the number of routes to a set of finalists. Four routes (Map 3-5) were chosen to move forward to the preference determination step.

3.4.6 Preference determination

The final four routes were compared using the preference determination model (Appendix A). The four final routes were compared and scored by the project team. Each route received a value between 1 and 3, for each of the criteria in the model, with lower values indicating higher suitability.

The scores given to each route were entered into the preference determination model (Table 3-1). The rationale for each score is provided in Appendix A. Route D received the lowest total score and was therefore selected as the preferred route (Map 3-5).

Table 3-1: Preference determination table

Criteria	%	ROUTE A	ROUTE B	ROUTE C	ROUTE D
Cost	40%	1	1.72	1.83	1.71
Weighted		0.4	0.688	0.732	0.684
System Reliability	7.5%	1	1.5	1.5	1.5
Weighted		0.075	0.1125	0.1125	0.1125
Risk To Schedule	7.5%	3	1.5	1	1.5
Weighted		0.225	0.1125	0.075	0.1125
Environment (Natural)	7.5%	3	1.5	1	1.25
Weighted		0.225	0.1125	0.075	0.09375
Environment (Built)	7.5%	3	1.5	1.5	1
Weighted		0.225	0.1125	0.1125	0.075
Community	30%	3	1.43	2.78	1
Weighted		0.9	0.429	0.834	0.3
TOTAL	100%	2.05	1.57	1.94	1.38
RANK		4	2	3	**1**

3.4.7 Present the preferred route

The preferred route (Map 3-6) was presented during the second round of engagement (details provided in Chapters 4.0 and 5.0). Several landowners had concerns with the placement of the line on their property (see Chapter 4.0 for details), so a few adjustments were made (Map 3-7). In addition, one change was made for technical reasons.

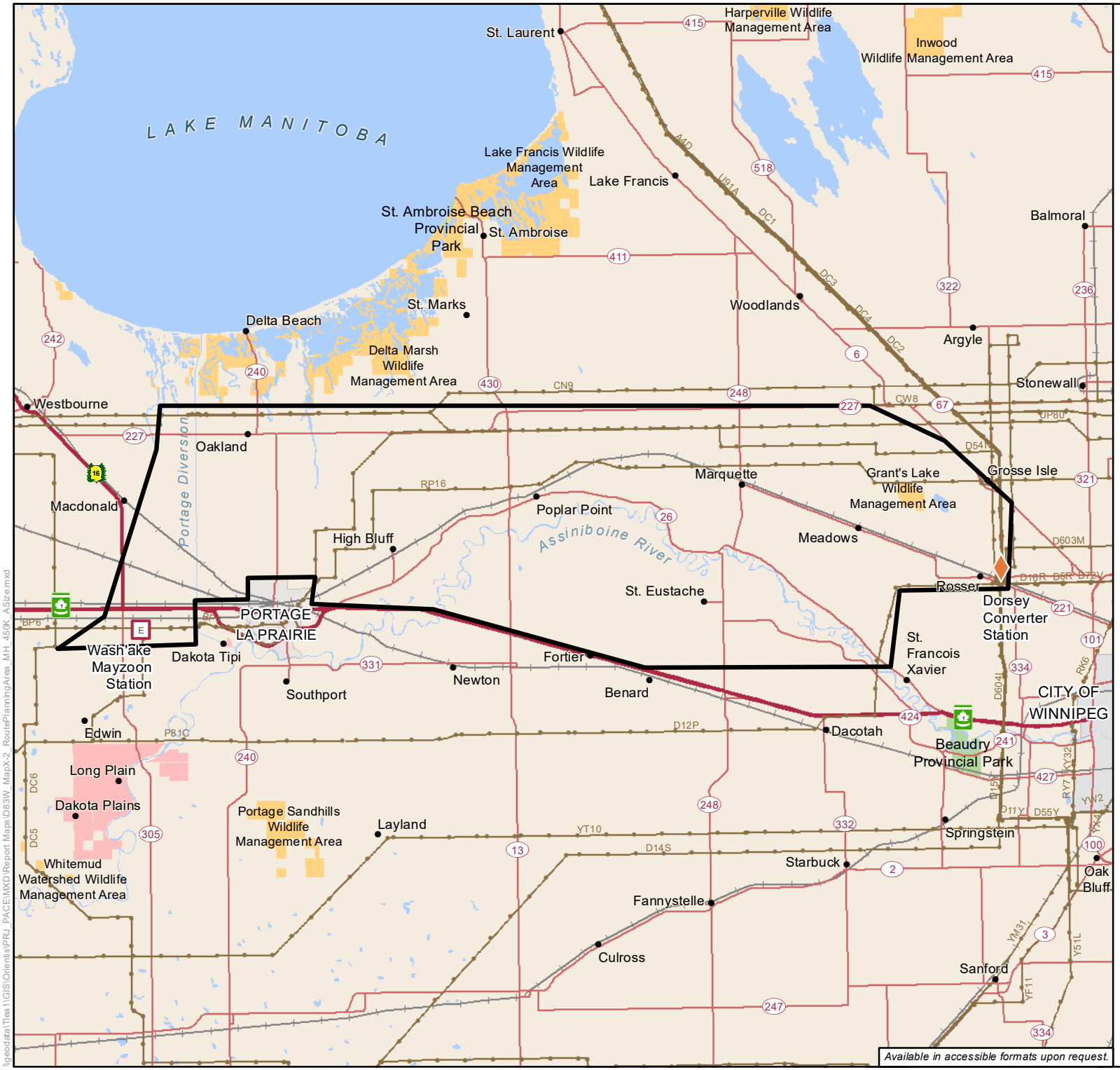
3.5 Final preferred route

The FPR is shown on (Map 3-8). Table 3-2 shows the route statistics for the FPR as well as the minimum and maximum values for routes considered during the evaluation stage.

Table 3-2: Final preferred route - statistics

REM Criteria	FPR	Min[3]	Max[3]
Built			
Relocated Residences (count)	0	0	1
Potential Relocated Residences (count)	6	0	16
Proximity to Residences (count)	36	11	72
Proposed Developments (count)	17	10	34
Current Agricultural Land Use (calculated value[1])	814	667	908
Land Capability for Agriculture (calculated value[1])	952	794	972
Diagonal crossing of Agriculture Crop Land (acres)	85.72	0.00	187.86
Proximity to Buildings and Structures (count)	7	0	21
Special Features (count)	5	4	6
Historic/Cultural Resources (count)	4	1	15
Natural			
Critical Habitat (acres)	0	0	0
Native Grassland (acres)	0	0	0
Natural Crown Land (acres)	0	0	0
Wetlands (acres)	1.5	0.08	3.42
Natural Forests (acres)	4	1.5	34.21
Stream / River Crossings (count)	11	4	27
Engineering			
Length (km)	98.3	84.461	101.352
Construction/Design Costs ($)	$50M	$44M	$54M
Construction + Maintenance Restrictions (calculated value[1])	289	243	316
Accessibility (calculated value[1])	19,309,420	10,714,243	27,569,005
Transmission Reliability (calculated value[2])	130,272,861	99,309,835	290,565,919
Proximity to Gas and Rail (calculated value[2])	138,400,280	96,562,698	252,011,621

[1] Lower values indicate a preference for routing a transmission line
[2] Higher values indicate a preference for routing a transmission line
[3] Minimum and maximum are based on all routes considered during the evaluation stage



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Assessment Area
- Route Planning Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 16, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Route Planning Area

Draft: For Discussion Purposes Only

Map 3-1

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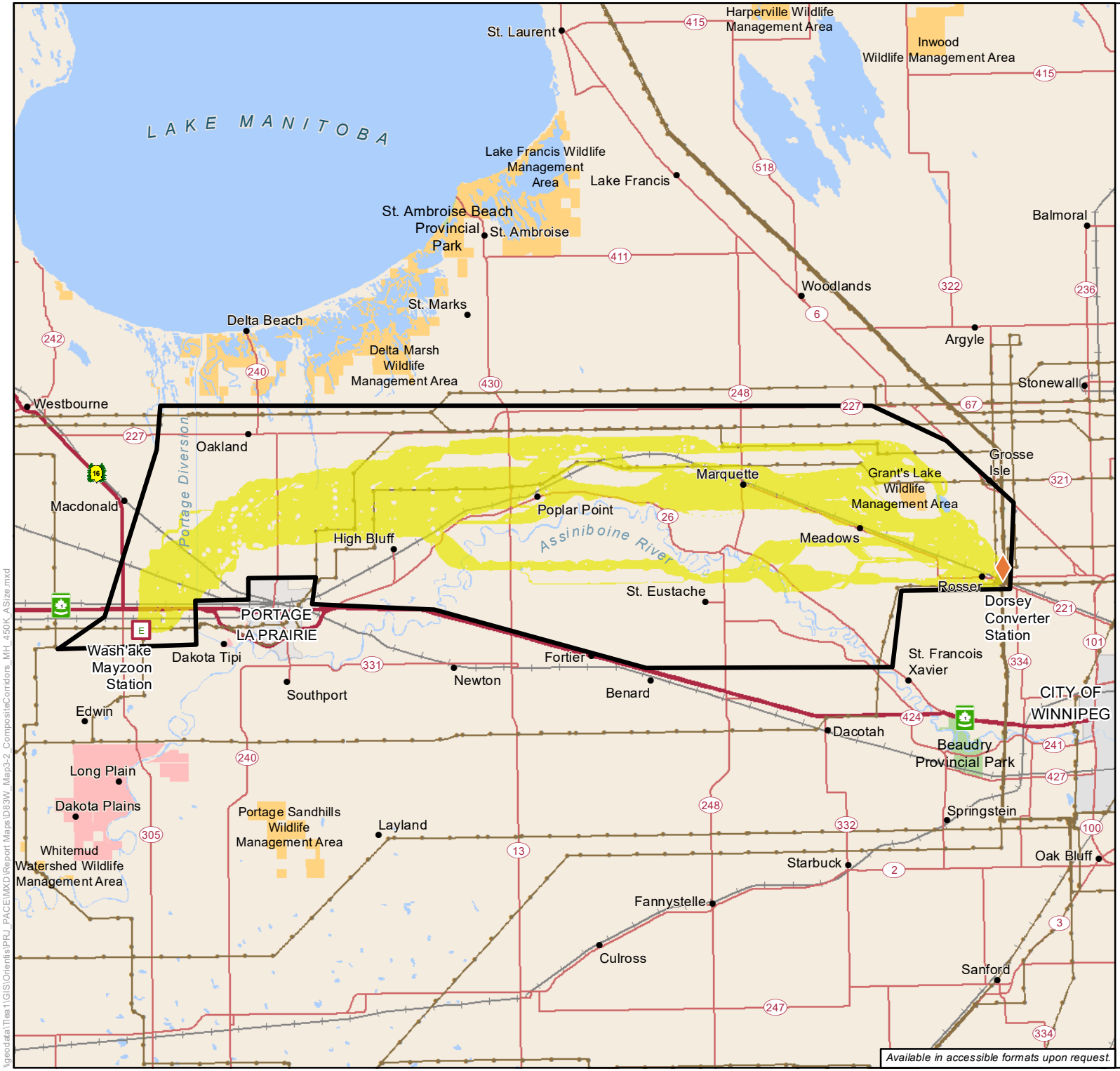

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Composite Corridors
- Composite Corridor

Assessment Area
- Route Planning Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 03, 2022

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0 5 10 Kilometres
0 3.75 7.5 Miles
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Composite Corridors

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Map 3-2

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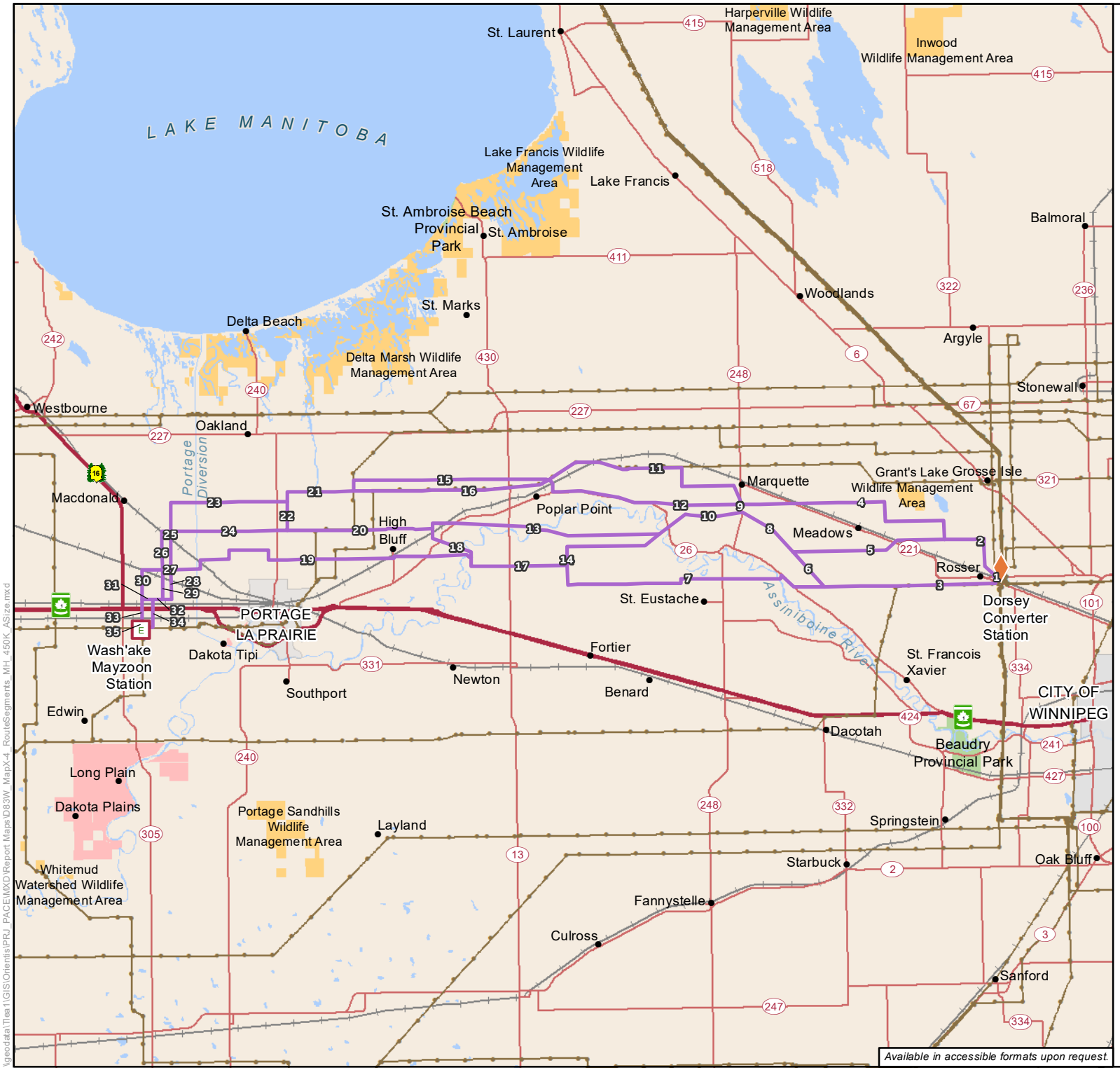

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Round 1 Route Segments

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 16, 2022

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Route Segments

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Map 3-3

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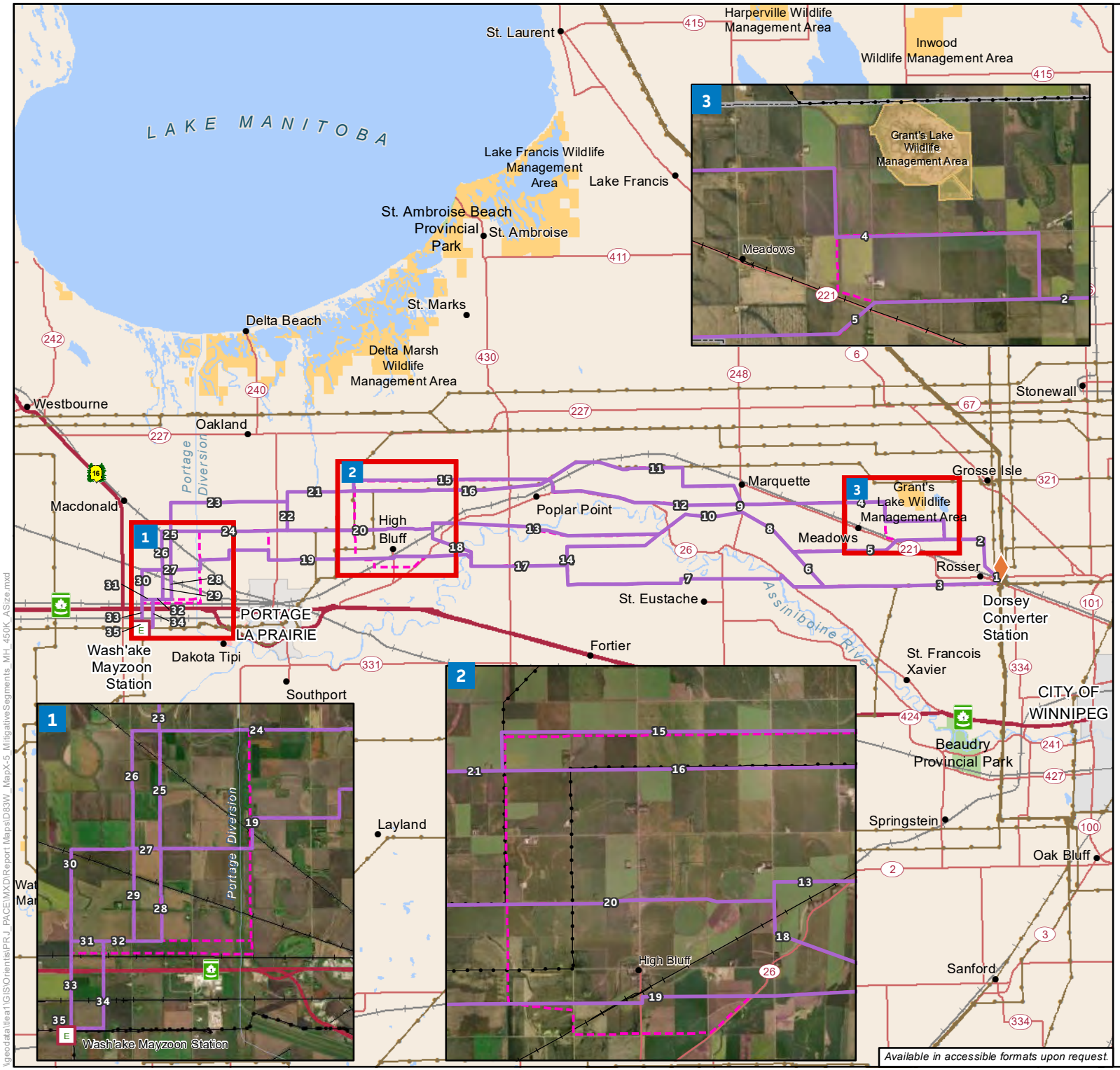

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Round 1 Route Segments
- Mitigative Segment

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 25, 2022

N

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0 3.75 7.5 Miles
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Mitigative Segments

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 3-4

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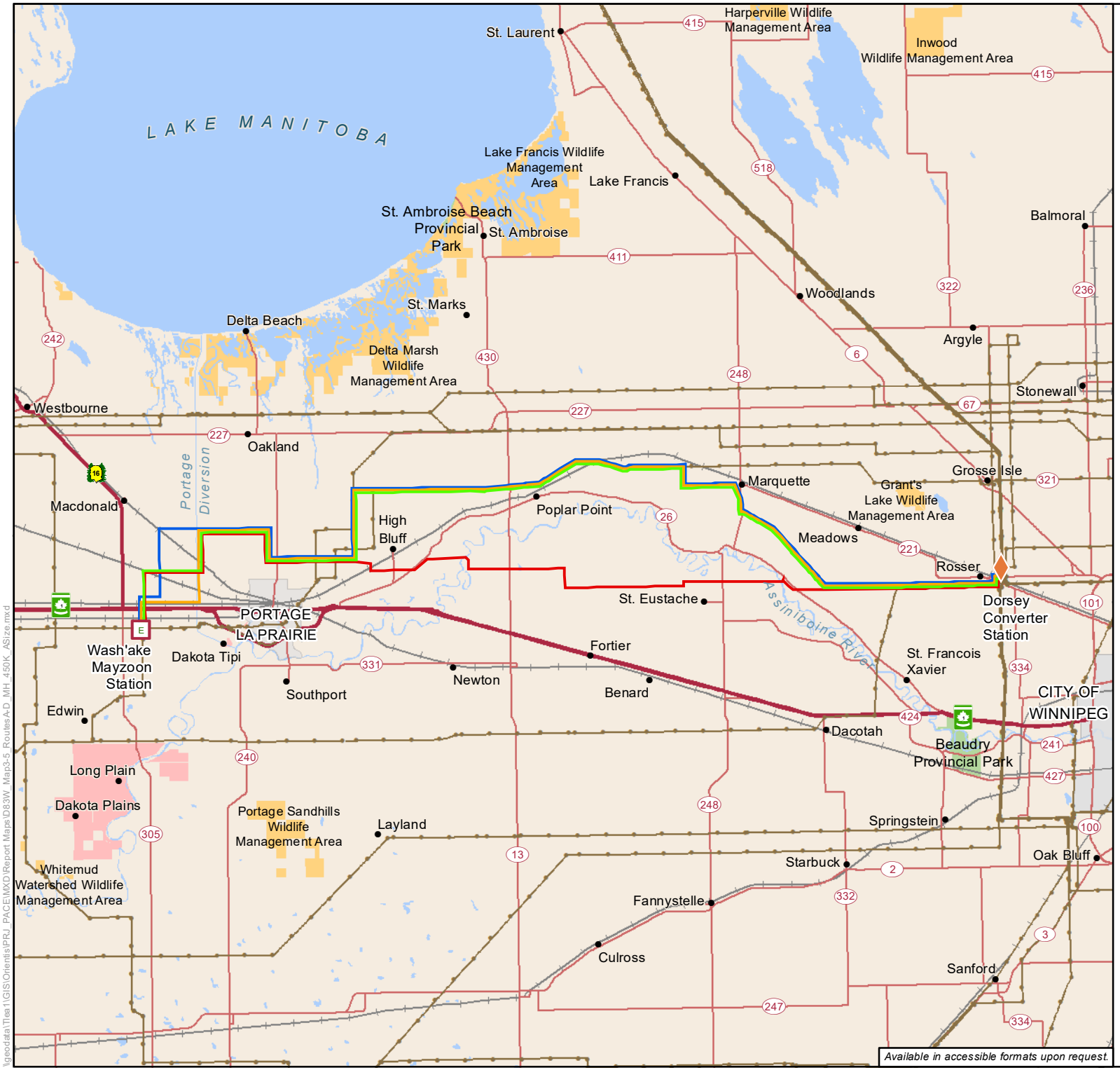

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Route A
- Route B
- Route C
- Route D

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 03, 2022

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Routes A-D

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 3-5

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Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Preferred Route

Infrastructure
- Converter Station (Existing)
- E — Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 16, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
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Preferred Route

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 3-6

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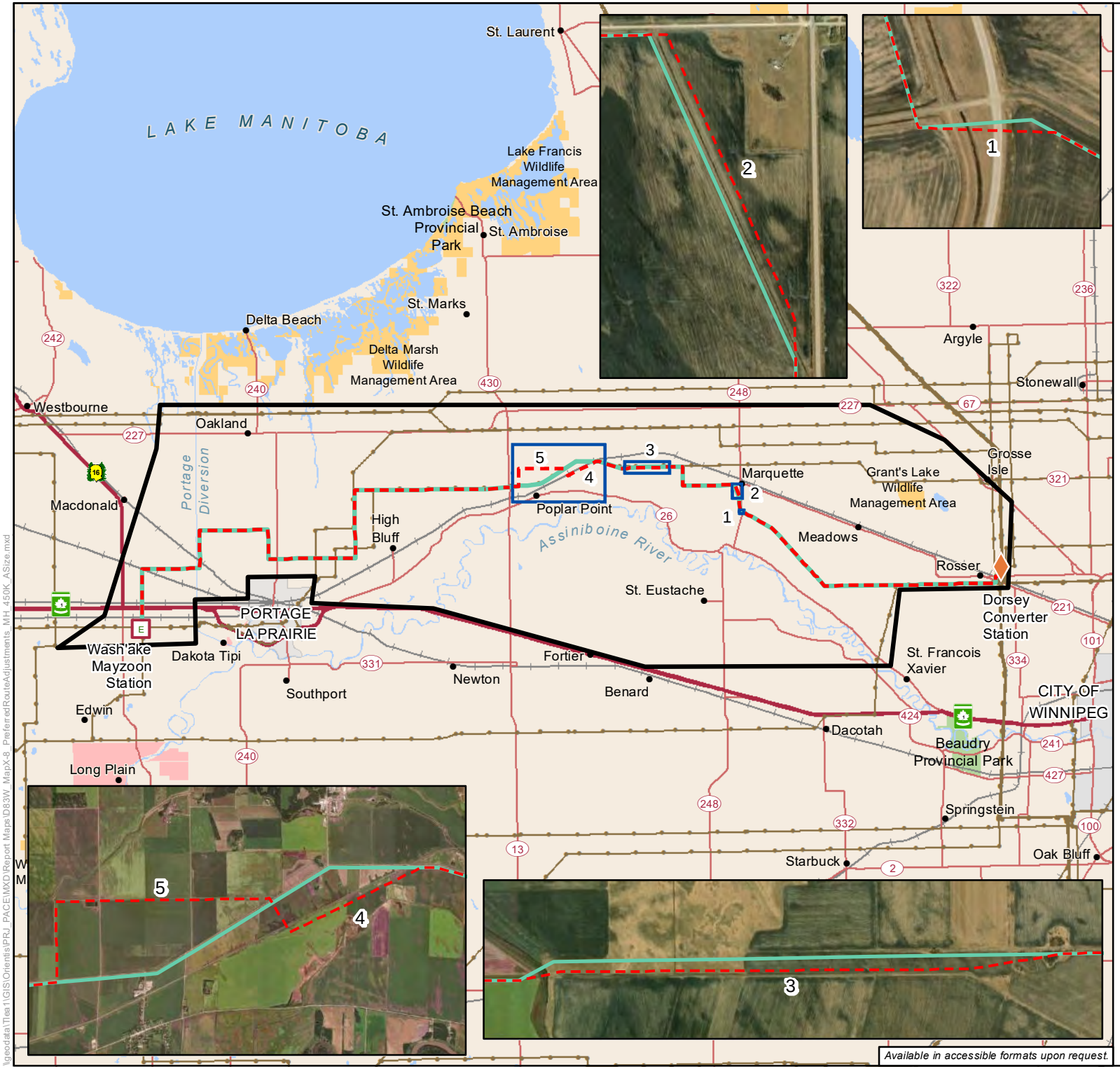

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Preferred Route
- Final Preferred Route

Assessment Area
- Route Planning Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 16, 2022

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0 5 10 Kilometres
0 3.75 7.5 Miles
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Preferred Route Adjustments

Available in accessible formats upon request.

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Map 3-7

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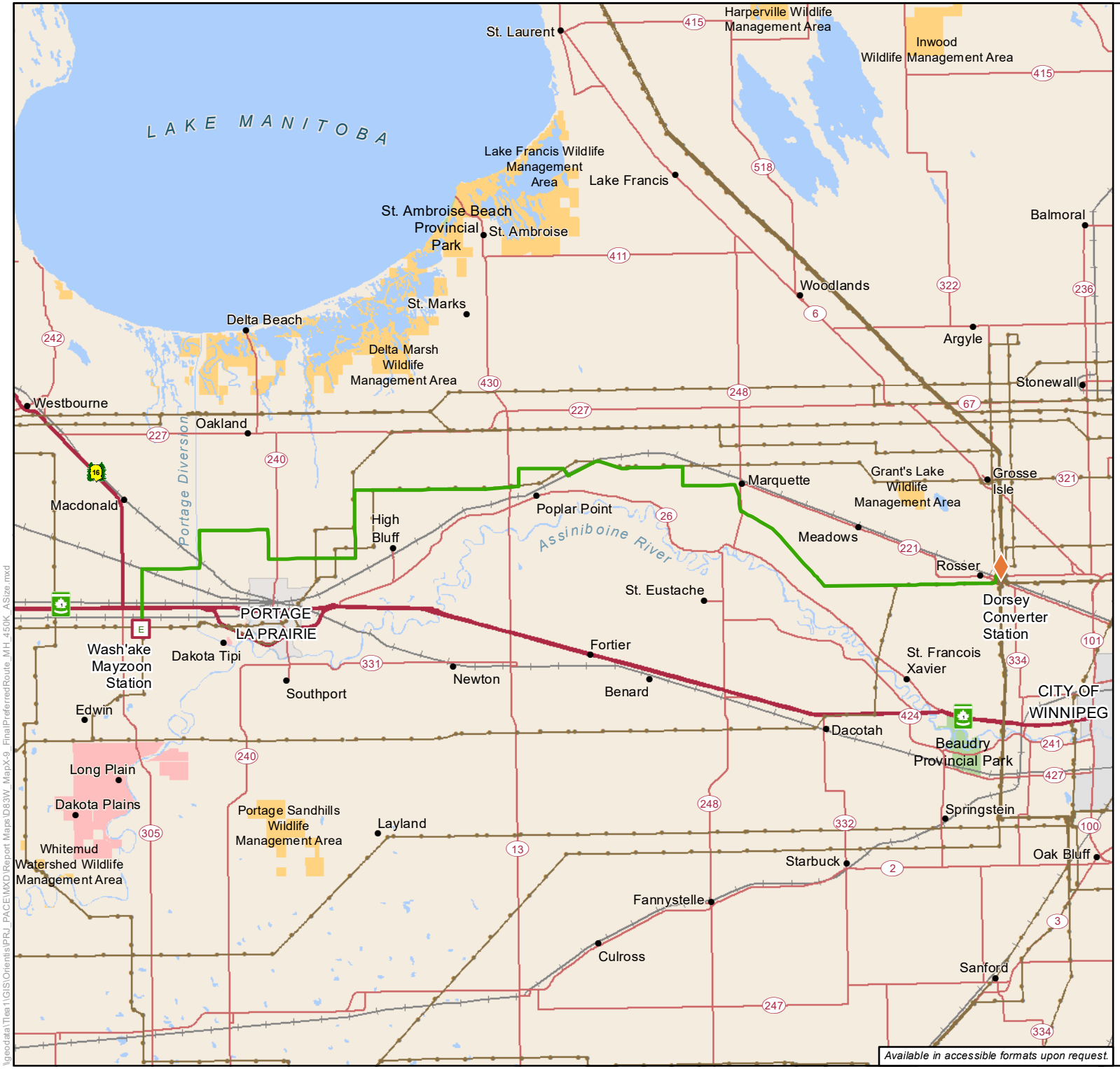

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure

- Final Preferred Route

Infrastructure

- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase

- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 16, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles

1:450,000

Final Preferred Route

Draft: For Discussion Purposes Only

Map 3-8

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4.0 Public engagement process

This chapter summarizes Manitoba Hydro's public engagement process for the D83W project. The full details of the communication and engagement activities undertaken for the project are presented in Appendix B.

4.1 Goal and objectives of engagement

Manitoba Hydro undertook a public engagement process (PEP) that began in October 2021 and will continue through regulatory, construction and operational phases of the D83W project. The goal of the PEP was to work directly with interested parties, landowners, and the public to understand and consider concerns and interests.

The objectives of public engagement for the D83W project included:

- Developing an engagement plan;
- Increasing responsiveness and transparency by sharing information, answering questions, and working to resolve concerns;
- Working directly with interested parties, First Nations, and the MMF to determine the community perspective score for the preferred route evaluation model; and
- Clearly communicating with communities, individuals, and groups about how their input influenced decision making.

Interested parties included:

- Local government, businesses, and organizations;
- Provincial government departments;
- Agricultural organizations;
- Recreation organizations or groups; and
- Environmental organizations.

4.2 Communication methods

4.2.1 Round 1 communication

Figure 4-1: Round 1 communication methods for the PEP

4.2.2 Round 2 communication

Figure 4-2: Round 2 communication methods for the PEP

4.3 Engagement methods

We incorporated techniques from the International Association of Public Participation (IAP2) when designing the public engagement process for the project. IAP2 defines public participation as a "means to involve those who are affected by a decision in the decision-making process. It promotes sustainable decisions by providing participants with the information they need to be involved in a meaningful way, and it

communicates to participants how their input affects the decision." IAP2's core values for public participation are as follows:

1) Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.
2) Public participation includes the promise that the public's contribution will influence the decision.
3) Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4) Public participation seeks out and facilitates the involvement of those potentially affected by or interested in a decision.
5) Public participation seeks input from participants in designing how they participate.
6) Public participation provides participants with the information they need to participate in a meaningful way.
7) Public participation communicates to participants how their input affected the decision.

We also considered IAP2's public participation spectrum when choosing public engagement techniques. We strategically used techniques that follow the consult and involve levels found on the public participation spectrum:

- Consult: To obtain public feedback on analysis, alternatives and/or decisions.
- Involve: To work directly with the public throughout the process to ensure that public concerns and aspirations and consistently understood and considered.

The virtual information sessions helped share information, answer questions, and obtain public feedback on the alternative route segments and preferred route for the D83W project, while the community ranking process (described in the routing chapter) involved interested parties and Indigenous communities in determining the community perspective score for the preferred route evaluation.

4.4 Round 1 engagement

The purpose of Round 1 engagement was to share information about the D83W project and hear feedback about the alternative route segments under consideration for routing. Engagement methods included virtual information sessions, meetings with interested parties, community preference routing workshops, online feedback mapping portal, and online survey about alternative route segments and potential project impacts.

4.4.1 Virtual information sessions

The purpose of the Round 1 virtual information sessions (see Table 4-1) was to share information about the D83W project, present the alternative route segments, answer questions, and hear feedback from interested parties, landowners, and members of the public.

Table 4-1: Round 1 virtual information sessions for the D83W project

Date	Time	Number of participants
November 2, 2021	7:00 p.m.	11
November 3, 2021	12:00 p.m.	7
November 4, 2021	4:00 p.m.	5
November 9, 2021	7:00 p.m.	10
November 10, 2021	12:00 p.m.	3
November 16, 2021	7:00 p.m.	7
November 17, 2021	12:00 p.m.	4
November 23, 2021	7:00 p.m.	18
November 24, 2021	12:00 p.m.	7
Total		72

We held the virtual information sessions at various dates and times to allow participants to select a date and time that met their needs. The virtual information sessions included introductions from the Manitoba Hydro employees and participants, a brief presentation, and an open discussion with the participants. The virtual information sessions were originally anticipated to end on November 17, 2021, but upon request from participants, we added additional virtual information sessions on November 23 and November 24, 2021.

4.4.2 Meetings with interested parties

Manitoba Hydro held five meetings with interested parties and attended two in-person meetings, one organized by the RM of Cartier and the other organized by the RM of St. François Xavier to discuss the D83W project (Table 4-2).

Table 4-2: Round 1 engagement meetings with interested parties

Interested party	Meeting date & location
RM of Portage la Prairie	October 13, 2021
RM of Cartier	October 25, 2021
RM of Rosser	November 5, 2021
RM of Portage la Prairie	November 9, 2021
KF Aero	November 24, 2021 Southport, MB
RM of Cartier	November 25, 2021 RM of Cartier Building
RM of St. François Xavier	November 30, 2021 St. François Xavier Community Club

4.4.3 Community preference routing workshops

Manitoba Hydro held two meetings with the community preference team on December 16, 2021, and January 27, 2022. The purpose of these meetings was to develop the community preference score for the preferred route. There is more information on the content and outcome of the community preference workshops in the First Nation and Métis engagement process chapter (Section 5.2.4.3).

4.4.4 Online feedback mapping portal

The Round 1 online feedback portal was available on the D83W project webpage from October 7, 2021, to December 1, 2021. The feedback portal was an interactive way for participants to comment on the alternate route segments, share suggestions for route segments, and identify points of interest in the area.

4.4.5 Online survey about alternative route segments and potential project impacts

Manitoba Hydro hosted an online survey for Round 1 engagement using Qualtrics on the PACE webpage from October 7, 2021, to December 1, 2021. There were 88 respondents to the survey.

4.5 Round 2 engagement

The purpose of Round 2 engagement was to present the preferred route for evaluation and feedback.

4.5.1 Virtual information sessions

The purpose of the Round 2 virtual information sessions was to share information about the D83W project, answer questions and hear feedback from interested parties, landowners, and members of the public. A total of 58 participants attended the virtual information sessions (Table 4-3).

Table 4-3: Round 2 virtual information sessions for the D83W project

Date	Time	Number of participants
February 22, 2022	7:00 p.m.	21
February 23, 2022	12:00 p.m.	9
February 28, 2022	7:00 p.m.	13
March 1, 2022	12:00 p.m.	10
March 2, 2022	7:00 p.m.	5
Total		58

4.5.2 One-on-one meetings with affected landowners

We sent out direct mail to landowners along the preferred route at the start of Round 2 engagement based on landowner title information. For landowners we did not hear directly from by March 23, 2022, we followed up with phone calls (where possible) to confirm that landowners were aware of the D83W project and to answer any questions they had. Conversations with landowners were generally about routing related to their property, and questions about the compensation process. For landowners that we were not able to reach by phone, we sent out additional letters on May 4, 2022. Nine landowners requested a virtual or in-person meeting to discuss the D83W project in further detail.

4.5.3 Meetings with interested parties

During Round 2 engagement, we met with three interested parties (Table 4-4).

Table 4-4: Round 2 engagement meetings with interested parties

Interested Party	Meeting Date & Location
Snoman Inc.	February 18, 2022 Microsoft Teams
RM of Woodlands	March 3, 2022 Microsoft Teams
RM of St. Francois Xavier	March 28, 2022 Microsoft Teams

4.5.4 Online feedback mapping portal

During Round 2, Manitoba Hydro hosted a link on the PACE Project webpage for an online feedback portal from February 11, 2022, to April 6, 2022. The feedback portal was an interactive way for participants to comment on the D83W project's preferred route and identify points of interest in the area.

4.5.5 Online survey about preferred route and environmental assessment mitigation

During Round 2, Manitoba Hydro hosted an online survey using Qualtrics on the PACE Project webpage. The survey went live on March 1, 2022, and was scheduled to stay live until March 25, 2022. Manitoba Hydro sent out an eCampaign on March 23, 2022, to notify individuals who had signed up for the D83W project updates that the survey deadline had been extended and was available on the project website until April 6, 2022. There were 36 respondents to the survey.

4.6 Public engagement feedback

4.6.1 Overview

Engagement feedback typically focused around one or more of the following topics:

- Proximity to homes
- Routing
- Agriculture
- Land and wildlife
- Health and safety
- Trees, birds, and wildlife
- Culture and heritage

4.6.2 Proximity to homes

Participants shared concerns about impacts to their homes and properties, such as the loss of use of land, property values, increased noise, and asked questions about easements and compensation. Some participants noted it would be overwhelming to have transmission lines located outside their homes and in their communities.

4.6.3 Routing

Participants shared perspectives on the alternative route segments presented. Some participants expressed a preference to route further north or south outside the study area, and other participants provided alternative segments for consideration through the mapping feedback portal. These suggestions were considered and evaluated when determining the final preferred route.

4.6.4 Agriculture

Participants shared concerns about impacts to agricultural activities, including pivot irrigation, aerial spraying, runways, tile drainage, biosecurity and associated economic impacts. Participants noted that there is a large amount of highly productive agricultural land in the D83W project area.

4.6.5 Land and wildlife

Participants shared concerns about impacts to land and wildlife, including the potential removal of trees for the project including important shelterbelts, and shared that the rivers and creeks in the project area have high concentrations of birds and other wildlife.

4.6.6 Health and safety

Participants shared concerns about the potential effects of electric and magnetic fields on human and animal health, as well as biosecurity concerns with the construction and maintenance of the transmission line on agricultural fields.

4.6.7 Culture and heritage

Concerns were shared in Round 1 about the proximity to St. Paul's Anglican Church along Highway 26.

4.7 Ongoing engagement

Manitoba Hydro continued to notify landowners, interested parties and the public within the area regarding the D83W project. This included notifying each affected

landowner once the final preferred route was determined and providing them with contact information, an outline of the regulatory process and the upcoming timelines. The D83W project webpage has been continually updated as the project progresses, and the information line and email address remain active.

4.8 Engagement results

4.8.1 Round 1 engagement results

Manitoba Hydro held nine virtual information sessions with a total of 72 participants. There were 88 participants who submitted feedback through the online survey. Detailed engagement findings can be found in Appendix B. Table 4-5 outlines feedback from participants.

Table 4-5: Round 1 engagement feedback results

Topic	Concern
Aesthetics	• Proximity of transmission line to St. Eustache • Potential degradation to property values as the result of the view • Removal of trees / disruption of shelterbelt • Potential impact on recreational activity
Project design	• Questions on tower size, span between towers, right-of-way width and specifications • Other tower design options
Heritage	• Municipal heritage site of concern along the routes, specifically St. Paul's Anglican Church • Indigenous burial site near route • Route would interfere with Hutterite heritage and culture.
Agriculture*	• Impacts to aerial spraying, runways, pivot irrigation, and tile drainage used to support high intensity agricultural operations • Preference for northern routes given the perception that the land is less agriculturally productive • Concerns with line interference on GPS used for agriculture • Biosecurity associated with construction and maintenance • Biosecurity concerns related to the potential introduction of invasive species and pathogens (specifically clubroot) • Preference for transmission line to follow road allowances rather than to be within fields

	• Economic impacts and economic loss from agricultural operations • Impacts to river lot land
Engagement	• Questions and concerns about avenues to submit information and feedback to the project team • Concerns about lack of communication by Manitoba Hydro about the project • Preference for Manitoba Hydro to contact individual landowners directly (letters) instead of broad methods (postcards) • Concerns about postcards and if they were received • Issues with contacting Manitoba Hydro via email/1-800 number • Questions on how public feedback influences routing process • Questions about project timelines and next steps
Economics	• Need for the project • Whether the 2019 storm was being used as justification for the project • Concerns that those most affected by the project do not equal the most in need for new power • Request for economic impact study as part of the assessment • Noted the high economic value of crops along some routes
EMF	• Potential effects to GPS signaling on precision agricultural application • Potential human health impacts, concerns about increased risk of miscarriage, leukemia, and other diseases • Interference from towers with livestock
Health & safety*	• Proximity to homes and perceived health risk • Interference with livestock • Concerns about conductors / wires falling on homes or property • Potential risk to low flying agriculture related aircraft
Property values	• Loss of use of land because of transmission towers o Direct impacts to agricultural production o Proposed route segments cutting through the middle of fields • High value river properties potentially affected

	• Questions about easements and compensation – when in the process this happens, what happens when the preferred route is selected • Questions about the expropriation process
Proximity to homes*	• Associated health concerns with homes in proximity to the line • Potential effects on internet service • Routes in proximity to towns (specifically St. Eustache and Marquette) • Overwhelming to have power lines outside property • Increase risk of property damage due to equipment malfunction
Routing	• The overall need for the project – whether Bipole III could be used for power, if existing rights-of-way could be used, and whether the power could come from Brandon instead of Dorsey • Concerns with previous flooding on riverfront properties and how transmission towers would be impacted • Preference from some participants for more northern routes - land further north is perceived to be less agriculturally productive • Preference to route along PR 227 and the Portage Diversion • Questions about what factors are considered when choosing the preferred route • Preference to follow existing rights-of-way and road allowances as much as possible • Preference from some participants for southern routes, along the Trans-Canada highway • Preference from some participants to use Crown land to route the Project • Concern about private runways in the area that Manitoba Hydro might not be aware of • Cyclists regularly use Highway 26. Increased traffic of heavy equipment poses additional risk to the cyclists.
Trees & vegetation	• Conservation agreement lands and whether special consideration would be given to these areas • Concerns about removing trees and tree lines as the result of specific route segments

Wildlife	• Rivers and creeks have high concentrations of birds and wildlife and are popular spots for hunting and fishing • Concern of transmission line impacts on chickens and other birds, including geese, eagles, and migratory birds • Proximity to Grant's Lake Wildlife Management Area • Disruption to critical wildlife habitat • The impacts to the Métis harvesting area

*indicates a priority topic for survey participants.

4.8.2 Round 2 engagement results

Manitoba Hydro held five virtual information sessions with a total of 58 participants. There were 36 participants who submitted feedback through the online survey. Table 4-6 outlines feedback from participants

Table 4-6: Round 2 engagement feedback results

Topic	Concern
Aesthetics	• Loss of shelterbelt
Agriculture*	• Aerial spraying impacts • Use of land underneath transmission line for agriculture • Removal of shelter belt causing negative agricultural impacts (loss of wind erosion protection, soil degradation, water, and soil moisture)
Construction & maintenance	• Compensation for damages to property during construction • Construction timelines and disruptions to daily life • Maintenance protocols for transmission towers • Soil compaction in areas with clay soil
Engagement	• Lack of clarity and sufficient detail with maps • Ongoing concerns with notification process • Benefits to affected landowners and RMs versus impacts to landowners and RMs • Notification process for line access for repairs and maintenance
Health & safety*	• Concerns about EMF levels on specific properties • Whether Manitoba Hydro could lend EMF measurement kits to landowners along the preferred route • Concerns about living near the transmission line and the impact of high voltage lines.

Licensing	• What type of licensing and environmental assessment process the project was subject to
Noise	• Noise from transmission line construction and operation
Property values	• Compensation process, amounts and possible negotiations • Taxation on land held by Manitoba Hydro • Footprint for transmission towers and associated loss of agricultural land • Inhibit future construction projects near towers
Routing	• Project specifications – distance between towers, tower design, right-of-way details • Preference for northern routes along PR 227 • Preference for southern routes • Requests to move preferred route closer to rail line • Concerns about the route "jogging" to avoid a proposed runway • Acceptable / minimum distances between power lines • Feasibility of undergrounding the transmission line • Concerns about the routes impact on nearby airstrips
Trees & vegetation*	• Loss of shelterbelts along the preferred route

*Indicates a priority topic for survey participants.

4.9 Route adjustments

Four route adjustments were made to the preferred route in response to feedback received by landowners.

- One of the adjustments removed a 4 km stretch of the preferred route from the RM of Portage la Prairie and added a 5 km stretch in the RM of Woodlands. This adjustment was made after considering a shelterbelt and future home build location in proximity to the preferred route. The adjustment added approximately 1.5 km to the route.
- Another adjustment was made within the RM of St. François Xavier, moving the route to the south side of a rail line to avoid land which is currently in the process of securing a conservation easement. The adjustment added approximately 0.5 km to the route.
- An adjustment was made within the RM of Woodlands after speaking with a landowner about the line impeding farm operations. The preferred route was

adjusted within the landowner's property to allow for better farming access. The adjustment did not add additional length to the route.

- An adjustment was made within the RM of St. François Xavier along Scott's drain. The landowner shared that the most productive agriculture land is on the west side of Scott's drain, and suggested the route be moved to less productive land on the east side. The adjustment did not add additional length to the route.

5.0 First Nation and Métis engagement process

This section provides an overview of the First Nation and Métis Engagement Process (FNMEP) that Manitoba Hydro undertook for the D83W project including the guiding principles and goals of the process, methods of engagement, key feedback and concerns, and outcomes resulting from engagement.

Manitoba Hydro's approach to First Nation and Métis engagement for the D83W project was guided by the following principles:

- Traditional territories and activities important to First Nations peoples' and Métis Citizens' ways of life and culture will be acknowledged, valued, and protected.
- The diversity of cultures and worldviews should be understood and appreciated.
- Manitoba Hydro will work with First Nations, the Manitoba Métis Federation (MMF), and Indigenous organizations to better understand perspectives and determine mutual approaches to address concerns and build relationships.
- First Nations, the MMF, and Indigenous organizations will be provided with opportunities to communicate early in the process and on an ongoing basis.
- First Nations, the MMF, and Indigenous organizations should be enabled to understand how their feedback influenced the D83W project.

5.1 Purpose, goals, and objectives

Manitoba Hydro's overall goal for the FNMEP is to work directly with First Nations, the MMF, and Indigenous organizations to understand and respond to their concerns, and to provide them with opportunities to meaningfully influence the D83W project. The FNMEP has several objectives in common with the PEP (Chapter 4.0) including:

- Developing an engagement plan;
- Increasing responsiveness and transparency by sharing information, answering questions, and working to resolve concerns;
- Working directly with interested parties, First Nations, and the MMF to determine the community perspective score for the preferred route evaluation model; and
- Clearly communicating with communities, individuals, and groups about how their input influenced decision making.

In addition to the above objectives shared with the PEP, the FNMEP had the following specific objectives:

- Continue to build and strengthen working relationships with First Nations, the MMF, and Indigenous organizations in Manitoba, across projects.
- Elevate meaningful participation of First Nations, the MMF and Indigenous organizations in Project engagement by providing multiple and varying opportunities while recognizing that what is considered meaningful may vary by community.
- Increase benefits related to training, employment and business opportunities for First Nation members and Métis Citizens potentially impacted by the D83W project where possible.
- Improve understanding of cumulative impacts of Manitoba Hydro projects and other development in the regional assessment area on First Nations and their members, the MMF and its Citizens, to better bolster the assessment of cumulative effects in the environmental assessment report.

The following sections outline the engagement methods Manitoba Hydro implemented to work towards the FNMEP objectives and the outcomes of the engagement process.

5.2 Methods of engagement

5.2.1 Overview

Manitoba Hydro designed the FNMEP to engage First Nations, the MMF, and Indigenous organizations early in the project assessment process, and at every stage, to enable feedback to meaningfully influence project decisions. In the context of the FNMEP, Manitoba Hydro understands meaningful engagement to be the timely process of seeking, discussing, and carefully considering the views of others, in a manner that is cognizant of all parties' cultural values. In achieving meaningful engagement, the team will seek to:

- Reach out early and often to foster relationship building and work to provide information in a manner that supports informed decision making and assessment of potential project impacts on their rights and title
- Provide opportunities for First Nations and the MMF to freely determine how they engage in the environmental assessment
  Incorporate Indigenous knowledge in the environmental assessment when provided, and
  Provide formal opportunities for First Nations, the MMF, and Indigenous organizations to provide feedback at key points throughout the environmental assessment process

Manitoba Hydro also strove for an adaptable and community-specific approach to engagement that was responsive to the engagement needs and preferences of each group. Manitoba Hydro has also made efforts to assess the potential effects of the D83W project on individual cultural groups to be respectful of different cultures and ways of life and the different ways the D83W project may affect each cultural group, where possible.

The FNMEP continued to build on a broader regional engagement process that began with recent Manitoba Hydro projects assessed in the Portage La Prairie area, including the Brandon–Portage la Prairie (BP6/BP7) transmission project and the Wash'ake Mayzoon Station. Based on feedback heard during engagement on past projects, Manitoba Hydro developed a regional engagement approach that contemplated cumulative engagement needs across these three projects, referred to as the Portage Area Projects, over the 2020 to 2023 period.

Manitoba Hydro's engagement process is separate from any Crown–Indigenous consultation process that may be initiated by the Province of Manitoba on the D83W project. Engagement with Métis Citizens was facilitated through the Manitoba Métis Federation.

5.2.2 Identification of Indigenous nations and groups

The Project is located on Treaty 1 territory, the traditional territory of the ancestors of the Anishinaabe, Cree, Ojibwe-Cree, and Dakota peoples, and on the traditional homeland of the Red River Métis. The D83W project is in an area of the province that is of historical and contemporary interest to the MMF and its Citizens and is entirely located within the Recognized Métis Harvesting Area.

As part of the Portage Area Projects, Manitoba Hydro engaged the same ten audiences engaged for BP6/BP7 and the Wash'ake Mayzoon Station. This included nine right-bearing nations (eight First Nations and the MMF) and one group that is not rights-bearing but may act to communicate issues important to Indigenous peoples. To establish the list of FNMEP participants and the level of engagement for each, Manitoba Hydro considered the following four criteria:

1) Historical and contemporary use of the regional assessment area
2) Potential for adverse impact to traditional pursuits because of the D83W project
3) Anticipated interest in the D83W project based on previous projects
4) Recommended inclusion by the Province

Table 5-1 lists the communities and organizations that Manitoba Hydro has engaged for the FNMEP and the rationale for the level of engagement undertaken with each.

Table 5-1: Communities and organizations engaged for the FNMEP

Indigenous nation or organization	Rationale for engaging on the project
Rights-holders	
Dakota Tipi First Nation	Historical and contemporary use of the study area Potential for adverse impact to traditional pursuits as a result of the project Interest in the D83W project Recommended inclusion by the Province
Long Plain First Nation	Historical and contemporary use of the study area Potential for adverse impact to traditional pursuits as a result of the project Interest in the D83W project Recommended inclusion by the Province
Manitoba Métis Federation	Historical and contemporary use of the study area Potential for adverse impact to traditional pursuits as a result of the project Interest in the Project Recommended inclusion by the Province
Peguis First Nation	Historical and contemporary use of the study area Has requested to stay informed on all projects in Manitoba Interest in the D83W project Recommended inclusion by the Province
Brokenhead Ojibway Nation	Historical and contemporary connection to the study area Recommended inclusion by the Province
Roseau River Anishinabe First Nation	Historical and contemporary connection to the study area Recommended inclusion by the Province
Swan Lake First Nation	Historical and contemporary connection to the study area Recommended inclusion by the Province

Sandy Bay First Nation	Historical and contemporary connection to the study area Recommended inclusion by the Province
Dakota Plains Wahpeton Nation	Historical and contemporary connection to the study area Interest in the D83W project Recommended inclusion by the Province
Other groups who may not be rights-bearing nations but may act to communicate issues important to Indigenous peoples	
Portage Urban Indigenous Peoples Coalition (PUIPC)	May have interest in the D83W project

It was Manitoba Hydro's understanding that some Indigenous communities had the potential to experience greater impacts to activities considered important to them because of the D83W project, including constitutionally protected rights and associated activities. For such communities, deeper engagement occurred, including supporting more targeted community engagement in a manner preferred by the community, support for gathering and sharing of Indigenous Knowledge to inform the D83W project, participation in archeological discussions, and a part-time coordinator position.

Roseau River Anishinabe First Nation and Brokenhead Ojibway Nation indicated that Manitoba Hydro should work with First Nations closer to the D83W project area. Other First Nations, such as Sandy Bay First Nation and Dakota Plains Wahpeton Nation did not respond to D83W project information sharing requests. All First Nations were kept informed at each stage of engagement, including providing regular updates about the D83W project, sharing various opportunities to participate along the way, and engaging in meetings where interest is confirmed.

Through the engagement process, Manitoba Hydro heard from some FNMEP communities that there was a need for additional engagement activities. As the FNMEP was designed to be adaptable, Manitoba Hydro was able to accommodate the expressed preferences and interests of FNMEP participants by adding additional activities to meaningfully inform the D83W project where reasonable. Peguis First Nation (PFN) confirmed they were interested in the D83W project early in the process and have provided suggestions regarding meaningful engagement. As such, the level of engagement with PFN increased as the D83W project progressed in response to their questions and requests for involvement.

Manitoba Hydro reached out to representatives from the Province of Manitoba, who will be responsible for conducting section 35 Crown consultation on the D83W project, to determine whether Manitoba Hydro's list of engaged communities was in alignment with those communities that Manitoba would likely consult. Manitoba did not request that any additional communities be added to Manitoba Hydro's FNMEP.

A community profile for each of the Indigenous nations and organizations engaged on the D83W project is provided below. Dakota Tipi First Nation (DTFN), Long Plain First Nation (LPFN) and the MMF authored their own community profiles during engagement for the Brandon to Portage La Prairie Transmission Line Replacement (BP 6/7). For those communities who did not prepare a profile, Manitoba Hydro gathered information from community websites.

5.2.2.1 Brokenhead Ojibway Nation

"The Brokenhead Ojibway Nation (BON) is a Treaty 1 Nation located northeast of Winnipeg, Manitoba on Hwy. 59. The Brokenhead Ojibway Nation are a proud and thriving First Nation. We're focused on providing education and opportunities that can help assure a positive tomorrow for our youth, our families and our Elders. Brokenhead Ojibway Nation #4 extends north to the shores of Lake Winnipeg and includes part of the Netley Creek Mars area. The Brokenhead River runs through the core area of the community. Both PTH #59 and the CN rail line cross through the northwest section of the Reserve. To the south is Winnipeg, 82 kilometres down highway #59 and to the north is Grand Beach, Patricia Beach and Victoria Beach to name only three beaches in this area located along 59 north." (Brokenhead Ojibway Nation website, August 2022)

"Our Vision: Brokenhead Ojibway First Nation is a proud Nation that is working towards building a healthy, independent, self-sustaining, evolving community, that strives to meet the needs of its citizens by making economic development and our Ojibway identity priorities in every aspect of our planning." (Brokenhead Ojibway Nation website, August 2022)

Brokenhead Ojibway Nation has an on-reserve population of 801 and an off-reserve population of 1,311 for a total membership of 2,112 (Brokenhead Ojibway Nation website 2022).

5.2.2.2 Dakota Plains Wahpeton First Nation

"Dakota Plains Wahpeton First Nation is in South Central Manitoba, 20 miles southwest of Portage la Prairie. The Dakota of this community were relocated here due to a motion made by the City Council of Portage la Prairie on March 11, 1920." (Dakota Plains Wahpeton Oyate website, August 2022)

As of July 2022, the total registered population of Dakota Plains Wahpeton First Nation is 267 with 164 living on Dakota Plains Wahpeton First Nation reserve (Indigenous Services Canada, 2022).

5.2.2.3 Dakota Tipi First Nation

"OVERVIEW OF THE DAKOTA TIPI OYATE BEING PART OF THE DAKOTA NATION and as it Relates to the D83W project"

In the Traditional Knowledge Study (TKS) the DTFN intends to provide information about the cultural and historical context of the Dakota Tipi community and who we are as a part of the larger Dakota Nation.

While there are differing views on the extent of the Dakota Homeland or Traditional Territory, most sources agree that at the time of contact the Dakota People / Nation (which the Dakota Tipi People are a part of) used and occupied areas within the current jurisdictions of Canada and the United States, the North West Territories, Alberta, Saskatchewan, Manitoba and portions of Ontario.

The DTFN and several other Dakota Nations within Manitoba are in a unique position, as they never adhered to a Treaty and thus retain, hold and assert Aboriginal Rights and Title to areas within southern Manitoba, and areas the project traverses. Some of the Aboriginal Rights that DTFN exercise and assert include (but are not limited to) the right to hunt, fish, harvest land and water-based resources, practice various forms of cultivation, build and occupy settlements, build and occupy camps and cabins, and the ability to travel to and access resource activity areas, etc.

The DTFN also asserts and maintain that it has never ceded its title or interests to its ancient homelands or traditional territory nor its inherent jurisdiction and decision-making authority in relation to the lands, waters, and resources.

Given this, at a minimum, Manitoba Hydro should begin its consideration of any potential known biophysical and socioeconomic effects against these noted broad rights categories through portions of southern Manitoba.

Community at a Glance

In 1959 the Old Sioux Village near Portage la Prairie relocated to the current location site of the Dakota Tipi First Nation. In 1972 the community divided and thereby creating two (2) First Nations presently known as Dakota Tipi First Nation (IR No.#56 or 295) and Dakota Plains Wahpeton Nation (which borders the Long Plain First Nation, south of Edwin, Manitoba Canada).

The Dakota Tipi First Nation was granted "Indian Reserve" Status in 1972.

Dakota Tipi First Nation is situated approximately 2 kilometers southwest of the City of Portage la Prairie, Manitoba, and is roughly 80 kilometers west of Winnipeg, Manitoba, and located on the Yellowquill Trail highway, just off of the Trans-Canada No. 1 Highway, and can be reached by a paved class "C" highway.

The current Dakota Tipi First Nation consists of Parish lot 25 and Parish Lot 24 and in 1985 the First Nation also secured Parish Lot 16, 17 and 18 for a total of 371.8 acres or 150.48 hectares.

The current population of the Dakota Tipi First Nation is approximately 275 people “on reserve on” and has on “off reserve” population of approximately 300 people.

Current Vision of the Dakota Tipi First Nation

The Dakota Tipi First Nation currently works with several industries and industry partners, such as Manitoba Hydro, in consultation to ensure the concerns of the Dakota Tipi Nation are dealt with in an according, proper and traditional way.

The Dakota Tipi Nation continues to work towards the goals and vision of itself as a part of the larger Dakota Nation in creation of a strong and viable future for its membership and in honour of the history of the ancestral Dakota people that which we derive from.” (provided by Dakota Tipi First Nation, March 15, 2021).

5.2.2.4 Long Plain First Nation

A signatory to Treaty 1, 1871, Long Plain First Nation is a proud, prosperous community of both Ojibway and Dakota people situated in the central plains region of Manitoba.

The Long Plain population is over 4,500 and is comprised of 3 reserves of which 2 are urban. The urban reserves are situated along the city limits of Portage la Prairie (Keeshkeemaquah Reserve) and in the City of Winnipeg (Madison Indian Reserve No. 1) with more plans for expansion already underway across the province in various stages of the Addition to Reserve process.

In the Portage and surrounding areas, which has been our people’s homeland for thousands of years, the community has a substantial amount of land currently under conversion back into Tribal Territory (of course taking into consideration that all these lands were once Tribal Territory).

The community has a diverse Economic Development portfolio including one of the most successful Petro Canada stations in all of Canada at the Madison Indian Reserve No.1, a thriving Hotel and Gaming Centre on the Keeshkeemaquah Reserve as well as recent acquisitions and builds that will only continue to make Long Plains a fixture in

both the Economic and Local Landscape for future generations to come." (provided by Long Plain First Nation, March 20, 2021).

5.2.2.5 The Manitoba Métis Federation

"On July 6, 2021, Canada and the MMF signed the Manitoba Métis Self-Government Recognition and Implementation Agreement which is the first agreement to give immediate recognition to an existing Métis government, namely, the Manitoba Métis Federation, which is the existing democratically elected government of the Manitoba Métis – also known as the Red River Métis. This Agreement will be followed by a treaty between the MMF and Canada and ensures that the MMF will continue to provide responsible and accountable self-government.

The MMF is the democratically elected government of the Red River Métis. The MMF is duly authorized by the Citizens of the Red River Métis for the purposes of dealing with their collective Métis rights, claims, and interests, including conducting consultations and negotiating accommodations (as per MMF Resolution No. 8). While the MMF was initially formed in 1967, its origins lie in the 18th century with the birth of the Red River Métis and in the legal and political structures that developed with it. Since the birth of the Métis people in the Red River Valley, the Red River Métis asserted and exercised its inherent right of self-government. For the last 50 years, the MMF has represented the Red River Métis at the provincial and national levels.

During this same period, the MMF has built a sophisticated, democratic, and effective Métis governance structure that represents the Red River Métis internationally. The MMF was created to be the self-government representative of the Red River Métis—as reflected in the Preamble of the MMF's Constitution (also known as the MMF Bylaws):

> *"WHEREAS, the Manitoba Métis Federation has been created to be the democratic and self-governing representative body of the Manitoba Métis Community;"*

In addition, the following is embedded within the MMF's objectives, as set out in the MMF Constitution as follows:

> *"1. To promote the history and culture of the Manitoba Métis, also known as the Red River Métis, and otherwise to promote the cultural pride of its Citizenship.*
>
> *2. To promote the education of its Citizens respecting their legal, political, social, and other rights.*
>
> *3. To promote the participation of its Citizens in community, municipal, provincial, federal, Aboriginal, and other organizations.*
>
> *4. To promote the political, social, and economic interests of its Citizens.*

5. To provide responsible and accountable governance on behalf of the Manitoba Métis, also known as the Red River Métis, using the constitutional authorities delegated by its Citizens."

The MMF is organized and operated based on centralized democratic principles, some key aspects of which are described below.

President: The President is the leader and spokesperson of the MMF. The President is elected in a national Election every four years and is responsible for overseeing the day-to-day operations of the MMF.

Cabinet: The MMF Cabinet leads, manages, and guides the policies, objectives, and strategic direction of the MMF and its subsidiaries. All 23 Cabinet Members are democratically elected by Red River Métis Citizens.

Regions: The MMF is organized into seven regional associations or "Regions" throughout the province (Figure 3): The Southeast Region, the Winnipeg Region, the Southwest Region, the Interlake Region, the Northwest Region, the Pas Region, and the Thompson Region. Each Region is administered by a Vice-President and two Regional Executive Officers, all of whom sit on the MMF Cabinet. Each Region has an office which delivers programs and services to their specific geographic area.

Locals: Within each Region are various area-specific "Locals" which are administered by a chairperson, a vice-chairperson, a secretary, and a treasurer (or a secretary-treasurer, as the case may be). Locals must have at least nine Citizens and meet at least four times a year to remain active. There are approximately 140 MMF Locals across Manitoba.

The MMF has created an effective governance structure to represent the Red River Métis. It is important to bear in mind that there is only one large, geographically dispersed, Red River Métis. Red River Métis Citizens live, work, and exercise their s.35 rights throughout and beyond the province of Manitoba."

5.2.2.6 Peguis First Nation

"Peguis First Nation is a Treaty 1 First Nation, in Manitoba, Canada. With a population of approximately 10,246 members of Ojibway and Cree descent, it is the largest First Nation community in Manitoba.

The main community of Peguis First Nation, Peguis 1B, is located approximately 196 kilometres north of Winnipeg, MB.

Peguis First Nation has a rich culture, strong traditions and a significant history within Canada. The community is named after Chief Peguis. Peguis led the band of Saultaux people from present day Sault Ste. Marie, Ontario to a settlement at Netley Creek,

Manitoba, and later to St.Peter's (present day East Selkirk, Manitoba). After an illegal land transfer in 1907, Peguis First Nation was moved to its present location at Peguis 1B." (Peguis First Nation website, August 2022).

5.2.2.7 The Portage Urban Indigenous People's Coalition

"The Portage Urban Indigenous Peoples Coalition (PUIPC) was created in effort to provide an environment for collaboration and increased dialogue for the Urban Indigenous people living in Portage la Prairie. This Coalition of community stakeholders have worked to create a Community Action Plan using feedback from the local Indigenous Community."

Members of the coalition include City Council, members of the community at large, the MMF, Red River Community College, the RCMP, the Portage School Division, the Portage Friendship Centre, Health Santé Sud, the Dakota Ojibway Tribal Council, the Portage Community Revitalization Corporation, the City Manager of Portage la Prairie and the Indigenous Community Coordinator.

The PUIPC's commitments and initiatives include:

- "Partnering with the Indigenous peoples in creating an inclusive community that values and respects the diversity that exists in the City of Portage la Prairie
- To work with the Urban Indigenous peoples to identify and assist with the removal of barriers that hinder their full participation
- Our Youth and Elder Conference requested that we recognize the resourcefulness of Indigenous Youth and assist with the creation of opportunities that will encourage them to participate in building our community
- To work with the community to create a safe and welcoming environment that Indigenous peoples and our community will feel comfortable in
- Recognize and celebrate the valuable contributions Indigenous peoples have made and continue to make to our community
- To have a culture commemorating plaque on Wilkinson Crescent
- Working with Portage Heritage to include future streets to be named in relation to our aboriginal history
- Organize a cultural awareness week with the City and Portage School Division
- To host a mandatory cultural training session with the City of Portage la Prairie staff
- The development of a continuing document establishing the working relationship with our Indigenous Urban Organizations and surrounding First Nations
- Initiative to create Portages own Bear Clan

- Holding future engagement sessions. A place where individuals can greet, meet and share for future engagement sessions."

(Portage La Prairie Revitalization Corporation website, August 2022).

5.2.2.8 Roseau River Anishinabe First Nation

"Roseau River Anishinabe First Nation is a rural community located approximately one hour south of Winnipeg, Manitoba. Roseau River Anishinabe First Nation has three physical reserves:

The people of Roseau River First Nation have a rich history in the Red River and Pembina Valleys. Their main community is located about an hour south of Winnipeg, near Emerson, with a total membership of 2,000 people across their three reserve communities.

As part of the collective Ojibway of Manitoba, they were known as the "Strong Heart People" in recognition of their bravery. Roseau River signed Treaty 1 on August 3, 1871 and finally resolved their land claim in 2011 with a final settlement offer that is held in trust for future generations." (www.Treaty1.ca, August 2022).

5.2.2.9 Sandy Bay Ojibway First Nation

"The Sandy Bay Ojibway First Nation is situated on Reserve No. 5, a 16,456-acre site on the western shore of Lake Manitoba. It is 165 kilometers northwest of Winnipeg and 90 kilometers from Portage la Prairie.

The reserve is accessible by all-weather roads via provincial highways #16 and #50 north from Portage la Prairie. Approximately three quarters of this land is committed to farming. Located in the lowlands with a gentle rise westward from Lake Manitoba, most of the shoreline along the lake consists of a fine sand beach bordered by Balsam Popular and Trembling Aspen.

A bog and marshland run alongside and into the lake. At the time of the signing of the treaty, Sandy Bay was called the White Mud Band, separate from the Portage Band of Chief Yellow Quill. It was a treaty after wards, the signing of treaty 1 of 1871 and in 1876 that settled the present location. The first chief after the treaty was Nawachegapow. Townships 17 & 18 were then granted to the band.

Sandy Bay does not have any more outstanding treaty land entitlements. Some of the economy for Sandy Bay Ojibway First Nation comes from and includes farming for livestock and various crops that are maintained by local Sandy Bay farmers. Our people of Sandy Bay have been a role model in keeping and speaking fluently in

Ojibway. There is about an 80% average of Ojibway speaking community members, thus keeping our language alive.

POPULATION TO DATE: The total registered population of Sandy Bay First Nation as of July 2013 is 6,174. With Sandy Bay's ever growing population, the birth rate now stands at 8-12 births a month. Not included in the population figures, are the non-aboriginal members on reserve." (Sandy Bay Ojibway First Nation website, August 2022).

5.2.2.10 Swan Lake First Nation

The story of Swan Lake First Nation begins long ago. In 1876, Chief Yellowquill and his followers settled on Swan Lake First Nation Reserve.

Swan Lake First Nation is in South Central Manitoba along junction Highway #23 and #34. SLFN people are known as Anishinabe people, meaning "original-peoples"; their native language is Saulteaux (Wikipedia, 2011). SLFN is divided into four areas: SLFN #7, which is the main reservation; #7a Carberry which consists of residential and commercial developments; #8 Indian Gardens, ¾ of which is under agricultural lease and #8a Headingley which will consist of mainly commercial developments. A recently settled Treaty Land Entitlement (TLE) with the Federal Government has enabled them to expand their land base for future developments.

With regards to governance, Swan Lake First Nation is signatory to Treaty 1, which was established in 1871 between Queen Victoria and various First Nations residing in South Eastern Manitoba (SLFN, 2011). An elected Chief and Council who are voted by community members in a two-year political cycle govern SLFN; their elections are still administered by Section 74 of the Indian Act. However, the community would like to extend its political cycle.

In terms of economy, SLFN is located on prime agricultural land and thus has a robust agricultural economy. The economy also consists of: a commercial buffalo ranch, two gaming centres, Spirit Sands Casino, Kitchi-Nodin Wind Farm and Four Corners gas bar and convenience store (SLFN, 2011). Swan Lake also has Indian Springs School, and a Health Centre. The community has a population size of approximately 1477, with 408 members who live in the community and 1053 who live outside the community, some in other provinces and countries (SLFN, 2019).

SLFN is working towards their vision of having a healthy, prosperous and self-sufficient community. Completed community projects include the Kitchi-Nodin Wind Farm, Youth Camp, as well as the new Band Office development. The recycling depot is completed, however it needs programming to truly reach its potential. (Swan Lake First Nation website, August 2022).

5.2.3 Communication methods

Manitoba Hydro asked First Nations, the MMF, and PUIPC about their communication preferences. The predominant communication methods Manitoba Hydro used to share project information for the FNMEP were letters and emails, including D83w project maps. Manitoba Hydro followed up on key project communications by phone to confirm that information was received and highlight key messages and questions such as confirming interest in a meeting to discuss the Project.

Other communication methods used by Manitoba Hydro to share information about the D83W project included:

- The D83W project webpage
- Printed materials (information sheets, maps)
- eCampaign, which sent email notifications to individuals who signed up to receive Project updates
- Geotargeted social media (Facebook) advertisements to devices in the Project area
- Virtual public information sessions

The FNMEP included several different avenues through which First Nations, the MMF, and the PUIPC could participate and provide feedback and perspectives about the D83W project. The main ways that Manitoba Hydro received or gathered information through the FNMEP were by letter, email or telephone; through (mainly) virtual meetings with First Nations, the MMF, the PUIPC, and Indigenous Community and Assessment Coordinators (ICACs); and through ICAC submissions of reports, including routing preferences, concerns, and comments on FNMEP related chapters of the environmental assessment.

The opportunities available to the public to engage on the Project were also available to First Nations people and Métis Citizens. Manitoba Hydro kept FNMEP audiences informed of these additional engagement options, which included:

- Online surveys to collect feedback on the alternate route segments, and subsequently, the preferred route
- Virtual information sessions (14 sessions held in total)
- Online mapping portal to collect segment-specific feedback, specific areas of concern in the project area, and suggested mitigative segments

Further details about communications Manitoba Hydro shared through the FNMEP are included in the Section 5.2.4 which outlines engagement activities.

5.2.4 Engagement activities

Manitoba Hydro's engagement process for the D83W project consisted of pre-engagement activities and two "rounds" of engagement, referred to as Round 1 and Round 2. The rounds are directly tied to the transmission line routing process and enable First Nation, Métis, and public feedback to inform routing decisions. Manitoba Hydro also undertook engagement during development of the environmental assessment, and will continue through to construction, and operation of the D83W project.

A summary of the engagement activities that Manitoba Hydro has undertaken during the FNMEP to date include:

- Seeking feedback from eight First Nations, the MMF and the Portage Urban Indigenous Peoples Coalition through sharing information and holding meetings (mainly virtual meetings).
- Community-specific engagement initiatives undertaken by Indigenous Community and Assessment Coordinators from the MMF and DTFN providing valuable feedback to Manitoba Hydro on how to mitigate effects and support community interests.
- A series of heritage-focused workshops with interested First Nations and the MMF to further discuss key concerns about heritage, cultural and archeological sites.

5.2.4.1 Indigenous community and assessment coordinators

Through the FNMEP for the D83W project, Manitoba Hydro continued to support Indigenous Community and Assessment Coordinator (ICAC) positions to assist in the coordination of engagement and assessment activities for three nations with the potential to experience greater impacts as a result of the D83W project:

- Dakota Tipi First Nation
- Long Plain First Nation
- Manitoba Métis Federation as the self-government representative of the Red River Métis in Manitoba

When planning engagement for the BP 6/7 project, Manitoba Hydro acknowledged the potential for additional forthcoming transmission work in the Portage La Prairie area. Learning from past engagement processes, Manitoba Hydro worked to develop a regional approach to engagement that contemplated cumulative engagement needs across multiple projects and supported an ICAC position to coordinate the engagement process of their nation and provide continuity across engagement on BP 6/7, the Wash'ake Mayzoon Station, and the Dorsey to Wash'ake

Mayzoon Transmission Line (the D83W project), collectively referred to as the Portage Area Projects.

The agreements that Manitoba Hydro entered into with DTFN, LPFN, and the MMF support meaningful participation by providing the following:

- Funding for a 3-year part-time ICAC position including:
  - Time and resources to engage their own members/Citizens
  - Time to meet with leadership and with Manitoba Hydro
  - Time to review Manitoba Hydro's draft FNMEP and Harvesting and Important Sites chapters of the environmental assessment report
- Training funds for external training to support the ICAC and/or for consultant support to help the ICAC meet deliverables
- Funding to conduct interviews, assessments, or Indigenous Knowledge studies
- Funding to review environmental assessment chapters, including this chapter and the Harvesting and Impacted Sites chapter
- Administrative funds including mileage and supplies

Each of the three nations developed their ICAC position at their own pace, with different levels of participation by Manitoba Hydro, and were responsible for hiring their own ICAC. Although LPFN was initially interested in hiring an ICAC, the position they had developed was never filled on a long-term basis and instead chose to produce deliverables using existing staff.

Key deliverables of the ICAC position related to the D83W project and the Wash'ake Mayzoon Station (collectively referred to as the Portage Area Capacity Enhancement Project) include attendance at meetings related to the D83W project; preparing a Routing Brief (including interviews, mapping, and community engagement); a self-directed study (including a community profile, outcomes of interviews, past and contemporary use and occupancy information, mapping, effects of the project on the nation, and proposed mitigation measures); and review of the Harvesting and Important sites chapter of the environmental assessment report.

The anticipated benefits of the ICACs to their respective communities and to Manitoba Hydro were to:

- Facilitate sharing and review of the D83W project information within the community
- Allow for a dedicated community representative to help move forward the engagement needs of their community
- Provide an opportunity to understand the Manitoba Hydro routing and assessment process by participating on the Community Preference Team

- Help Manitoba Hydro understand and address concerns relevant to their community earlier in the engagement process
- Help Manitoba Hydro develop a less impactful project with relevant mitigation developed collaboratively
- Facilitate input in the routing and assessment processes to understand mitigation that works to resolve issues
- Provide a useful bridge into each of the communities to help facilitate communication between Manitoba Hydro and the community
- Facilitate a process that builds knowledge over time for all involved where learnings from one project may be applied to subsequent projects in the Portage la Prairie Area and provides the opportunity to have consistency across projects over time.

In response to a request from the MMF, Manitoba Hydro developed a series of training modules to help support the MMF ICAC in perform deliverables by providing clarity about the value and use of Indigenous Knowledge in Manitoba Hydro's transmission line routing and assessment process.

5.2.4.2 Round 1 engagement

Round 1 of the FNMEP for the Project took place between October 2021 and December 2021. The purpose of Round 1 engagement was to share information about the D83W project and hear feedback about the 35 alternative route segments initially under consideration in the routing process.

On October 7, 2021, Manitoba Hydro sent an email to FNMEP engaged audiences to introduce the project, advise of the option to meet virtually, and provide links to the project website and survey[1]. On October 26, 2021, Manitoba Hydro followed up by a letter sent by registered mail with introductory project information, a segment map, and contact information.

Manitoba Hydro phoned engaged audiences to ensure initial project communications had been received, to advise about the avenues available for sharing information, to understand individual engagement preferences, and to

[1] Dakota Plains Wahpeton First Nation did not receive the initial Round 1 email on October 7, 2021. Due to the recent passing of the Chief, Manitoba Hydro did not feel it appropriate to reach out at that time. Round 1 engagement was initiated with Dakota Plains Wahpeton First Nation by letter on October 26, 2021.

determine if there was interest in meeting to discuss the D83W project in greater detail.

During Round 1, at least one virtual meeting took place with representatives of the following engaged audiences:

- Dakota Tipi First Nation (DTFN)
- Long Plain First Nation (LPFN)
- The Manitoba Métis Federation (MMF)
- Peguis First Nation (PFN)
- Swan Lake First Nation (SLFN)
- The Portage Urban Indigenous Peoples Coalition (PUIPC)

Due to COVID-19 restrictions and precautions in place for First Nations, the MMF, and Manitoba Hydro staff, meetings during Round 1 were held virtually through Microsoft Teams or Zoom.

5.2.4.3 Community preference routing meetings

Manitoba Hydro incorporated First Nation and Métis feedback into each stage of routing and included representatives from DTFN, LPFN, the MMF, and PFN on the Community Preference Team, a key routing decision-making team that also included representatives of the municipalities of Portage la Prairie, Cartier, Woodlands, Rosser, and St. François Xavier. Prior to meeting with the full team, Manitoba Hydro hosted a virtual meeting for the FNMEP participants that would be involved to share routing preferences and understand one another's feedback and preferences, if interested. This pre-meeting was attended by representatives from DTFN, the MMF, and PFN.

Manitoba Hydro held two meetings with the Community Preference Team. The overall purpose of the meetings was to identify a preferred route from the community perspective. At the first meeting on December 16, 2021, Manitoba Hydro shared information about the routing process, how engagement helps inform routing decisions, and what to expect at the second meeting.

Between the first and second meetings, Manitoba Hydro distributed maps of four preferred route options to the team members and provided instructions on how to provide scores for the route options.

The purpose of the second meeting, held January 27, 2022, was to determine a preferred route from the Community Preference Team perspective and to develop scores for each of four route options. The Community Preference score carried a weight of 30% in the determination of a preferred route. At the meeting, each nation and municipality in attendance had the opportunity to directly weigh into the routing process by presenting the scores they had individually assigned to each route option

and providing rationale for the scores. Representatives from DTFN, LPFN, PFN, and the MMF attended the meeting, sharing scores for the route options and an explanation of the concerns and preferences behind each score.

For the D83W project, the route option put forward by the Community Preference Team was selected as the preferred route that was presented and discussed during Round 2.

During the Community Preference routing meetings, Manitoba Hydro heard concerns about certain terminology used in the process. A Community Preference Team participant shared that referring to a route option as "most preferred" did not accurately reflect their perspectives about the route which they provided the best score. It was shared that a more accurate descriptor for the route that would move forward in the process would be the "least worst" route as development of a transmission line along any of the proposed route options is not viewed favourably.

For more information about the methodology and outcome of the community preference meetings, see Route Selection (Chapter 3.0).

5.2.4.4 Round 2 engagement

In Round 2, the FNMEP focused on discussing the preferred route, understanding feedback about the potential impacts of the preferred route on First Nation peoples and Métis Citizens, and discussing mitigation recommendations.

Manitoba Hydro continued to share information about the D83W project, shared feedback that was heard during Round 1, explained how feedback influenced the "least-worst" route, and communicated about the options available for sharing feedback. Where there was interest, meetings took place to discuss the "least-worst" route in detail and gather any outstanding concerns and proposed mitigation. During Round 2, only DTFN confirmed interest and participated in a formal meeting to discuss route concerns. However, informal discussions took place with other First Nations, the PUIPC, and the MMF. Manitoba Hydro continued to follow up with all FNMEP participants to gauge interest in Round 2 engagement and to advise of the options available for sharing information.

Manitoba Hydro continued to follow up with ICACs and discuss the status of the ongoing community-specific engagement processes. Manitoba Hydro received Manitoba Métis Specific Concerns (Unconcluded) Manitoba Hydro Dorsey to Wash'ake Mayzoon Transmission Line (D83W) Project and preliminary Traditional Knowledge Study information from DTFN, both of which have informed development of this assessment. Manitoba Hydro understands that further information developed by ICACs and the nations they represent may be forthcoming from DTFN and LPFN.

If additional information is received after submission of the environmental assessment, Manitoba Hydro will consider the feedback and incorporate to the extent possible, such as in the development of subsequent Environmental Protection Plans.

5.2.4.5 Heritage workshops

Leading up to the FNMEP for the D83W project, Manitoba Hydro was hearing substantial concerns from several First Nations and the MMF about the way heritage sites are defined, investigated, assessed and monitored within current proponent-led and provincially administered heritage processes. As a result, Manitoba Hydro hosted a series of two heritage workshops intended to help develop a better understanding of concerns and to inform the development of the heritage program for the Project. The first workshop took place on October 7, 2021, prior to the start of Round 1 engagement. It was attended by representatives of DTFN, LPFN, the MMF, PFN, Manitoba Hydro, Western Heritage (the Project archeologist) and the Province of Manitoba's Historic Resources Branch. DTFN, the MMF, and PFN also had their archeologist(s) in attendance.

The first workshop provided valuable information to assist Manitoba Hydro in developing the heritage program for the Portage Area Projects and has contributed to the assessment of the D83W project's impacts on heritage resources and culture.

The second workshop took place on November 9, 2022, after a final preferred route had been determined. It was attended by representatives of the MMF, PFN, Manitoba Hydro, Western Heritage (the D83W project archeologist) and the Province of Manitoba's Historic Resources Branch. PFN also had their archeologist in attendance.

More information about the topics of discussion at the heritage workshops is included in Section 8.9.7.

5.2.4.6 First Nation and Métis Engagement Process meeting overview

Table 5-2 provides an overview of formal meetings between Manitoba Hydro and First Nations, the MMF, and the PUIPC that have taken place over the course of the FNMEP to date. Copies of the presentations from the meetings referenced in Table 5-2 are provided in Appendix B.

Table 5-2: FNMEP meetings held between Manitoba Hydro and First Nations, the MMF, and the PUIPC[2]

Date of Meeting	Nation or organization
September 21, 2021	PFN
September 22, 2021	LPFN
October 1, 2021	MMF
October 7, 2021	DTFN, LPFN, MMF, PFN – Heritage workshop #1
November 23, 2021	LPFN
November 23, 2021	SLFN
November 24, 2021	PFN
December 14, 2021	DTFN, MMF, PFN – Community Preference pre-meeting
December 16, 2021	DTFN, MMF, PFN – Community Preference Team meeting #1
December 16, 2021	PUIPC
January 6, 2022	PFN and archeologists
January 14, 2022	PFN
January 20, 2022	DTFN
January 21, 2022	MMF
January 27, 2022	DTFN, LPFN, MMF, PFN – Community Preference Team meeting #2
February 3, 2022	PFN and archeologists
March 11, 2022	MMF

[2] This is not an exhaustive list of FNMEP meetings. Additional meetings and informal discussions took place that are not included in the table, particularly meetings related to ICAC administrative topics.

March 15, 2022	PFN
March 31, 2022	DTFN
May 24, 2022	MMF
August 17, 2022	DTFN
August 23, 2022	PFN
November 9, 2022	MMF, PFN - Heritage workshop #2

5.3 First Nation and Métis engagement feedback

5.3.1 Overview

Manitoba Hydro received FNMEP feedback during meetings (virtual and some in-person) and informal discussions, through emails and letters, through formal report submissions and through the ICAC positions for DTFN, LPFN, and the MMF. Some key themes Manitoba Hydro heard in the feedback from First Nations, the MMF, and the PUIPC are described below.

- Routing: Participants shared perspectives on the alternative route segments presented in Round 1 and on the preferred route presented in Round 2. Routing preferences, and the rationale behind those preferences, varied between nations. All routing feedback was considered and evaluated in determining the final preferred route (FPR) with DTFN, LPFN, the MMF, and PFN participating directly on the Community Preference Team.
- Culture and heritage: Participants shared knowledge about the likelihood of finding cultural and heritage artifacts close to rivers, at old oxbows, and in historically travelled areas north of Portage la Prairie. Participants shared it will be important to have a culturally specific approach to understanding project impacts and heritage resources. The value and history of the D83W project area and the concurrent discoveries of unmarked graves at residential schools at various locations across Canada and at the St. Andrews lock and dam site brought concerns regarding heritage value to the forefront of discussions during the FNMEP. Some First Nations and the MMF had one or more archeologists closely involved with aspects of engagement and project assessment.
- Land, vegetation, and wildlife: Participants shared concerns about impacts to land and wildlife, including the potential disruption to small pockets of

vegetation and habitat remaining in the project area including the removal of trees and traditional plants and medicines. Participants shared that the rivers and creeks in the project area have high concentrations of birds and other wildlife. Participants also shared that the project area is a Métis harvesting area and that both Crown and private land in the project area is used for practicing rights-based activities.

- Jobs and economic opportunities: Participants expressed interest in jobs and business opportunities that the Project may make available for First Nation community members and Métis Citizens, particularly related to construction and monitoring. SLFN shared concerns about barriers to employment and challenges with the short-term nature of employment opportunities typically available on Manitoba Hydro transmission projects.
- Cumulative and broad impacts: Participants shared concerns about the cumulative nature by which the D83W project, in conjunction with other current and future projects, contribute to the drastic changes that have occurred to the landscape in the Portage La Prairie area since colonization. Participants also shared understandings about the interconnected relationships between all beings, living and non-living, that are part of the environment and explained that projects have impacts to the cultural fabric of the environment that are not accurately captured through traditional environmental assessment approaches.

The following sections include brief summaries of the feedback Manitoba Hydro has heard from each engaged First Nation, the MMF, and the PUIPC. More detailed inventories of concerns are included in Appendix B.

5.3.2 Feedback specific to each engaged nation or Indigenous organization

5.3.2.1 Brokenhead Ojibway Nation

Following Manitoba Hydro's initial Round 1 communications, BON advised Manitoba Hydro that they would not be participating in the engagement activities related to the Project. BON encouraged Manitoba Hydro to work with communities located closer to the project.

Manitoba Hydro has continued to share information with BON at Project milestones and remains open to further engagement if BON is interested in participating in the Project at a later time.

5.3.2.2 Dakota Plains Wahpeton First Nation

Manitoba Hydro has not received any feedback about the Project from DPWFN. Manitoba Hydro has continued to share information with DPWFN at D83W project milestones, informing about opportunities to provide feedback, and remains open to further engagement if DPWFN is interested in participating later.

5.3.2.3 Dakota Tipi First Nation

The ICAC for DTFN has been actively involved in D83W project engagement throughout the routing process and development of the environmental assessment, providing route preferences on behalf of DTFN, participating on the Community Preference Team, and working to facilitate the development of a self-directed Indigenous Knowledge Study.

From conversations with the ICAC for DTFN, a meeting held with DTFN leadership in Round 2, and DTFN's submissions of routing preferences, Manitoba Hydro understands DTFN's key concerns about the D83W project to include:

- Concerns with the ongoing potential to encounter heritage resources or cultural sites along the D83W project route and having thorough and culturally appropriate processes in place to address heritage resources or cultural sites that may be encountered. This has remained a key topic of concern for DTFN throughout engagement on the Portage Area Projects.
- Minimizing disruption to undisturbed non-agricultural areas along the route that may support traditional plants, medicines, and provide wildlife habitat, and a preference to avoid water crossings
- The importance of ceremonies to acknowledge and respect the land and spirits affected by projects.
- The cumulative toll of development on the traditional lands of the Dakota Nation

During the route preference determination stage, the route option that DTFN scored as their preferred option was ultimately selected as the preferred route. DTFN shared that this preference was based on the route option paralleling existing lines for certain portions, predominantly crossing pre-disturbed private agricultural land, and appearing to require the least amount of disturbance to remaining vegetation in the area. In providing rationale for the preference, DTFN continued to share that the potential to encounter sites of cultural significance and heritage resources is high along the entire project area.

Other topics that have been raised by DTFN through the FNMEP include concerns about potential effects of EMF, an interest in maximizing economic opportunities that

may be available to DTFN members and businesses through construction of the D83W project, and barriers to the employment of DTFN members on Manitoba Hydro projects.

Manitoba Hydro understands that further information from DTFN's Indigenous Knowledge study may still be received. If additional information is received after submission of the environmental assessment, Manitoba Hydro will consider ways to incorporate feedback and recommendations, where possible, in upcoming phases of the D83W project.

DTFN's routing preference information and a summary of their feedback provided through the FNMEP is provided in Appendix B.

DTFN also provided feedback about the proposed approach to assess effects of the D83W project on traditional pursuits, cultural and heritage and the draft Harvesting and Important Sites valued component effects assessment (Section 8.9).

5.3.2.4 Long Plain First Nation

From conversations with LPFN representatives, ICAC planning meetings, LPFN's submissions of routing preferences, and participation on the Community Preference Team, Manitoba Hydro understands LPFN's key concerns and preferences about the Project to include:

- Avoiding disruption to identified traditional land use sites. This area of concern drove LPFN's scoring of route options during the preferred route determination process, which identified the most southerly option (Option A), which did not get chosen, as LPFN's preferred route. The FPR is in the proximity of LPFN traditional land use sites, particularly in the Poplar Point/High Bluff area.
- Avoiding impact to parcels under consideration by LPFN for TLE. Three parcels were identified that would have been dissected if Route Option C had been selected.
- Noting that interests will evolve and change, even over the course of engagement on this D83W project, thereby highlighting the need for engagement that occurs often and is ongoing.

Although LPFN was initially interested in hiring an ICAC, the position they had developed was never filled on an ongoing basis. LPFN's Lands Program Manager took on the tasks in absence of an ICAC. Manitoba Hydro understands that further information developed on LPFN's ICAC deliverables may still be received. If additional information is received after submission of the environmental assessment,

Manitoba Hydro will consider ways to incorporate feedback and recommendations, where possible, in upcoming phases of the D83W project.

LPFN's routing preference information is provided in Appendix B.

5.3.2.5 The Manitoba Métis Federation

From conversations and meetings with representatives of the MMF and their ICAC, participation on the Community Preference Team, and submission of the MMF's report on Manitoba Métis Specific Concerns (Unconcluded) for the D83W project during Round 1, Manitoba Hydro understands the MMF's key concerns about the D83W project to include:

- Concerns from Métis Citizens living or harvesting in the area regarding the negative affects to land they use for farming, and the land their families rely on for hunting to feed their families.
- Concerns about effects to hunting on private land, including to help balance wild animal populations to support the health of the ecosystem (e.g., controlling invasive wild boar populations for landowners).
- Concerns about impacts to agricultural land including the threats to apiary production, pollinator health, and an overall reduction in land availability to provide hay or crops for local Métis agriculture producers.
- Concerns that archeological finds are likely, and that specific consideration be given to Métis cultural heritage and Métis governance structure in how finds are reported, ensuring communities get information they need while protecting sites.
- Métis cultural history is unique, and that uniqueness is reflected in the archeological record.
- Previously identified concerns shared through studies on previous Manitoba Hydro transmission projects include:
    - Potential for impacts to the Métis way of life, including impacts to constitutionally protected rights, due to the cumulative impacts of the Project in addition to other developments in the regional assessment area;
    - Concerns about Métis Valued Components being considered in the process, including 'Harvesting' and 'Available Lands'. (From Wash'ake Mayzoon Station; MMTP Métis Land Use and Occupancy Study; Bipole III Métis Land Occupancy and Use Study); and
    - Position that appropriate distinctions-based consultation processes should be advanced separately and labeled as 'Métis Engagement' and 'First Nations Engagement. (From Wash'ake Mayzoon Station).

In response to a request from the MMF, Manitoba Hydro also developed a series of five training modules to help support the MMF ICAC in achieving their deliverables. The training modules were intended to provide clarity about the value and use of Indigenous Knowledge in Manitoba Hydro's transmission line routing and assessment process and to establish a consistent understanding and approach to Indigenous Knowledge from the perspective of Manitoba Hydro's subject matter experts. The five modules, presented across four sessions, included:

- July 29, 2021 – 'Module 1: Indigenous Knowledge Part 1 – Overview, Gathering & Use'
- August 12, 2021 – 'Module 2: Routing and Assessment at Manitoba Hydro'
- September 15. 2021 – 'Module 3: Indigenous Knowledge Part 2 – Indigenous Knowledge in Routing and Assessment'
- November 4, 2021: 'Module 4 – Indigenous Knowledge Part 3 – Bringing it All Together' and 'Module 5 – Coordinator Specific Report Preparation'

During the route preference determination stage, the MMF recommended that the final route minimize impacts to both private landowners and to Section 35 rights-holders as much as possible. The MMF communicated concerns and interests on behalf of both perspectives but noted that the collective rights are a greater priority. The MMF considered Options B, C, and D (three options that traverse north of the Assiniboine River) to be comparable and indicated they did not have a preference amongst those three options but were clear to specify that Option A was the worst/least preferred option from the MMF's perspective. The MMF also raised concerns about the terminology used in the routing process, indicating having to use the term "preferred" was not accurate as it is the MMF's view that none of the options are good and therefore the term 'least worst' should be used.

On November 2, 2022, the MMF submitted their Manitoba Métis Knowledge, Land Use, and Occupancy Study for Manitoba Hydro Portage Area Projects.

In the study, the MMF documents the outcomes of map biographies and oral history interviews undertaken with Métis Citizens who use or have a connection to land in the Portage la Prairie area and presents information about "where and how Red River Métis citizens use and occupy the lands and waters around Portage la Prairie and the identified study area" as well as perspectives about the Portage Area Projects, their potential impacts on Red River Métis rights and interests, and recommendations regarding mitigation and accommodation (MMF, 2022).

Key issues of concern described in the study include general outstanding concerns related to Manitoba Hydro transmission line projects that the MMF have shared through engagement on other Manitoba Hydro transmission projects (BP6/7

Transmission Line replacement, Wash'ake Mayzoon Station, MMTP, Birtle Transmission Project, and Bipole III Transmission Line) and which remain relevant to the Portage Area Projects. Concerns about engagement with the Red River Métis Citizens in the Portage la Prairie area, impacts to culture and way of life, and impacts to land use are described and supplemented with information heard from Métis Citizens interviewed for the study and a variety of maps (MMF, 2022).

Manitoba Hydro has worked to incorporate information from that report into this assessment and will continue discussions on outstanding concerns and mitigation.

The MMF's Manitoba Métis Knowledge, Land Use, and Occupancy Study (2022), report on Manitoba Métis Specific Concerns (Unconcluded) (2021), and routing preference information are provided in Appendix B, which also includes a summary of Manitoba Hydro's responses.

5.3.2.6 Peguis First Nation

From conversations and meetings with representatives of PFN, participation in heritage meetings, participation on the Community Preference Team, and submission of routing preferences, Manitoba Hydro understands PFN's key concerns about the Project to include:

- Concerns about the methodology used in proponent-led heritage processes administered by the Province of Manitoba's Heritage Resources Branch, outdated heritage regulations in Manitoba, and the need for First Nation and Métis involvement in the heritage process prior to D83W project development
- Concerns about the potential for archaeological finds throughout the project area even in areas where the route parallels existing transmission infrastructure or roads because depending on the date and timing of original construction the areas may not have been tested. PFN shared that there are three known archeological sites near the intersection of PR 240 and 227.
- Preference to work to avoid oxbows and old river systems north of Portage La Prairie and close to the Station that are likely to have been travel routes

In addition to sharing route preferences, PFN also proposed a mitigative segment during Round 1 with a goal to decrease the number of crossings of old rivers and creeks. During the route preference determination stage, PFN strongly opposed the southerly route option (Option A), which would involve crossing the Assiniboine River twice. PFN's routing preferences and scoring were guided by avoiding areas with high potential for environmental impacts and archeological finds.

Other topics that have been raised by PFN through the FNMEP include concerns about potential impacts to PFN's ability to select parcels of land to fulfill Treaty Land

Entitlement (TLE) obligations within the area now and in the future on both Crown and private lands, and interest in having climate change discussions with Manitoba Hydro, other First Nations and the MMF.

PFN's routing preference information is provided in Appendix B.

5.3.2.7 Portage Urban Indigenous Peoples Coalition

During Round 1, Manitoba Hydro and the PUIPC met virtually to discuss the D83W project. At this meeting, Manitoba Hydro provided shared information about the D83W project and the options available for sharing feedback. The PUIPC did not raise any concerns about the project but advised that they would like to stay informed about it.

Manitoba Hydro has continued to share information with the PUIPC at project milestones and remains open to further engagement if PUIPC is interested in participating at a later date.

5.3.2.8 Roseau River Anishinabe First Nation

Following Manitoba Hydro's initial Round 1 communications, RRAFN indicated that local Nations should be asked for feedback and consulted on the D83W project and therefore opted to not participate in engagement activities for the Project.

Manitoba Hydro has continued to share information with RRAFN at project milestones and remains open to further engagement if RRAFN is interested in participating in the Project at a later time.

5.3.2.9 Sandy Bay Ojibway First Nation

Manitoba Hydro has not received any feedback about the Project from SBOFN. Manitoba Hydro has continued to share information with SBOFN at project milestones, informing about opportunities to provide feedback, and remains open to further engagement if SBOFN is interested in participating at a later date.

5.3.2.10 Swan Lake First Nation

During Round 1, Manitoba Hydro and SLFN met virtually to discuss the D83W project. Based on this meeting, Manitoba Hydro understands SLFN's key area of concern related to the D83W project to be employment, training, and economic opportunities. In particular, SLFN expressed concerns about how Indigenous employment opportunities have been implemented for past projects and a lack of continuity in Indigenous employment and training opportunities from one Manitoba

Hydro project to the next. SLFN expressed interest in longer term employment opportunities as well as monitoring positions.

In response, Manitoba Hydro has since provided SLFN with an employment report, sharing statistics on employment and training outcomes for SLFN members on recent Manitoba Hydro transmission construction projects (2014 to 2022) and information on the evolution of Manitoba Hydro's contracting strategy in terms of the approach to promoting Indigenous content on its recent transmission projects. Manitoba Hydro has also offered to arrange a separate meeting focused on transmission line construction jobs, employment, and training opportunities, and hiring processes that may be of interest to SLFN.

Other topics that were raised by SLFN include an interest in climate change considerations being assessed for the D83W project and an interest in having representation at heritage discussions with the project archaeologist.

Manitoba Hydro has continued to share information with SLFN, informing about opportunities to provide feedback, and remains open to arranging a meeting about employment and training interests and undertaking further engagement on the D83W project if SLFN expresses interest in further participation at a later date.

5.4 Ongoing engagement

Following Manitoba Environment, Climate and Parks' decision regarding the D83W project, Manitoba Hydro will notify the engaged First Nations, the MMF, and the PUIPC of the outcome of the decision and keep them informed of construction schedules and activities. Manitoba Hydro will remain open and responsive to any questions or concerns from communities.

Manitoba Hydro will share the scope of work anticipated for the D83W project components and information about what types of employment and training opportunities will exist once it is known.

Prior to construction, Manitoba Hydro will also reach out to FNMEP participants to arrange a pre-construction ceremony for those who are interested and to discuss monitoring options for the D83W project.

Manitoba Hydro plans to follow up with DTFN, LPFN, and the MMF to gather feedback about the effectiveness of the multi-project engagement approach and ICAC positions, to determine how well the anticipated benefits of the ICAC positions were realized, and to develop lessons learned to support the continual improvement of Manitoba Hydro's First Nation and Métis engagement processes.

6.0 Environmental assessment methods

The following chapter is an overview of the methods used to conduct this environmental assessment. This report was completed to meet the requirements of *The Environment Act (Manitoba)* and the Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Environment, Climate and Parks 2022). These methods have been developed through a review of regulations, current practice in environmental assessment and experience from assessments of similar projects.

Project-related environmental effects were assessed using a standard framework for each valued component, with standard tables and matrices to facilitate and document details of the assessment. Although Manitoba guidelines do not require cumulative effects assessments for Class 2 developments, a cumulative effect assessment has been included.

Residual project-related environmental effects (i.e., after mitigation has been applied) were characterized using specific criteria. The significance of the project-related environmental effects was determined based on predefined criteria or thresholds (also called significance criteria). If there was potential for residual effects of the project to interact cumulatively with the residual effects of other projects or physical activities, these cumulative environmental effects were assessed. The significance of cumulative effects was not determined but was described in a manner relevant to each valued component in plain language.

The assessment progressed through the following steps (discussed in detail below):

- Scoping
  - Scoping the assessment
  - Scoping the project
- Selecting valued components
- Determining spatial and temporal boundaries
- Determining project interactions with the environment
- Determining pathways of effects
- Developing mitigation
- Characterizing residual effect
- Determining significance
- Assessing cumulative effects
- Developing follow-up and monitoring programs

6.1 Scope

This section describes the scope of the D83W project and the scope of the environmental assessment. It serves to focus the assessment on important components of the D83W project and the environment. Spatial and temporal boundaries for the project and assessment are also provided.

Scoping identifies the valued components considered in the environmental assessment, the geographic areas, and timescales over which potential effects will be studied, and the thresholds of change for determining if predicted project effects due to the D83W project would be significant.

Scoping is an iterative process that is adjusted throughout the environmental assessment process as new information becomes available. This iterative process is particularly important during routing where the impacts of different route segments on valued components are considered.

6.1.1 Scope of the project

The scope of the proposed D83W project includes the construction, operation, maintenance, and eventual decommissioning of the 230 kV transmission line. The project's scope also includes the acquisition of property.

The project scope includes the following (details for each are provided in Chapter 2.0):

- Transmission line construction
  - Mobilization and staff presence
  - Right-of-way clearing
  - Watercourse crossings
  - Vehicle and equipment use
  - Marshalling yards and fly yards
  - Transmission tower construction
    - Implodes
    - Helicopter use
  - Project wrap up and rehabilitation
- Transmission line operations/maintenance
  - Transmission line operation
  - Vehicle and equipment use
  - Inspection patrols
  - Vegetation management
- Decommissioning

6.1.2 Valued components

Valued components are defined as elements or conditions of the biophysical and socioeconomic environment that may be impacted by a proposed project and are of concern or value to Indigenous peoples, the public, regulatory authorities and/or interested parties. Valued components may be identified as having scientific, biological, social, health, cultural, traditional, economic, historical, archaeological and/or aesthetic importance. The criteria considered when identifying valued components included the following:

- have been identified as important issues or concerns by participants in the engagement process, by other effects assessments in the region or by regulatory agencies
- have scientific, social, cultural, spiritual, economic, historical, archaeological, or aesthetic importance
- are considered important to First Nation and Métis peoples engaged on the project or a part of their current use of lands for traditional purposes
- represent a broad environmental, ecological, or human environment component

Several factors were considered while selecting valued components including reviewing valued components from previous assessments on transmission lines; considering input from First Nation and Métis communities, landowners, interested parties and/or the public; and the professional judgment of the assessment team.

The final valued components identified for the environmental assessment and rationale for their selection is presented in Table 6-1.

Table 6-1: Valued components and rationale for selection

Valued component	Rationale for selection
Agriculture	• Dominant land use in the project area • Potential interaction during construction and operations • Concerns identified during the public engagement process • Valued resource with substantial important to the regional economy • Loss of agricultural land from tower footprints
Economic Opportunities	• Potential employment opportunities and benefits to local business during construction

Human Health	• Concerns heard during public engagement related to EMF, safety and noise during construction and operations
Community Well-being	• Concerns heard during public engagement related to an increase in stress related to human health and changes to visual environment
Property and Services	• Potential interaction during construction and operations • Concern raised during the public engagement process
Fish and Fish Habitat	• Potential impacts from construction and operations • Concern identified during the public engagement process include impacts to riparian areas, harvesting, water quality and drainage and flood management • Provide habitat for land and aquatic wildlife
Vegetation	• Potential interaction with shelterbelts and treed areas during construction • Concern identified during the public engagement process • Reduce soil erosion from water and wind • Provide important habitat to wildlife species (i.e., breeding birds, species of conservation concern)
Wildlife and Wildlife Habitat	• Potential impacts to birds during operations (bird-wire collisions) and loss of wildlife habitat (shelterbelts and treed areas) • Concern identified during the public engagement process include impacts to wildlife • Potential for provincial and federal species of conservation concern to occur in the project area.
Harvesting and Important Sites	• Potential interactions during construction and operations • Concerns raised during First Nations and Métis engagement include impacts to harvesting, traditional practices, hunting; culture and tangible and intangible heritage values • Regulatory guidance from the Province of Manitoba to include direct impacts on communities in the project areas; resource use (hunting, fishing, trapping, gathering etc.) and cultural or traditional activities in the project development area.

6.1.3 Spatial boundaries

The spatial boundaries of the environmental assessment consist of the D83W project development area, local and regional assessment areas as described below:

Project development area (PDA): Footprint of the proposed D83W project including the transmission line right-of-way, any additional areas such as fly yards or marshalling yards and access road allowances.

Local assessment area (LAA): Represents the area where direct and indirect or secondary effects of construction, operation and maintenance are most pronounced or identifiable. The local assessment area will be specific to each valued component.

Regional assessment area (RAA): Encompasses the area where D83W project-specific environmental effects overlap with those of past, present, and reasonably foreseeable future projects and activities. It is used to provide regional context and is the area used for assessing the project's contribution to cumulative effects.

The direct, indirect, and cumulative environmental effects of the proposed project are considered within these assessment areas.

6.1.4 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities. More detailed temporal boundaries could be established for specific environmental and/or socioeconomic components being assessed, and this is discussed in each component's assessment section. The two primary temporal boundaries are:

- Construction – estimated to be 18 months
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life.

6.2 Assessment of project effects

The following sections will describe how the assessment was undertaken including: project-environment interactions, effects pathways, mitigation, characterizing residual effects, the determination of significance, and follow-up and monitoring

6.2.1 Project-environment interactions

Assessing project effects on the environment begins with an understanding of which project activities interact with the valued components. Identifying these interactions allows the assessment to focus on the issues of greatest concern. A matrix was

developed by listing the project activities and noting where they have the potential to interact with the valued components.

The interactions were identified by the discipline specialists based on experience with similar projects, a review of previous transmission line environmental assessments, and engagement feedback. Table 6-2 provides the interaction matrix.

6.2.2 Effects pathway

Once interactions likely to have effects were determined, the potential resulting effects for each valued component were then identified. This was done based on available scientific information, the assessment team's professional judgement and understanding of the interactions, previous experience from similar types of projects and recent environmental assessments, and input from engagement with Indigenous and Métis groups, the public, regulators, and technical experts.

The pathways where these effects may occur were identified, and one or more measurable parameter(s) were selected for the quantitative (where possible) or qualitative measurement of potential project and cumulative effects.

Examples of measurable parameters include the area of wildlife habitat that may be affected or the expected number of workers that will move into the area for project construction. The amount of change in these measurable parameters is used to help characterize the environmental effects and to assist in evaluating their significance.

Table 6-2: Project valued components / subtopics and project activity interaction matrix

Project activity	Valued components								
	Agriculture	Economic opportunities	Human health	Community well being	Property and services	Fish and Fish Habitat	Vegetation	Wildlife and wildlife habitat	Harvesting and important sites
Construction									
Mobilization and staff presence		X		X				X	X
Vehicle and equipment use	X		X	X		X		X	X
Right-of-way clearing			X	X	X	X	X	X	X
Watercourse crossings					X	X	X	X	X
Marshalling / fly yards	X				X		X	X	X
Transmission tower construction	X	X	X	X	X	X	X	X	X
Implodes			X	X				X	X
Helicopter use			X	X				X	X
Project wrap up and rehabilitation								X	X
Operation and maintenance									
Transmission line presence	X	X	X	X	X			X	X
Vehicle and equipment use	X		X	X		X		X	X
Inspection patrols	X						X	X	X
Vegetation management	X	X	X	X		X	X	X	X
Decommissioning	X	X	X	X	X	X	X	X	X

6.2.3 Mitigation

Mitigation measures are developed to eliminate, reduce, or control potential adverse effects to manageable levels where they do not threaten the sustainability of a valued component and become significant.

The process of characterizing, quantifying, and mitigating effects is typically an iterative process for most environmental components. Initial measures considered in the planning and design phase include avoiding a sensitive location or critical timing for a valued component, reducing the size or magnitude of the project activity and its associated effect, reducing its geographic extent, or reducing the frequency or duration that a project activity occurs (e.g., number of times a day, number of hours a day).

Where residual adverse effects still occur, measures are developed to try to address the remnant effects through replacement, restoration, or compensation measures, and by allowing natural recovery, actively facilitating recovery, or constructing something to replace what would be lost.

As an initial step, the flexible nature of transmission line routing allows for the project team to route the line to reduce effects to people and the environment. Beyond routing, additional mitigative measures are applied during the design, construction, and operation of the project, depending on the nature of interactions with valued components.

Manitoba Hydro also sought mitigation suggestions from the public through online surveys, virtual information sessions and through engagement with First Nation community representatives and the Manitoba Métis Federation (MMF).

Mitigation measures are addressed largely through the implementation of the environmental protection program described in Chapter 12.0. General and specific mitigation measures are described in the construction environmental protection plan (CEnvPP), which will be created after licence receipt.

Specific mitigation measures for each biophysical and socioeconomic component are described in each component's assessment section.

6.2.4 Characterizing residual effects

Residual effects are those that remain after the application of mitigation measures. The residual effects characterization process is typically iterative and the goal in developing mitigation measures is to reduce residual adverse effects to "acceptable" levels where they do not threaten the sustainability of a valued component and become significant.

Guidance is provided through the various criteria listed in Table 6-3 using results of research, field studies, engagement, and professional judgement, to predict potential significance.

The Impact Assessment Agency of Canada's guidance (Government of Canada 2022) on determining whether a project is likely to cause significant effects was relied upon for the D83W project. Guidance from the British Columbia Environmental Assessment Office (British Columbia Environmental Assessment Office 2020) was also used.

Characterization of residual effects was completed with respect to the nature of the interaction. The direction, magnitude, geographic extent, duration, frequency, and reversibility were determined.

Table 6-3 describes the factors used to characterize the interactions.

Table 6-3: Factors and criteria used to characterize interactions

Factor	Definition	Criteria	Evaluation
Direction	Describes the difference or the trend of the effect on the environment	Positive	Beneficial or desirable change.
		Neutral	No expected change.
		Adverse	Adverse or undesirable change.
Magnitude	The predicted degree or intensity of disturbance of an effect	Small	No definable or measurable effect; or below established thresholds of acceptable change; or within the range of natural variability; or minimum impairment of an ecosystem component's function.
		Moderate	Effects that could be measured and could be determined with a well-designed monitoring program; or are generally below established thresholds of acceptable change; or are marginally beyond the range of natural variability or marginally beyond minimal impairment of ecosystem component's function.
		Large	Effects that are easily observable and described, and well beyond guidelines or established thresholds of acceptable change; are well beyond minimal impairment of an ecosystem component's functions.
Geographic extent	The spatial boundary where the residual environmental effect is expected to occur	Project footprint	Effects confined to the Project footprint including the right-of-way.
		Local	Direct and indirect effects that extend beyond the Project footprint but remain within the local study area defined for each valued component.
		Regional	Direct and indirect effects that extend into the regional assessment area described for each valued component.
Duration	The length of time that the predicted residual effect is expected to last	Short-term	Effects that generally are limited to the construction phase of the project (i.e., less than one year) or recovery cycle of a biological component.
		Medium-term	Effects that extend throughout the construction and into the operation phases of the project or that occur within one or two generations of recovery cycles.
		Long-term	High level effects that extend greater than 50 years; or are permanent, or that extend for two or more generations or recovery cycles.
Frequency	How often the effect will occur	Infrequent	Effect may occur once during the life of the project.
		Sporadic/ Intermittent	Effect may occur without predictable pattern during the life of the project.
		Regular/ Continuous	Effect may occur periodically or continuously during the life of the project.
Reversibility	Likelihood and time required for the Project to no longer influence a component. For socio-economic components, the manageability of effects is considered rather than reversibility	Reversible	Effect is reversible within the lifetime of the project or after decommissioning.
		Irreversible	Effect will persist after decommissioning.

6.2.5 Determination of significance

Assessment practitioners included a determination of the significance of residual effects. In general, significant effects are those likely to be of enough magnitude, duration, frequency, geographic extent, or reversibility to cause a change in the valued component that will alter its status or integrity beyond an acceptable level (Table 6-3 above).

Significance thresholds were selected for the valued component with consideration of provincial and federal regulatory requirements, standards, objectives, guidelines, and other relevant planning objectives applicable to each valued component.

Thresholds are developed considering guidance, past practice, and the specific conditions of the receiving environment. There are few listed or legal standards or thresholds for defining significance of effects or activities for the valued components identified. In lieu of regulatory standards or thresholds, detailed definitions of the significance criteria for each environmental effect are provided in the valued component's effects assessment section. A threshold approach for the determination of significant effects is supported by the Clean Environment Commission (Manitoba Clean Environment Commission, 2013).

6.2.6 Follow up and monitoring

Manitoba Hydro uses an adaptive management approach in dealing with potential project effects. Best efforts are made to predict and characterize effects. Follow-up and monitoring may be carried out to verify the accuracy of the environmental assessment of a project, assess the effectiveness of measures taken to mitigate adverse effects through the continuous observation, measurement, or assessment of environmental conditions at and surrounding the project, and determine compliance with regulatory requirements.

Manitoba Hydro's environmental protection program (Chapter 12.0) provides the framework for implementation, management, monitoring and follow-up of environmental protection activities in keeping with environmental effects identified in the environmental assessment as well as in regulatory requirements.

Adaptive management will be a core approach in implementation of the EPP. Adaptive management is a planned process for responding to uncertainty or to an unanticipated or underestimated project effect. It applies information learned from monitoring actual project effects and compares them with predicted effects. If there is a variance between the actual and predicted effects, a determination will be made as to whether modifications are required in existing mitigation measures or whether

other actions are necessary to address the variance, or in cases where there may be no mitigating options available, the appropriate information is disseminated in a timely manner. Plans for reporting and disseminating information regarding follow-up and monitoring activities, including any public reporting, are included in the EPP.

6.3 Assessment of collective effects

The effects assessment section of an environmental assessment analyzes in detail, the potential impacts of the proposed project on individual valued components while the cumulative effects assessment section considers the impacts of the proposed project in combination with existing and reasonably foreseeable future projects/activities. A missing level of assessment is the consideration of multiple impacts of a single project which may not be individually significant, but may be collectively significant, particularly when considered as interrelated parts of a system (Ehrlich, 2021).

Collective environmental effects are the environmental effects that are likely to result from the impacts of a single project across multiple components of the environment. While the residual effects on individual components may not be significant, considering the effects of the single project across interrelated parts of the system may result in a significant collective effect (Ehrlich, 2021).

According to Ehrlich (2021), the process for collective effects assessment consists of four steps (discussed in detail in the following sections), namely:

1) Pan back to look at the roles each valued component plays in the broader system
2) Assess the predicted changes on system functioning
3) Mitigate the impacts to the valued components or to the ways they interact
4) Mitigate any remaining significant impact on the system

While the completion of collective effects assessment is not a requirement of *The Environment Act (Manitoba)*, in pursuit of continual improvement in how we assess our projects' impacts, Manitoba Hydro is adopting guidance for collective effects assessment from other jurisdictions, particularly the Northwest Territories' Mackenzie Valley Review Board per Ehrlich (2021). As the assessment of collective effects is at a systemic level, the mitigation of the ensuing systemic impacts can require broader tools than those required in the valued component-based effects assessment approach, but the interconnected characteristic of systems presents options for creatively mitigating impacts. System-wide mitigation approaches may involve other stakeholders or require higher levels of information that may be beyond the reach of an individual project, and, as a proponent, Manitoba Hydro would engage with the

Province of Manitoba, First Nation Communities, and the Manitoba Métis Federation in the development of some system-wide mitigation.

The following two criteria were selected as triggers for considering an impact as a collective effect:

1) A concept heard through engagement that isn't well captured by an individual valued component
2) The presence of a non-negligible residual effect on a system due to the combined effects of interrelated components

The collective effects that were assessed for this project are discussed following the valued component-level effects assessment section.

6.3.1 Panning back

Panning back involves consideration of the broader, panoramic view of a project when considering impacts, to see the level where individual components' impacts converge to form a collective impact. Although certain identified impacts may be not significant individually, at the system level where they interact, the impacts of the project can be significant. The challenge for panning back is to find the appropriate scale of focus, zooming in and panning out until a meaningful system-level, panoramic-view impact emerges.

For example, what constitutes a meaningful scale of consideration for a project may differ between a proponent and a member of a potentially affected Indigenous community. Through Manitoba Hydro's public engagement and First Nation and Métis engagement for this project, engagement input/feedback was used as basis for determining meaningful scales for consideration of collective effects.

For the D83W project, panning back was done during a Collective Effects Assessment Workshop that was held on August 5, 2022, and included authors of the environmental assessment and the project engagement team as participants. Prior to delving into panning back to identify potential collective effects, the workshop participants were provided with summaries for the project's FPR as well as individual valued component summaries and conclusions.

After the concept of collective effects assessment was introduced:

- Participants were split into four groups and tasked to imagine they were an agricultural producer living and farming in the project area, and to consider the project's potential impacts to determine those impacts that could collectively affect the producer, in a way that was not captured by an individual valued component.

- Following group discussions, each group shared the impacts they determined could occur in concert as well as a "name" for the resulting collective effect if they had one.
- Participants were asked to confirm if any of the collective effects' subcomponents could be addressed via mitigation and whether residual effects would remain following mitigation.
- Participants were then asked to discuss and confirm the similarities and differences among the identified potential collective effects to determine if any of them could be consolidated and considered together.

Based on the above, two collective effects, effects to agricultural productivity and effects to rural life, are assessed in the agriculture effects assessment section (Section 8.1). The consideration of system-level project impacts has been done as part of effects assessment for traditional land and resource use valued components for other recent Manitoba Hydro transmission projects, e.g., MMTP and BP6/BP7. Consequently, as system-wide impacts had already been considered for D83W's Harvesting and Important Sites valued component, the co-authors of the component's environmental assessment shared how they came up with their collective system named "Cultural Landscape" with other workshop participants (see Figure 6-1).

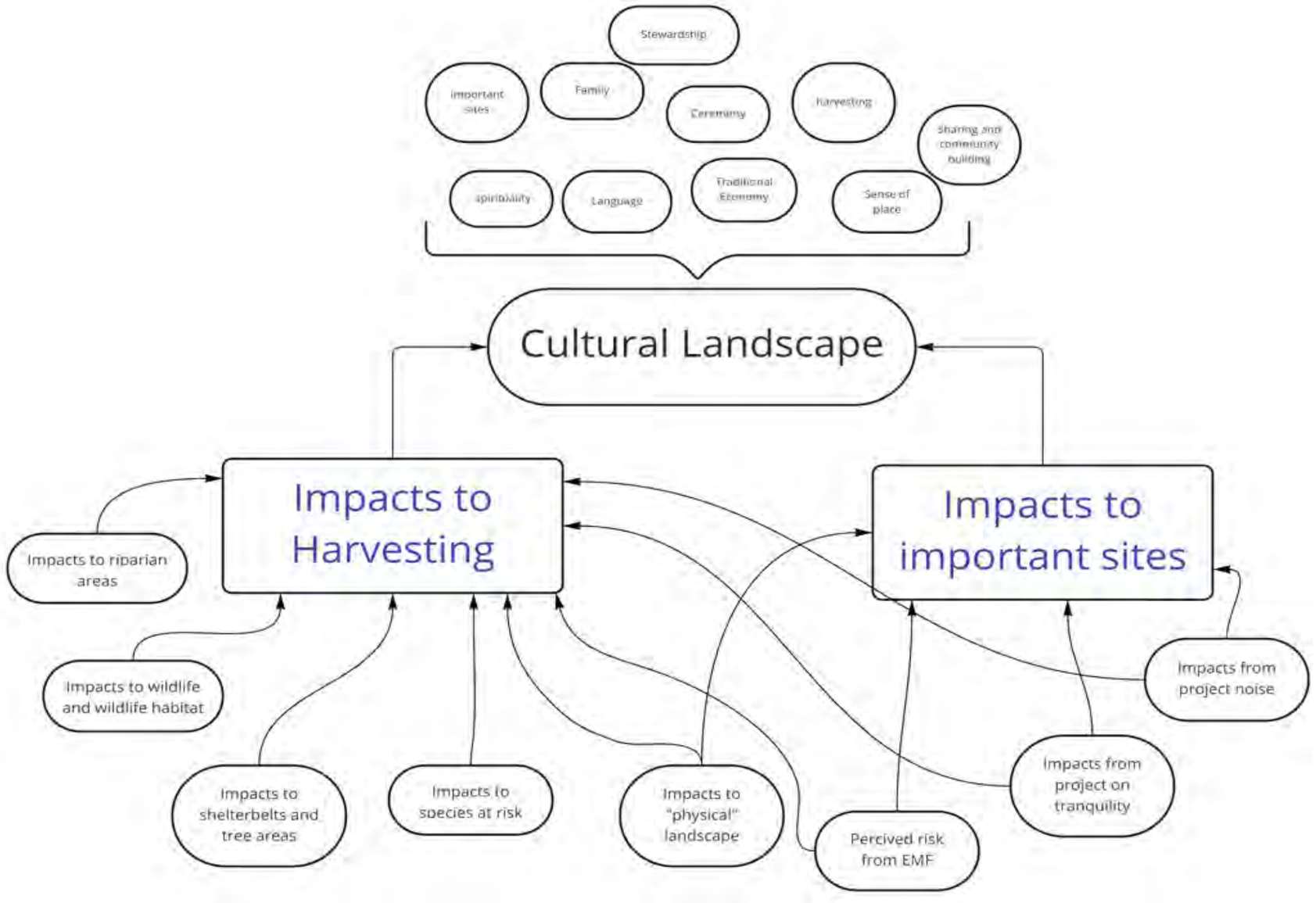


Figure 6-1: Illustration showing across-valued component interactions that impact Harvesting and Important Sites contributing to a system-level impact on Cultural Landscape

Based on the above, one collective effect named effects to cultural landscape was assessed for Harvesting and Important Sites in Section 8.9.

6.3.2 Assessment of effects on system functioning

Following the drawing of linkages among potential impacts to determine impacts that could collectively affect the environment in a way that was not captured by an individual valued component, the resultant potential collective effects were synthesized. Synthesis of collective effects involved the relative weighing of each potential collective effect through a "well-being" lens in line with the guiding principles of the *Mackenzie Valley Resource Management Act* [par. 115(1)(b) and (c)], which require the consideration of well-being in environmental assessments (Government of Canada 1998).

Understanding the role and context of the valued component within the system, the predicted impacts of the project on each of the valued components, as well as their combined predicted impacts were considered:

- Do the predicted impacts affect system functioning?
- Do they collectively reduce system resilience?

As with individual valued components, a significance determination was then made, applying relevant societal values when determining whether the collective impact of the D83W project is acceptable, or whether the collective impact matters enough to merit additional mitigations to reduce or avoid it.

6.3.3 Mitigation

For collective effects assessment, mitigation is applied in two ways, namely mitigating the impacts to the valued components or to the ways they interact and mitigating any remaining significant impact on the system.

According to Ehrlich (2021), if the collective impact on the system is substantive enough to merit additional mitigation measures to reduce or avoid the impact (i.e., the collective impact is significant), then the impacts to the affected valued component(s), or the way they interact should be mitigated. And, like cumulative effects assessment, one way to reduce the collective impact is to avoid or minimize the change to each valued component that contributes collectively to the impact on the system.

If the collective impacts on the system cannot be addressed well enough by mitigating impacts on the valued components that it is composed of, it may be possible to offset impacts on the system by reducing net impacts or enhancing other

aspects that foster resilience of the system. Because the system level is broad, there may be additional mitigative options that are not open to Manitoba Hydro as the proponent, but fit within the mandates of others, such as government agencies. Manitoba Hydro will consider collaboration with such agencies to implement the mitigative options, where possible.

6.4 Cumulative effects

Cumulative effects are those changes to the biophysical and socioeconomic environment resulting from the residual effects of past, present, and reasonably foreseeable future projects and activities combined with the contribution of a proposed project's residual effects. The effects of past and current projects contributed to the baseline conditions upon which D83W project effects were assessed.

Cumulative effects assessment involves examining potential interactions among other projects and activities with the project's residual environmental effects. The assessment of cumulative environmental effects is generally a five-step process (CEAA 2018) that includes:

1) Scoping
2) Analysis of effects
3) Identification of mitigation
4) Evaluation of significance
5) Follow-up

Manitoba Hydro also considered current cumulative effects best practices and learnings from past assessments. The following sections describe how cumulative effects assessment was completed.

Cumulative effects assessment was conducted for each valued component if it was determined that there would be an adverse residual effect from the D83W project and one of the current or future projects listed in Table 6-4 may interact with the valued component (Table 6-1) and affect the environment cumulatively.

For the current assessment, where there were potential interactions, the pathways were examined and interactions with the D83W project's residual effects were characterized in combination with those of other reasonably foreseeable future projects.

This environmental assessment uses plain language to describe potential cumulative effects, with the corresponding cumulative effects assessment discussion occurring at

the end of the environmental assessment section of each valued component with adverse residual effects.

This environmental assessment also included a project-level discussion on cumulative effects in a concluding section. Participants in some past environmental assessment processes, e.g., engaged stakeholders, interveners, and Indigenous nations, have shared that cumulative effects discussions are too limited. Manitoba Hydro has worked with Indigenous Assessment and Community Coordinators to characterize how future projects may further change the environment and what that may mean to their respective communities.

6.4.1 Scoping

Scoping includes identifying valued components for which residual environmental effects are predicted, determining spatial and temporal boundaries to capture potential cumulative effects, and examining the relationship of the residual environmental effects of the designated project with those of other physical activities. Scoping helps determine which valued components should be carried forward to the analysis step. All valued components with adverse residual effects are carried forward to the cumulative effects assessment.

6.4.1.1 Spatial and temporal boundaries

Spatial boundaries are generally greater and temporal boundaries are often longer for a cumulative effects assessment since the effects of other projects and activities may occur over a wider area and extend before and after the project boundaries.

The spatial boundaries identified for the cumulative effects assessment area will include the regional assessment areas described for each valued component.

The temporal boundary for the cumulative effects assessment was determined to extend over an approximate 75-year period, which is the normal life expectancy for a transmission line.

6.4.1.2 Future projects / activities

Foreseeable future projects (CEAA, 2018) are those that are:

Certain

- The physical activity has received approval in whole or in part, such as: o environmental assessment approval
- Pre-development approval for early works, permits for exploration, or collection of baseline data or some other regulatory approval from a province
- The physical activity is under construction

- The site preparation is being undertaken

Reasonably foreseeable

- The intent to proceed is officially announced by a proponent
- The physical activity is under regulatory review (i.e., the application is in process)
- The submission for regulatory review is imminent
- The physical activity is identified in a publicly available development plan that is approved or for which approval is anticipated
- The physical activity supports – or is consistent with – the long-term economic or financial assumptions and engineering assumptions made for the project's planning purposes
- A physical activity is required for the project to proceed (e.g., rail or port transportation facilities, or a transmission line)
- The economic feasibility of the project is contingent upon the future development
- The completion of the project would facilitate or enable the future development

Certain and reasonably foreseeable future projects or activities are described in Table 6-4. Table 6-5 provides the interaction matrix between future projects and activities and the valued components identified for the D83W Project. Figure 6-2 shows the timelines of both existing and foreseeable future projects/activities.

Table 6-4: Project and activity inclusion list

Project / Activity	Description of project /activity	Potential effects
Ongoing projects and activities		
Agriculture	Agricultural activities include cropping, livestock operations, aerial spraying, apiary and organic farming, tile drainage continue throughout the regional assessment area.	Potential effects include loss of agricultural land, inconvenience, nuisance and increased costs from presence of structures; GHG emissions.
Domestic resource use activities	Hunting, fishing, trapping and other domestic resource use activities throughout the assessment area.	None
Recreational activities	Recreational activities (e.g., leisure, sports, campgrounds) throughout the Regional Assessment Area.	None
Infrastructure	Infrastructure includes: existing rail lines (e.g. CPR, CN), provincial trunk highway (#1, 6, 16 and 26) provincial roads (221, 227, 236, 240, 248, 305 and 424), transmission lines (e.g. BP6/BP7, Bipole III, Poplar Bluff Transmission Project, Portage Diversion, pipelines).	Potential effects include loss of agricultural land and a reduction in shelterbelts and treed areas.
Water treatment / lagoons	Existing water treatment plants and lagoons in the Regional Assessment Area.	Potential effects include loss of agricultural land and a reduction in shelterbelts and treed areas.
Industrial and processing development / facilities	Existing projects include a Pea Processing Facility, Organics Resources Management Facility, Simplot and Poplar Bluff Industrial Park.	Potential effects include loss of agricultural land.
Future projects and activities		
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot (No date)	Operation of a hazardous waste depot at the Rosser Waste Transfer Station located on portions of SW 30-12-1 EPM within the Rural Municipality of Rosser.	Potential effects include loss of agricultural land; and noise and emissions during construction.
BP6/7 Transmission Project (2023 to 2024)	Construction of a new transmission line in a new route for a portion of the existing double circuit transmission line between Brandon and Portage la Prairie (i.e., BP6/BP7 transmission lines) that was damaged by a snowstorm in October 2019, in the Portage la Prairie area.	Potential effects include increased traffic, noise, and visual impacts due to construction activities; and effects to agriculture associated with the inconvenience, nuisance and increased production costs of operating farming equipment and crop production.
Wash'ake Mayzoon Station Project (2023-2025)	Construction of a new station as part of the Portage Area Capacity Enhancement Project which will enhance the transmission system in the Brandon/Portage area, to address the current reliability issues.	Potential effects include loss of agricultural land; and noise and emissions during construction.
RM of Cartier Rural Water Pipelines (Spring 2022 to Spring 2023)	Proposed development of water treatments plants, reservoirs and water transmission lines to supply the RM of Cartier with potable, sustainable water, replacing the existing current water system, improving water quality.	Potential effects include loss of agricultural land; noise and emissions during construction and reduction in shelterbelts and treed areas.
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex (construction in 2024)	Convert vegetable oils and animal fats into renewable fuels.	Potential effects include loss of agricultural land; and noise and emissions during construction.
Poplar Bluff Industrial Park Expansion (No date found)	Future projects include the Regional Water Reservoir	Potential effects include loss of agricultural land; and noise and emissions during construction.

Table 6-5: Future projects / activities interaction matrix with the D83W Project valued components

Project / activity	Valued components								
	Agriculture	Economic opportunities	Human health	Community well being	Property and services	Fish and Fish Habitat	Vegetation	Wildlife and wildlife habitat	Harvesting and important sites
Agriculture			X			X	X	X	X
Domestic resource use								X	X
Recreational activities									X
Infrastructure	X		X	X	X	X	X	X	X
Water treatment / lagoons	X					X			X
Industrial and processing development / facilities	X								X
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	X								X
BP6/7 Transmission Project	X	X	X	X	X	X	X	X	X
Wash'ake Mayzoon Station Project	X	X	X	X	X				X
RM of Cartier Rural Water Pipelines	X								X
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	X	X	X	X					X
Poplar Bluff Industrial Park Expansion	X								X

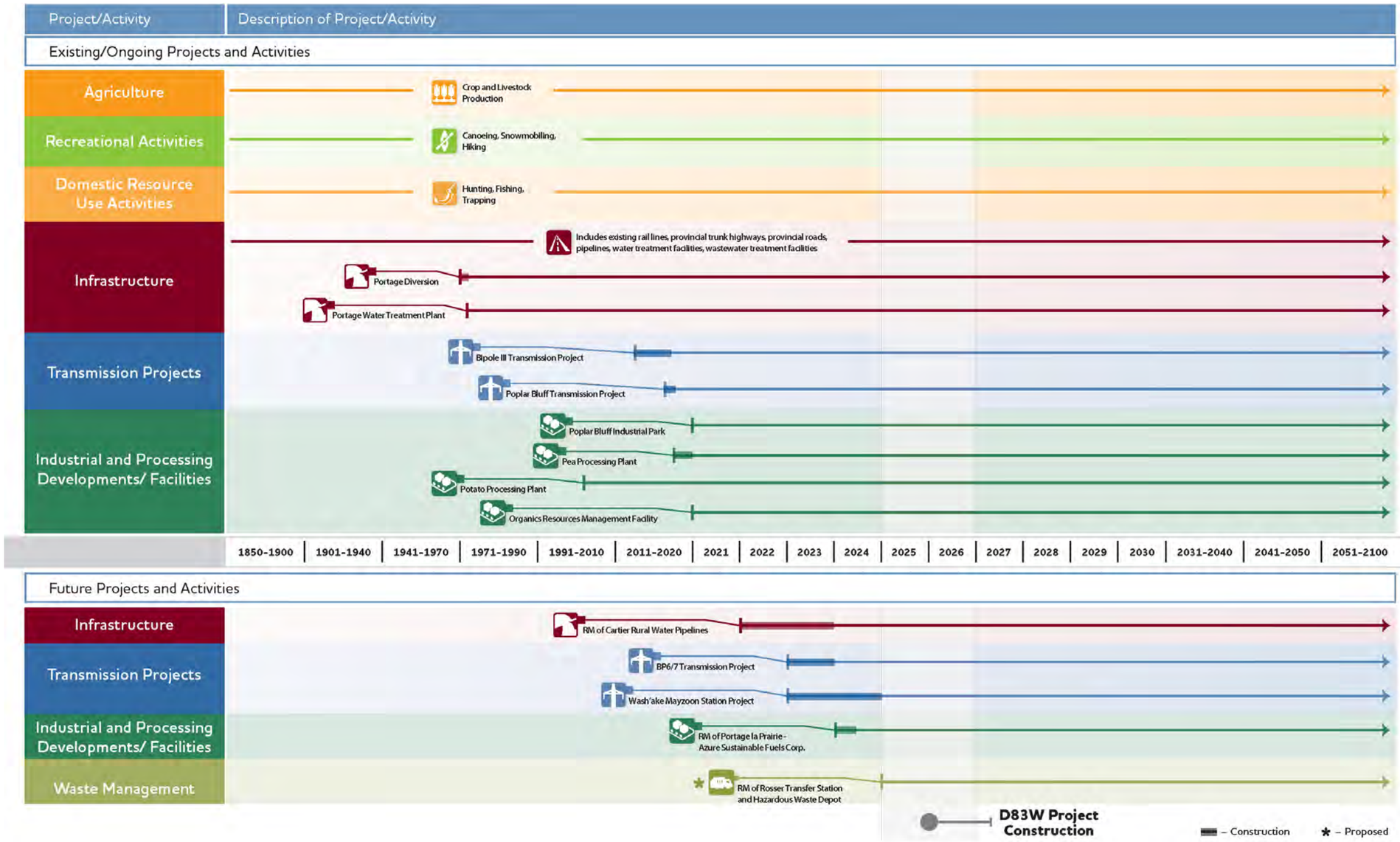


Figure 6-2: Past, present, and future projects in the D83W regional assessment area

6.4.2 Analysis of effects

Valued components with residual project effects that may interact with potential effects of a current or future project are carried forward to the analysis step. This step considers how the physical activities examined during scoping may affect the valued components identified for further analysis. Analysis of cumulative effects follows that for project effects (i.e., considers magnitude, duration, frequency, geographic extent, and irreversibility).

6.4.3 Identification of mitigation

Identification of mitigation aims to identify technically and economically feasible measures that would mitigate adverse cumulative effects. Mitigation may include elimination, reduction, or control or, where this is not possible, restitution measures such as replacement, restoration or compensation should be considered.

One of the challenges in developing mitigation measures for adverse cumulative environmental effects is that it is typically not feasible (or appropriate) for one proponent to manage effects in an area where effects were created by several proponents' activities. However, as Manitoba Hydro already has projects in, and is tentatively planning further work in the Portage la Prairie area, the development of mitigation measures for adverse cumulative effects will be relatively more practical. Accordingly, Manitoba Hydro is proposing cumulative mitigation including supporting First Nation and Métis engagement and monitoring over a region that includes these potential projects.

The primary responsibility of any given proponent is to deal with their own projects. The three types of mitigation measures that can be implemented are those:

- Implemented solely by the project proponent
- Implemented by the project proponent in cooperation with other project proponents, government, First Nation, Métis or interested parties
- Implemented independently by other project proponents, government, First Nation, Métis or interested parties

For the latter two, the degree to which the proponent can influence the implementation of these measures is noted, where known.

6.4.4 Evaluation of significance

For the current assessment, significance evaluations were not completed for cumulative effects assessments. Rather, the effects of future projects that could combine with residual effects of the D83W project are characterized in plain language. Each valued component's effects assessment section includes a discussion

on the potential incremental future cumulative effects and identifies additional measures that could mitigate cumulative effects.

6.5 Greenhouse gases and climate change

The Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Environment, Climate and Parks 2022) requires the discussion of climate change implications including a greenhouse gas inventory that should be calculated according to guidelines developed by Environment Canada (2021) and the United Nations (IPCC 2019). Chapter 9.0 provides details on climate change and the greenhouse gas inventory for the project.

6.6 Effects of the environment on the project

This environmental assessment includes an evaluation of environmental effects that may occur because of the environment acting on the D83W project. Potential environmental changes and hazards may include wind, severe precipitation, ice storms, flooding, grass and forest fire, or tornado. The influence that these environmental changes and hazards may have on the D83W project will be predicted and described as well as the measures taken to avoid potential adverse effects. The effects of the environment on the project are presented in Chapter 10.0.

6.7 Accidents and malfunctions

This environmental assessment considers the effects of accidents and malfunctions that might occur in connection with the D83W project. It includes a range of potential accidents and malfunctions from the construction and operation of the project and evaluates their environmental effects. It provides an initial basis for the development of emergency response planning and what eventually will be incorporated into the emergency response plan.

For each event considered, a possible scenario relating how the event might occur during the life of the D83W project was developed. Details on the types of accidents and malfunctions considered in this environmental assessment and the scenarios developed for this assessment, are discussed in Chapter 11.0. Potential environmental effects on the valued component due to accidents, malfunctions and unplanned events are assessed in a similar fashion to project environmental effects.

Environmental effects are characterized using the same terms used for project environmental effects, and mitigation measures are prescribed. The significance of the environmental effect is then determined using the same thresholds used for routine project environmental effects.

7.0 Existing environment

This chapter provides an overview of the existing environment in the RAA of the D83W project.

The existing conditions were established based on data collected during desktop analysis, field programs, First Nation and Métis engagement, and public engagement. Desktop analysis included literature reviews and personal communications.

This chapter provides an overview of the following:

1) Physical environment

    - Atmospheric environment (climate)
    - Noise and air quality
    - Electric and magnetic fields

2) Biophysical environment

    - Ecological classification
    - Geology and hydrogeology
    - Terrain and soils
    - Aquatic environment
    - Vegetation
    - Wildlife

3) Socio-economic environment

    - Agriculture
    - Population, employment, and economy
    - Public safety and emergency services
    - Parks and recreation
    - Regional infrastructure
    - Property ownership
    - Indigenous lands
    - Commercial and residential development
    - Traditional practices and culture
    - Heritage sites or objects

7.1 Physical environment

7.1.1 Atmospheric environment

7.1.1.1 Climate

The RAA falls within the Portage, Winnipeg, Lundar, Gladstone and MacGregor Ecodistricts of the Prairies Ecozone's Lake Manitoba Plain Ecoregion which is characterized by short, warm summers and long cold winters (Smith et al. 1998).

Table 7-1 shows select climate data for the City of Portage la Prairie, City of Winnipeg, Town of Grosse Isle and Town of Marquette, that were collectively considered to be representative of climate data for the RAA.

Table 7-1: Select climate data for the regional assessment area

Parameters	Year	June – Aug	May – Sept	July	Jan
City of Winnipeg[3]					
Average Temperature °C	3.0	18.5	16.0	19.7	-16.4
Precipitation mm	521.1	246.5	349.0	79.5	19.9
Rain/Snow (mm/cm)	418.9/113.7	246.5/0	346.1/2.9	79.5/0	0.2/23.7
Portage la Prairie Southport Airport[4]					
Temperature °C	3.1	18.5	16.1	20.0	-16.3
Precipitation mm	514.6	224.8	335.0	72.8	21.0
Rain/Snow (mm/cm)	397.4/154.1	224.8/0	331.2/3.9	72.8/0	0.4/30.0
Marquette[1]					
Temperature °C	3.3	18.6	16.2	19.8	-15.9
Precipitation mm	554.9	242.0	358.0	76.1	23.8
Rain/Snow (mm/cm)	429.6/125.2	242.0/0	355.4/2.7	76.1/0	0.5/23.3
Grosse Isle[1]					
Temperature °C	na	na	na	na	na
Precipitation mm	494.5	237.0	340.3	78.8	17.8
Rain/Snow (mm/cm)	409.1/85.5	237.0/0	338.8/1.5	78.8/0	0.0/17.8

[3] Source: Government of Canada, 2021a. Climate normal from 1981-2020

[4] Source: Government of Canada, 101`a. Climate normal from 1971-2010

Yearly temperatures in the RAA range from 3.0 to 3.3°C, with the average June to August and May to September temperatures consistent at 18°C and 16°C respectively. Annual average precipitation ranges from 495 to 555 mm with the. majority of the precipitation occurring from May to September in the form of rain (Table 7-1). In January, precipitation in the RAA falls primarily as snow with the highest snowfalls recorded at the Portage la Prairie Southport Airport.

7.1.2 Noise and air quality

7.1.2.1 Noise

Existing noise levels in the D83W project area will be typical of urban and rural settings. Noise levels in urban areas near Portage la Prairie, especially those near industrial, commercial, and high-traffic areas, may be higher than noise levels in rural areas. Noise in rural areas may be due to highway traffic, agricultural activities, airplanes, and recreational activities. Based on a noise assessment conducted for the Selkirk Generating Station, typical baseline noise levels for an urban-rural mixed setting are between 40.4 and 44.5 dBA in the daytime (Stantec, 2015). Health Canada (2017) considers day-night noise levels to vary from less than 45 dBA for a typical quiet rural area to 53 to 57 dBA for a typical suburban residential area.

7.1.2.2 Air quality

Manitoba generally has good air quality, with poorer air quality being attributable to exceptional events such as wildfire smoke and transboundary pollutants from the United States or other Canadian provinces. As the RAA is primarily in an agricultural setting, air quality in the area may also be affected by dust and other particulate emanating from agricultural activities like aerial spraying of pesticides, application of fertilizers and manure, harvesting, and from smoke generated by local crop burning programs (Government of Manitoba, 2021). The RAA has also experienced diminished air quality due to smoke from forest fires (CBC News, 2021). The primary chemicals of concern to human health from crop burning and forest fire smoke include asphyxiant and irritant gases, and particulate matter of less than 2.5 µm ($PM_{2.5}$) (USEPA, 2021).

The D83W project area is close to provincial highways or roads. Passenger vehicles on roads and highways may emit various air pollutants including ozone precursors (volatile organic compounds (VOCs) and nitrogen oxides (NOx)), carbon monoxide (CO), sulphur oxides (Sox) and particulate matter (PM) (Government of Canada, 2017).

Comparison of $PM_{2.5}$ and ozone for the three-year period from 2013 to 2015, as part of the national Air Quality Management System (AQMS), indicated that these parameters complied with the Canadian Ambient Air Quality Standards (CAAQS) at five air monitoring stations located across the province of Manitoba (Manitoba Conservation and Climate, 2020). Two of the air quality monitoring stations from the study were in northern Manitoba and three were closer to the D83W project area. Near the D83W project area, air quality was measured at two monitoring stations in downtown Winnipeg and in a residential neighbourhood in Winnipeg. In the Brandon area, air quality was measured in the parking area of a community college. Transportation, agriculture, and industrial combustion were listed as the primary sources of $PM_{2.5}$ emissions and transportation and industrial activities were listed as the primary sources of ozone precursors (NOx and VOCs) in the Winnipeg area. In the Brandon area, transportation, agricultural and industrial activities (electric power generation and fertilizer production) were listed as the primary sources of emissions (Manitoba Conservation and Climate, 2020). Except during exceptional events (forest fire, wildfire smoke and transboundary flow), air quality complied with the CAAQS 24-hour and annual standards for $PM_{2.5}$ and with the CAAQS 8-hour standard for ozone during the reporting period.

7.1.3 Electric and magnetic fields

Extremely low frequency electric and magnetic fields (ELF EMF) are produced from the generation, transmission, and use of electric power (NIEHS, 2002). ELF EMF are within the frequency range of 1 Hertz (Hz) to 3 kilohertz (kHz). The ELF EMF associated with electricity in Canada has a frequency of 60 Hz (Health Canada, 2020). Electric fields are created via voltage and often exist if an appliance is plugged into an electric power source, even when it is turned off (NIEHS, 2002). Magnetic fields are produced from the flow of current through electrical devices and thus are typically only present when electrical appliances are turned on (NIEHS, 2002). Most objects such as buildings, trees, and fences, easily block electrical fields but not magnetic fields.

Typical household exposures to ELF EMF associated with electricity are from wiring, appliances that use electricity (such as a toaster or a television), and electrical boxes (Health Canada, 2020). Household electrical wiring typically represents a large proportion of an individual's total EMF exposure; however, this exposure is difficult to estimate as it depends on electricity usage throughout the house, the time of day, and the types of appliances used (NIEHS, 2002). A study in the United States determined that the average person was exposed to a household magnetic field of

less than 2 milligauss (mG) for a 24-hour average, and this remained true throughout the country and regardless of gender (NIEHS, 2002).

Both magnetic and electrical fields decrease in strength with increasing distance from the source (NIEHS, 2002). For example, a dishwasher can produce a magnetic field of 100 mG six inches (15 cm) from the source, but the magnetic field is reduced to background levels (similar levels to when the appliance is turned off) at 4 feet (1.2 m) from the source (NIEHS, 2002).

Farming and livestock equipment can also create ELF EMF. For example, compressors for milking machines can create a magnetic field ranging from 4 to 620 mG, 30 to 60 cm from the source, and a silo unloader can create a magnetic field of 6 mG, 30 to 60 cm from the source (Hydro Quebec, 1999).

7.2 Biophysical environment

7.2.1 Ecological classification

Ecological classification in Canada is a hierarchical designation describing ecologically distinct areas based on interrelationships of geology, landform, soil, water, vegetation, climate, and human factors, with the ecozone at the coarsest level, followed by ecoregion and ecodistrict. The proposed D83W project in the Prairies Ecozone, Lake Manitoba Plain Ecoregion, and occurs mainly within the Winnipeg and Portage Ecodistricts, in the central portion of the ecoregion (Map 7-1). Other ecodistricts the Project overlaps include Lundar, MacGregor and Gladstone. The ecological classification descriptions below have been obtained from Smith et al. (Smith et al., 1998). Table 7-2 shows the area of land that each ecodistrict occupies.

Table 7-2: Ecodistrict area (ha) and percent (%) coverage of the study area, within the Lake Manitoba Plain Ecoregion

Ecodistrict	**RAA**		**LAA (500 m Buffer)**		**PDA (30 m right-of-way)**	
	Ha	**%**	**Ha**	**%**	**Ha**	**%**
Winnipeg	65,138.6	47.1	6,144.6	62.6	369.3	62.6
Portage	63,274.1	45.7	2,992.8	30.5	181.2	30.7
Lundar	4,897.7	3.5	0	0	0	0
MacGregor	2,698.9	1.9	177.4	1.8	8.5	1.4
Gladstone	2,408.9	1.7	508.2	5.2	30.8	5.2
Total	138,418.2	100	9,823.0	100	589.8	100

7.2.1.1 Prairies Ecozone

The Prairies Ecozone extends north from the Canada-United States border and ranges from the western edge of Alberta to eastern Manitoba. This ecozone comprises the northern extension of the former open grasslands of the Great Plains of North America. The ecozone has a landscape characterized by level to rolling or gently undulating terrain. Agricultural crops dominantly represent the vegetation. Groves of trembling aspen, balsam poplar and bur oak are represented in the prairies. Nearly all the tall grass and mixed grass prairie have been modified by human activity.

7.2.1.2 Lake Manitoba Plain Ecoregion

The lake Manitoba Plain Ecoregion is in the Prairies Ecozone. Extending north from the Canada-United States border to Lake Dauphin, the Manitoba Escarpment marks its western extent (Smith et al., 1998). Agricultural crops and pastureland have changed the landscape from much of the natural vegetation. Stands of trembling aspen, bur oak and grassland communities occur in the ecoregion.

7.2.1.3 Portage Ecodistrict

The Portage Ecodistrict is in the central portion of the Lake Manitoba Plain Ecoregion and extends to the south shore of Lake Manitoba. The land in this ecodistrict consists largely of cultivated fields. Agriculture has replaced most of the native tall grass prairie. Some aspen groves remain along with deciduous forest remnants of elm, green ash, Manitoba maple and basswood along waterways. Bur oak occurs in the upper dry terraces. The Delta Marsh supports cattails, reed grass, and willows. The beach ridges around the marsh support Manitoba maple, aspen and balsam poplar.

7.2.1.4 Winnipeg Ecodistrict

The Winnipeg Ecodistrict lies in the southeastern portion of the Lake Manitoba Plain Ecoregion. This ecodistrict encompasses the City of Winnipeg and subsequent development and drainage associated with the city and the surrounding agricultural land. Originally mostly covered by tall grass prairie, only small remnants of this native vegetation remain on the landscape. Tree cover along the flood plains of the waterways contain Manitoba maple, green ash, cottonwood, basswood, and American elm. A mixture of aspen and bur oak can be found on the upper terraces with an understory of hazelnut, red-osier dogwood, and snowberry.

7.2.1.5 Lundar Ecodistrict

The Lundar Ecodistrict is situated on the northeastern part of the Lake Manitoba Plain Ecoregion. Only limited portions of the ecodistrict are cultivated for spring wheat, other cereal grains, oil seeds and hay crops; much of the land is public land and leased out for native pasture and hay. Many stands of trembling aspen and bur oak have been impoverished by cattle grazing and shrub fires. The ecodistrict provides important wild- life and waterfowl breeding habitat.

7.2.1.6 Gladstone Ecodistrict

The Gladstone Ecodistrict occupies a small area of the west-central portion of the larger Ecoregion. Agriculture has modified much of the natural vegetation. Trembling aspen groves, areas of shrubs, and grasslands were once the native vegetation in the area. Cattails, sedges, and reed grasses dominate the Big Grass Marsh that is found in this ecodistrict.

7.2.1.7 MacGregor Ecodistrict

The MacGregor Ecodistrict occurs on the west side of the Lake Manitoba Plain Ecoregion. Agriculture has significantly modified the natural vegetation in this ecodistrict. The original native vegetation was comprised of tall prairie grasses and sedges dotted with groves of trembling aspen and balsam poplar. Shrubs associated with these stands included Saskatoon, willows, red-osier dogwood, and snowberry.

7.2.2 Geology and hydrogeology

7.2.2.1 Bedrock geology

The dominant bedrock geology in the RAA is from the Ordovician period (Stonewall Formation), Silurian period (Fisher Branch Formation from the Interlake Group) and Jurassic period (Amaranth, Reston, and Melita Formations) (Manitoba Energy and Mines, 1990 and 1997; Manitoba and Mineral Resource 2013).

The Stonewall Formation is approximately 15 to 34 metres thick and consists mainly of pale yellowish grey, faintly mottled, finely crystalline, medium-bedded dolomite that is sparsely fossiliferous. Grey to reddish brownish argillaceous and/or sandy dolomite comprise a basal unit that is approximately 3 metres thick. Within the middle of the formation, a thin, sandy argillaceous marker is present and at the base of the formation, a brown anhydrite bed that has an average thickness of 2.5 to 3 m thick occurs.

The Fisher Branch Formation is approximately 5 metres thick sequence of greyish yellow to light grey dolomite that is partially resistant to weathering and is

characterized as being medium to fine grained and aphanitic, medium to thick bedded and fossiliferous with thin argillaceous and arenaceous marker beds.

The Amaranth Formation ranges in thickness from 0 to 46 metres and consist of two members: the lower Amaranth and upper Amaranth. The lower Amaranth is characterized by hard massive, reddish brown dolomitic shale that becomes siltier and sandier near the base and in some areas progresses into sandstone. Near the top of the formation, medium sized sand grains that are well rounds, frosted and pitted as well as inclusions of fracture filling and anhydrite are present. The upper Amaranth is comprised of large beds of finely crystalline, bluish-white anhydrite with interbeds of greenish grey to brown colored shale and dolomite. Areas of bluish white chert can also be found at the top of the unit.

The Reston Formation ranges in thickness from 0 to 61 metres and is comprised of interbedded light buff, dolomitic, argillaceous, and partly sandy limestones as well as dark grey to greenish grey, rarely reddish to yellowish brown shale. Towards the top of the unit, limestone interbeds tend to be thicker. In addition, sandy and oolitic beds also mark the top of the unit and locally, anhydrite and gypsum are present.

The Melita Formation is primarily a subsurface unit and maximum thickness of the unit is approximately 143 m. As the unit thins, an increase in sand and silt content is evident especially in the lower portion of the formation. The Melita Formation is comprised of two units: the lower Melita and the upper Melita. The lower Melita unit is characterized by various colored shales and interbeds of sandstones, which are more common at the base of the unit. The upper Melita is comprised of darker greenish to brownish grey, slightly calcareous, and silty shales that have interbeds of light grey, variably fossiliferous, sandy limestone that occurs in the upper part of the unit. Interbeds that are thin and consist of fine-grained calcareous or kaolinitic quartzose sand are also evident.

In addition to the dominant bedrock geology, inclusions of bedrock geology from the Devonian period (Ashern Formation, Winnipegosis Formation and Dawson Bay Formation) are also found in the RAA.

The Ashern Formation has variable thicknesses ranging in some areas between 3 and 4.6 metres and in other areas having a subsurface thickness up to 55 metres. In the areas where the formation is thinner, brick red to greyish orange, unfossiliferous, slightly silty, argillaceous dolomite to dolomitic shale can be found. In the areas with thicker subsurface, red bed facies grade upward through variegated green and red shales to grey shales and argillaceous dolomite. Small amounts of anhydrite, iron sulphide and salt casts can also be found in the formation. Carbonate breccia may be evident in basal beds which are contain significant amounts of quartz sand and silt.

The Winnipegosis Formation is common in outcrops along the shores of Lake Winnipegosis and Lake Manitoba and has a thickness that ranges from 13 to 100 metres. Characteristics of the formation include carbonate banks that occur upon "platform" carbonate, a mottled dolomite. These two areas of carbonates are separated by an argillaceous zone. In addition, laminated bituminous carbonates may be evident and anhydrite can be found in the upper part of the formation. In the carbonate banks, fossils can be found and within the outcrop, fossiliferous, yellowish grey dolomite that is porous is evident.

The Dawson Bay Formation has a uniform thickness of 40 to 50 m and is comprised of basal dolomitic mudstone that is overlain by microcrystalline to crypto crystalline, limestone that is fossiliferous overlain by argillaceous carbonate followed by a microcrystalline to sucrosic bituminous limestone. At the top of the unit, is dolomite and anhydrite.

7.2.2.2 Geology and hydrogeology

The surficial geology in the RAA is dominated by offshore glaciolacustrine sediments comprised of clay, silt, and minor sand approximately 1 to 20 metres in thickness. Areas of low relief are associated with these sediments in the form of massive and laminated deposits that came from suspension in the offshore deep water of Glacial Lake Agassiz (Matile, G.L.D and G.R. Keller, 2004a, b and c).

Areas near waterbodies, such as rivers, are comprised of alluvial sediments characterized by sand and gravel, silt, clay, and organic detritus and are approximately 1 to 20 m thick. Sediments along the channels are reworked by the rivers and are deposited as bars (Matile, G.L.D and G.R. Keller, 2004a, b and c).

In the northern portion of the RAA, inclusions of till comprised of calcareous silt diamicton can be found, which are approximately 1 to 25 metres thick. These areas are associated with low relief and are generally streamlined subglacial deposits that have formed from the dolomite and limestone in the area. Areas of thicker deposits consist of multiple units of varying types of textures that are discontinuously covered by thin veneers of less than one metre of glaciolacustrine and glaciofluvial sediments. Also, in the northern portion of the RAA, inclusions of glaciofluvial sediments of sand and gravel approximately 1 to 20 metres thick can be found. These inclusions are complex deposits associated with esker ridges and karnes as well as deposits that are thin and found in areas of low relief (Matile, G.L.D and G.R. Keller, 2004a, b and c).

7.2.2.2.1 Bedrock aquifers

In the area of the RAA from Winnipeg to just west of Portage la Prairie, the majority of the carbonate rocks present are identified as limestone and dolomite of the

Ordiovician and Devonian eras (Rutulis, 1986a). Bedrock aquifers in this portion of the RAA are continuous and have been formed by extensive and thick carbonate rock beds that contain minor shale beds. Domestic wells in these areas typically yield more then 1.0 L/s while the potential of high-capacity wells can have an intermittent yield of greater than 100 L/s. The quality of water ranges from good to very salty, and in the area between Winnipeg and just west of Portage la Prairie, water quality is mostly slightly saline water that is not potable but can be used for livestock and other uses for salty water. The total dissolved solids concentrations range from 2500 mg/L to up to 100,000 mg/L in this area (Rutulis, 1986a).

Near and including the area around Portage la Prairie, in the RAA, water bearing zones have been formed by the limestone and permeable sandstone and shale zones associated with the Jurassic shale, siltstone and gypsum formations. These aquifers tend to contain water that is salty and not a significant source of water supply. The total dissolved solids concentrations range from 5000 mg/L to 100,000 mg/L in this area (Rutulis, 1986a).

7.2.2.2.2 Sand and gravel aquifers

The western portion of the RAA has areas with very few widely scattered minor sand and gravel aquifers. Bedrock is either at the surface, or the surficial deposits in these areas are comprised of sediments such as clay that have low permeability (Rutulis, 1986b).

The eastern portion of the RAA, is characterized by sand and gravel aquifers that overlay till and other surficial deposits. The depth to these sand and gravel aquifers ranges from a few metres to more than 100 metres and the size of the aquifers can range from just less than a hectare to several square kilometres. Yields from wells vary from less than 0.1 L/s to more than 10 L/s and water quality ranges from very poor to excellent (Rutulis, 1986b).

Inclusions of areas with alluvial and glaciofluvial sand and gravel aquifers can be found in the RAA and occur along valleys and meander belts. These aquifers range in size from very small thin pockets to extensive aquifers that are fairly thick. These aquifers' wells' yields range from 0.1 L/S to 50 L/s and water quality ranges from poor to good (Rutulis, 1986b).

7.2.2.2.3 Groundwater

The principal source of water is good quality groundwater extracted from shallow, sandy, surface deposits and gravelly aquifers associated with till (Smith, et al. 1998). These shallow groundwater aquifers occurring in some sand and gravel lenses in the project area have depths ranging from a few meters to more than 100 m. They

typically produce well yields between 0.1 L/s and 10 L/s, with groundwater quality ranging from very poor to excellent (Rutulis, 1986b). There are several groundwater wells that are registered for domestic use within the LAA. These are indicated on Map 7-2.

7.2.3 Terrain and soils

The terrain and soil descriptions below have been obtained from Smith et al. (Smith, et al. 1998) as well as Agriculture and Agri-Food Canada (Agriculture and Agri-Food Canada, 1997, 1999a, 1999b, 1999c and 1999d).

7.2.3.1 Terrain

The portion of the RAA in the RM of Rosser is part of the Red River and Woodlands Plain physiographic regions and is characterized as being generally flat with slopes that are less that 2 percent. Elevation of the land decreases from 242 masl in the west to 230 masl in the southeast and surface drainage, because of the gradual change in slope, is slow. Most surface drainage occurs through man-made ditches to Sturgeon Creek and Omands Creek which both eventually drain to the Assiniboine River. In addition to the ditches in the RM, there are also man-made drains, that provide drainage in the RM for agricultural purposes.

The portion of the RAA in the RM of St. Francois is part of the Red River Valley physiographic region and is classified as being very flat with slopes less that 2 percent. Elevation decreases gradually from 243 masl in the west to 238 masl in the east. Surface drainage is considered very slow and moves through shallow creeks and ditches that eventually drain to the Assiniboine River.

The southern portion of the RM of Woodlands that is in the northern portion of the RAA, has slopes that are generally less than 2 percent and surface drainage that is poorly developed. In areas where there are ridges, runoff collects in the adjoining swales or in marshes and intermittent waterbodies.

The RM of Cartier is also part of the Red River Valley physiographic region that is characterized by slopes that are very flat, generally less than 2 percent. Elevation changes from approximately 240 masl in the west to 235 masl in the east. As a result of the flat topography and gradual change in elevation, drainage is slow towards the La Salle and Assiniboine rivers. Within the RM, there is a network of man-made drains that help with runoff and reduce surface ponding that can occur.

Within the RM of Portage la Prairie, there are four distinct physiographic regions that are found within the RAA: the Lower Assiniboine, Red River Valley, Interlake Plain and Woodlands Plain. Within the Lower Assiniboine physiographic region, surface

topography is characterized as being level to gently undulating lacustrine sands over fine textured materials with depths up to 4 m. Within the Red River Valley physiographic region, topography is level to very gently sloping characterized by fluvial lacustrine loams and lacustrine clays. In the northeast corner of the RM, within the Interlake Plain physiographic region, soils have developed on extremely calcareous loamy glacial and water-worked stony till characterized by a gently undulating topography. In the Woodlands Plain physiographic region between the Interlake Plain and Red River), strongly calcareous loamy to clayey lacustrine sediments underlain by extremely calcareous loam till is present.

7.2.3.2 Soils

Most soils in the RM of Rosser, are comprised of shallow and deep clay lacustrine sediments represented by Black Chernozems in drier areas and Humic Gleysols in area that are level to depressional. Inclusions of Chernozemic Dark Gray Luvisols can be found in the northern portion of the RM of Rosser. As a result of the flat topography, soils are imperfectly to poorly drained resulting in the potential for periodic flooding during spring runoff. Minor areas of poorly drained soils with weak salinity may occur and soils associated with areas of low ridges tend to have slight to moderate stony and cobbly characteristics.

Within the RM of St. François Xavier, soils are dominantly Black Chernozems in drier areas and Humic Gleysols in more level to depressional sites. Chernozemic Dark Gray Luvisols are generally found under wooded vegetation that can be found along the Assiniboine River. Immediately adjacent to the Assiniboine River, Regosolic soils are present. The high clay content of the soils as well as the flat topography results in imperfectly to poorly drained soils resulting in areas that are subject to periodic flooding during spring runoff. Areas of weak salinity in soils can be found on poorly drained sites. Minor areas of poorly drained soils with weak salinity may occur and soils associated with areas of low ridges tend to have slight to moderate stony and cobbly characteristics

Within the RAA, in the RM of Woodland, thin clayey lacustrine and till material, underlain by loam textured stony glacial till can be found. Black Chernozems on calcareous loam till and clayey lacustrine deposits are dominant with inclusions of Humic Gleysols found in level to depressional areas. Soils are characterized as being imperfect to poorly drained because of the flat topography and clayey deposits.

Soils in the RM of Cartier are primarily clayey lacustrine sediments. In areas on the floodplain and near the Assiniboine River, soils with variable texture and stratified alluvial deposits occur. Dominant soils are imperfectly to poorly drained Black Chernozems and Humic Gleysols, however, Chernozemic Dark Gray Luvisols can be

found under wooded vegetation along the Assiniboine River. Immediately adjacent to the Assiniboine River, Regosolic soils can be found.

Soils in the Lower Assiniboine physiographic region of the RM of Portage la Prairie are dominantly imperfectly drained Gleyed Black Chernozems with inclusions of poorly drained Rego Humic Gleysols. In areas where the lacustrine sand sediments have been modified by wind erosion, imperfectly drained Orthic and Gleyed Regosols can be found. Where more coarse loamy textured soils occur, imperfectly drained Gleyed Rego and Gleyed Black Chernozems are present. Poorly drained Rego Humic Gleysols are found in level to depressional areas, and soils closer to Lake Manitoba, near the delta have high water tables. In the Red River physiographic region, soils that are imperfectly drainage as a result of the low relief and medium to fine textured deposits near the surface, include Gleyed Rego Black and Gleyed Solonetzic Black Chernozems. Near the La Salle watercourse, loamy textured well drained Cumulic Regosols and imperfectly drained Gleyed Cumulic Regosols occur. Along the North of the Assiniboine River, imperfectly drained Gleyed Carbonated Rego Black Chernozems on loamy alluvium and deltaic deposits are found. In the Interlake Plain Physiographic Region, dominant soils are well drained Rego Black Chernozems with loam textures. Imperfectly drained soils identified as Gleyed Rego Black Chernozems and Rego Humic Gleysols are present. Inclusions of Orthic Black Chernozems comprised of coarse textured sand and gravel deposits occur. Woodland Plains, physiographic region, imperfectly drained areas are represented by Gleyed Rego Black Chernozems and Rego Humic Gleysols in the poorly drained areas.

7.2.4 Aquatic environment

The project falls within the Assiniboine River watershed. The RAA for the aquatic environment includes the lower Assiniboine River, Shoal Lakes/Delta Marsh, and Whitemud River sub-watersheds (Map 7-3).

7.2.4.1 Surface water hydrology

The RAA is contained within the Prairie ecozone (Smith et al., 1998). Surface water hydrology in the Prairie Ecozone is characterized by large, turbid rivers and streams along with many smaller rivers and creeks that drain the area in a north-easterly direction through the Nelson River drainage system, ultimately draining to Hudson Bay. Many of the major watercourses in these ecozones have been modified or developed to some extent by hydropower, irrigation, flood protection or water management.

The hydrology of the Assiniboine River Basin is consistent with that of prairie river systems with large variability in annual stream flows with peaks occurring during the spring freshet and low flows during fall and winter (Genivar, 2012).

7.2.4.2 Surface water quality

Manitoba Environment, Parks and Climate – Water Quality Management Section has conducted a long-term trend analysis of total nitrogen and total phosphorus at various locations along the Assiniboine River (Jones and Armstrong, 2001). The study found that between 1973 and 1999 there was an incremental increase in total nitrogen and total phosphorus with increasing distance downstream between Brandon and Winnipeg (Jones and Armstrong, 2001).

In general, the Water Quality Index (WQI) for the Assiniboine River, upstream of the RAA, was within categories of 'Fair' and 'Good', with total phosphorous typically responsible for driving down the WQI (AHCD, n.d.).

7.2.4.3 Fish species

The MMF (2022) report harvesting a wide range of fish species in the RAA including black crappie, sunfish, brown trout, bullhead, burbot (mariah), carp, channel catfish, freshwater drum, goldeye, mooneye, northern pike (jackfish), perch, rainbow trout, rock bass, sauger, sucker, walleye (pickerel), white bass, sturgeon, chubb, and drum bass.

The Assiniboine River and its tributaries provide habitat for 65 species of fish (Cleator et. al., 2010), including many recreationally important species (Nelson and Franzin 2000). Fish species included northern pike (*Esox lucius*), walleye (*Sander vitreus*), goldeye (*Hiodon alosoides*), channel catfish (*Ictalurus punctatus*), lake sturgeon (*Acipenser fulvescens*) and suckers (e.g., *Catostomus spp*.).

Fish species include spring-spawners (with species such as walleye and sucker spawning in rocky areas in larger rivers or lakes, and species such as northern pike spawning in weedy flooded areas of terrestrial vegetation), and species such as lake whitefish that spawn in rocky areas in larger rivers or lakes in the fall (Stewart and Watkinson, 2004).

Several forage species such as brook stickleback and fathead minnow can spawn in the early summer and are tolerant of warm low oxygen conditions in the weedy ponds they inhabit.

The burbot spawns in midwinter (Stewart and Watkinson, 2004).

Milani (2013) sampled several sites along Long Lake Drain. Fish species captured included walleye, pike, black bullhead, white sucker, brook stickleback, common carp, fathead minnow, river shiner.

7.2.4.4 Fish habitat

The MMF (2022) report ecologically sensitive locations in the RAA including fish spawning areas for carp, perch, pickerel/walleye and other species.

North of the Assiniboine River, the banks of most watercourses passing through the RAA have been cleared of native vegetation cover. Agricultural activities, including cultivation, pastures, and haying, occur to the waterline of many watercourses.

The riparian zones of watercourses within the route planning area are composed of grassland/rangeland (a mix of mixed native and/or tame prairie grasses and herbaceous vegetation – 34%), Cultivated (23%), forested (21%), water / wetland (18%) and developed (roads / urban – 4%) land cover types.

7.2.4.5 Stream crossings

The proposed transmission line traverses fifteen (15) waterbodies. Table 7-3 provides a list of the streams crossings as well as the landcover classes (hectares) within the riparian area of each stream crossing.

Table 7-3: Landcover classes within the riparian area of each stream crossing

Site	Watercourse Name	Existing Land Cover within the Riparian PDA (hectares)			
		Agriculture	Developed	Grass / shrubs	Forested
1	Unnamed drain	0	0.17	0.88	0
2	Old Sturgeon Creek	0.24	0.12	0	0
3	Sturgeon Creek	0	0	0.51	0
4	Elkers Drain	13.17	5.034	0.76	0
5	Long Lake Drain	0.026	0	0.35	0
6	Long Lake Drain	0.17	0.0053	0.63	0
7	East Blind Channel	0.065	0	0.31	0
8	East Blind Channel	0	0.31	1.10	0

9	East Blind Channel	0	0.27	0.88	0
10	West Cram Creek	0.37	0.067	0	0
11	East Outside Drain	0.14	1.066	2.48	0
12	Portage Diversion	0	0	0.36	0
13	Unnamed Drain	0.71	0.99	0.41	0
14	Unnamed Drain	0.0084	0.16	0.20	0
15	Unnamed Creek	0	0.080	0.28	0

7.2.4.6 Species of conservation concern

Species of conservation concern (SOCC) (Table 7-4) include those listed by *The Endangered Species and Ecosystems Act* (ESEA) (Manitoba), the federal *Species at Risk Act* (SARA), and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The Species at Risk public registry and the Manitoba Conservation Data Centre (MBCDC) website were reviewed to determine species presence in the RAA.

Table 7-4: Aquatics species of conservation concern occurring within the regional assessment area

Scientific Name	Common Name	ESEA	SARA	COSEWIC
Ichthyomyzon castaneus	Chestnut Lamprey	-	Special Concern	-
Quadrula quadrula	Mapleleaf	Endangered	Threatened	-
Ictiobus cyprinellus	Bigmouth Buffalo	-	Special Concern	Special Concern

The following aquatic priority species are potentially present:

- Chestnut Lamprey (*Ichthyomyzon castaneus*);
- Bigmouth Buffalo (*Ictiobus cyprinellus*); and
- Mapleleaf Mussel (*Quadrual quadrula*).

In addition to these SOCC, additional considerations are commercial, recreational, aboriginal fisheries, which are protected by the Fisheries Act and invasive species such as the zebra mussel. The D83W project is not anticipated to cause an increase in the spread of invasive species.

7.2.4.7 Chestnut lamprey

The Chestnut Lamprey is currently listed as Special Concern on Schedule 3 of the SARA. It has been found historically in the Qu'Appelle and Assiniboine Rivers but has not been captured since 2001 in either (COSEWIC 2010). Sightings in Saskatchewan by anglers on the Assiniboine and Qu'Appelle Rivers indicate that it may still be present in the area (COSEWIC 2010). Lamprey are not effectively sampled by any collection gear so they may be more common and widespread than current data suggests (Stewart and Wilkinson 2004).

Spawning occurs in mid- to late-June and the presence of suitable hosts is likely the most important factor for habitat suitability for adults (Stewart and Wilkinson 2004).

Larval chestnut lamprey burrow in firm sand-mud substrates in fast flowing water (Scott and Crossman 1979).

Potential threats to the chestnut lamprey include destruction of spawning habitat through soil erosion causing siltation, eutrophication through runoff of fertilizers and pesticide and herbicide pollution affecting both Chestnut Lamprey and its hosts (COSEWIC, 2010).

7.2.4.8 Bigmouth buffalo

The Bigmouth Buffalo is listed as a species of special concern under Schedule I of the SARA. A disjunct population of the Bigmouth Buffalo is found in the Assiniboine River drainage (COSEWIC 2009a). In Manitoba, it is found mainly in the lower reaches of the Assiniboine River downstream of Portage la Prairie (Stewart and Watkinson 2004). The Saskatchewan Water Security Agency (2014) lists the Bigmouth Buffalo as being present in the lower reaches of the Qu'Appelle River. Based on the distribution map (COSEWIC, 2009a), it is unlikely for Bigmouth Buffalo to occur in the D83W project's RAA. As successful reproduction appears to be associated with flooding of shoreline vegetation, loss of spawning habitat associated with regulated water levels is a threat to Bigmouth Buffalo (COSEWIC, 2009a).

7.2.4.9 Mapleleaf

The Mapleleaf was designated Endangered in April 2006 but was re-examined and designated Threatened in November 2016 (COSEWIC 2016b). It is listed as Endangered under Schedule I of the SARA and under *The Endangered Species and Ecosystems Act* (Manitoba).

In Manitoba, the species is found in the Red River and some tributaries, the Assiniboine River, and Lake Winnipeg and some tributaries (COSEWIC 2016b). In the late 1990s, mussels were sampled at 185 sites all along the Assiniboine River and

larger tributaries, including sites as far upstream as Silver Creek and the Qu'Appelle River (Watson et al., 1998). Mapleleaf were captured at six sites, all downstream of Portage la Prairie. In 2007, four live mapleleaf were recorded near the city of Brandon, providing evidence that mapleleaf distribution spans the Assiniboine River both above and below the Portage Diversion (Bouvier and Morris, 2011). Mapleleaf are found in a variety of habitats, including medium to large rivers with slow to moderate current and has been recorded from mud, sand, and gravel substrates (COSEWIC, 2016b).

In Manitoba this species is threatened by habitat loss and degradation and the effects of invasive species, particularly zebra mussel (COSEWIC, 2016b). Zebra mussels now threaten mapleleaf mussel in Manitoba, with zebra mussel populations becoming established in the Red River, Lake Winnipeg, and in reservoirs in the Red River watershed in North Dakota and Minnesota (COSEWIC, 2016b).

Habitat changes associated with zebra mussels and modifications to the banks of the Red and Assiniboine rivers (e.g., rip-rap and dikes) that alter the flow hydrology of these rivers are threats (COSEWIC, 2016b).

The D83W project does not cross the Assiniboine River and as a result, effects to mapleleaf mussels are not anticipated.

7.2.5 Vegetation

Desktop data and field surveys were conducted to characterize the existing biophysical information and vegetation resources in the RAA. The vegetation field report for the project is provided in Appendix F. Valuable knowledge regarding vegetation was also gained from the First Nation and Métis Engagement Program including the Manitoba Metis Knowledge, Land Use, and Occupancy Study (MMF, 2022).

The proposed D83W project lies within the Aspen-Oak Section of the Boreal Forest Region (Rowe, 1959) of Manitoba. This is a transitional zone between forest and prairie vegetation of west-central Canada. The deciduous element of the boreal forest forms grove land where elements of prairie are intermixed.

Across North America, grassland ecosystems once existed over large areas (Sampson and Knopf 1994), yet few undisturbed natural areas remain today, as losses to grasslands have exceed those of other major biomes (Hoekstra et al., 2005). Although at a slower pace, grasslands losses continue in some areas. The health and persistence of native grasslands is threatened by a combination of agricultural expansion, energy development, fire suppression, trembling aspen encroachment, invasion of exotic species, and fragmentation. Despite these pressures, remnant

grasslands remain important habitats for threatened species, and their preservation is vital to conserve biodiversity.

Within the Prairies Ecozone of Manitoba's ecological landscape stratification lies the Lake Manitoba Plain Ecoregion (Smith et al., 1998) (Section 7.2.1). The Lake Manitoba Plain Ecoregion historically was comprised of prairie grasslands and stands of trembling aspen (*Populus tremuloides*) and bur oak (*Quercus macrocarpa*); however domestic crops and pastureland have now replaced much of the natural vegetation. Some groves remain along with deciduous forest remnants of trembling aspen, balsam poplar (*Populus balsamifera*), elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*), and Manitoba maple (*Acer negundo*) on moist sites. Bur oak and grassland communities dominate drier sites. Stands of trees could also be intermixed with shrub species such as willows (*Salix spp*.), Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*) and snowberry (*Symphoricarpos occidentalis*), and various herbs in the understory. Grasses in the region include fescue (*Festuca spp*.), wheat grass (*Elymus spp*.), June grass (*Koeleria macrantha*) and Kentucky bluegrass (*Poa pratensis*). Poorly drained areas support slough grasses (*Beckmannia syzigachne*), marsh reed grass (*Calamagrostis canadensis*), sedges (*Carex spp*.), cattails (*Typha spp*.) and willows. The proposed project occurs almost entirely within the Winnipeg (47.1%) and Portage (45.7%) Ecodistricts (see Section 7.2.1).

Within the RAA, 10 land use/land cover classes are identified from the Manitoba Land Cover Classification (Map 7-4). Table 7-5 shows the broad land use/ land cover types (Manitoba Conservation 2006) determined (calculated) for the assessment areas. These classes include native vegetation of range and grassland, deciduous forest, and marsh wetland. The water class includes rivers and streams. Agricultural forage crops and fields, cultural features, and roads and rail lines are also identified.

Table 7-5: Land use / land cover class area (ha) and percent (%) coverage in the study area

Land Use/ Land Cover Class	**RAA**		**LAA**		**PDA**	
	Ha	**%**	**Ha**	**%**	**Ha**	**%**
Agricultural Field	108,799.8	78.6	8,462.8	86.2	475.7	80.7
Range and Grassland	14,468.2	10.5	620.0	6.3	32.7	5.5
Deciduous Forest	5,482.3	4.0	50.0	0.5	1.9	0.3
Roads, Trails and Rail Lines	4,707.3	3.4	404.6	4.1	73.1	12.4
Agricultural Forage Crops	3,261.7	2.4	225.0	2.3	5.8	1.0
Water Body	877.8	0.6	15.8	0.2	0.3	0.05
Wetland Marsh	410.0	0.3	1.1	0.01	0	0
Cultural Features	308.5	0.2	43.3	0.4	0.3	0.05
Sand and Gravel	61.6	0.04	0	0	0	0
Open Deciduous Forest	41.1	0.03	0.7	0.007	0	0

More than 85% of the land is used for agriculture (agricultural field, range and grassland and agricultural forage crops) in the RAA, LAA and PDA, with the majority falling under the agricultural field class. Less than five percent of the RAA consists of forested stands, mainly in the northcentral portion of the study area and along waterways. Less than 10% of the LAA is forested. Wetlands and waterbodies make up less than one percent of the RAA.

7.2.5.1 Vegetation in the project development area

Vegetation surveys for the D83W project were conducted in June and July 2022 (see Vegetation Technical Report, Appendix F). The primary objective was to visit various sites to describe the vegetation communities in the RAA and potential for rare plants and noxious weeds along the proposed transmission line route for the D83W project.

7.2.5.1.1 Vegetation community types

Of the 28 vegetation sites visited during surveys, eight vegetation community types were identified, as described below.

7.2.5.1.1.1Deciduous Forest Community Types

Bur Oak-Black Ash/Wild Sarsaparilla

This community type was a closed-canopied (>60%) deciduous forest composed of bur oak (*Quercus macrocarpa*) and black ash (*Fraxinus nigra*), with a presence of basswood (*Tilia americana*) in the tree layer (Figure 7-1). The tall shrub stratum (1 to 3 m in height) was poorly developed with only highbush-cranberry (*Viburnum opulus*) observed. The herb and low shrub stratum (<1 m height) consisted of 19 species, dominated by open cover (>25-60%) of wild sarsaparilla (*Aralia nudicaulis*). Low shrubs recorded included red baneberry (*Actaea rubra*), bur oak, green ash (*Fraxinus pennsylvanica*), prickly rose (*Rosa acicularis*), dewberry (*Rubus pubescens*) and western snowberry (*Symphoricarpos occidentalis*). One Imperilled species (S2) was recorded in this community type (black ash), and three Vulnerable species (S3S4): basswood, crested shield fern (*Dryopteris cristata*), and riverbank grape (*Vitis riparia*).

Figure 7-1: Bur Oak-Black Ash / Wild Sarsaparilla community type

Trembling Aspen/Tall Shrub

The Trembling Aspen/Tall Shrub community type had an open-canopy (>25-60%) of trembling aspen (*Populus tremuloides*) with a minor presence of bur oak (*Quercus macrocarpa).* In total, 28 species were recorded in this vegetation type, over two sites. Three species were recorded in the tall shrub stratum, with moderate cover (25%) of Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*), and trembling aspen. Twenty-three species were recorded in the herb and low shrub stratum, including three grasses, 15 forbs and five low shrubs. Species constant over both sites were prickly rose (*Rosa acicularis*), western snowberry (Symphoricarpos occidentalis), Kentucky bluegrass (*Poa pratensis*), northern bedstraw (*Galium boreale*), snakeroot (*Sanicula marilandica*), common dandelion (*Taraxacum officinale*), veiny meadow-rue (*Thalictrum venulosum*), poison-ivy (*Toxicodendron rydbergii*) and American purple vetch (*Vicia americana*). Abundant leaf litter, with deadfall and mosses accounted for the ground layer. Similar vegetation has been classified by others (e.g., Zoladeski et al., 1995).

One Imperilled species (S2) was observed in this vegetation type, large enchanter's-nightshade (*Circaea canadensis ssp. canadensis*). This plant community was found in the northern portion of the study area, along the Portage Community Pasture. Figure 7-2 shows the Trembling Aspen/Tall Shrub community type.

Figure 7-2: Trembling Aspen / Tall Shrub community type

Green Ash-Manitoba Maple/Tall Shrub

This deciduous tall shrub community type consisted primarily of open-canopied hardwoods dominated by green ash (*Fraxinus pennsylvanica*) and Manitoba maple (*Acer negundo*). Other tree species recorded in the canopy included American elm (*Ulmus americana*) and cottonwood (*Populus deltoides*). The tall shrub layer (>1 m) consisted of closed cover (>60%) dominated by red-osier dogwood (*Cornus sericea*) and wild black currant (*Ribes americanum*). Other species recorded in this stratum included common caragana (*Caragana arborescens*) and willows (*Salix spp.*). The low shrub and forb layer was poorly developed, with nine species recorded. Graminoids were dominated by non-native grasses of smooth brome (*Bromus inermis*), quackgrass (*Elymus repens*) and meadow timothy (*Phleum pratense*). One Vulnerable species was recorded in this vegetation type (cottonwood, S3S5). This community type was surveyed in two locations along the final preferred route (Figure 7-3).

Figure 7-3: Green Ash-Manitoba Maple / Tall Shrub community type

Riparian Forest

The Riparian Forest vegetation consisted of open to close-canopied deciduous cover occurring along existing waterways in the study area (Figure 7-4). In total, 32 plant species were recorded in this community type across five sites surveyed. Manitoba maple (*Acer negundo*) was constant across sites, with other trees including American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*) and cottonwood (*Populus deltoides*). Cottonwoods measured at the Assiniboine River were 31.5 m in height. Eleven species were recorded in the tall shrub stratum that consisted mainly of highbush-cranberry (*Viburnum opulus*), Manitoba maple, sandbar willow (*Salix exigua*) and other willows (*Salix spp*.). A well-developed low shrub and herb stratum (<1 m height) was composed of several species. Species with high constancy (occurred in at least 60% of sites) included wild cucumber (*Echinocystis lobata*), common milkweed (*Asclepias syriaca*), reed canarygrass (*Phalaris arundinacea*) and lesser duckweed (*Lemna minor*). Similar vegetation was recorded in another study in the region (Szwaluk Environmental Consulting, 2020). Vulnerable species recorded in this community type included cottonwood (S3S5) and common milkweed (S3S4) along the roadside.

Figure 7-4: Riparian Forest community type

7.2.5.1.1.2Wetland community types

Marsh Wetland

This community type was a low to intermediate height (approximately 1 m), closed-canopied (>60% cover) marsh wetland (National Wetlands Working Group, 1997) dominated by common cat-tail (*Typha latifolia*). Sandbar willow (*Salix exigua*) with other willow species (*Salix spp*.) were the only tall shrubs observed at these sites. Characteristic graminoid species were bluejoint reedgrass (*Calamagrostis canadensis*), reed canarygrass (*Phalaris arundinacea*), tall mannagrass (*Glyceria grandis*), common reedgrass (*Phragmites australis*), and sedges (*Carex spp*.). Forb species (12 plants) made up a minor component of the total vegetation cover. This vegetation was associated with areas of standing or slow-moving water that was permanently or seasonally flooded. Marsh wetlands may experience water level drawdowns which will result in portions drying up and exposing the sediments (National Wetlands Working Group, 1997). Five surveys were completed throughout the study area of this vegetation type. Figure 7-5 shows the Marsh Wetland community type. Similar wetlands were also described in the region by Szwaluk Environmental Consulting (2020).

Figure 7-5: Marsh wetland community type

Meadow Wetland

The Meadow Wetland community typically consisted of bluejoint reedgrass (*Calamagrostis canadensis*) with a mixture of native and non-native herb species. Other graminoids included smooth brome (*Bromus inermis*), quackgrass (*Elymus repens*), wild barley (*Hordeum jubatum*), reed canarygrass (*Phalaris arundinacea*), and meadow timothy (*Phleum pratense*).

In total, 16 species were recorded over two sites, eight of which included forbs. The tall shrub stratum was poorly developed with only few species encountered, trembling aspen (*Populus tremuloides*) and willows (*Salix* spp.). The water regime is semi-permanently to seasonally flooded in areas. Trees were absent from this community type, located near the Portage Diversion. Figure 7-6 shows the Meadow Wetland community type.

Figure 7-6: Meadow Wetland community type

7.2.5.1.1.3Herbaceous community types

Prairie Grassland

The Prairie Grassland vegetation was a low-growing community type dominated by a mixture of grasses, forbs, and low shrubs (Figure 7-7). The prairie grasslands surveyed showed evidence of cattle grazing. Remnant areas of prairie interspersed among trembling aspen are typical of the landscape in the region (Shay, 1999). In total, 27 species were recorded at two sites during surveys along the Portage Community pasture, in the northern portion of the study area. Graminoids were dominated by a mixture of creeping bent grass (*Agrostis stolonifera*), big bluestem (*Andropogon gerardii*), bluejoint reedgrass (*Calamagrostis canadensis*), creeping spikerush (*Eleocharis palustris*), and Kentucky bluegrass (*Poa pratensis*). Low shrub (<1 m) and forb species, common to both surveys, included shrubby cinquefoil (*Dasiphora fruticosa*), prickly rose (*Rosa acicularis*), common yarrow (*Achillea millefolium*), harebell (*Campanula rotundifolia*), and common dandelion (Taraxacum officinale). Other prairie grassland species recorded were silverberry (*Elaeagnus commutata*), western snowberry (*Symphoricarpos occidentalis*), streamside fleabane (*Erigeron glabellus*), smooth wild strawberry (*Fragaria virginiana*), great blanketflower (*Gaillardia aristata*), northern bedstraw (*Galium boreale*), wild licorice (*Glycyrrhiza lepidota*), black-eyed Susan (*Rudbeckia hirta*), Canada goldenrod (*Solidago*

canadensis) and smooth aster (*Symphyotrichum laeve*). Common milkweed (S3S4) is a Vulnerable species recorded along the roadside.

Species typical of these grasslands in the region have also been recorded by Shay (1999), and included little bluestem (*Schizachyrium scoparium*), sand dropseed (*Sporobolus cryptandrus*), wood lily (*Lilium philadelphicum*), white camas (*Anticlea elegans*), three-flowered avens (*Geum triflorum*), thimbleweed (*Anemone cylindrica*), wild bergamot (*Monarda fistulosa*), silvery scurfpea (*Pediomelum argophyllum*), meadow blazingstar (*Liatris ligulistylis*), Canada milkvetch (*Astragalus canadensis*), purple prairie clover (*Dalea purpurea*), white prairie-clover (*Dalea candida*), stiff goldenrod (*Solidago rigida*), many-flowered aster (*Symphyotrichum ericoides*) and fragrant false indigo (*Amorpha nana*). The grassland remnants in the region have been impacted by cattle grazing and haying (Shay, 1999).

Figure 7-7: Prairie Grassland community type

Disturbed Ground

Disturbed ground consisted of roadside ditches and ground that has been previously altered (Figure 7-8). Nine sites surveyed were grouped together to represent disturbed ground vegetation. The Portage Diversion is Crown land intersected by the D83W Project where vegetation has been previously altered. These sites typically support plants of low to intermediate height (<1 m), dominated by non-native species. Thirty-two plant species were recorded in these sites, with seven graminoids including smooth brome, barnyard grass (*Echinochloa crus-galli*), quackgrass (*Elymus*

repens), slender wildrye (*Elymus trachycaulus*), wild barley (*Hordeum jubatum*), reed canarygrass (*Phalaris arundinacea*), and Kentucky bluegrass (*Poa pratensis*). Widespread forbs (species occurring in greater than four surveys) were Canada anemone (*Anemone canadensis*), Canada thistle (*Cirsium arvense*), sweet clover (*Melilotus* sp.) and common dandelion (*Taraxacum officinale*). Eighteen other forbs were recorded in the disturbed ground vegetation. Low shrubs included shrubby cinquefoil (*Dasiphora fruticosa*), prickly rose (*Rosa acicularis*), and western snowberry (*Symphoricarpos occidentalis*). Disturbed ground was surveyed roadside adjacent to agricultural land use and at the Portage Diversion, at two locations.

Figure 7-8: Disturbed ground vegetation

7.2.5.1.2 Invasive and non-native plant species

Information on invasive and noxious plant species was collected by reviewing relevant legislation and sources identifying these species (e.g., Invasive Species Council of Manitoba; *The Noxious Weeds Act*).

During vegetation surveys, 40 species were considered non-native or invasive (see Appendix F for a complete list of non-native or invasive species found). Thirty-five species are ranked SNA (conservation status rank not applicable), four species have conservation ranks (S3S4 to S5), and one species is ranked SU or unrankable (Manitoba Government 2022a). Of these species, two are Tier 2 Noxious weeds (leafy spurge - *Euphorbia virgata*; and oxeye daisy - *Leucanthemum vulgare*) while 14 are

considered Tier 3 Noxious weeds (Manitoba Government 2022c). In Manitoba, the *Noxious Weeds Regulation* lists approximately 90 plant species as noxious under the *Noxious Weeds Act*, with Tier I noxious weeds as the most threatening species. Nineteen species are considered invasive plants with the Canadian Food Inspection Agency (2008), while the Invasive Species Council of Manitoba (2022) lists seven species as invasive. Figure 7-9 and Figure 7-10 show leafy spurge and oxeye daisy, respectively.

Figure 7-9: Leafy spurge observed along the final preferred route

Figure 7-10: Oxeye daisy observed in the study area

Milkweeds (*Asclepias spp*.) are noxious species that may be harmful to livestock if ingested. Milkweeds are an ecologically important species for the monarch butterfly (*Danaus plexippus*) and were observed in many roadside ditches. COSEWIC has designated the monarch butterfly as Endangered. In July of 2022, the monarch butterfly was added to the International Union for the Conservation of Nature's "Red List" of Threatened species and categorized as Endangered – two steps from extinct. Milkweed occurrences along the final preferred route are identified in Table 7-7.

The most prominently represented families of noxious, invasive, and non-native species are Asteraceae (10 species), Fabaceae (nine species), Poaceae (seven species), and Brassicaeae (three species). Most non-native or invasive species were recorded in roadside ditches and land that has been altered (The Portage Diversion).

7.2.5.2 Vegetation important to First Nations people and Métis Citizens

Vegetation of importance to First Nations people and Métis Citizens for harvesting and gathering in the Project area were identified through the First Nation and Métis Engagement Process. The MMF's Manitoba Metis Knowledge, Land Use, and Occupancy Study (2022) describes flowers, berries, trees, willows, mushrooms, forbs, and grasses that are used for food and medicines in the Portage la Prairie area. These plants were shown to occur in a wide variety of areas with some concentrations near waterways and natural areas.

7.2.5.3 Species of conservation concern

Species of conservation concern include those plants listed by the MBCDC as Critically Imperilled to Vulnerable, per the ESEA, SARA, and COSEWIC.

According to provincial sources, there are 105 plant SOCC that can be expected to range within the Lake Manitoba Plain Ecoregion. Currently, there are 10 species listed as at risk in the ecoregion, with either ESEA, SARA, or COSEWIC (Table 7-6).

Table 7-6: Plant species listed at risk in the Lake Manitoba Plain Ecoregion

Scientific Name	Common Name	ESEA	SARA	COSEWIC
Agalinis aspera	Rough Agalinis	Endangered	Endangered	Endangered
Agalinis gattingeri	Gattinger's Agalinis	Endangered	Endangered	Endangered
Celtis occidentalis	Hackberry	Threatened	-	-
Cypripedium candidum	Small White Lady's-slipper	Endangered	Threatened	Threatened
Dalea villosa	Hairy Prairie-clover	Threatened	Special Concern	Special Concern
Fraxinus nigra	Black Ash	-	-	Threatened
Solidago riddellii	Riddell's Goldenrod	Threatened	Special Concern	Special Concern
Symphyotrichum sericeum	Western Silvery Aster	Threatened	Threatened	Threatened
Vernonia fasciculata	Western Ironweed	Endangered	Endangered	Endangered
Veronicastrum virginicum	Culver's-root	Threatened	-	-

Based on MCDC provincial records, 20 SOCC and two natural plant communities of conservation concern occur within the RAA. Ten species are ranked Critically Imperilled (S1S2) or Imperilled (S2 to S2S3), eight species are ranked Vulnerable (S3 to S3S4), and two species are currently without ranks (Table 7-6). Rough agalinis (*Agalinis aspera*) is listed as Endangered under ESEA, SARA and COSEWIC. Both natural plant communities are ranked Vulnerable (S3? To S3S4). A list of the 20 SOCC can be found in the Vegetation Technical Report in Appendix F.

During the vegetation surveys conducted in June and July 2022, eight SOCC were recorded and are summarized below in Table 7-7. Among these, two are ranked Imperilled species (S2) and six are ranked Vulnerable species (S3S4 to S3S5) by the MCDC. Imperilled species include black ash (*Fraxinus nigra*) and large enchanter's-nightshade (*Circaea canadensis ssp. canadensis*). Black ash was observed at one site occurring in the tree layer of a deciduous stand mixed with bur oak and basswood. Under COSEWIC, black ash is listed as a threatened species. Large enchanter's-nightshade was also recorded at one location in a trembling aspen stand, with 10 plants observed. Elsewhere in the study area, the vulnerable species were observed in both forest and roadside ditch vegetation. These species included common milkweed (*Asclepia syriaca*), crested shield fern (*Dryopteris cristata*), cottonwood (*Populus deltoides*), basswood (*Tilia americana*), narrow-leaved cat-tail (*Typha angustifolia*) and riverbank grape (*Vitis riparia*). Measured cottonwood height ranged from 17.5 to 31.5 m (mean 25.8 m) with a diameter at breast height ranging from 18 to 87 cm (mean 44.8 cm).

Table 7-7: Species of conservation concern recorded in the study area

Scientific Name	Common Name	Rank	Site	Vegetation
Imperilled Species (S2)				
Circaea canadensis ssp. *canadensis*	Large Enchanter's-Nightshade	S2	11	Deciduous forest
Fraxinus nigra	Black Ash	S2	13	Deciduous forest
Vulnerable Species (S3S4 to S3S5)				
Asclepia syriaca	Common Milkweed	S3S4	12, 14, 15, 17, 20, 31, 62	Roadside Herbaceous
Dryopteris cristata	Crested Shield Fern	S3S4	13	Deciduous forest
Populus deltoides	Cottonwood	S3S5	1, 12, 14, 56, 57, 65, 66, 70, 71	Deciduous forest, Roadside Herbaceous
Tilia americana	Basswood	S3S4	13, 71	Deciduous forest
Typha angustifolia	Narrow-leaved Cat-tail	S3S4	8	Wetland
Vitis riparia	Riverbank Grape	S3S4	13	Deciduous forest

No other species at risk listed under ESEA, SARA, or COSEWIC were observed during surveys. According to Friesen and Murray (2011), rough agalinis (*Agalinis aspera*) is known to occur in the northern portion of the regional study area (not including the final preferred route), and is listed as Endangered by ESEA, SARA and COSEWIC. No natural plant communities of conservation concern were observed within the study area. Figure 7-11 and Figure 7-12 show black ash and large enchanter's-nightshade, respectively.

Figure 7-11: Black ash observed in the field

Figure 7-12: Large enchanter's-nightshade observed in the field

7.2.6 Wildlife

Existing conditions for wildlife were summarized from a desktop review of existing literature and through field studies. Valuable knowledge regarding wildlife was also gained from the First Nation and Métis Engagement Process, including the Manitoba Métis Knowledge, Land Use, and Occupancy Study (2022).

Migration bird surveys were conducted in April 2022 and were implemented to document the presence and abundance of spring migrating species that may be using habitat as stopover locations along the preferred D83W transmission line route. In addition to migration surveys, breeding bird surveys were conducted in June and July of 2022 to document the presence and absence of breeding and non-breeding bird species in different habitats found along the preferred D83W transmission line route.

In August 2022 mammal surveys were conducted to document the presence of any wildlife species that occur within the preferred D83W transmission line route. Identification and documentation of mammal species present along the preferred transmission line route occurred through visual observations of mammal species and mammal track identification.

Detailed methods and additional information for the migration and breeding bird surveys as well as mammal surveys can be found in field reports in Appendix C.

7.2.6.1 Amphibians and reptiles

Desktop data were analyzed to characterize the existing condition of amphibians and reptiles in the region. Sources included the Canadian Herpetological Society, The Manitoba Herps Atlas, the MCDC (Lake Manitoba Plain Ecoregion), and The Amphibians and Reptiles of Manitoba (Preston, 1982). Information on species important to Indigenous peoples was received through the First Nation and Métis Engagement Process (Chapter 5.0). Public engagement documents (Chapter 4.0) were also reviewed.

The Assiniboine River, Red River and Lake Manitoba drainage basins overlap the RAA and support a variety of amphibian and reptile species (herptofauna). Eight amphibian species have their distribution overlap with the RAA and include the mudpuppy (*Necturus maculosus*), western tiger salamander (*Ambystoma mavortium*), Canadian toad (*Anaxyrus hemiophrys),* gray treefrog (*Hyla versicolor*), Cope's gray treefrog (H*yla chrysoscelis*), boreal chorus frog (*Pseudacris maculata*), wood frog (Lithobates sylvaticus), and northern leopard frog (Lithobates pipiens). Six reptiles expected to occur within the RAA are the snapping turtle (*Chelydra serpentina*), western painted turtle (*Chrysemys picta bellii*), red-bellied snake (storeria

occipitomaculata), plains gartersnake (*Thamnophis radix*), red-sided gartersnake (*Thamnophis sirtalis parietalis*), and smooth green snake (*Opheodrys vernalis*).

Amphibians and reptiles typically are found in natural habitats such as wetlands, riparian areas, forests, and grasslands. Table 7-5 shows the land use/land cover classes for the regional assessment area. A portion of the project route (<6 ha) will traverse natural habitats that would be expected to support amphibian and reptile species. Ditches adjacent to municipal roads will provide marginal habitat for amphibians and reptiles.

7.2.6.2 Birds

Data from desktop reviews and field studies were analyzed to characterize the existing biophysical information about birds in the D83W project area. Desktop data review sources included the Species at Risk Act Public Registry, COSEWIC List of Canadian Wildlife at Risk, The Manitoba Endangered Species and Ecosystems Act List of Species at Risk, MCDC, and the Manitoba Breeding Bird Atlas.

The D83W project area is located within two of Bird Studies Canada' regions in Manitoba, South-Central and Red River Valley, which support approximately 200 species of breeding birds (Bird Studies Canada, 2021). This includes 151 species for which evidence of breeding has been identified within the 26, ten kilometre by ten kilometre survey squares that cover the RAA (See Appendix C).

Suitable habitat for many bird species, including several of the SOCC can be found within the RAA. Grasslands provide habitat for many bird species, including Bobolink (*Dolichonyx oryzivorus*), Sprague's Pipit (*Anthus spragueii*), and Short-eared Owl (*Asio flammeus*). Although native prairie is rare and not likely to be found in the RAA, pastures, hay lands, and even no-till agricultural lands can support many grassland bird species. Forests, forest edges, and shelter belts within the project study area, provide suitable habitat for many bird species, including Olive-sided Flycatcher (*Contopus cooperi*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Eastern Wood Pewee (*Contopus virens*), and Whip-poor Will (*Antrostomus vociferus*).

Although most of the project study area is comprised of agricultural land, some forested areas remain, including riparian forest along the Assiniboine River, and deciduous stands and shelterbelts that are integrated within the agricultural areas. Wetlands can be utilized as nesting and foraging habitat for many birds, including Yellow Rail (*Coturnicops noveboracensis*), Chimney Swift (*Chaetura pelagica*), and Barn Swallows (*Hirundo rustica*). Grants Lake Wildlife Management Area (WMA) an important bird area (IBA), located within the project study area, is a marsh wetland that is important for supporting large populations of geese, ducks, and other wetland

birds. The RAA also has riparian wetlands along the Assiniboine River and several smaller watercourses that can support wetland bird species. Within the PDA, most land traversed by the proposed transmission line is agricultural land (>80%). According to the land cover classification (Table 7-5) approximately 32.7 hectares (5.5%) of range and grassland, 1.9 hectares (0.3%) of forested land and no wetlands are traversed by the proposed D83W project.

7.2.6.2.1 Migration Surveys

Migration surveys were conducted during spring migration in April 2022. The information collected during the migration surveys supplements the existing avian occurrence data with additional information on the presence and abundance of spring migrating species using any stopover habitat on or in the vicinity of the proposed transmission line route. Detailed methods used for the migration surveys are included in the Birds and Mammals Field Report (Appendix C).

At least 33 bid species (Table 7-8) and 1165 individuals were observed and/or heard from five migration sites identified for the surveys (Birds and Mammals Field Report Appendix C).

Table 7-8: Bird species recorded during migration surveys

Form	Scientific Name	Common Name
Grebes	*Podilymbus podiceps*	Pied-billed Grebe
Pelicans	*Pelecanus erythrorhynchos*	American White Pelican
Duck, swans, geese	*Bucephala albeola*	Bufflehead
Duck, swans, geese	*Branta canadensis*	Canada Goose
Duck, swans, geese	*Aythya valisineria*	Canvasback
Duck, swans, geese	*Aythya affinis/Aythya marila*	Lesser/Greater Scaup
Duck, swans, geese	*Anas platyrhynchos*	Mallard
Duck, swans, geese	*Anas acuta*	Northern Pintail
Duck, swans, geese	*Spatula clypeata*	Northern Shoveler
Duck, swans, geese	*Aythya collaris*	Ring-necked Duck

Duck, swans, geese	*Cygnus columbianus*	Tundra Swan
Duck, swans, geese	-	Ducks, unidentified
Raptor	*Haliaeetus leucocephalus*	Bald Eagle
Raptor	*Circus hudsonius*	Northern Harrier
Raptor	*Buteo jamaicensis*	Red-tailed Hawk
Raptor	*Buteo lagopus*	Rough-legged Hawk
Raptor	*Cathartes aura*	Turkey Vulture
Grouse, Allies	*Tympanuchus phasianellus*	Sharp-tailed Grouse
Grouse, Allies	*Meleagris gallopavo*	Wild Turkey
Coots, Cranes	*Antigone canadensis*	Sandhill Crane
Shorebirds, Gulls	*Leucophaeus pipixcan*	Franklin's Gull
Shorebirds, Gulls	*Charadrius vociferus*	Killdeer
Shorebirds, Gulls	*Limosa fedoa*	Marbled Godwit
Shorebirds, Gulls	*Larus delawarensis*	Ring-billed Gull
Shorebirds, Gulls	*Gallinago delicata*	Wilson's Snipe
Passerines	*Corvus brachyrhynchos*	American Crow
Passerines	*Euphagus cyanocephalus*	Brewer's Blackbird
Passerines	*Quiscalus quiscula*	Common Grackle
Passerines	*Agelaius phoeniceus*	Red-winged Blackbird
Passerines	*Columba livia*	Rock Pigeon
Passerines	*Sturnella neglecta*	Western Meadowlark
Passerines	*Zonotrichia leucophrys*	White-crowned Sparrow
Passerines	*Colaptes auratus*	Northern Flicker

Waterfowl and aquatic birds accounted for most of the observations with at least 18 species recorded. The most abundant bird species observed were Canada Goose (699 individual birds), Tundra Swan (138 individual birds) and Mallards (36 individual birds). Passerines were the next most abundant form with eight species recorded. Most frequent passerines were Red-winged Blackbirds (45), Common Grackles (30) and American Crow (16). Five raptor species and two upland birds (grouse and allies) were also observed.

Figure 7-13 show a site along the proposed D83W project's right-of-way which was surveyed for bird migration during the spring of 2022. Additional information on sites chosen and corresponding photographs can be found in the Birds and Mammals Field Report in Appendix C.

Figure 7-13: Looking south at a flooded agricultural field with peripheral stubble on the proposed D83W project right-of-way

7.2.6.2.2 Breeding bird surveys

Point count surveys were conducted for breeding birds between June 9 and July 5, 2022, along the final preferred transmission line route between the Dorsey Converter Station and the site of the yet-to-be-built Wash'ake Mayzoon Station. The information collected during the field surveys was used to supplement existing avian occurrence data with additional data on the presence and absence of birds, both breeding and non-breeding, using the natural and developed habitats within the PDA. Sites were pre-selected and situated to cover different land uses and habitat types present along the length of the transmission line right-of-way. Detailed methods used for the breeding bird surveys are included in the field report in Appendix C.

At least 58 bird species and 1,020 individuals were recorded from 59 survey points (Appendix C). Approximately a third (27%) of all point locations surveyed were

located on annually cropped lands (Figure 7-14), with no other habitat type present. At the time of survey, many crops were still sparse and emerging, these survey locations on average had the lowest bird diversity (4.8 species/survey point). Most points surveyed (57.6%) were dominated by cultivation with a combination of one or more other natural habitat types present (e.g., perennial grass, trees/shrubs, or water). The mean diversity in these cultivated/ natural habitat combination sites was slightly higher (6.6 – 8.6 species/point). The greatest bird diversity was found in sites dominated by natural (or perennial) habitats such as pasture, idle grass, tree cover and/or the presence of water or wetlands (11-15 species/point). Cultivated land was also a peripheral influence for these sites.

Figure 7-14: Emerging crop with wide verge of smooth brome

Similarly, the mean bird abundance was lowest (ca 13 birds) at points with cultivation as the sole land use. More birds were detected at points where natural habitats are present along with cultivation (ca 14-23 birds), or where natural habitats are predominant (ca 15- 30 birds). Greatest mean abundance was detected at sites with an aquatic influence (creek, drain, wetland), and foremost in sites with primarily natural habitat (water with a component of trees and/or shrubs), followed by cultivated sites with an aquatic influence, as well as other sites with natural habitats (grass and trees). Figure 7-15 illustrates an example of crop, tree and water habitat found along the proposed D83W project's right-of-way.

Figure 7-15: Pond at drain, near brush piles and shelterbelt (not pictured), surrounded by cultivation

Passerines accounted for the greatest diversity and number of observations, with 790 individuals from 40 species recorded. The most abundant passerines were Red-winged (182) and Brewer's (176) Blackbirds, which were most abundant in the cropped land use. Next most abundant passerines were Western Meadowlark (61), Mourning Dove (45), Savannah Sparrow (38) and Barn Swallow (36).

Waterfowl was the next most abundant type of bird, primarily Mallard (70), Canada Goose (26) and Blue-winged Teal (8). The Canada Geese were foraging in fields or water and generally seen in pairs or very small groups. Sora (8) and Virginia Rail (1) were restricted to wet sites. Shorebirds and Gulls were also abundant, most frequent were Franklin's Gull (43), Wilson's Snipe (16) and Killdeer (12). Raptors were not particularly abundant during morning surveys, with Northern Harrier (5) the most frequent (Appendix C). No raptor nests were observed.

Late season migrating waterfowl were also observed flying overhead during breeding surveys. Fourteen of 43 points surveyed in June had one or more flocks observed. Canada Goose migrants were observed in 19 flocks varying in size from 14 to 125 geese, between June 9 and 15, for a total of ca 1,462 migrating geese recorded. A single incidence of approximately 165 ducks was observed on June 15. Ducks were not identified to species. The counts for these late season migrants are added to total bird abundance. The geese were observed flying northwards and not using stopover habitat. The migrant ducks appeared to be making use of stopover

habitat, circling overhead, and then settling in a large wet depression within hay near the portage diversion and point B45. Flocking geese or ducks were not observed during July surveys.

7.2.6.3 Mammals

Desktop data were analyzed to characterize the existing biophysical information about mammals in the project study area. Sources included Species at Risk Act Public Registry, COSEWIC List of Canadian Wildlife at Risk, the Endangered Species and Ecosystems Act List of Species at Risk, MCDC Database, and Mammals of Canada (Banfield, 1974).

The project study area is located within the Lower Assiniboine, Shoal Lake and Delta Marsh, and La Salle River watersheds, which support a variety of mammal species.

Most mammal species that occur in the project study area are common and widespread across the Manitoba, particularly in natural habitats including forests, grasslands, and wetlands. However, some of the most common mammal species found in the region are also well adapted to the agricultural lands that dominate the project study area. These species include eastern cottontail (*Sylvilagus floridanus*), eastern grey squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), coyote (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), beaver (*Castor canadensis*), and woodchuck (*Marmota monax*).

Field surveys to document mammal species in the study area were conducted on August 4, 2022. Incidental mammal observations were also recorded during vegetation and bird surveys conducted for the project. Mammals or signs of mammal habitat utilization were observed at 21 locations in the study area and eight mammal species were recorded (Table 7-9).

Table 7-9: Mammals observed in the project development area

Common Name	**Scientific Name**	**SARA Schedule 1 Status**
American Badger	*Taxidea taxus*	Special Concern
Coyote	*Canis latrans*	Not at Risk
Long-tailed Weasel	*Mustela frenata*	Not at Risk
Racoon	*Procyon lotor*	Not at Risk
Red Fox	*Vulpes vulpes*	Not at Risk
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	Not at Risk
White-tailed Deer	*Odocoileus virginianus*	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	Not at Risk

Figure 7-16 and Figure 7-17 show evidence of mammal utilization in the study area.

Figure 7-16: Raccoon tracks observed next to the final preferred route

Figure 7-17: Red fox tracks next to the final preferred route

Occurrences of wild pigs, an invasive mammal species, have been recorded in the project study area (Brook, 2021). Wild pigs pose a risk to both livestock and wildlife and have the potential to cause extensive damage to native vegetation communities and crops (Manitoba Fish and Wildlife, 2022). No evidence of wild pigs was observed during field surveys. However, targeted surveys for wild pigs were not conducted.

7.2.6.4 Wildlife important to First Nations people and Métis Citizens

Wildlife of importance to First Nations people and Métis Citizens in the Project area were identified through the First Nation and Métis Engagement Process, including the MMF's Manitoba Metis Knowledge, Land Use and Occupancy Study (2022). These included mammals such as deer, rabbits, coyotes, wolves, raccoons, gophers, badger, mink, muskrat, beaver, and hares. Important bird species included grouse, wild turkey, mallards, canvasbacks, redheads, scaup, widgeon, bufflehead, gadwall, shoveler. These wildlife species were shown to occur in a variety of areas, with some concentrations near the Assiniboine River corridor, Lake Manitoba, and natural areas near Portage la Prairie.

7.2.6.5 Species of conservation concern

7.2.6.5.1 Amphibians and reptiles

According to the MCDC's Database, the Lake Manitoba Plain Ecoregion supports three amphibian SOCC, five reptile species, and a reptile animal assemblage (i.e., snake hibernaculum).

Based on MCDC's provincial records, three SOCC (two amphibian and one reptile) are known to occur within the RAA of the D83W project (Table 7-10). The northern leopard frog (*Lithobates pipiens*) and western tiger salamander (*Ambystoma mavortium*) are provincially ranked as Apparently Secure (S4 to S4S5) but are both designated as Special Concern under SARA and COSEWIC. The northern prairie skink (*Plestiodon septentrionalis*) ranked Critically Imperilled (S1), is listed as Endangered under ESEA and SARA and Special Concern by COSEWIC. Snapping turtle (*Chelydra serpentina*), occurring in the broader ecoregion, is listed as Special Concern under SARA and COSEWIC.

Distribution maps of amphibian and reptile SOCC were also reviewed to determine possible occurrence within the RAA. One amphibian (mudpuppy - *Necturus maculosus*) and two reptile species (red-bellied snake - *Storeria occipitomaculata*; and smooth green snake – *Opheodrys vernalis*) of conservation concern also overlap with the RAA. All species are ranked Vulnerable to Apparently Secure (S3S4).

Table 7-10: Amphibian and reptile species of conservation concern that may occur within the regional assessment area

Scientific Name	Common Name	MBCDC Rank	ESEA	SARA	COSEWIC
Ambystoma mavortium	Western Tiger Salamander	S4S5	Not Listed	Special Concern	Special Concern
Lithobates pipiens	Northern Leopard Frog	S4	Not Listed	Special Concern	Special Concern
Plestiodon septentrionalis	Northern Prairie Skink	S1	Endangered	Endangered	Special Concern

7.2.6.5.2 Birds

Fifteen bird SOCC have been recorded in theD83W project study area (See Table 7-11). Eleven of the bird SOCC were identified from MCDC's records and an additional four SOCC were identified within the breeding bird atlas survey squares (Bird Studies Canada 2021).

Table 7-11: Bird species of conservation concern with potential to occur in the project study area (Manitoba Conservation Data Centre, 2021; Bird Studies Canada, 2021)

Common Name	Scientific Name	Status	Habitat
Bank Swallow	*Riparia riparia*	Threatened (SARA Schedule 1)	Breeds in natural or artificial sites with vertical banks and sand-silt substrates, including riverbanks, aggregate pits, and stockpiles of soil, often situated near open terrestrial habitats, such as grasslands, meadows, or agricultural land.
Barn Swallow	*Hirundo rustica*	Threatened (SARA Schedule 1)	Nests primarily in artificial structures, including barns and other buildings, bridges, and culverts. Forage in open habitats (grasslands, croplands, wetlands, and shores of waterbodies)
Bobolink	*Dolichonyx oryzivorus*	Threatened (SARA Schedule 1)	Grasslands, including tall grass prairie, wet prairie, pastures, hayfield, and no-till croplands.
Burrowing Owl	*Athene cunicularia*	Endangered (SARA Schedule 1; MB ESEA)	Sparsely vegetated grasslands with burrows excavated by mammal species.

Chimney Swift	*Chaetura pelagica*	Threatened (SARA Schedule 1; MB ESEA)	Nests in hollow trees, or chimneys and often forages on insects over waterbodies.
Eastern Wood-pewee	*Contopus virens*	Special Concern (SARA Schedule 1)	Associated with forest edges and clearings in decidious and mixed forests with little understory vegetation.
Loggerhead Shrike	*Lanius ludovicianus migrans*	Endangered (SARA Schedule 1; MB ESEA)	Inhabits open areas with occasional trees and shrubs that serve as nesting sites and perches for hunting.
Olive-sided Flycatcher	*Contopus cooperi*	Threatened (SARA Schedule 1; MB ESEA)	Associated with open areas with tall trees or snags for perching, such as forest edges and forest clearings.
Peregrine Falcon	*Falco peregrinus*	Special Concern (SARA Schedule 1); Endangered MB ESEA	Nests on cliffs or ledges of tall buildings, near good foraging sites.
Piping Plover	*Charadrius melodus*	Endangered (SARA Schedule 1; MB ESEA)	Nests just above the high-water mark on gravel or sandy shores of prairie lakes.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Endangered (SARA Schedule 1); Threatened MB ESEA	Found in various habitats including oak forest, grasslands, forest edges, riparian forests, urban parks, and golf courses.

Short-eared Owl	*Asio flammeus*	Special Concern (SARA Schedule 1); Threatened MB ESEA	Open habitats, including grasslands, marshes, and occasionally agricultural fields.
Sprague's Pipit	*Anthus spragueii*	Threatened (SARA Schedule 1; MB ESEA)	Found in native grasslands with native vegetation of medium height and density.
Whip Poor-will	*Antrostomus vociferus*	Threatened (SARA Schedule 1; MB ESEA)	Nests in semi-open, or patchy oak forests with clearings, and forages in shrubby pastures, or wetlands with perches.
Yellow Rail	*Coturnicops noveboracensis*	Special Concern (SARA Schedule 1)	Typically found in marshes dominated by sedges, rushes, and grasses, with little or no standing water.

No avian species-at-risk were observed during migration surveys. Several observed species are important prairie birds that rely on grasslands for breeding, including Brewer's Blackbird (S4B), Marbled Godwit (S3S4), Sharp-tailed Grouse (S5) and Western Meadowlark (S3S4).

During breeding bird surveys, four federally listed species were recorded which included the following: the Barn Swallow (Threatened) was recorded 36 times at nine points, generally near creeks, drains, or buildings (e.g., abandoned barns, grain bins); thirteen observations of Bobolink (Threatened) were taken from six points with idle grass or crop, five of the points were situated between Reaburn and Poplar Point localities; a single juvenile Red-headed Woodpecker (Threatened) was observed incidentally in small grove of trees in otherwise grassy site (point B13); and the Eastern-wood Pewee (Special Concern) was recorded in an uncultivated wet area with trees and willows (point B14). Several other species observed in the project area are ranked as Vulnerable by the MCDC and are important prairie birds that rely on grasslands for breeding, including Horned Lark (S3B), Northern Rough-winged Swallow (S3S4B), Western Kingbird (S3S4B, Western Meadowlark (S3S4B) and Willet (S3S4B).

7.2.6.5.3 Mammals

Three mammal SOCC have the potential to occur in the D83W project study area (see Table 7-12): little brown myotis (*Myotis lucifugus*; SARA Schedule 1 – Endangered; MB ESEA - Endangered), northern myotis (*Myotis septentrionalis;* SARA Schedule 1 – Endangered; MB ESEA - Endangered), and mule deer (*Odocoileus hemionus*- MB ESEA- Threatened). Riparian areas along the Assiniboine River, other forested areas, and wetlands have the potential to support these SOCC, however, suitable habitat for these mammals is limited within the project development area. Both little brown myotis and northern myotis avoid large open fields, which are widespread due to the abundance of crop land in the project study area. There are no known hibernacula in the project study area for either of these bat species (MB CDC 2021). Mule deer require mixed habitat with dry forest for cover and open areas for feeding, which is rare in the project study area.

Table 7-12: Mammal species of conservation concern with potential to occur in regional assessment area

Common name	Scientific name	Conservation status		Habitat/ecology
		SARA Schedule 1	Manitoba ESEA	
Little Brown Myotis	*Myotis lucifugus*	Endangered	Endangered	Roosts in caves, hollow trees, or buildings; forages on insects mainly over water, but also in forest canopy
Mule Deer	*Odocoileus hemionus*	N/A	Threatened	Prefers mixed habitats with forest for cover and open areas for feeding.
Northern Myotis	*Myotis septentrionalis*	Endangered	Endangered	Roosts in trees, caves, or occasionally in buildings near foraging areas; mainly forages in the forest canopy.

One mammal SOCC was recorded during field surveys, the American Badger (*Taxidea taxus*) which is listed federally under SARA as a species of special concern. The American badger was observed approximately 60 m north of the proposed D83W's right-of-way (Figure 7-18).

Figure 7-18: American Badger and its den just north of the preferred route

7.2.6.5.4 Invertebrates

Prior to settlement, the Lake Manitoba Plain Ecoregion was a mosaic of trembling aspen/bur oak groves and rough fescue grasslands. As a result of cultivation and modified drainage, much of the native vegetation has been supplanted by agricultural crops. Remaining native stands of vegetation and wetlands provide habitat for invertebrates. Seven invertebrate SOCC are known to occur in the D83W project's RAA. Provincial database records include the mapleleaf mussel (*Quadrula quadrula*), black sandshell (*Ligumia recta*), riverine clubtail (*Stylurus amnicola*), monarch (*Danaus plexippus*), yellow-banded bumble bee (*Bombus terricola*), red-tailed prairie leafhopper (*Aflexia rubranura*), and the creeper (*Strophitus undulatus*).

7.3 Socio-economic environment

The RAA for the D83W project is in the South Interlake Planning District, in the RMs of Rosser and Woodlands; the Whitehorse Plains Planning District, in the RMs of St. François Xavier and Cartier; and the Portage la Prairie Planning District, in the RM of Portage la Prairie (Map 7-5).

Within the RAA, small communities include Grosse Isle, Rosser, Meadows Marquette, St. Eustache, Poplar Point, and Oakland. The largest population centres closest to the RAA, but not included in the RAA, are the City of Portage la Prairie which is

surrounded by the RM of Portage la Prairie and the Local Urban District (LUD) of Warren in the RM of Woodlands.

7.3.1 Agriculture

The RAA is primarily in an agricultural setting. Agricultural land use in the RAA consists of intensive cropping on cultivated lands with the dominant crops being cereal crops, canola, corn, and soybeans. In addition, irrigation-driven potato production is prevalent in the RM of Portage la Prairie and generally involves the use of pivot irrigation systems. In addition to annual cropping, there are smaller areas of forage production.

The RAA falls under Division No. 9 and 10 of Census Agricultural Region (CAR) 7 and Division number 14 of CAR 11 (Statistics Canada, 2021).

According to the 2016 Census, CAR 7 had 1,735 farms of which 300 were in Division 9 (RM of Portage la Prairie) and 113 in Division 10 (RMs of Cartier and St. François Xavier). Census Agricultural Region 11 had 849 farms of which 260 were in Division No. 14 (RMs of Rosser and Woodlands). Comparing 2011 and 2016, the total number of farms in Division No. 9 decreased by 13%, while in Division 10 and Division 14, the number of farms decreased by 8.1% and 19.5% respectively.

7.3.1.1 Agricultural capability within the regional assessment area

Agricultural land capability is a function of climatic, topographic and soil conditions for any given parcel of land. Assignment of soils to agricultural capability classes provides insight into the ability of the soils to support cropping and the extent of limitations affecting the soils. The agricultural capability of land in Manitoba is a seven-class rating of soils that considers the severe limitations for dryland farming (Government of Manitoba, 2021). Table 7-13 defines the agricultural capability classes while Table 7-14 outlines the agricultural capability classes of land within the D83W project assessment areas.

Table 7-13: Agricultural capability class

Agricultural Capability Class	Degree of Limitation
1	There are no important limitations on soils for crops. Soils in this class have level to nearly level topography, are deep and well to imperfectly well drained and have a moderate ability to hold water. Soils are naturally supplied with plant nutrients and have good tilth and fertility and are moderately high to high productivity for cereal and field crops.
2	There are moderate limitations to soils in this class that can reduce the types of crops planted or require moderate conservation practices. Soils have good water holding ability and are either well supplied with plant nutrients or respond well to the application o fertilizers. Their productivity is moderate to high for a range of field crops. Limitations in this class are not severe soils respond well to good soil management and cropping practices.
3	Moderate limitations on soils in this class include the restriction in the type of crops grown or the need for moderate conservation practices. Limitations in this class affect the ease of tillage, choice of crops, planting and harvesting and maintenance of conservation practices used.
4	Significant limitations to soils that restrict the type of crops grown or the need to implement special conservation practices (or both). The types of limitations in this class result in only certain types of crops being suited to grow, yields for a range of crops may be low or the risk of crops failing is high. Soils have low to moderate productivity for only a small range of crop types but may be suited for the growth of specialty crops or perennial forage.
5	Severe limitations of this class restrict the soils capability for producing perennial forage crops however practices that improve the soils is feasible. There are severe soil, climate, or other limitations that the soils are not capable of being used for the sustained production of annual field crops. Soils can be improved

	through farm machinery for the production of native or tames species of perennial forage plants.
6	Perennial forage crops are the only crops that can be produced on soils in this class and improvement practices are not feasible. Soils in this class can sustain grazing for animals but as a result of the severe soil, climate and other limitations, the physical nature of the soils prevents the use of farm machinery for improvement or soils do not respond to improvement practices.
7	This class has no capability for arable culture or permanent pasture due to limitations that are extremely severe.

(Source: Government of Manitoba, 2021)

7.3.1.1.1 Rural Municipality of Rosser

Most of the soils in the municipality are rated Class 2 (62 percent) and Class 3 (37 percent) for agricultural capability, with moderate to moderately severe limitations for agriculture (Agriculture and Agri-Food Canada, 1999). Most soils are rated as poor for irrigation suitability, primarily due to fine texture and poor drainage. Medium textured lacustrine soils on the east side of the municipality are rated as Fair (11 percent) for irrigation suitability Agriculture and Agri-Food Canada, 1999). The major limiting condition for agricultural use of soils in the municipality is inadequate drainage. Unfavourable workability and potential degradation due to erosion by wind are other important limitations.

Management considerations are primarily related to heavy clay textures and wetness. There are no significant relief features to contend with although minor areas of weak salinity occur at scattered locations, primarily in poorly drained soils throughout the municipality. Less obvious subsoil salinity may occur at depths below 0.5 m. Slightly to moderately stony and cobbly conditions are common on low ridges throughout the Marquette and Semple areas. Poorly drained soils throughout the municipality are subject to periodic flooding during spring runoff.

While most soils in the RM of Rosser have moderate to moderately severe limitations for arable agriculture, the clayey textured soils require management practices which maintain adequate surface drainage, soil structure and tilth. All soils require careful management to protect against the risk of wind erosion. This includes leaving adequate crop residues on the surface to provide sufficient trash cover during the early spring period. The provision of shelter belts, minimum tillage practices, and

crop rotations including forages will help to reduce the risk of soil degradation and maintain productivity.

Low relief and a dominance of imperfectly to poorly drained clayey soils often result in drainage problems which adversely affect crop growth. These soils have slow to very slow permeability and are frequently saturated and subject to surface ponding and slow runoff, particularly during spring snowmelt or following heavy rains. Consequently, improvement and maintenance of water management infrastructure on a watershed or regional basis is required to reduce surface ponding while maintaining adequate soil moisture for crop growth.

7.3.1.1.2 Rural Municipality of Woodlands

Nearly 30 percent of soils in the municipality are rated Class 2 for agricultural capability and 9 percent of soils are rated Class 3. Seven percent of the soils are rated Class 5 due to droughtiness or excess wetness. Class 6 soils affected by excessive stoniness and wetness occupy 0.1% of the area. Areas affected by very poor drainage conditions and Marsh soils occupy nearly 7 percent of the municipality and are rated Class 7 (Agriculture and Agri-Food Canada, 1999b). The irrigation suitability of soils in this municipality is dominantly Fair, with clayey soils in the Woodlands Plain and poorly drained areas around the lakes rated as Poor (Agriculture and Agri-Food Canada, 1999b).

Major management considerations are related to fine texture and wetness. Seasonal high-water tables (at 1 to 2 metres) and saturated soils are common, particularly in the Woodlands Plain. Surface water ponds in poorly drained depressional sites throughout the area. Moderately to excessively stony conditions are associated with the till soils and beach deposits throughout the area and weakly to moderately saline conditions are common in level to depressional areas of the Woodlands Plain.

Most soils in the RM of Woodlands have moderate to moderately severe limitations for arable agriculture. Clay textured soils require management practices which maintain adequate surface drainage, soil structure and tilth. The stony and bouldery conditions on many of the glacial till soils require clearing to permit annual cultivation. The soils are susceptible to wind erosion and management includes leaving adequate crop residues on the surface during the early spring period, provision of shelter belts and use of minimum tillage practices and crop rotations which include forages. The choice of crops is reduced to pasture and forage production for many of the saline soils. A major portion of the municipality has low relief and a dominance of imperfectly to poorly drained soils. These soils are frequently saturated and subject to surface ponding and slow runoff, particularly during spring runoff or following heavy rains. Consequently, improvement and

maintenance of water management infrastructure on a regional basis is required to reduce surface ponding while maintaining adequate soil moisture for crop growth.

7.3.1.1.3 Rural Municipality of St. François Xavier

Most of the soils in the municipality are rated in Class 3 (81 percent) and Class 2 (17 percent) for agricultural capability with moderate to moderately severe limitations for agriculture (Agriculture and Agri-Food Canada, 1999c). Most oils are rated as Poor for irrigation suitability, primarily due to fine texture and poor drainage. About 16.8 percent of the area, mainly the alluvial soils along the Assiniboine River are rated as Fair for irrigation suitability (Agriculture and Agri-Food Canada, 1999c). The major limiting condition for agriculture is inadequate drainage. Unfavourable workability and potential degradation due to erosion by wind are other notable limitations.

While most soils in the RM of St. Francois have moderate to moderately severe limitations for arable agriculture, the clayey textured soils require management practices which maintain adequate surface drainage, soil structure and tilth. The level topography and slow to very slow permeability associated with these heavy clay soils often result in drainage problems which adversely affect crop growth. These soils are frequently saturated and subject to surface ponding and slow runoff, particularly during spring snowmelt or following heavy rains. Improvement and maintenance of water management infrastructure on a watershed or regional basis is required to reduce surface ponding while maintaining adequate soil moisture for crop growth.

Soils in the municipality also require management for protection against the risk of wind erosion and to maintain soil productivity. This includes leaving adequate crop residues on the surface to provide sufficient soil cover during the early spring period, having shelter belts, and implementing minimum tillage practices and crop rotations that include forages.

7.3.1.1.4 Rural Municipality of Cartier

Most soils in the RM of Cartier are rated Class 2 (53%) or Class 3 (44%) for their agricultural capability and have moderate to moderately severe limitations for agriculture. Management considerations for soils in the RM of Cartier is mostly related to the heavy clay textures of the soils and moisture content (wetness). The topography and stoniness conditions associated with these soils is not an issue, however minor areas of salinity can occur in the poorly drained soils in the municipality that are subject to periodic flooding during spring runoff (Agriculture and Agri-Food Canada, 1999d). The majority of the soils in the RM are rated as being poor for irrigation suitability.

While most soils in the RM of Cartier have moderate to moderately severe limitations for arable agriculture, the clayey textured soils require management practices which maintain adequate surface drainage, soil structure and tilth. The level topography and slow to very slow permeability associated with these heavy clay soils often result in drainage problems which adversely affect crop growth.

The clayey soils are frequently saturated and subject to surface ponding and slow runoff, particularly during spring snowmelt or following heavy rains. Improvement and maintenance of water management infrastructure on a watershed or regional basis is required to reduce surface ponding while maintaining adequate soil moisture for crop growth. All soils require careful management to protect against the risk of wind erosion. This includes leaving adequate crop residues on the surface to provide sufficient trash cover during the early spring period. Having shelter belts and practicing minimum tillage practices and crop rotations that include forages will help reduce the risk of soil degradation and maintain productivity.

7.3.1.1.5 Rural Municipality of Portage la Prairie

7.3.1.1.5.1Lower Assiniboine Delta Physiographic Region

Capability for dryland agricultural is class 3 and 4 for the imperfectly drained sites and class 5 or 6 in the poorly drained locales (Agriculture and Agri-Food Canada, 1997). Reinland and Kronstal series are rated class 2 for agricultural capability due to their low water holding capacity. The Lower Assiniboine Delta is generally suitable for irrigation, however, the high water tables and rapid permeability results in a high potential for leaching and adverse environmental impact from irrigation. These soils are also very susceptible to wind erosion and proper management of crop residues is needed. As result of increased slope gradients and lower fertility levels, the Skelding and Long Plain series are less suitable for dryland agriculture (Class 4 to Class 6). These soils are generally not suited for irrigation because of their low water holding capacity.

7.3.1.1.5.2Red River Valley

The finer textured soils in this area have been rated as Class 2 and Class 3 for agricultural capability, and poor to fair for irrigation suitability Agriculture and Agri-Food Canada, 1997. Excess moisture and the occurrence of salinity are the main limitations. Soils with a coarser surface texture have slightly improved drainage and are generally rated Class 1 and Class 2 for agricultural capability, and fair to good for irrigation suitability.

Fine and moderately fine textured soils within the RM of Portage La Prairie require the maintenance of adequate surface drainage, soil structure and tilth. Clayey soils of the Red River Valley have slow to very slow permeability, high shrink-swell properties and are very plastic. They are subject to surface ponding and slow runoff unless adequate surface drainage is provided. The sandy, moderately coarse and loamy textured soils of the Lower Assiniboine Delta, Interlake Plain and Red River Valley require careful management to reduce the risk of wind and water erosion. Soils of the Lower Assiniboine Delta have moderate to moderately rapid permeability, seasonal high water table or a saturation zone above the clay subsoil particularly in spring or following heavy rains.

Table 7-14: Soil agricultural capability class within the D83W project assessment areas

Soil Capability Class	Regional Assessment Area (ha)	Local Assessment Area (ha)	Project Development Area (ha)
Class 1	12184.9	970.6	52.3
Class 2	71354.1	3970.8	228.6
Class 3	46860.3	4651.2	296.9
Class 4	3720.8	-	-
Class 5	1887.2	54.5	2.6
Class 6	239.3	-	-
Class 7	1052.0	166.2	8.9
Unclassified	1119.6	9.7	0.6
Total:	138418.2	9823.0	589.8

In the RAA, soils are dominantly Class 2 (52%) rated for capability for agriculture, followed by Class 3 (33.9%). Approximately 8.8% of the soils in the RAA are rated as Class 1 for agriculture. The soil capability for agriculture for 5% of the soils (approximately 6900 ha) ranges from Class 4 to Class 7. Less than 1% of soils are unclassified in the RAA.

Within the LAA, most soils are rated Class 3 (47%) or Class 2 (40.4%) for soil capability for agriculture, with moderate limitations. Approximately 9.9% of soils have Class 1 capability for agriculture, with no important limitations on agriculture. Less than 2% of soils in the LAA are found in each of Class 5, Class 7, or are unclassified.

In the PDA, like the LAA, soils are dominantly found in Class 3 (50.3%) or Class 2 (38.8%) capability for agriculture. Approximately 8.9% of soils are Class 1 capability for agriculture and less than 2% of soils are found in each of Class 5, Class 7 or unclassified. Overall, 89.1% of soils in the PDA have moderate limitations to agriculture that can reduce or restrict the type of crops grown. Limitations to soils are not severe and soils respond well to soil management and cropping practices including tillage, choice of crops, planting and harvesting and maintenance of the types of conservation practices that are implemented.

7.3.1.2 Annual and perennial cropping

Most of the land in the RAA is under annual crop production, according to the land cover classification. As previously noted in Section 7.2.5, approximately 78.6% of the RAA is identified as agricultural field and 2.4% as agricultural forage crops. Range and grassland make up approximately 10.5% of the RAA. Similar to the RAA, the PDA traverses approximately 80.7% of agricultural field and 1.0% of agricultural forage crops with range and grassland comprising 5.5% of the PDA.

Based on a review of the harvested acres in the municipalities that fall within the RAA, from 2010 to 2019 (Manitoba Agricultural Services Corporation 2021), the crops that were harvested the most include canola, red spring wheat and soybeans, followed by barley, grain corn, oats, feed wheat, and winter wheat. White pea beans were a dominant crop grown in the RM of Portage la Prairie only.

Some agricultural operations in the RAA also produce many speciality crops such as carrots, onions, asparagus, parsnips, beans, rutabagas, cauliflower, broccoli, peas, potatoes, various grains and oil seeds, strawberries, Saskatoon berries, and raspberries (PCRC 2018; RM of Rosser, 2021; RM of St. François Xavier). Much of the RM of Portage la Prairie is under irrigation, and additional acreage can be incorporated into the existing irrigation system. The diverse agricultural production of the Portage area has drawn many food-processing plants to the city. These include McCain Foods Ltd., Richardson Milling, Roquette Canada, and JR Simplot's Canadian potato processing plant.

7.3.1.3 Aerial application

Aerial application is an important application method for crop inputs or protection products for disease and pest control within the RAA due to soil moisture and texture

constraints which may limit the use of ground application. Advantages to using aerial application includes no soil compaction, a more even spread of seed, fertilizer and pest control products and no damage to crops resulting in higher yields. The use of ground equipment, especially during wet conditions, can result in the increased compaction of soil and reduction in soil pore space resulting in a restriction to the movement of oxygen and water that is necessary in the root zone (Canadian Aerial Application, 2020). In addition, the use of ground sprayers can result in uneven application and equipment being moved on the ground can damage the crop resulting in reduced yields.

There are eight runways (each with glide paths 2 km long in two or four directions) within the RAA, some or all of which may be used by aerial applicators. Runway locations were taken into consideration during the routing process for the D83W project, and the closest runway is located approximately 800 m away from the PDA (see Map 7-6).

7.3.1.4 Tile drainage

Tile drainage (also known as subsurface drainage) involves the placement of perforated pipes below the soil surface to aid in the removal of excess water from the soil profile. A tile drainage system typically consists of several smaller diameter lateral pipes that empty into an increasingly larger main pipe, with water in the pipes flowing by gravity to the edge of a field where it is released, via gravity or pumped using a lift station, to a ditch, municipal drain, or natural watercourse (PAMI 2022).

According to PAMI (2022), the adoption of tile drainage by Manitoba growers is increasing due to the potential agronomic and economic benefits of tile drainage. Tile drainage:

- allows earlier planting as it causes quicker and more uniform soil drying and warming
- facilitates deeper crop rooting due to removal of excess water
- enables timely application of crop inputs and reliable field access at harvest
- reduces soil erosion due to quick removal of excess water from the surface, and
- diminishes yield losses, lowers yield variability, and can lead to potentially higher yields.

Considering the RAA's predominantly annual cropping land base and the types of crops grown, there is potential for some parcels of land to have tile drainage. During public engagement, it was indicated that the PDA traverses two parcels of land with tile drainage in the RM of Portage la Prairie (see Map 7-6).

7.3.1.5 Irrigation

One of the ways to address the risk of inadequate soil moisture during the growing season, to maintain crop yield, is to irrigate the land.

Within the RAA, irrigation is common in the RMs of Portage la Prairie and Cartier (GAIA Consulting Ltd.) to help offset the risk of lack of moisture during the growing season. In 2006, the highest percent of crops irrigated included potatoes and cereals (MARF, 2006). Potatoes were the most crops irrigated in the RM of Portage la Prairie followed by vegetables and cereal crops. In 2006, the RM of Cartier was the only other RM in the RAA with recognized crops including vegetables and potatoes identified as being under irrigation.

According to census data, in 2016, the RM of Portage la Prairie had the highest number of farms under irrigation (i.e., 23 farms) with an irrigated land base of approx. 2,744 hectares, followed by the RM of Cartier which had six farms under irrigation with an irrigated land base of approx. 271 hectares. The RMs of St. François Xavier, Rosser and Woodlands had three or less farms under irrigation with no size amount recorded (due to the low number of farms) (Census of Agriculture, 2021).

A substantive portion of the rural municipality of Portage la Prairie is under irrigation, and additional acreage can be incorporated into the existing irrigation system. The diverse agricultural production of the Portage area has drawn food-processing companies like McCain Foods, Richardson Milling, Roquette Canada, and JR Simplot to build and operate processing facilities within the municipality. Such facilities' needs for crop inputs helps drive the need for irrigation, particularly for potatoes.

In 2006, the highest percentage of crops that were irrigated in Manitoba are potatoes (74.8%) followed by cereals at 14.8% (MARF, 2006). Within the RAA, the RM of Portage la Prairie had the highest acreage of irrigated crops in 2006 compared to the other RMs in the RAA. Potatoes were the most irrigated crop in the RM of Portage la Prairie with an acreage ranging from 5,001 to 10,000 acres followed by vegetables which covered 1,001 to 5,000 acres, and cereals which covered 501 to 1,000 acres (GAIA 2006). In 2006, the RM of Cartier was the only other RM in the RAA with reported irrigated crops. Approximately 501 to 1,000 acres of vegetables and 1 to 500 acres of potatoes were identified as being under irrigation in the RM of Cartier.

7.3.1.5.1 Irrigation suitability

The irrigation suitability classification considers soil and landscape characteristics such as texture, drainage, depth to water table, salinity, geological uniformity, topography, and stoniness. There are four irrigation suitability classes, namely, excellent, good, fair, and poor.

A description of the four irrigation suitability classes is provided in Table 7-15.

Table 7-15: Description of irrigation suitability classes

General Rating	Class	Degree of Limitation	Description
Excellent	1A	No soil or landscape limitations	These soils are medium textured, well drained and hold adequate available moisture. Topography is level to nearly level. Gravity irrigation methods may be feasible.
Good	1B 2A 2B	Slight soil and/or landscape limitations	The range of crops that can be grown may be limited. As well, higher development inputs and management are required. Sprinkler irrigation is usually the only feasible method of water application.
Fair	1C 2C 3A 3B 3C	Moderate soil and/or landscape limitations	Limitations reduce the range of crops that may be grown and increase development and improvement costs. Management may include special conservation techniques to minimize soil erosion, limit salt movement, limit water table build-up or flooding of depressional areas. Sprinkler irrigation is usually the only feasible method of water application.
Poor	1D 2D 3D 4A 4B 4C 4D	Severe soil and/or landscape limitations	Limitations generally result in a soil that is unsuitable for sustained irrigation. Limited potential to some land may occur when special crops, irrigation systems and soil and water conservation techniques are implemented.

7.3.1.6 Livestock operations

Based on the most recent Census of Agriculture (2021) reported by Statistics Canada, the RAA contains hog, dairy, beef, sheep, and poultry (hens and chickens) livestock operations. Map 7-6 shows agricultural infrastructure including some of the livestock operations within the RAA.

The RM of Cartier contains the most hog operations within the RAA (12 farms), while the RM of Portage la Prairie has the second most with 11 farms reporting. Fewer hog

operations are found in the RMs of Rosser (one) and Woodlands (seven). There are no hog operations reporting in the RM of St. Francois Xavier.

The RMs of Portage la Prairie and Woodlands have the most beef livestock operations with 92 and 73 farms, while much fewer beef livestock operations are reported for the RMs of Cartier (6), Rosser (13), and St. François Xavier (5). Most dairy farm operations in the RAA are found in the RM of Woodlands (i.e., 14 farms), while the RMs of Cartier, Rosser and Portage la Prairie are reported to have three, seven, and ten dairy farms, respectively. There were no dairy farms recorded in the RM of St. François Xavier in 2021.

Most sheep operations are reported for the RM of Woodlands and RM of Portage la Prairie both with 11 and 8 farms respectively, while the RMs of Rosser and RM of Cartier had much fewer operations with four farms and two farms. The RM of St. Francois Xavier had no sheep farms reporting for 2021.

Per the Census of Agriculture (2021), most poultry farms in the RAA are in the RMs of Portage, Woodlands, Cartier which were reported as having 21, 16 and 14 farms, respectively. Five and one poultry farm(s) were reported for the RMs of Rosser and St. François Xavier. Egg production also occurs in the RAA with the RMs of Portage la Prairie having 17 egg farms and Woodlands having 15. The RM of Cartier reported as having 11 egg operations in 2021, while the RMs of Rosser and St. François Xavier had fewer egg operations, with five and one farm, respectively.

7.3.1.7 Communal operations

Based on desktop review, there are four communal operations within the RAA. On a typical operation, on average, 15 families live and work communally, producing crops, livestock, and manufactured goods for sustenance (Hutterian Brethren, 2022).

- Little Creek Hutterite Colony near Marquette, in the RM of St. François Xavier, is located west and south of the FPR of the D83W project, with portions of the colony's cropping fields along the northern boundary falling within the LAA.
- Woodland Colony which is northeast of Poplar Point in the RM of Woodlands, is located approximately 150 m north of the FPR at its closest point and partly falls within the LAA.
- A portion of Sommerfeld Colony which is located northeast of High Bluff in the RM of Portage la Prairie falls within the D83W project's LAA but there are no existing structures that fall within the PDA.
- Rosedale Hutterite Colony near Saint Eustache in the RM of Cartier falls within the RAA but is outside of the LAA (approx. 6 km south of the FPR).

7.3.1.8 Risk to Biosecurity

Biosecurity means security from transmission of infectious diseases, parasites, and pests (Manitoba Agriculture no date[a]). Biosecurity can be achieved and maintained through the implementation of measures designed to help protect an agricultural operation from the entry and spread of disease-causing pathogens.

Manitoba Hydro understands that adherence to biosecurity protection procedures during its transmission activities, including surveying, construction, and line maintenance, is of importance to producers in the D83W project area. Manitoba Hydro will implement its standard operating procedures to protect the biosecurity of croplands and livestock.

7.3.1.8.1 Cropland biosecurity

The primary disease of concern for field crops within the RAA is clubroot which affects canola and was raised as a concern during public engagement (see Section 4.8). Clubroot can substantially reduce seed quality and oil content in canola, resulting in economic losses.

Clubroot is caused by *Plasmodiophora brassicae*, a soil-borne pathogen that can be transmitted from field to field through movement of infested soil by both agricultural and non-agricultural equipment, including vehicles. While clubroot is more common in Alberta, there have been increasing reported cases in Manitoba, and Manitoba Agriculture maintains a growing database of soil analytical results for clubroot. Of particular concern to Manitoba producers is the longevity of the clubroot pathogen in soil as the pathogen can survive for ten to twenty years in the absence of a canola crop (Manitoba Agriculture, no date[b]). There are no economic control measures through which the disease can be eradicated after a canola-growing field gets infested. However, it is possible to curtail the spread and reduce the incidence and severity of infection, through the implementation of agronomic mitigation practices as well as biosecurity measures.

Based on Manitoba Agriculture's 2020 clubroot distribution map (see Figure 7-19), of the five RMs traversed by the D83W project, Portage la Prairie has the highest risk of clubroot and has had soil samples with >80,000 spores per gram of soil and or apparent clubroot symptoms observed in fields.

Per Figure 7-19, the RM of Cartier has had soil samples with 10,001 to 80,000 spores per gram of soil, but no fields within the municipality have been reported as showing apparent symptoms of clubroot. The RMs of Rosser and Woodlands have low risk for clubroot as they have had analytical results less than 1,000 spores per gram. There is

currently no data for the RM of St. François Xavier which is yet to have soils tested for the clubroot pathogen.

In 2014, Verticillium stripe (formerly known as Verticillium wilt), another canola disease which is caused by Verticillium longisporum, was identified by Manitoba Agriculture staff, and this was the first time this disease has been detected in Canada (Manitoba Agriculture, no datec). Verticillium stripe infection occurs earlier in the season, but symptoms and the reproductive microsclerotia appear much later in the season (Froese 2022, pers. Comms). While the pathogen for Verticillium stripe can be transmitted through movement of soil (i.e., soil borne), it is more ubiquitous than the pathogen for clubroot. It can also be transmitted via stubble and is easily wind-dispersed as fine stubble pieces are shredded during harvest, a characteristic that makes its mitigation challenging (Froese 2022, pers. Comms). Since wind dispersal is so easily done, controlling the spread of Verticillium longisporum through mitigation designed for soil-borne pathogens does is not effective (Froese 2022, pers. Comms).

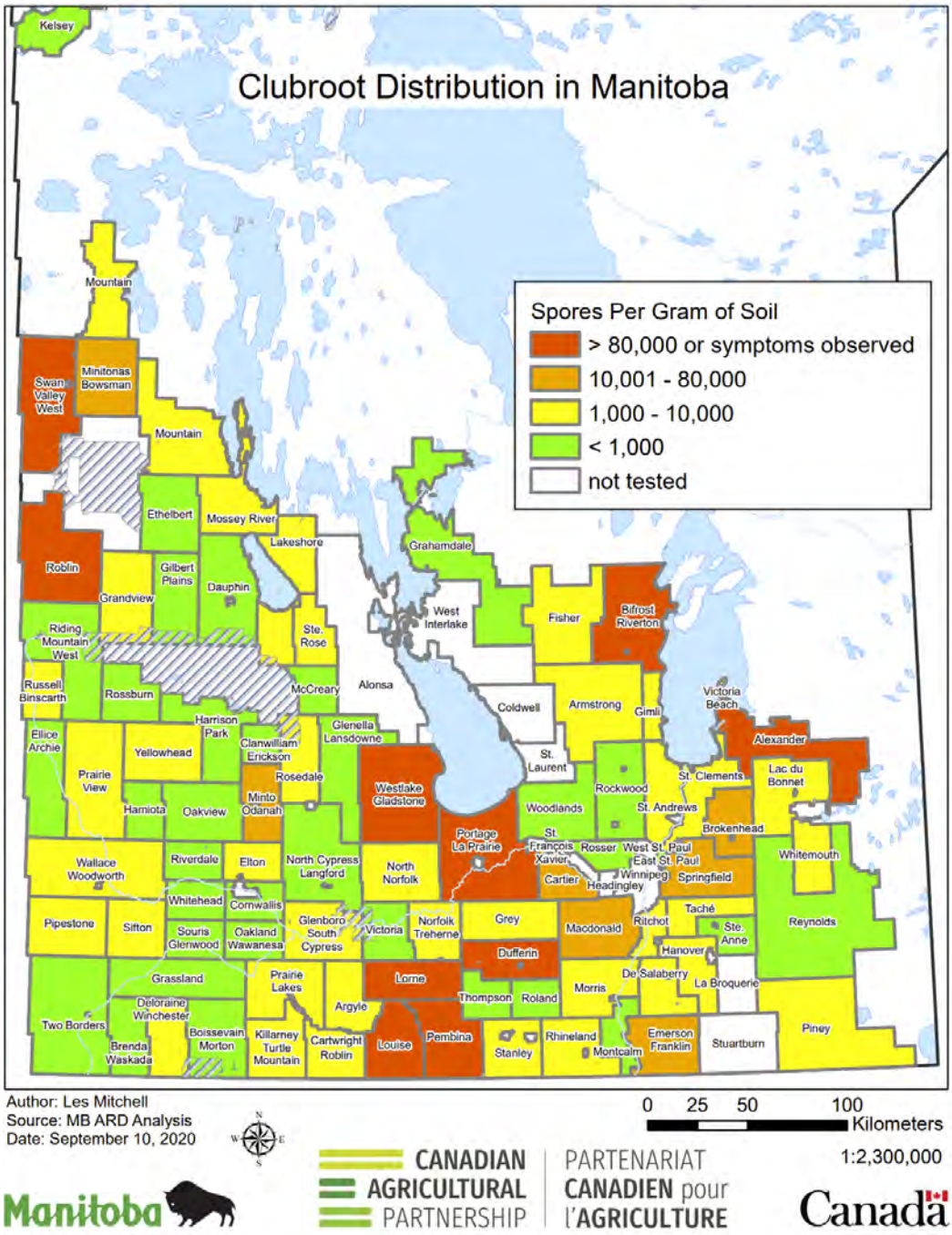


Figure 7-19: Clubroot distribution in Manitoba (2020)

7.3.1.8.2 Livestock biosecurity

Pests and diseases have lasting adverse production value (reductions in livestock health) and production cost (increased input and management costs) effects. The effect of compromised biosecurity would particularly be greater for livestock

operations with large numbers of animals contained in proximity within common spaces (e.g., cattle feedlots, intensive poultry, and hog operations).

With a wide range of agricultural operations in the D83W project area, risk to biosecurity is a concern for livestock operations. The potential for compromised biosecurity through project activities was identified as a concern by landowners during public engagement for the D83W project. The primary mechanisms of livestock disease transmission during D83W project construction could include worker contact with animals (e.g., grazing animals, intensive livestock operations), transfer of manure between fields where animals may be grazing, and manure spreading operations. Porcine Epidemic Diarrhea (PED) Virus that affects pigs and is primarily transmitted through manure would be a biosecurity risk for hog farms in the vicinity of the D83W project. Anthrax is a fatal, contagious, and infectious soil-borne disease that can affect cattle, sheep and other grazing livestock which often die suddenly without showing any signs of disease. *Bacillus anthracis*, the bacteria which causes anthrax, forms spores that can survive in the soil for decades and get exposed to the soil surface due to flooding, drought, or cultivation-induced changes in soil moisture (Manitoba Agriculture, no date[d]). Animals become infected by eating contaminated soil or forages and/or breathing in contaminated dust, and through animal-to-animal transmission (Manitoba Agriculture, no date[d]). While anthrax's high-risk areas include the south-central region in which the D83W project RAA falls, the presence and distribution of anthrax and its pathogen within the D83W project area is unknown.

7.3.1.9 Other speciality farm operations

There is one known organic operation (wheat) in the RM of Woodlands, near the community of Marquette, within the RAA that is registered as an organic producer with the Organic Producers Association of Manitoba (Organic Producers Association of Manitoba website, 2022). There is the potential for more organic farms to be located within the RAA.

Other known specialty farm operations in the RAA include:

- A honeybee farm in the RM of Portage la Prairie, and
- One fruit farm and one vegetable produce farm in the RM of St. François Xavier

There is the potential for other unknown specialty farm operations, such as fish, mushroom, and sod farms as well as more apiary and fruit and/or produce farms to occur in the RAA.

7.3.1.10 Shelterbelt / treed areas

Shelterbelts and treed areas protect soil from erosion and are found throughout the RAA. The construction of a linear project parallel to a shelterbelt, results in the clearance of a wider portion of the shelterbelt compared to when the project is constructed perpendicular to the shelterbelt. As a result, the construction of the D83W project might increase the risk of soil erosion through the removal of windbreaks that were planted along field edges or between fields.

The preferred D83W project transmission line route traverses seven areas of shelterbelt and one private treed area, which will result in a reduction of vegetation in these areas (Table 7-16).

Table 7-16: Locations of shelterbelts and treed areas along the final preferred route

Location	Notes
NE6-12-1E	Planted shelterbelt
W6-12-1E	Planted shelterbelt
RL-201 to 214	Planted shelterbelt
N4-13-3W	Planted shelterbelt
RL-103-BP	Planted shelterbelt
SE17-12-6W	Planted shelterbelt
SE13-13-7W	Planted shelterbelt
NE22-12-7W	Trees in yard site
NE7-12-7W / NW8-12-7W	Remnant shelterbelt

7.3.1.11 Traditional practices and cultures

The regional assessment area has been used extensively by First Nations people and Métis Citizens to practice their culture including hunting, fishing, and gathering rights since time immemorial and the earliest roots of the fur trade, respectively.

As described in Section 5.0, Manitoba Hydro worked closely with several First Nations, the MMF, and the PUIPC to understand traditional and cultural practices and values within the regional assessment area.

In the past, cultural activities, hunting, fishing, trapping, and plant gathering for food and medicines were concentrated around/near the Assiniboine River and its tributaries including old river oxbows but have occurred throughout the regional assessment area. Although access permissions have changed over time, traditional and cultural activities continue on both Crown and private lands in the regional assessment area.

The potential for disturbances to these activities, or the loss of access and resources that support these activities, are concerns frequently shared by First Nations people and Métis Citizens when new transmission lines are planned. For this reason, Manitoba Hydro engaged with potentially affected communities to understand concerns and relevant mitigation to reduce those impacts.

Section 8.9 includes a detailed discussion about Manitoba Hydro's understanding of past and present use of the area and an assessment of effects of the D83W Project on harvesting, important sites, and cultural landscapes. Manitoba Hydro understands that different cultural groups may experience project impacts to traditional and cultural activities and values uniquely. Therefore, in this assessment, Manitoba Hydro has presented three separate culturally-specific assessments for harvesting and important sites, which individually consider impacts of three cultural groups that participated in the FNMEP: Anishinaabe, Dakota, and Métis.

Appendix B includes a summary of feedback heard through the FNMEP, including feedback related to past and present use of the area for traditional and cultural activities. The MMF's Manitoba Métis Knowledge, Land Use, and Occupancy Study for Manitoba Hydro Portage Area Projects (2022), which includes detailed information and maps about the use of the area by Métis Citizens is also included in Appendix B.

7.3.2 Population, employment, and economy

7.3.2.1 Rural Municipality of Rosser

The RM of Rosser became a municipality in 1893. At that time, it was made up of land formerly in the municipalities of St. François Xavier, Assiniboia, and St. Paul. The portion of Assiniboia which became part of Rosser included the Village of Brooklands. In 1895 the boundaries were adjusted to include an area of land previously in the municipality of Kildonan and gave up one township to St. Paul (Rosser Municipality Centennial Book Committee, 1993).

The RM was initially 108,000 acres and extended 24 miles from Stony Mountain west to Marquette. It was bordered to the south by riverlots and to the north were the RMs of Rockwood and Woodlands. Villages in the RM included Rosser, Grosse Isle,

Meadows, and Marquette. The communities of Little Mountain, Gordon and Lilyfield were later organized. Settlers who located in the municipality purchased land from the Métis or from speculators who had already purchased Métis lands. Farms in the area were originally 240–acre parcels. In the initial years there was very little acreage that was cultivated. The first crops were oats, mainly to feed oxen and horses which were the working animals for the settlers. Agriculture developed at a very fast rate and by the 1900s, large fields were being cultivated.

7.3.2.1.1 Population

The RM of Rosser today covers an area of 44,156 ha (approximately 4.7 townships) in southern Manitoba. Small communities in the RM of Rosser include Grosse Isle, Rosser, Meadows, and Marquette. Gordon, Lilyfield, and Little Mountain are other important communities found in the RM. In 2016, the RM of Rosser had a population of 1,372 (Statistics Canada, 2017). The population of the RM of Rosser increased by 1.5% from 2011 to 2016. Table 7-17summarizes population information for the RM of Rosser.

Table 7-17: Population summary for the RM of Rosser

2001 Population	2006 Population	2011 Population	2016 Population	% Population Change 2001-2006	% Population Change 2011-2016
1,412	1,364	1,352	1,372	-3.4	1.5

7.3.2.1.2 Employment and economy

The RM of Rosser is home to several businesses and services. Prominent employers in the region include the BFI disposal grounds, Bel Acres Golf and Country Club, Maxim Transport and Collision Centre, Manitoba Hydro and Player's golf course. The municipality has a strong agricultural presence with many residents employed as farmers or in agricultural businesses. Rosser has four large grain elevators, six seed plant cleaners, and several farm equipment suppliers and implement dealers. The Manitoba Hydro Dorsey Converter Station and the large static inverter plant for the Nelson River Bipole HVDC power transmission scheme are located by the Village of Rosser.

CentrePort Canada, although located outside and adjacent to the RAA for the D83W project, is partly located within the RM of Rosser, and is North America’s largest inland port with approximately 22,000 acres of industrial land and access to tri-modal transportation which encompasses the Canadian National (CN) Railway, Canadian

Pacific (CP) Railway, and BNSF Railway; a global cargo airport; and an international trucking hub.

Because of its location on the northern border of Winnipeg and along the Perimeter Highway, Rosser is home to many trucking trailer services and terminals. Prominent transport companies such as Trans X, Quick X, Pro Line Trailers, EBD Enterprises and Peterbilt Truck Sales are found within the municipality's borders, along with many smaller independent companies. Some of these companies are also expanding and developing their facilities further.

The RM of Rosser also has a very strong agricultural presence. Many residents are employed as farmers or in agricultural businesses. The area includes four large grain elevators, six seed plant cleaners and several farm equipment suppliers and implement dealers. Figure 7-20 shows the distribution of the labour force by industry in the RM of Rosser, while Table 7-18 shows the percent workforce per industry (Statistics Canada, 2017).

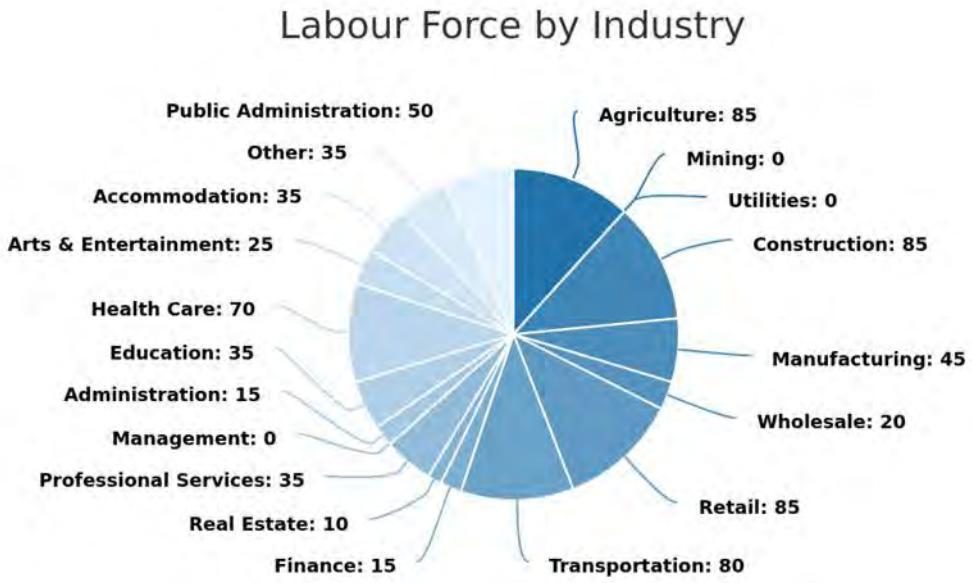


Figure 7-20: Distribution of labour force per industry in the RM of Rosser

Table 7-18: Industry and percent workforce in the RM of Rosser

Industry	% Workforce
Agriculture, forestry, fishing, and hunting	11.5
Construction	11.5
Manufacturing	6.1
Wholesale Trade	2.7
Retail Trade	11.5
Transportation and warehousing	10.8
Finance and insurance	2.0
Real Estate and rental and leasing	1.4
Professional, scientific, and technical services	4.7
Administrative and support, waste management and remediation services	2.0
Educational services	4.7
Health care and social assistance	9.5
Arts, entertainment, and recreation	3.4
Accommodation and food services	4.7
Other services (except public administration)	4.7
Administration	6.8

7.3.2.2 Rural Municipality of Woodlands

A small portion of the northern part of the RAA is in the RM of Woodlands. The RM of Woodlands became a rural municipality in 1880, however townships were surveyed within the RM between 1872 and 1891. As the population grew, settlements in the area were given names based on the landscape, such as Poplar Heights because of the poplar trees and Woodlands because of the wooded areas or were named after

prominent people such as Lake Francis which was named after Frances Wagner, a surveyor.

The RM today covers approximately 117,800 hectares and is bordered by the RM of St. Laurent to the north, RM of Rockwood to the east, RM of St. François Xavier to the south and the RM Portage la Prairie to the west. Notable waterbodies found in the RM of Woodlands include a portion of west and east Shoal Lake, Lake Francis, and a small portion of Lake Manitoba. After the RM was incorporated, it was divided into six Wards. Ward 1 included the LUD of Warren and portions of the community of Marquette; Ward 2 included the community of Woodlands and Stodgell; Ward 3 consisted of Marquette, Reaburn and Poplar Heights; Ward 4 encompassed Ossawa, Ward 5 included Lake Francais; and Ward 6 included Erinview, Woodroyd, Argyle and Oswald. The number of settlers with families who immigrated to the municipality resulted in the construction of many one room school rooms and different dominations of churches. The RM is a rural agricultural setting with smaller communities dominated by rural farming areas, while larger communities provide rural residential areas and numerous business services to the residents.

7.3.2.2.1 Population

The largest population centre in the RM of Woodlands is the unincorporated LUD of Warren. Other unincorporated communities in the RM of Woodlands include Marquette and Woodlands. Smaller communities include Meadow Lake, Reaburn, Oswald, Lake Francis, Woodridge and Erinview. In 2016, the RM of Woodlands had a population of 3,416 (Statistics Canada, 2017). The population of the RM of Woodlands decreased by 3.0% from 2011 to 2016. Table 7-19 summarizes population information for the RM of Woodlands.

Table 7-19: Population summary for the RM of Woodlands

2001 Population	2006 Population	2011 Population	2016 Population	% Population Change 2001-2006	% Population Change 2011-2016
3,453	3,562	3,521	3,416	3.2	-3.0

7.3.2.2.2 Employment and economy

The RM of Woodlands provide residential lots that are serviced through the municipality. The biggest population centre located immediately adjacent to the northern boundary of the RAA, is the LUD of Warren on Provincial Highway #6. The municipality is home to several businesses and services including post offices, gas

stations, automotive repair, veterinarians, grocery stores, hardware stores, insurance agencies, credit unions, local restaurants, and specialty stores. Agriculture is a dominant land use in the municipality and approximately 92 agricultural industries occur and include agricultural operations and supply business such as: agriculture fertilizer sales, cattle ranches, cattle sales, seed cleaning companies, and aerial application. Farm businesses in the municipality include hog operations and dairy. Eastern Plains Saskatoon Inc., an organization that represents Saskatoon harvesters in the area is also in the RM of Woodlands.

Figure 7-21 shows the distribution of the labour force by industry in the RM of Woodlands, while Table 7-20 shows the percent workforce per industry (Statistics Canada, 2017).

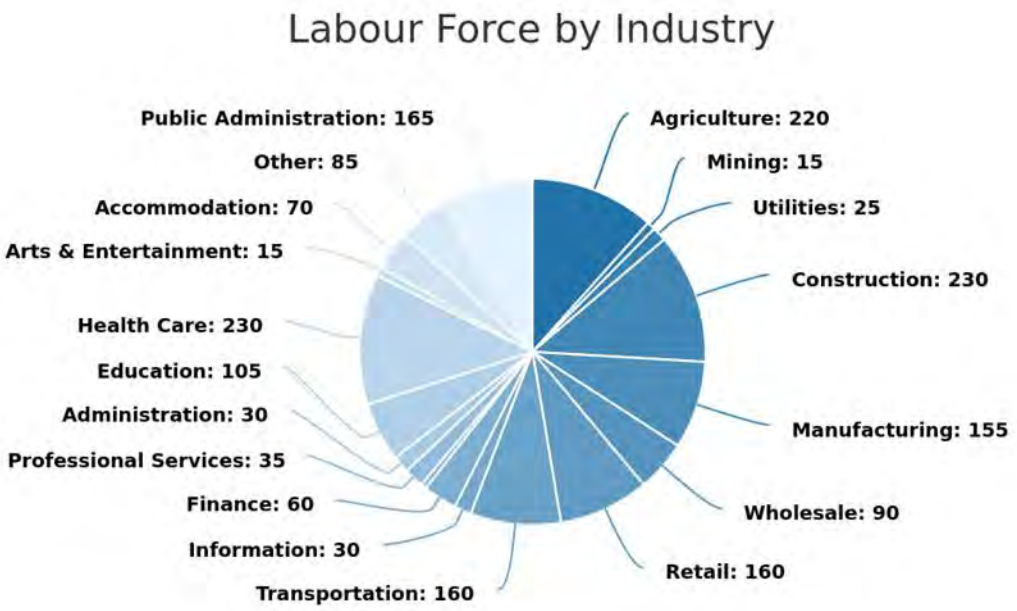


Figure 7-21: Labour force by industry in the RM of Woodlands

Table 7-20: Industry and workforce in the RM of Woodlands

Industry	% Workforce
Agriculture, forestry, fishing, and hunting	11.6
Mining, quarrying, and oil and gas extraction	<1.0
Utilities	1.3
Construction	12.2
Manufacturing	8.2
Wholesale Trade	4.8
Retail Trade	8.5
Transportation and warehousing	8.5
Information and cultural industries	1.6
Finance and insurance	3.2
Real Estate and rental and leasing	<1.0
Professional, scientific, and technical services	1.9
Administrative and support, waste management and remediation services	1.6
Educational services	5.6
Health care and social assistance	12.2
Arts, entertainment and recreation	<1.0
Accommodation and food services	3.7
Other services (except public administration)	4.5
Administration	8.7

7.3.2.3 Rural Municipality of St. François Xavier

The RM of St. François Xavier was incorporated in 1880 (Rural Municipality of St. François Xavier n.d.[a]) and falls in the central-eastern portion of the RAA. The eastern border of the RM of St. François Xavier is about 10 km west of the City of Winnipeg along the Trans Canada Highway (Highway 1). The RM of St. François Xavier is bordered by the RM of Rosser to the west, the RM of Woodlands to the north and the RM of Cartier to the east. The RM Council consists of a Reeve, Chief Administrative Officer, and four councillors (Rural Municipality of St. François Xavier n.d.[b]). Most of the land in the RM of St. François Xavier is divided into riverlots.

The RM of St. François Xavier is known for its folklore and is known as "White Horse Plain" which came from a well-known Indigenous legend. The lands around St. François Xavier supported tribes of Cree and Sioux who harvested the land for buffalo and other animals for food and fur. The Métis soon inhabited the area and were an important part of the history of the municipality and continue to have a noticeable role within it. Many immigrant settlers that moved west from Winnipeg, found the land in St. François Xavier to be suitable for homesteading and St. François Xavier became Manitoba's second oldest settlement. The area is rich in history with many plaque and cairns along the old red rivercart route to the west, which now is known as Highway 26.

7.3.2.3.1 Population

The RM of St. François Xavier hosts two communities, namely the community of St. François Xavier and village of Pigeon Lake. Table 7-21 summarizes the population information for the RM of St. François Xavier.

Table 7-21: Population summary for the RM of St. François Xavier

2001 Population	2006 Population	2011 Population	2016 Population	% Population Change 2001-2006	% Population Change 2011-2016
1,025	1,085	1,240	1,411	5.9	13.8

7.3.2.3.2 Employment and economy

The economy in St. François Xavier is focused primarily on agriculture with local farmers involved in operating various grain, seed, and livestock operations. In addition to agriculture, the municipality offers a wide range of services such as a grocery store, liquor outlet, bakery, Credit Union, veterinary services, hardware, tree

nurseries and chiropractic and massage therapy clinic. There are also numerous contractors who provide services in construction, electrical, plumbing, heating, mechanical repairs, and landscaping. Industrial services include Direct Auto Parts which conducts auto part recycling.

Within the municipality and along the TransCanada Highway, is The Welcome Stop, which offers services such as a gas station, restaurant, and convenience store as well as a KOA RV Campground alongside the Assiniboine River.

Figure 7-22 shows the distribution of the labour force by industry in the RM of St. François Xavier, while Table 7-22 shows the percent workforce per industry (Statistics Canada, 2017).

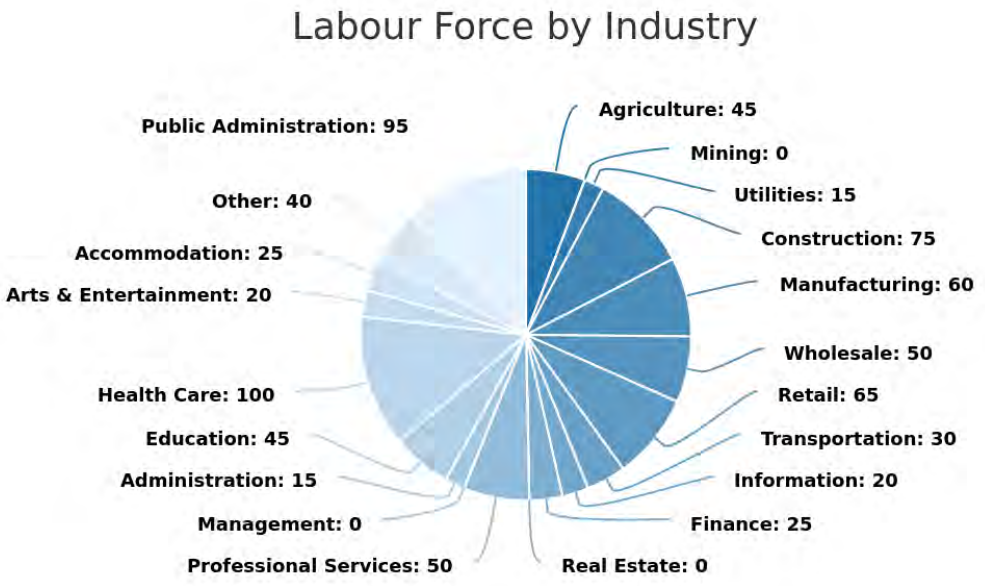


Figure 7-22: Labour force by industry in the RM of St. François Xavier

Table 7-22: Industry and workforce in the RM of St. François Xavier

Industry	% Workforce
Agriculture, forestry, fishing, and hunting	5.8
Utilities	1.9
Construction	9.7
Manufacturing	7.7
Wholesale Trade	6.5
Retail Trade	8.4
Transportation and warehousing	3.9
Finance and insurance	3.2
Professional, scientific, and technical services	6.5
Administrative and support, waste management and remediation services	1.9
Educational services	5.8
Health care and social assistance	12.9
Arts, entertainment, and recreation	2.6
Accommodation and food services	3.2
Other services (except public administration)	5.2
Administration	12.3

7.3.2.4 Rural Municipality of Cartier

Cartier was incorporated as a rural municipality in1914 (RM of Cartier website) and in the central portion of the RAA. The eastern border of the RM of Cartier is situated approximately 20 km west of the City of Winnipeg. Currently, the RM has five wards, and the council office is in the Town of Elie, which is located outside of the RAA. The RM Council consists of a Reeve, a councillor/Deputy Reeve, and four councillors (RM of Cartier website).

The RM of Cartier is within the White Horse Plains Planning District (WHPPD) which jointly serves the RM of Cartier and the RM of St. François Xavier (Rural Municipality of St. François Xavier n.d.[c]). The Planning District is involved and responsible for establishing the joint Development Plan and Zoning By-Laws that dictate the future development and land use within each member municipality. Land use in the RM of Cartier is subject to the White Horse Plains Planning District Development Plan By-Law No. 1-2008. (Rural Municipality of St. François Xavier 2010) The majority of the land in this Planning District is designated a Rural General Policy Area. Under the Development Plan, a policy objective relating to Municipal Services seeks to ensure that expansion of utility services and corridors are coordinated with other municipalities, landowners, and utility companies. Further, in its statement of General Policies, the Development Plan states that essential activities of government and public and private utilities shall be allowed in any land use designation subject to the WHPPD zoning by-law requirements (White Horse Plains Planning District 2010). The zoning by-law in the RM of Cartier is By-Law No. 1620 (V. McLennan, personal communication).

7.3.2.4.1 Population

Rural living is evident in the municipality as seen with Lido Plage, the municipalities largest rural residential area. In addition, urban living is evident in the villages of Elie, St. Eustache and Springstein. Table 7-23 summarizes the population information for the RM of Cartier.

Table 7-23: Population summary for the RM of Cartier

2001 Population	2006 Population	2011 Population	2016 Population	% Population Change 2001-2006	% Population Change 2011-2016
3,120	3,162	3,153	3,368	1.3	6.8

7.3.2.4.2 Employment and economy

The RM of Cartier has many businesses and services throughout the region available to residents in the area including excavation, construction, car sales and repairs, insurance, financial institutions, dental, walk-in clinics, pharmacy, and post offices.

The RM of Cartier is also considered a valuable location for companies that require accessibility from there customers. The municipality is located along the TransCanada Highway providing a prime location for trucking and logistics operations. Commercial and industrial lands are available in the municipality, with

access to the TransCanada Highway and the municipality is closely located to the proposed Centreport highway that will eventually link to the City of Winnipeg. The Community Futures White Horse Plains (CFWHP) is a not-for-profit organization that focuses on supporting small business and community development by working with new and existing businesses to create economic development in the municipality and surrounding areas.

The RM of Cartier also has a large proportion of its population employed in agricultural business and services, including farm implement dealers, seed plants, farm equipment supply and fertilizer dealers. The RM of Cartier is dominant in agriculture, providing products such as canola, wheat, hogs, cattle, dairy products, oats, poultry, barley, and flaxseed.

Figure 7-23 shows the distribution of the labour force per industry in the RM of Cartier, while Table 7-24 shows the percent workforce per industry (Statistics Canada, 2017).

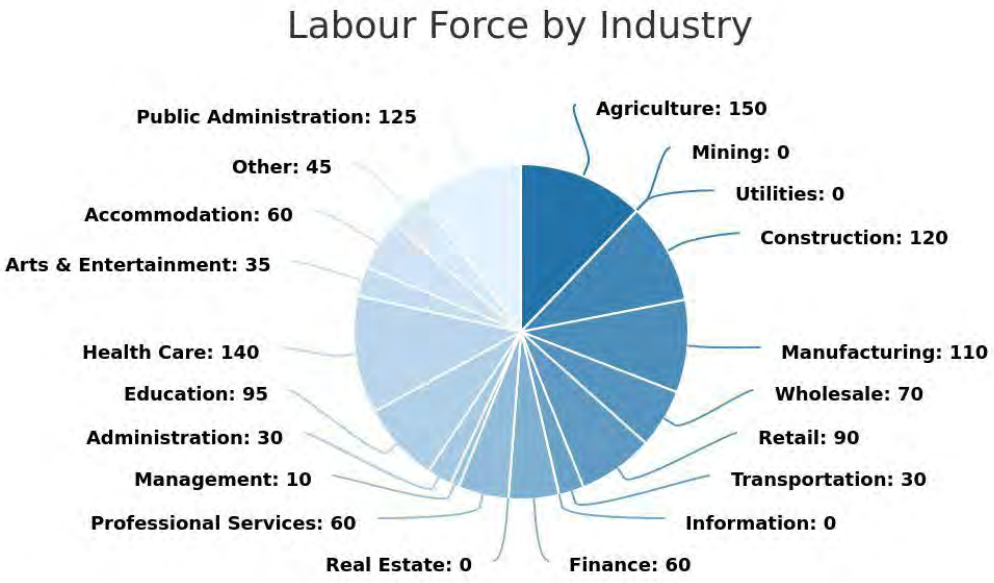


Figure 7-23: Labour force by industry in the RM of Cartier

Table 7-24: Industry and workforce in the RM of Cartier

Industry	% Workforce
Agriculture, forestry, fishing, and hunting	12.2
Construction	9.8
Manufacturing	9.0
Wholesale Trade	5.7
Retail Trade	7.3
Transportation and warehousing	2.4
Finance and insurance	4.9
Professional, scientific, and technical services	4.9
Management of companies and enterprises	<1.0
Administrative and support, waste management and remediation services	2.4
Educational services	7.8
Health care and social assistance	11.4
Arts, entertainment, and recreation	2.9
Accommodation and food services	4.9
Other services (except public administration)	3.7
Administration	10.2

7.3.2.5 Rural Municipality of Portage la Prairie

The RM of Portage la Prairie, the largest municipality in the province, was incorporated in 1879 and is centrally located in Manitoba. The RM of Portage la Prairie falls in the western portion of the RAA and the eastern border of the RM is approximately 50 km west of the City of Winnipeg along the Highway 1 (Rural Municipality of Portage la Prairie, n.d.). The RM Council consists of a Reeve and seven ward counsellors (Manitoba Local Government n.d.). The RM of Portage la Prairie is

bordered by Lake Manitoba to the north; the RMs of North Norfolk and Westlake-Gladstone to the west; the RMs of Grey and Norfolk-Treherne to the south; and the RMs of Cartier, St. François Xavier, and Woodlands to the east. The RM initially was developed around a community from the 1870s at a location where boats were taken out of the Assiniboine River and portaged over the prairie to the north towards Lake Manitoba (Manitoba Historical Society, 2021).

The largest urban centre in the municipality is the City of Portage la Prairie, adjacent to Highway 1. In addition to the City of Portage la Prairie, the municipality is comprised of other communities of various sizes and backgrounds including St. Ambroise, Delta, Edwin, High Bluff, MacDonald, Newton, Oakville and Poplar Point. Indigenous communities include Dakota Plains, Dakota Tipi, and Long Plain.

7.3.2.5.1 Population

According to the 2016 census (Statistics Canada 2021), the City of Portage la Prairie had a population of 13,304, which represents a 2.3% increase over the reported population of 12,996 in 2011 (Table 7-25). According to Crown-Indigenous Relations and Northern Affairs Canada the total population of Dakota Tipi First Nation is 347 with 180 living on reserve. The Long Plain First Nation population was 3853, with 2,135 on reserve. Dakota Plains Wahpeton First Nation population was 239, with 168 on reserve (Crown-Indigenous Relations Northern Affairs Canada 2021).

The RM contains several small communities, such as St. Ambrose, High Bluff, Newton, Oakville, Poplar Point, Skelding and Edwin.

Table 7-25: Population summary for the RM of Portage la Prairie

2001 Population	2006 Population	2011 Population	2016 Population	% Population Change 2001-2006	% Population Change 2011-2016
6,790	6,790	6,525	6,975	0	6.9

7.3.2.5.2 Employment and economy

In the RM of Portage la Prairie, local businesses and services include regional government offices, transportation, shipping, retail, wholesale, health services restaurants, sporting venues, and accommodations. The commercial and industrial activities found in the municipality are primarily agricultural and include the agriculture service industry and food processing industry. The RM of Portage la Prairie also has sites currently available for new commercial, industrial, or institutional

facilities including Poplar Bluff Industrial Park, Oakville Industrial Park and Southport Aerospace Centre.

Portage Regional Economic Development (PRED) represents agri-food manufacturing and helps with new investments and re-investments of business across the region. The PRED has a board that is made up of seven directors, three councillors that represent the City of Portage la Prairie, three councillors that represent the municipality and one member at large (PRED website, 2021). The municipality is home to a growing number of agri-food manufacturing operations both small and large scale, and can provide the natural resources, transportation, and water capacity to support the growth of this industry. Many of the leading employers in the RM of Portage la Prairie are food manufacturing companies which include:

- Can-Oat Milling: one of three Richardson Milling sites in western Canada providing oat supply to North America, with products such as granola clusters, oat bran and whole oat flour.
- McCain Products: production of French fries for international markets.
- NutriPea: involved with yellow peas as an ingredient in health products and export their products to the United States, Mexica and Brazil
- Simplot: involved in the shipment of frozen French fries and specialty potato products across North America.
- Roquette: a pea protein processing facility that will be the largest in the world.

The RM of Portage la Prairie is a major service centre for the Central Plains region of Manitoba, located in one of the most productive agricultural zones in Canada, containing regional government offices, retail and distribution services and has proven to be a sound investment for manufacturing and processing for export-driven companies.

Figure 7-24 shows the distribution of the labour force per industry in the RM of Portage la Prairie, while Table 7-26 shows the percent workforce per industry (Statistics Canada, 2017).

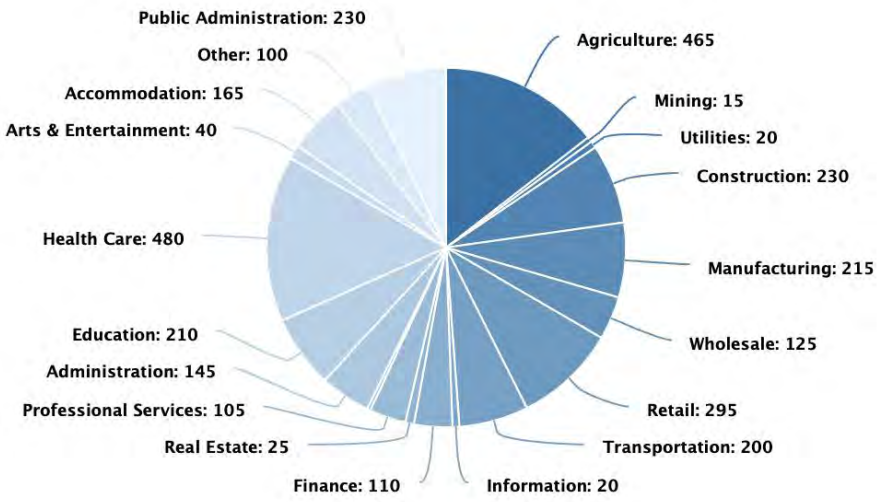


Figure 7-24: Labour force by industry in the RM of Portage la Prairie

Table 7-26: Industry and workforce in the RM of Portage la Prairie

Industry	% Workforce
Agriculture, forestry, fishing, and hunting	14.5
Mining, quarrying, and oil and gas extraction	<1.0
Utilities	<1.0
Construction	7.2
Manufacturing	6.7
Wholesale Trade	3.9
Retail Trade	9.2
Transportation and warehousing	6.3
Information and cultural industries	<1.0
Finance and insurance	3.4

Real Estate and rental and leasing	<1.0
Professional, scientific, and technical services	3.3
Management of companies and enterprises	<1.0
Administrative and support, waste management and remediation services	4.5
Educational services	6.6
Health care and social assistance	15
Arts, entertainment, and recreation	1.3
Accommodation and food services	5.2
Other services (except public administration)	3.1
Administration	7.2

7.3.3 Public safety and emergency services

7.3.3.1 Rural Municipality of Rosser

The RM of Rosser provides emergency fire services through a team that consists of a fire chief, deputy chief, and volunteer firefighters (Rural Municipality of Rosser, 2007). Ambulance service is provided by the Stonewall & District Ambulance in the RM of Rockwood (Interlake Regional Health Authority, personal communication).

The Stonewall Royal Canadian Mounted Police (RCMP) detachment patrols the area in north of the main CPR line, while the Headingley RCMP detachment patrols the area south of the main CPR line. In addition to the RCMP, zones were formed in the municipality in which volunteers were placed as part of a local Crime Watch Unit.

The Interlake Regional Health Authority serves the RM of Rosser. Other health services close to the RM of Rosser, include the Town of Stonewall, which offers medical clinics, a Dynacare laboratory, and the Dr. Evelyn Memorial Hospital. Health programs and services that are offered at the Dr. Evelyn Memorial Hospital include diagnostic imaging and lab services, emergency and out-patient services, ambulance, physiotherapy, and rehabilitation services.

7.3.3.2 Rural Municipality of Woodlands

In the RM of Woodlands, emergency services are located at the firehall in the LUD of Warren. This is a rural, volunteer, paid-on-call fire department that serves the RM of Woodlands and the towns of Warren, Woodlands, Marquette, and Lake Francis. The RM of Woodlands is a member of the South Interlake Mutual Aid District, along with the RMs of Selkirk, St. Andrews, St. Laurent, Rockwood, Rosser, West St. Paul, and St. Francis Xavier. This mutual aid service involves municipalities entering into agreements with other municipalities in the same district to:

- Receive assistance with a fire or event that is too large for one department to handle;
- Receive back-up protection if a department is responding to an event in one area and another event happens somewhere else in that municipality and they don't have the resources to respond they can request assistance from a neighboring department; and
- Share resources when requested

The Stonewall RCMP detachment is responsible for providing policing services for the RM of Woodlands.

The Interlake Regional Health Authority serves the RM of Woodlands. Other health services close to the RM of Woodlands include the Town of Stonewall which offers medical clinics, a Dynacare laboratory, and the Dr. Evelyn Memorial Hospital which provides diagnostic imaging and lab services, emergency and out-patient services, ambulance, physiotherapy, and rehabilitation services. A medical clinic is also in the community of Woodlands which has a nurse practitioner and physiotherapist.

7.3.3.3 Rural Municipality of Cartier

The RM of Cartier Fire Department provides emergency fire services and consists of a team of paid on- call firefighters as well as a fully equipped fleet of emergency vehicles. The department operates out of one fire-hall centrally located in Elie (Rural Municipality of Cartier, 2011c).

The RM of Cartier has an ambulance service in Elie. This station provides ambulance service to the RM as well as to the residents of the RM of St. François Xavier. If this ambulance is unavailable, ambulance service can be provided to the RMs by any of the 13 other ambulances in the RHA (Central).

The Southern Health-Santé Sud Regional Health Authority serves the RM of Cartier primarily through a Health Centre Medical Clinic in the community of Elie. The closest hospitals are in the Cities of Winnipeg and Portage la Prairie. Other medical

clinics and services can be found in nearby communities like Headingley and the City of Winnipeg.

The RMs of Cartier and St. François Xavier are provided with police services by the Headingley RCMP Detachment. In addition to small communities such as La Salle, Oak Bluff, Sanford, Elie, Headingley, St. Francois-Xavier, Starbuck, and St. Eustache, the area hosts numerous residential subdivisions. The Headingley Correctional Centre is also located within the detachment area (RCMP, 2011b).

7.3.3.4 Rural Municipality of St. François Xavier

The RM of St. François Xavier's Volunteer Fire Department provides fire protection services through a department overseen by the Fire Chief and Deputy Fire Chief and supported by the community and residents. Volunteers are trained, paid-on-call and are available for fire services 24 hours a day. In addition to the Volunteer Fire Department, the RM of St. François Xavier has agreements in place with surrounding communities to provide or receive fire service support. Ambulance service for the residents of the Municipality is provided by the Cartier Ambulance from the nearby community of Elie (RM of St. François Xavier, 2021).

The Headingley RCMP detachment provides police services to the municipality.

The municipality falls under the Southern Health-Santé Sud Regional Health Authority St. François Xavier. The closet hospital to the residents in the eastern portion of the RM, is Grace Hospital in the City of Winnipeg, while for residents in the western portion of the RM, the Portage District General Hospital is the closest hospital. Medical clinics and other medical services are in nearby communities, like Elie, Headingley and the City of Winnipeg.

7.3.3.5 Rural Municipality and City of Portage la Prairie

Emergency services are shared between the City and RM of Portage la Prairie. The RM of Portage la Prairie is served by the Portage la Prairie Fire Department which consists of a fire chief and deputy chief, as well as 16 full-time members and 25 part-time fire fighters. The department provides services to both the city and the municipality and serves an area of approximately 850 square miles (Rural Municipality of Portage la Prairie, 2021).

The Portage District General Hospital, in the City of Portage la Prairie, is the primary health care centre, with ambulance services provided by the Central Region Emergency Medical Services which is staffed with full time, part time and casual paramedics that are helped by first responders in the community (RM of Portage la

Prairie, n.d.). The city has several medical clinics, pharmacies, personal care homes, dental clinics, massage therapists and physiotherapists.

Emergency services, including 911, are provided by the fire department and the RCMP, both of which are in the City (Rural Municipality of Portage la Prairie, 2021). Policing of the City and the municipality is conducted by the City of Portage la Prairie RCMP detachment.

7.3.4 Parks and recreation

There are various local parks and recreation areas and opportunities in the RAA. The following describes some of these opportunities found in the RMs that are part of the RAA.

7.3.4.1 Rural Municipality of Rosser

There are a variety of recreational activities and opportunities offered in the RM of Rosser for residents and visitors to the area. The Rosser Woodlands Recreation Commission (RWRC), which was established in 2010, was designed to promote and address recreational activity in the RMs of Rosser and Woodlands. In addition, the RWRC is an active member of various regional and provincial organizations such as the Interlake Municipal Recreation Association (IMRA), the Interlake Recreation Professionals' Association (IRP), and Recreation Connections Manitoba. The RWRC also partners with the West Interlake Trading Company and works closely with Manitoba Tourism Education Council (MTEC), Community Futures – West Interlake, the Interlake Tourism Association (ITA), and Travel Manitoba.

7.3.4.1.1 The Prairie Dog Central

The Prairie Dog Central is a vintage locomotive that travels through the RM of Rosser, departing from Inkster Junction approximately 3 kilometres west of Route 90 and Inkster Boulevard travelling northwest towards the community of Grosse Isle, in the RM of Rosser. Throughout the journey you can view the prairie landscape intermixed with local communities and farmland, with a stop at the Country Market in Grosse Isle.

7.3.4.1.2 Recreation and Community Clubs

There is a hall and recreation club that can be used to host a variety of events in the community of Grosse Isle and a community club and curling rink in the community of Rosser.

7.3.4.1.3 Grants Lake Wildlife Management Area

Located northwest of Winnipeg, Grants Lake Wildlife Management Area is a small, primarily cattail-filled marsh near the towns of Warren, Rosser, and Grosse Isle. It has shrunk to a remnant of its former immense status and is now surrounded by intensively cultivated farmland. Several young poplar and willow stands dot the area. Ducks Unlimited has manipulated the marsh through the placement of level ditches, a well-established method of creating diversity within otherwise homogenous sites, and the blasting of potholes.

7.3.4.2 Rural Municipality of Woodlands

Within the RM of Woodlands' portion of the RAA, there are community and recreation facilities in the communities of Marquette and Meadow Lea such as the Marquette Curling Club and Meadow Lea community hall.

7.3.4.3 Rural Municipality of St. François Xavier

The RM of St. Francois stretches for some 40 km along the north bank of the Assiniboine River, which provides excellent opportunities for fishing, canoeing, boating and other recreational activities.

There are two municipal parks in the Village of St. François Xavier which fall within the RAA. The St. François Xavier Park has a ball diamond, children's playground, and a picnic shelter. The Medicine Rock Park displays replicas of the Red River Cart and a historical log cabin called The Breland House.

7.3.4.4 Rural Municipality of Cartier

While there are many parks located outside the RAA but within the RM of Cartier (i.e., Joe Legault Park, Magloire Park, Vrel Park and Nicola Park) there are no parks in the RAA. In the RAA, recreational facilities are in the community of St. Eustache including the St. Eustache Arena which has an indoor arena that is home to various minor hockey teams, hosts tournaments and public skating. In addition to the arena, St Eustache also has a community club that has baseball diamonds, horseshoe pitches and a hall that is available for community events.

7.3.4.5 Rural Municipality of Portage la Prairie

The Portage la Prairie region is home to several camping venues for visitors to enjoy as they are visit or travel through the municipality. In addition to camping, the RM of Portage la Prairie may be best known for some of the fruits and vegetables that are produced in the area. Strawberry picking season is widely celebrated with visitors

coming from distances to enjoy this activity. Venues such as the year-round Farmers Market has also become a popular destination for families.

Recreational activities such as fishing are also popular and occur on Lake Manitoba and the Assiniboine River as well as other water bodies in the area. Another well known fishing destination is the Portage Spillway, also known as Wayside Park which offers a water recreation spot for boating and fishing as well as a secluded picnic area.

The campgrounds in the RAA and within the RM of Portage la Prairie include Creekside Camping and Recreational Vehicle (RV) Park and Miller's Camping Resort. Creekside Camping and RV Park is located along the TransCanada Highways approximately 13 km east of the City of Portage la Prairie. This campground has 105 fully serviced sites, tenting areas, an inground pool, washroom and shower facilities, convenience store and fishing at the nearby Assiniboine River. Miller's Camping Resort is located approximately 6 kilometers east of the City of Portage la Prairie on the north side of the TransCanada Highway. This camping resort has 30 fully serviced sites, a heated pool, bike rentals, firepits, a laundromat and a convenience store. Recreational sports such as basketball, sand volleyball and baseball can also be played at the resort and a games room is available that offers arcade, billiards, foosball, and ping pong.

7.3.4.6 Other recreational activities in the regional assessment area

There are a variety of other recreation and tourism activities throughout the RAA such as hunting, fishing, and snowmobiling.

The RAA provides hunters with hunting opportunities during specified seasons. Manitoba's big game hunting is administered by Manitoba Natural Resources and Northern Development within Game Hunting Area (GHA) zones. The RAA is in GHA zone 25B and species hunted within the RAA would include coyote, deer, upland birds (grouse, wild turkey) and migratory birds such as ducks and geese. The entire RAA is located within Manitoba's Open Trapping Area Zone 3. Typical furbearing species that are harvested in this zone include beaver, badger, coyote, fox, marten, raccoon, and weasel (Trapping Guide, 2021-22).

Areas which allow hunting within the RAA include Wildlife Management Areas, undesignated Crown lands, and private lands where permission is provided. The Big Game Hunting Areas (GHAs) associated with the RAA include GHA Zones 25B and is regulated by Manitoba Natural Resources and Northern Development (Manitoba Hunting Guide 2021-22). Commonly hunted species include white-tailed deer, waterfowl, and upland game birds.

Snowmobiling is a popular recreational pursuit within the RAA and in conjunction with local clubs, Snowmobilers of Manitoba Inc. (SnoMAN) develop and maintain a network of trails with the goal of promoting safe and environmentally responsible snowmobiling. According to the 2020-21 SnoMAN map, numerous club and provincial snowmobile trails traverse the RAA in north-south and east-west orientations. There are several snowmobile shelters associated with the trails as well.

There is also the Prime Meridian Trail, which is a 116 km heritage trail on the abandoned rail line. It is a spur trail of the Trans Canada Trail starting near Grosse Isle and passing through several Near Grosse Isle, in the RM of Rosser, there is the Prime Meridian Trail, which is approximately a 116 km heritage trail located on the abandoned rail line. This trail is a branch off the TransCanada Trail starting at the community of Grosse Isle and passing several communities until it reaches the community of Fisher Branch.

7.3.5 Provincial and federal protected areas

Manitoba's Protected Areas Initiative (PAI) is a government program administered through Climate, Environment & Biodiversity, whose goals are to build a network of protected and conserved areas that include the biological diversity and unique natural features that can be found in the province. Manitoba's commitment to protecting areas began in 1990, becoming the first jurisdiction in Canada to protect different areas that represent the multiple diversities in its landscape. Manitoba protected areas have grown to recognize other types of conserved areas and has increased in area from approximately 350,000 hectares to currently over 7.2 million hectares, an area that is roughly 11% of the land in Manitoba.

7.3.5.1 Wildlife management areas

The Province of Manitoba also designates specific Wildlife Management Areas (WMAs) for "*better management, conservation and enhancement of the wildlife resources of the province.*" Like the PAI, WMAs exist to protect wildlife, the environment and promote people's enjoyment of natural areas. Hunting and trapping are generally permitted in WMAs but may be subject to restrictions or prohibited in some areas.

Grant's Lake Wildlife Management Area is the only WMA in the RAA. Covering approximately 4 km^2 (400 ha) it encompasses Grant's Lake Game Bird Refuge and is designated as in Important Bird Area (IBA). Grant's Lake WMA is located within the eastern portion of the RAA, between PR 221 and PTH 6, approximately 4 km northeast of Meadows, MB.

Grant's Lake is a major waterfowl staging area, particularly for the Snow Goose. Canada Goose, various ducks and shorebirds also use the wetland in migration. Recent and past activities, such as agricultural irrigation, have reduced the historical area of Grant's Lake, now a small, cattail dominated marsh, edged with young poplar and willow stands. The marsh has been manipulated by Ducks Unlimited through the placement of stream-like ditches that radiate out from the lake at the center of the WMA. This well-established method of creating diversity within otherwise homogenous sites, separates the area into various sites to promote a larger diversity of species within the region (Important Bird Areas, 2021; IBA Canada, 2021). The area surrounding Grant's Lake is a Managed Hunting Area (MHA) for waterfowl, while the WMA and some adjacent private lands are closed to hunting, to provide a safe resting area for waterfowl and encourage them to remain in the general area (Manitoba Agriculture and Resource Development, 2021). Grant's Lake WMA is surrounded by intensively cultivated farmland.

Portage Sandhills WMA (1,600 ha) is just over 4 km south of the RAA boundary, directly south of Portage la Prairie. The Delta Marsh WMA (11,000 ha) is located approximately 4 km north of the RAA, on the south shore of Lake Manitoba. The Delta Game Bird Refuge is a protected area that encompasses 8,125 ha within the Delta Marsh WMA, which is free of all activities that could significantly and adversely affect habitat (Manitoba Agriculture and Resource Development, 2021).

7.3.5.2 Provincial parks

Two provincial parks are outside of and adjacent to the RAA. The Portage Spillway Provincial Park covers 3.7 ha and is situated between the Assiniboine River and Yellow Quill Trail, south of Portage la Prairie. It is comprised of two neighboring parcels of land, which are separated by a small lagoon. It is accessed from the Yellow Quill Trail and is 500 m south of the Portage la Prairie Bypass/Trans-Canada Highway (Government of Manitoba 2013). Yellow Quill Provincial Park covers 3 ha south of Portage la Prairie and is accessed from the Trans-Canada Highway. In the Lake Manitoba Plain Ecoregion, the site is entirely mowed lawn scattered with shade trees (Government of Manitoba 2017).

Beaudry Provincial Park is approximately 6 km from the east side of the RAA, near the community of Headingley, and outside the perimeter of Winnipeg.

7.3.5.3 Community pastures

The northern boundary of the RAA passes through the south end of the Portage Community Pasture (PCP) for about 2.5 km, west of PR 430. Woodlands Community Pasture is adjacent to the PCP, and about 3 km north of the RAA. Both these

Community Pastures are operated independently, without government support, by the Portage Pasture Association. They are among the four community pastures in Manitoba that did not participate in the transfer of lands to Association of Manitoba Community Pastures from the Prairie Farm Rehabilitation Administration, from 2014 to 2018 (Hamilton, 2019).

7.3.5.4 Portage diversion

The Portage Diversion and land adjacent to it is identified as Crown land. The total distance of Crown land traversed by the D83W project is approximately 600 metres across the Portage Diversion in SW17-12-7WPM.

7.3.6 Resource use

Agriculture is the dominant land use in Southern Manitoba as discussed in Section 7.3.1. Other resource use activities in or immediately adjacent to the RAA include woodlot management, hunting, trapping, mineral extraction, and domestic resource uses.

No commercial forestry management licences exist within the RAA. The Government of Manitoba, Agriculture and Resource Development Branch, administers domestic forest utilization through the issuance of timber permits. Some private landowners may manage woodlots on their own properties under the direction of the Manitoba Woodlot Association's Private Land Resource Planning initiative.

The RAA provides hunters with abundant hunting opportunities during specified seasons. Manitoba's big game hunting is administered by Manitoba Natural Resources and Northern Development within Game Hunting Area (GHA) zones. The RAA is in GHA zone 25B and species hunted within the RAA would include coyote, deer, upland birds (grouse, wild turkey) and migratory birds such as ducks and geese. The entire RAA is located within Manitoba's Open Trapping Area Zone 3. Typical furbearing species which are harvested in this zone include beaver, muskrat, badger, coyote, fox, marten, raccoon, and weasel (Trapping Guide, 2021-22). Within GHA 25B, hunters of white-tailed deer, elk, or moose, are restricted to operating vehicles on roads and established trails and waterways.

In some instances, aggregate resources have been identified by Rural Municipalities within the RAA in their Development Plans and associated By-laws. Within the RM of Rosser, between the Town of Rosser and Grosse Isle, an identified area of medium aggregate potential contains lands with significant mineral, aggregate or quarry potential which is not high or has not had its full potential proven. It also may contain lower quality mineral resources. With approval, conflicting land uses may be permitted (SIPD, 2021). In the RM of Cartier, a small aggregate deposit has been

identified approximately 3.5 km northeast of the Town of Elie. A review of the aggregate compilation maps for the RAA, showed multiple private and crown sand and gravel deposits in the northern portion of the study area in the RM of Woodlands (Township 13, Ranges 3 and 4) and continuing into the RM of Portage la Prairie (Township 13, Range 5). These areas of deposits correlate with the identification of many gravel ridges of sand and stones in the RM of Woodlands that have been used for the development of roads (RM of Woodlands, 2021).

Local resource-use activities within the RAA consist of fishing, berry picking, and likely wood gathering (firewood). Residents likely participate in traditional and contemporary (recreational and subsistence) fishing throughout the region. Berries of interest in southern Manitoba include Saskatoon berry, raspberry, and strawberry. There are a few U-Pick farms in or near the RAA, including Jeffries Berry Patch, Connery's Berry Farm, Mayfair Farms and Riverbend Orchard in the RM of Portage la Prairie, and The Purple Berry Orchard in the RM of Rosser.

7.3.7 Regional infrastructure

7.3.7.1 Road network

The D83W project area can be accessed through Provincial Trunk Highways (PTH) and Provincial Roads (PR). Most rural areas within the RAA are also connected by a square mile grid of gravel or earth roads maintained by each municipality, while the rural areas adjacent to the Assiniboine River are connected by paved and unpaved municipal roads following the river lot system. The highways and roads in the RAA are detailed below. Eight additional Provincial Roads numbered in the 600s occur as small loops or spurs, generally under three kms in length, near small communities.

Provincial Trunk Highways

- PTH 1 - The Manitoba section of the Trans-Canada Highway, a heavily used 4-lane divided highway, with full freeway status sections at Portage la Prairie and Winnipeg.
- PTH 6 – A provincial primary highway that runs from the Perimeter Highway of Winnipeg to the Thompson south city limits.
- PTH 13 – Runs north from Carman to its junction with PTH 1 and PR 430, north of Oakville.
- PTH 16 - The Manitoba section of the Yellowhead Highway, is a two laned highway connecting Winnipeg with Saskatoon and Edmonton. It begins east of Bloom, at the junction with the Trans-Canada Highway and PR 305.
- PTH 26 - An east-west route that begins and ends at junctions with the Trans-Canada Highway. The western terminus is located 3 km east of Portage la

Prairie, while the eastern terminus is 3 km southeast of St. François Xavier (13 km west of Winnipeg). PTH 26 provides access to the small communities of St. François Xavier and Poplar Point and follows the Assiniboine River.

Provincial Roads

- PR 221 - Runs northwest, from Winnipeg to the community of Marquette, alongside the main CP Railway line.
- PR 236 – Runs east from Rosser to Winnipeg's Perimeter Highway.
- PR 240 – Runs from Delta Beach at Lake Manitoba, southwards through Portage la Prairie.
- PR 248 – Originates at a junction with PR 305, west of Brunkild, and proceeds north, passing through the community of Elie and crossing the Trans-Canada Hwy and continuing past its junction with PTH 26 and north past the community of Marquette.
- PR 305 - This paved provincial road runs north-south, 10 km west of Portage la Prairie, connecting PTH 16 to the Trans-Canada Highway.
- PR 321 – Runs east from Grosse Isle to the community of Stony Mountain.
- PR 322 - Runs north from Grosse Isle to the Interlake region.
- PR 331 – Runs east from PR 240 to PTH 13 at Oakville.
- PR 332 – Runs south from PTH 1 through the community of Dacotah (RM of Cartier).
- PR 424 – Runs south of the Assiniboine River from PR 248 (north of PTH 1), it joins PTH 1 near Lido Plage.
- PR 430 - This provincial road extends north from its junction with PTH 1 as a continuation of PTH 13, which runs south of the Trans-Canada through Oakville.

7.3.7.2 Railways

The CP Carberry subdivision railway line spans the RAA, between Portage la Prairie and Winnipeg. This line comes into Portage la Prairie from due west, then heads northeast to near Reaburn, and continues east then southeast along PR 221, to Winnipeg. Maximum speed on the Carberry subdivision is 96 km/h (60 mph). Within the CP Minnedosa subdivision, another line leads northwest from Portage la Prairie. Maximum speed on the Minnedosa subdivision is 64 km/h (40 mph).

Within the RM of Portage la Prairie, CN Railway has two lines in the Rivers subdivision into the town of Portage la Prairie from due west and west-northwest, and a single line heading southeast of the town of Portage la Prairie.

The rail station in Portage la Prairie is located at 130 Fisher Av (VIA Rail, 2021). The CP Station is no longer used by train and maintenance crews since it was damaged by fire in 2002. It is currently operated as a museum (CP Station Portage, 2021).

At the eastern edge of the RAA, the Vintage Locomotive Society operates The Prairie Dog Central Railway in the summer months along PTH 6, from Inkster Station in Winnipeg to Grosse Isle.

7.3.7.3 Transmission lines and facilities

The Dorsey Converter station in the RM of Rosser accommodates 500kV, 230 kV and 88 kV transmission lines that cross the RAA. The 500 kV and the 88 kV lines pass only briefly through the RAA at the northeastern edge. One 500 kV line (D603M) leads north of Dorsey 4.8 km (3 mi) before turning east to the Riel Station. Two 500 kV lines (DC1-DC2 and DC3-DC4) come through the Interlake from the north and traverse 11.2 km (7 mi) in the northeastern edge of the RAA to Dorsey. The two 88 kV lines (Dorsey Electric 1 and 2) head north from Dorsey.

There are two 230 kV transmission lines in the RAA. One 230kV line (D54N) runs from Dorsey, north to Grosse Isle, then west along the northern edge of the RAA for approximately 22 km (14 mi) before exiting the RAA 1.6 km (1 mi) past PR 248. It remains within one to two miles outside the RAA boundary, where it follows PR 227 west to Neepawa. Another 230kV transmission line (D12P) spans the south end of the RAA. From Dorsey D12P runs 8 km (5 mi) west, then turns south along the eastern boundary of the RAA through Cabot to PTH 1. At Dacotah, it passes south of PTH 1 for 1.2 km (.75 mi), and continues west to Brandon, with a portion falling within the RAA.

In addition, sections of two 115 kV lines, each from north of Winnipeg to Portage la Prairie, fall within the RAA. One 115 kV line (UP80) follows an east west alignment 1 mile north of the RAA boundary, and runs into the RAA north of High Bluff, towards Portage la Prairie. Another 115 kV line (RP16) runs from Grosse Isle west and cuts south to the city of Portage near the UP80 transmission line. These two 115 kV lines converge northeast of the city of Portage, cross PTH 1, then continue east to Brandon.

There are thirteen electrical stations in the RAA. Nine stations are within the RM of Portage, three stations are in Cartier, and one station is in Rosser at Dorsey.

7.3.7.4 Underground pipelines

The Canadian Mainline natural gas pipeline traverses the SW corner of the RAA approximately 4.5 km northwest of Edwin in the RM of Portage la Prairie and runs southeast, approximately 6.4 km east of PR 240. This includes Trans Canada Pipelines

Ltd natural gas (five lines), and two lines of natural gas liquids operated by Plains Midstream Canada ULS and Trans Canada Keystone Pipeline GP Ltd (Canada Energy Regulator, 2021).

Within the RAA there is a provincial Centra Gas line located between Oakville and Elie in the central region of the Study Area south of Benard, as well as a Centra Gas line surrounding the City of Portage.

7.3.7.5 Licensed airstrips and runways

There are no licensed airports within the D83W RAA. However, four airports within 10 km or less of the RAA boundary, are outlined below:

Portage la Prairie/Southport Airport (YPG; CYPG) is located approximately three kilometres south of the RAA (two miles south of the City of Portage la Prairie). This is a mid-sized airport with four adjacent runways located south of Portage la Prairie. Operated by Southport Aerospace Centre Inc.

Portage la Prairie (North) Airport (CJZ2), a registered aerodrome with three runways, is located approximately two and a half kilometres south of the RAA and just north of City of Portage la Prairie.

The Macdonald Airport (CJU3) is located approximately 3.7 km northwest of Macdonald and the RAA and is accessed from PTH 16. It has a single runway (732 m) with fuel available (100LL and Jet A).

The St. François Xavier Airport (CKA8) has a single runway (914 m) with fuel available (100LL and Jet A). It is located on the northeast side of the community of St François Xavier, approximately 3 kilometres southeast of the RAA and is accessed off PTH 26.

There are also eight private runways, used for aerial application, located a half a mile away or greater from the preferred D83W transmission line route as shown on Map 7-6.

Within the RAA, six runways were identified that are used for aerial applications during the public engagement program. The locations of these known runways were considered during the extensive routing process and resulted in the preferred route avoiding all known runways and potential planned runways in the project study area. However, along the preferred route, the closest runway is located half a mile from the proposed transmission line.

7.3.7.6 Communication facilities

Communication towers, including microwave and cellular towers are found across southern Manitoba. These facilities are maintained by telephone communication

companies, broadcast companies and radio stations and corporations, Government of Canada, provincial and municipal governments, and utility companies. There are approximately 34 antenna tower locations in the RAA. In the RM of Portage la Prairie, they are situated in and around the city of Portage la Prairie, at Macdonald, near High Bluff and Oakville. Towers are also located near Elie (RM of Cartier), west of the junction of PTH 26 and PR 248 (RM of St François Xavier), in Rosser (RM of Rosser), and near Marquette (RM of Woodlands) (SCADACore, 2021).

7.3.7.7 Municipal water and solid waste disposal facilities

The RMs within the RAA are mostly serviced by the Cartier Regional Water System which is fed from both the treatment facility in St. Eustache and from the City of Portage Water Treatment facility (Cartier Regional Water Co-op 2021).

There are approximately 24 wastewater treatment lagoons and two wastewater treatment plants within the RAA. In the RM of Portage la Prairie, there are twelve wastewater treatment lagoons and two wastewater treatment plants. Other wastewater treatment lagoons are within the RM of Cartier (seven facilities), the RM of Rosser and RM of St François Xavier (1 facility in each), and in the RM of Woodlands (three facilities). A solid waste site is located in the City of Portage la Prairie (Manitoba Land Initiative 2021).

Within the RAA, there are landfills in the RMs of Portage (City of Portage), Cartier (near Elie), and Woodlands (Marquette). The Portage la Prairie Regional Landfill site is 12 km north of the city on PR 240 and 15 km east on PR 227. A landfill site in the RM of Cartier is located on Dugas Siding Road (Road 10 W.), approximately 5 km east of Elie and 1.6 km south of PTH 1 (Rural Municipality of Cartier, 2021).

7.3.7.8 Floodway system and flood protection

The Portage Diversion (Assiniboine River Diversion) is a 29 km long channel located west of Portage la Prairie that diverts water from the Assiniboine River northward into Lake Manitoba. The Portage Diversion provides flood protection to the City of Winnipeg and to the communities along the Lower Assiniboine River, which include the RMs of Portage la Prairie, Cartier, St. François Xavier, and Headingley (Government of Manitoba).

7.3.8 Property ownership and residential development

Within the RAA, land is typically divided up using a section-township-range system. Most of this land consists of agricultural, privately-owned parcels. There are also publicly owned parcels of land located within the RAA which may be allocated for a range of purposes, including landfills, cemeteries, and municipal infrastructure.

7.3.8.1 Planning districts in the regional assessment area

There are three Planning Districts in the RAA including the Portage la Prairie Planning District (PPPD), the White Horse Plains Planning District (WHPD), and the South Interlake Planning District (SIPD). Most lands in the RAA are zoned either Agricultural or Rural. In these cases, the development plans note that utilities are permitted in any land use designation, subject to requirements in their respective municipal zoning by-law and should be developed in a manner that minimizes potential incompatibilities with neighbouring land uses. Manitoba Hydro is not formally subjected to municipal land use and development controls (because of its status as a Crown Corporation) but typically abides by them when developing new projects.

7.3.8.1.1.1South Interlake Planning District

The SIPD is comprised of the RM of Rosser and the RM of Rockwood (South Interlake Planning District, 2010). The SIPD Development Plan sets out its overall objectives as ensuring that development is consistent with Provincial Land Use Policies and, among other goals, seeks to protect surface and groundwater, protect prime agricultural land, and protect areas that can support aggregate extraction. This Development Plan states in its Utilities Policies section that essential activities of public and private utilities shall be permitted in any land use designation, subject to requirements in member municipality Zoning By-Laws (South Interlake Planning District, 2010). Land use in the RM of Rosser is subject to the South Interlake Planning District Development Plan By-Law No. 03/10. The zoning By-law in the RM of Rosser is By-law 4-85.

7.3.8.1.1.2Whitehorse Plains Planning District

The RM of St. François Xavier and the RM of Cartier are within the White Horse Plains Planning District (WHPPD). The WHPPD is involved and responsible for establishing the joint Development Plan and Zoning By-Laws that dictate the future development and land use within each member municipality. Land use in the RM of St. François Xavier is subject to the White Horse Plains Planning District Development Plan By-Law No. 1-2008 (Rural Municipality of St. François Xavier, 2010). Most land in this Planning District is designated as Rural General Policy Area. Under the Development Plan, a policy objective relating to Municipal Services seeks to ensure that expansion of utility services and corridors are coordinated with other Municipalities, landowners, and utility companies. Further, in its statement of General Policies, the Development Plan states that essential activities of government and public and private utilities shall be allowed in any land use designation subject to the WHPPD zoning by-law requirements (White Horse Plains Planning District, 2010). The zoning By-law in the

RM of St. François Xavier is By-law No. 4- 2011(Rural Municipality of St. François Xavier, 2011).

7.3.8.1.1.3Portage la Prairie Planning District

In 2002, the City of Portage la Prairie and the RM of Portage la Prairie formed the Portage la Prairie Planning District (PLPPD) and worked together to produce the PLPPD Development Plan. The RM and city coordinate planning through the PLPPD (Portage la Prairie Planning District, 2021), to standardize requirements and "promote a regional approach to industrial, agricultural, and urban fringe development". The primary purpose of the PLPPD is to manage a planning program for the municipal partners with one of its goals being to provide standardized planning requirements through an updated development plan and zoning by-law for the district. In addition, the office of the PLPPD is responsible for building inspections, permitting, planning and development plan amendments, and creating zoning memorandums (Portage la Prairie Planning District, n.d.).

Key objectives for the RM outlined in the development plan include:

- Encourage agricultural development initiatives and diversifications which sustain the agricultural food industry in Portage la Prairie.
- Agricultural land use is a priority in the 'Rural Policy Area'. Developments must be compatible with agricultural land use. These may include agro-commercial, agro-industrial, and outdoor recreation land uses. Rural residential lots are not considered an appropriate use of agricultural lands.
- Non-farm developments should not be located near prime agricultural land or lower-class agricultural land, or livestock. New developments should not be located on prime agricultural lands unless there are no alternate sites.
- Division of agricultural lands into smaller parcels should be avoided.

Regarding utilities, the PLPPD Development Plan states that essential activities of government, public and private utilities should be permitted in any land use designation subject to requirements in a municipal zoning by-law (Lombard North Group, 2008). Land use in the RM of Portage la Prairie (including the City of Portage la Prairie) is subject to PLPPD By-Law No. 1-2006 (Lombard North Group, 2008). The zoning By-law in the RM of Portage la Prairie is By-law 3096 and in the City of Portage la Prairie is By-law 7713 (Portage la Prairie Planning District, 2012).

7.3.8.2 Land-use development controls

Municipalities may adopt development plans and zoning bylaws to guide land-use decisions within their boundaries. In the absence of such controls, provincial land-use policies apply as a guideline for reviewing subdivision applications and development

proposals (Provincial Land Use Policies Regulation No. 184/94). The municipalities in the RAA have a variety of development controls in place. A summary is provided below:

- As a member of the South Interlake Planning District, the RM of Rosser is subject to the South Interlake Planning District Development Plan (By-law No. 310). The RM of Rosser is also subject to its own Zoning By-law No. 15/95 and its own Secondary Plan (By-law No. 1/16).
- The RM of Woodlands is subject to its Development Plan By-law and Zoning By-law 2648/14.
- The RMs of St. François Xavier and RM of Cartier are members of the Whitehorse Plains Planning District and are bound by the Whitehorse Plains Planning District Development Plan 1-2016. The RM of St. François Xavier is also bound by its own Zoning By-law 26-2018. The RM of Cartier is subject to its Zoning By-law No. 1658-18 and Lido Plage Secondary Plan 1674-19.
- The City of Portage la Prairie is a member of the Portage la Prairie Planning District which owns and enforces its own development plan (2018). The City of Portage la Prairie is bound by its own zoning By-law No. 7713 and the RM of Portage la Prairie also has into own zoning By-Law No 3096 and South Basin Lake Manitoba Planning Area Secondary Plan. However, both the City and RM of Portage la Prairie Zoning By-Laws are enforced by the Portage la Prairie Planning District.

The lands traversed by the RAA predominantly consist of rural farmsteads and most lands outside the urban centres are designated either Agricultural or Rural:

- In the RM of Rosser, most lands are designated as "AG" or Agricultural General Zones under the zoning By-Law. These areas provide for a full range of agricultural and other compatible activities. Small portions of areas around the communities in the RM are designated as "AL or Agricultural Limited Zones" which are lands that provide for agricultural uses and activities on a restricted basis to avoid any potential conflicts with other land uses to preserve lands for future expansion. General Development Zones occur immediately around the communities of Rosser, Grosse Isle and Meadows and are areas where guidance is provided on land uses and development within the rural settlement centres. "RSC" or Rural Settlement Centre Zone is found in the communities and provides guidance to residential development in hamlets in the RM and works in conjunction with Secondary Plans.
- In the RM of Woodlands, the small portion of the RAA that traverses this municipality in the south is zoned as "RA" or Rural Area Zone which provides for a large range of agricultural and rural uses.

- In the RM of St. François Xavier, most lands are "AG" or Agricultural General with lands near the river designated as "AL" or Agricultural Limited. Near the Community of St. François Xavier, and closer to the Assiniboine River, some lands have been designated as "RV" of Residential Village intermixed with "CC" or Commercial Central Zone and "RS" or Residential Single Family. There are a few areas immediately adjacent to the river that are designated as "PR" or Parks and Recreation Zones.
- Within the RM of Cartier, most lands are designated as "Ag" or Agricultural General Zones. Areas around communities such as St. Eustache and Elia are "AL" or Agricultural Limited with smaller areas identifies as "MG" or Industrial General, or "RR" or Rural Residential.
- In the RM of Portage la Prairie, like the other RMs in the RAA, most lands are designated as "AG" or Agricultural General". Near the northern portion of the City of Portage la Prairie (within the RAA) the rural fringe area is mostly zoned as "AL" or Agricultural Limited with areas of "RMH" (Residential Mobile Home Zone); "CH" (Commercial Highway Zone); and "RH" (Residential Urban Zone. In the community of MacDonald, Oakland, and Poplar Point, within the RAA, the majority of the area around these communities is "AL" or Agricultural Limited and within the community the area is designated as "GD" of General Development Zone. In the community of High Bluff, land immediately around the community is designated as "AL" or Agricultural Limited, however an area of "RR" Rural Residential Zone is located just south of the community.

In rural and agricultural areas, development plans note that utilities are a land use, subject to applicable municipal zoning bylaws and should be developed in a manner that minimizes potential incompatibilities with neighboring land uses.

7.3.8.3 Dwellings and farmsteads

There are no residences located within the preferred D83W transmission line right-of-way. Six houses are located from the edge of the right-of-way to 100m from the edge of the right-of-way and 36 residences located between 100m and 400 m from the edge of the right-of-way.

7.3.8.4 Cemeteries and churches

Cemeteries and churches are generally associated with communities and settlement areas within the RAA. The following identified churches and cemeteries are in the various RMs within the RAA.

7.3.8.4.1 RM of Rosser

Churches in the RM of Rosser and within the RAA include the Rosser and Grosse Isle United churches in their respective communities and St. Michaels Anglican Church located near the community of Grosse Isle. There is one cemetery in the RM of Rosser (historical site) located between the communities of Rosser and Grosse Isle.

7.3.8.4.2 RM of Woodlands

The Meadow Lea church and cemetery is in the community of Meadow Lea, and the St. Paul's Anglican church and cemetery is in the community of Poplar Point, in the RAA.

7.3.8.4.3 RM of Cartier

The St. Eustache Roman Catholic church and cemetery is in the community of St. Eustache in the RM of Cartier within the RAA.

7.3.8.4.4 RM of St. François Xavier

Churches and associated cemeteries in the RM of St. François Xavier in the RAA include the St. François Xavier Roman Catholic Church and cemetery and the Schoenfelder Mennonite Church and cemetery.

7.3.8.4.5 RM of Portage la Prairie

There are several cemeteries and churches within the RAA in the RM of Portage la Prairie, including the following:

Cemeteries

- Burnside Cemetery (located approximately 1000 m of the proposed transmission line
- Setter's Cemetery (between Poplar Point and High Bluff)
- McKenzie Cemetery (Highbluff)
- Poplar Point Cemetery
- St. Anne's Anglican Cemetery
- High Bluff Methodist Church cemetery

Churches

- St. Anne's Anglican Church
- St. Paul's Anglican Church (near Marquette)
- St. Eustache Parish
- Meadow Lea United Church
- Golden Plains Baptist Church

7.3.9 Indigenous lands

The D83W project will be located on Treaty 1 territory, the traditional territory of the ancestors of the Anishinaabe, Cree, Ojibwe-Cree, and Dakota peoples, and on the traditional homeland of the Red River Métis and within the Recognized Métis Harvesting Zone.

In a submission for the BP 6/7 Project, Dakota Tipi First Nation shared that "while there are differing views on the extent of the Dakota Homeland or Traditional Territory, most sources agree that at the time of contact the Dakota People /Nation (which the Dakota Tipi People are apart of) used and occupied areas within the current jurisdictions of Canada and the United States, the North West Territories, Alberta, Saskatchewan, Manitoba and portions of Ontario. The DTFN and several other Dakota Nations within Manitoba are in a unique position, as they never adhered to a treaty and thus retain, hold and assert Aboriginal Rights and Title to areas within southern Manitoba, and areas the project traverses." (Dakota Tipi First Nation, 2021)

Discussions during the FNMEP extended beyond the boundaries of the regional assessment area, including all of Treaty 1 territory, the southern portion of the Métis Natural Resource Harvesting Area and the traditional territory of the Dakota people. Events or sites considered important to First Nations and the MMF beyond the spatial scope of the D83W Project have been included in this assessment's Cultural Landscapes discussion in Section 8.9.9, which generally discusses the region south of Lake Manitoba, west of Winnipeg to just west of the Portage Diversion and north of Highway 1.

Most of the land in the regional assessment area is privately owned with only small areas of Crown land remaining. Crown land in the regional assessment area includes the Portage Diversion, which will be traversed by the D83W project final preferred route. The total distance of Crown land traversed by the D83W project is approximately 600 metres across the Portage Diversion in SW17-12-7WPM.

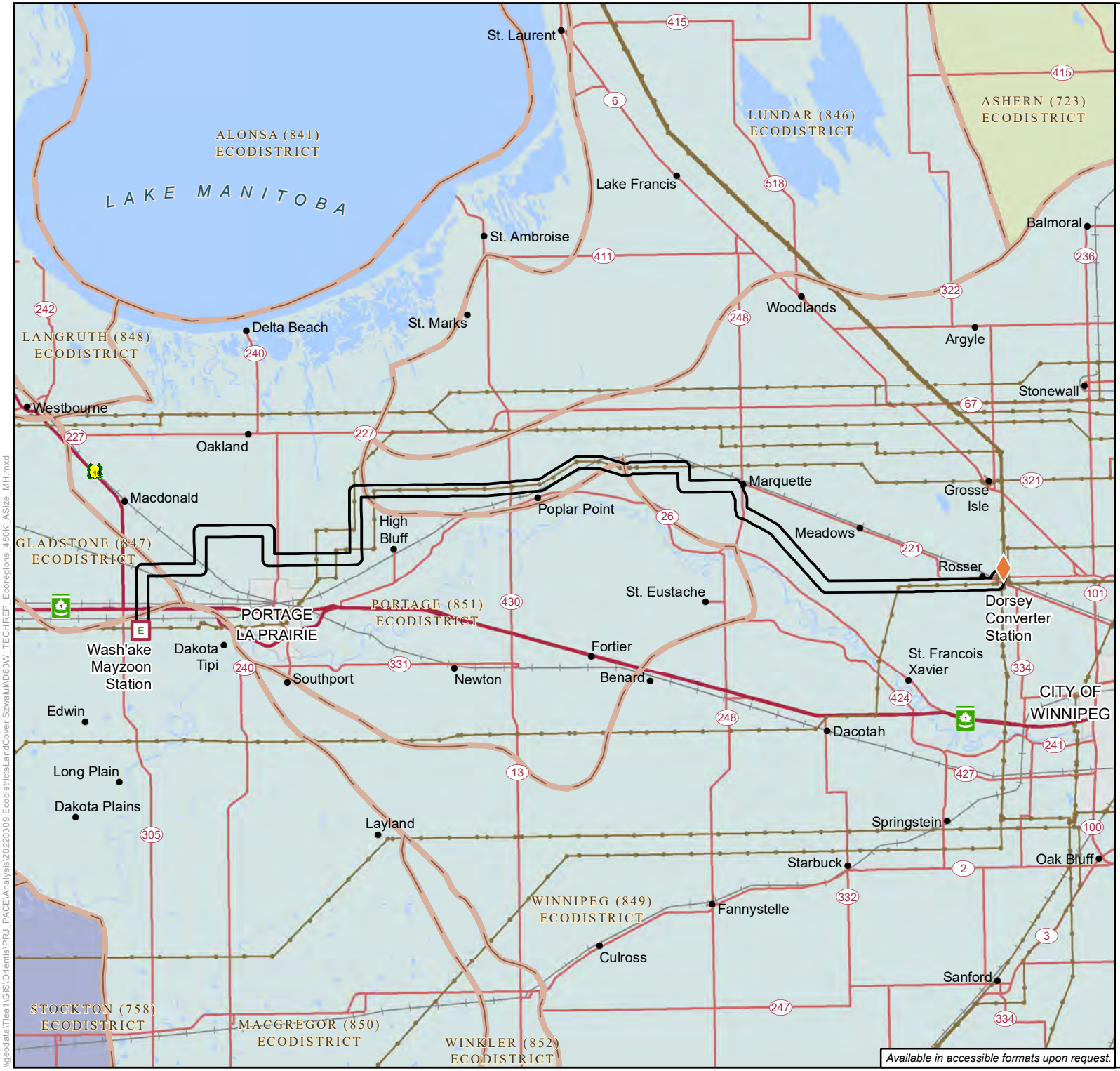
Manitoba Hydro understands that unoccupied Crown lands, where traditional activities can take place without permission, are considered important to the MMF and Métis Citizens (MMF, 2021). The final preferred route has not been routed through any unoccupied Crown land.

Through the FNMEP, Peguis First Nation and Long Plain First Nation both shared concerns about potential impacts Treaty Land Entitlement (TLE) and to the ability to select TLE land within the area now and in the future on both Crown and private lands. The Project area is included within the Peguis First Nation's Notice Area. The Province of Manitoba is obligated to notify Peguis First Nation of any proposed dispositions of Crown land within this Notice Area. Long Plain First Nation shared the locations of three parcels that were currently under consideration for TLE selection

through the FNMEP. The final preferred route does not intersect these sites or any other known TLE selection sites.

7.3.10 Heritage sites or objects

Heritage sites in the study area include registered century farms, and municipal, provincial, and federally designated sites and description of those sites (see Section 8.9 for details).



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Ecoregions
- Aspen Parkland Ecoregion
- Interlake Plain Ecoregion
- Lake Manitoba Plain Ecoregion

Ecodistricts
- Ecodistrict

Assessment Area
- Local Assessment Area (500m)

Infrastructure
- Wash'ake Mayzoon Station (Future)
- Converter Station (Existing)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: March 15, 2022

N

0 5 10 Kilometres
0 4 8 Miles
1:450,000

Ecoregions and Ecodistricts

Map 7-1

Draft: For Discussion Purposes Only

\\geodata\Tlea1\GIS\Orientis\PRJ_PACE\Analysis\20220309 Ecodistricts\LandCover Szwaluk\D83W_TECHREP_Ecoregions_450K_ASize_MH.mxd

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Groundwater Wells
- Domestic
- Domestic and Livestock
- Domestic and Other
- Municipal
- Unknown

GWDrill (2022), Province of Manitoba, Groundwater Management.

Assessment Area
- Local Assessment Area (500m)

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 14, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Water Wells Within 500m

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 7-2

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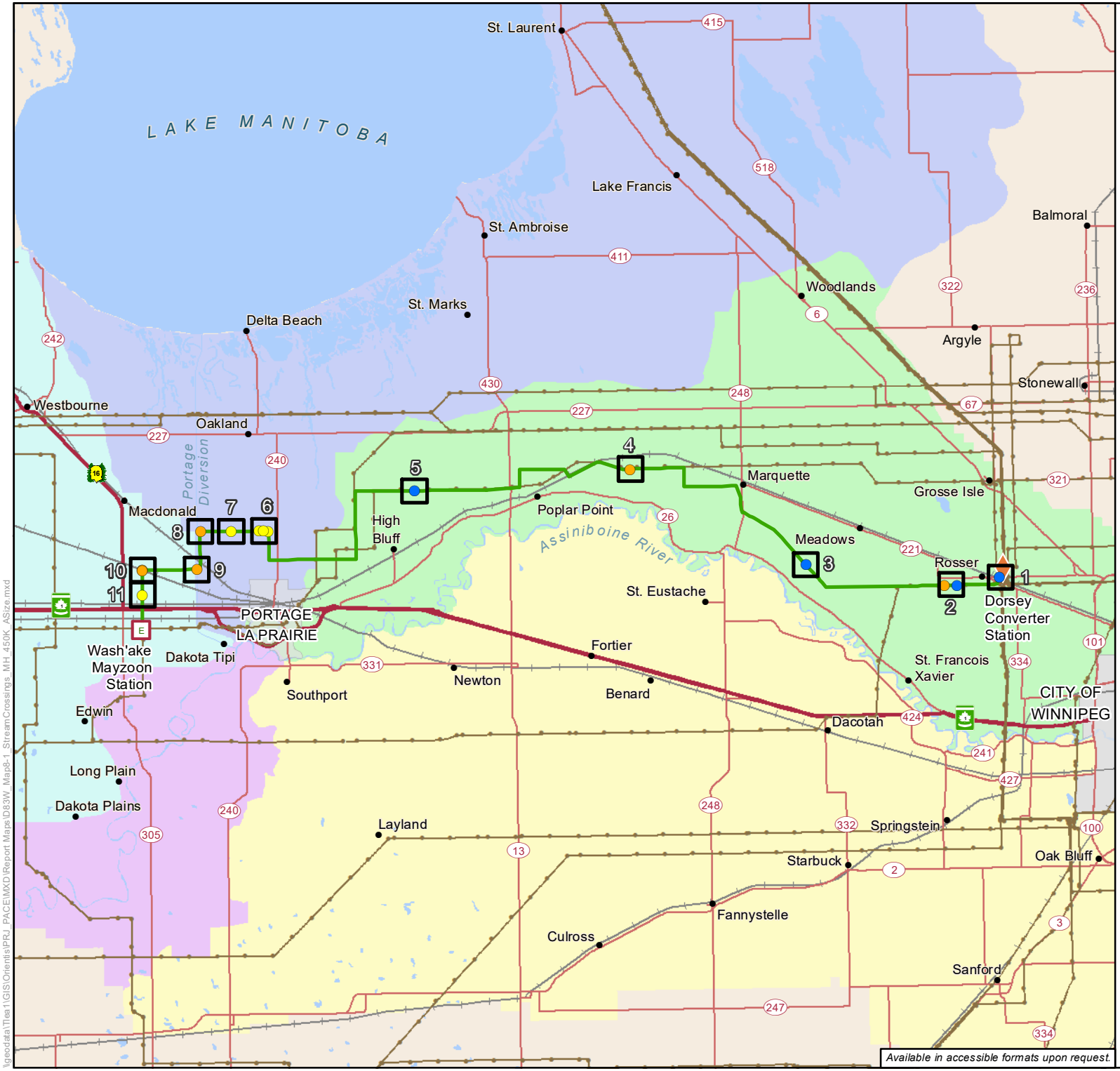

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Gross Sub-Watersheds
- Central Assiniboine
- La Salle River
- Lower Assiniboine
- Shoal Lakes/Delta Marsh
- Whitemud River

Map Tile Index - 1:10,000
- Map Series Tile

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Stream Crossings

Draft: For Discussion Purposes Only

Map 7-3

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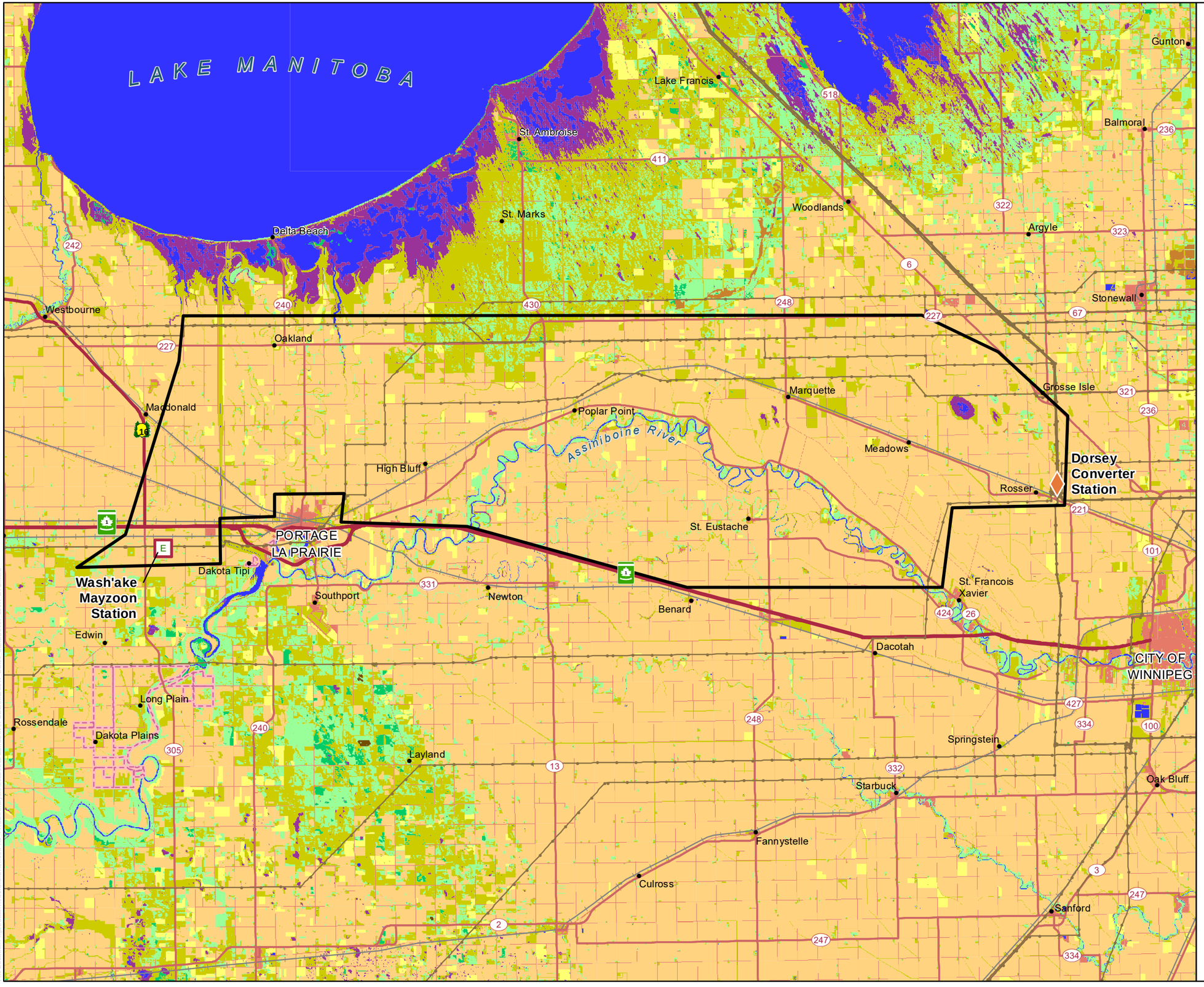


Manitoba Hydro

D83W Transmission Project

Land Cover

- Agricultural Cropland
- Bare Rock, Gravel and Sand
- Coniferous Forest
- Cultural Features
- Deciduous Forest
- Forage Crops
- Forest Cutover
- Marsh and Fens
- Mixedwood Forest
- Open Deciduous Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Proposed Infrastructure

- E — Wash'ake Mayzoon Station
- Regional assessment area

Existing Infrastructure

- Converter Station (Existing)
- Transmission Line (>115 kV)

Landbase

- Community
- Trans Canada Highway
- Road
- Railway Line
- First Nation

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: February 15, 2022

N

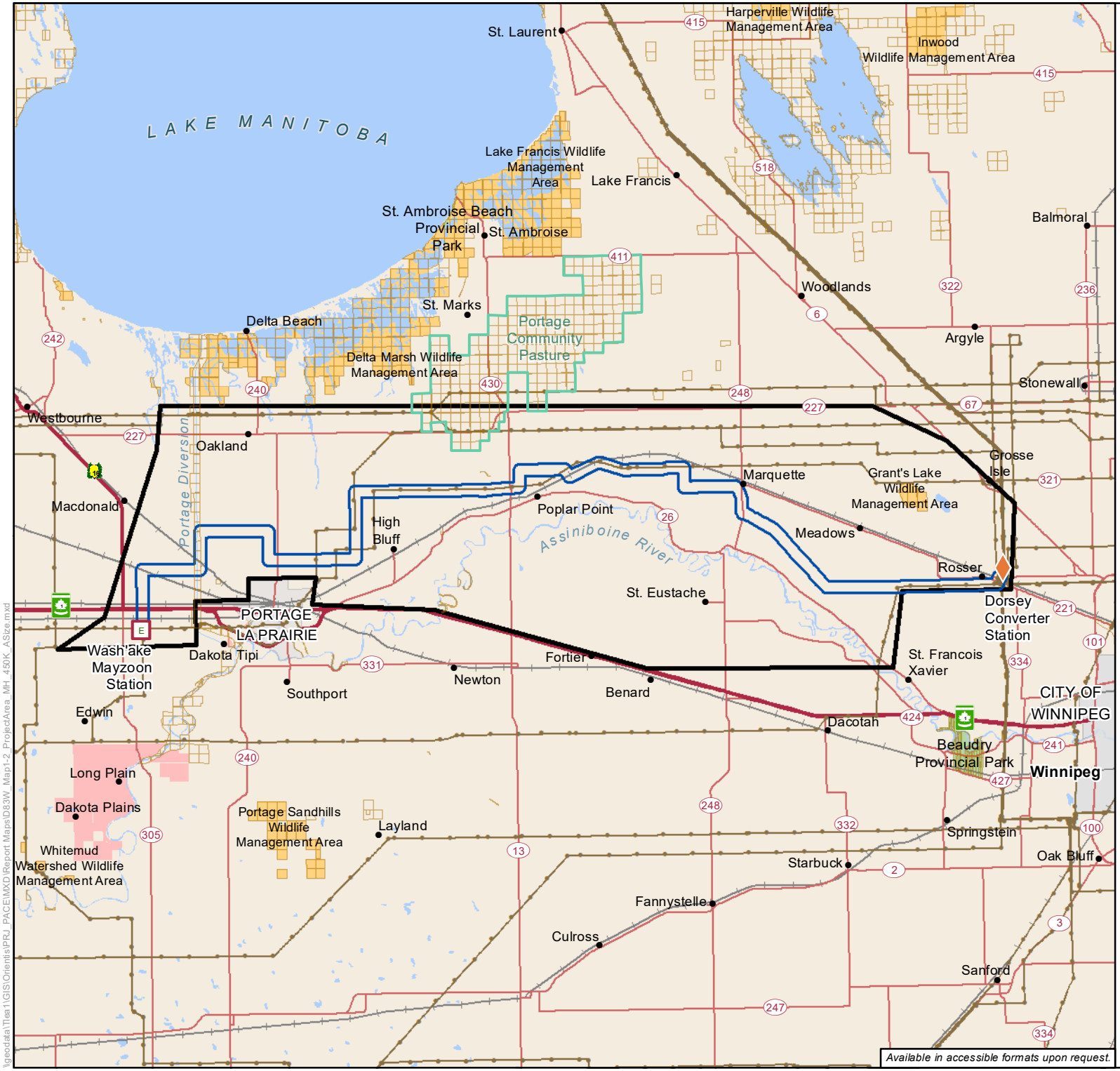
0 5 10 Kilometres
0 2 4 Miles

1:300,000

Land Cover Classification

Map 7-4

Draft/Confidential: For Discussion Purposes Only



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Assessment Area
- Local Assessment Area (500m)
- Regional Assessment Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- Community Pasture
- Crown Land
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: September 02, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Socioeconomic LAA and RAA

Map 7-5

Available in accessible formats upon request.

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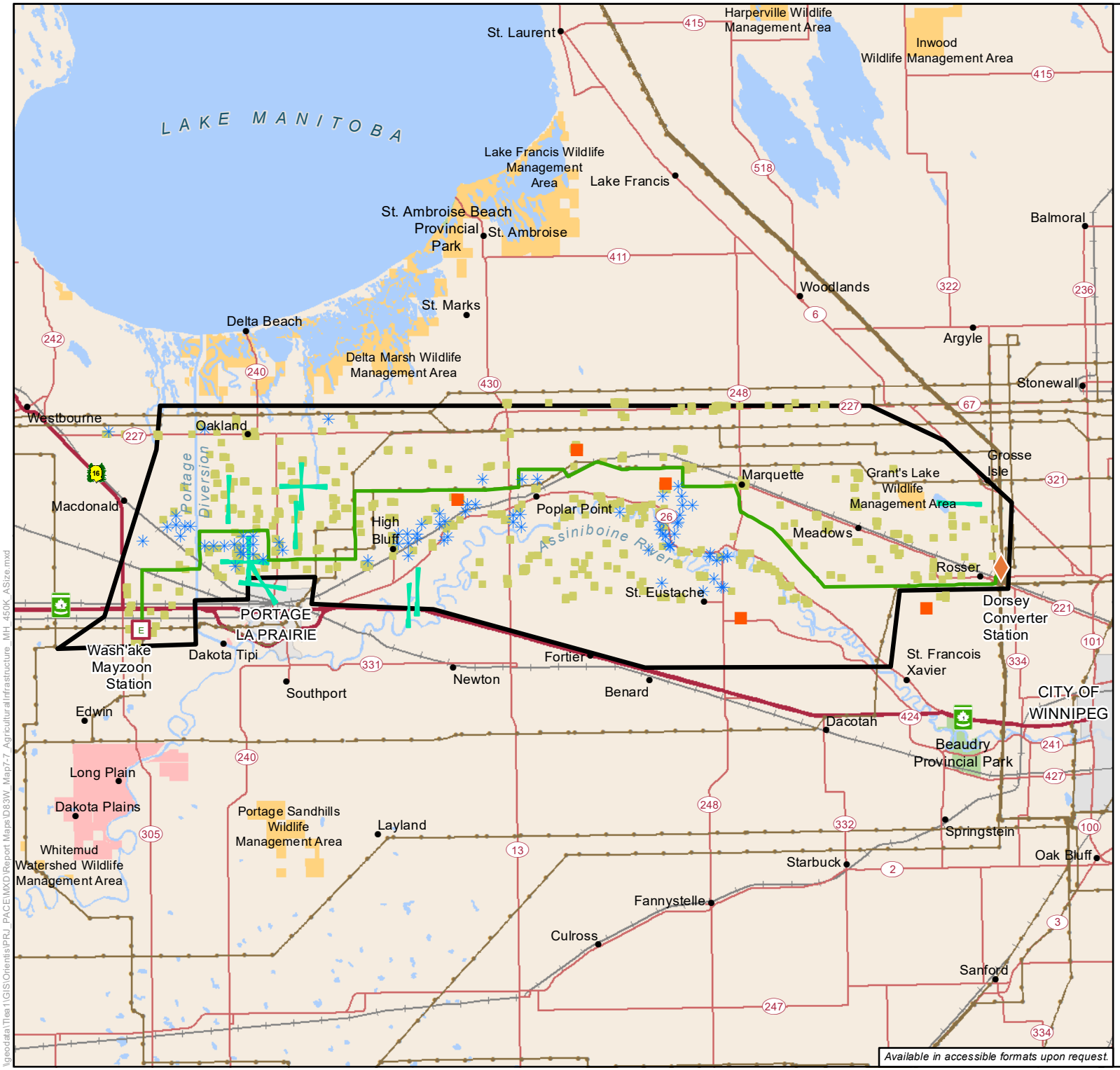

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Agricultural Infrastructure
- Irrigation Pivot
- Agriculture Building
- Hutterite Colony
- Runway

Project Infrastructure
- Final Preferred Route

Assessment Area
- Regional Assessment Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 03, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Agricultural Infrastructure

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 7-6

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8.0 Environmental assessment

This chapter assesses potential project effects of the D83W project on valued components identified in Table 6-1. Information on each valued component includes (but not limited to): significance thresholds (if there are any); spatial boundaries; effects pathways; mitigation measures; characterization of residual effects; follow-up and monitoring; cumulative effects; and sensitivity to future climate change scenarios.

8.1 Agriculture

Agriculture is the dominant land use in the D83W project RAA (see Table 7-13, Section 7.3.1) and an important component of the area's economy. Public engagement concerns regarding the D83W project's potential impacts to agriculture included loss of agricultural land and/or degradation of soils, impacts to and interference with irrigation systems, tile drainage, aerial spraying/runways, increased biosecurity risk, and impacts to organic farming.

Agriculture was selected as a valued component because of its importance to landowners, agriculture producers, the local community, and the provincial economy.

8.1.1 Scope

8.1.1.1 Spatial boundaries

The spatial boundaries for the environmental assessment consist of the PDA, LAA, and RAA. Valued component specific details for agriculture are described below.

PDA: footprint of the D83W project including the tower footprints and the 60 m right-of-way, and any additional areas such as staging areas (Map 8-1).

LAA: consists of a 1 km buffer around the transmission line right-of-way (500 m from centreline on either side of the right-of-way) and other project components (Map 8-2). The LAA covers an area that generally encompasses the basic field management unit commonly used, the quarter section, or an area of land measuring 800 m × 800 m.

RAA: The RAA is shown on Map 8-2 and includes portions of the RMs of Woodlands, Rosser, St. François Xavier, Cartier, and Portage la Prairie. The RAA represents the region that encompasses the communities within which changes in socioeconomic parameters attributable to project effects on agriculture might occur.

8.1.1.2 Temporal boundaries

The temporal boundaries for the environmental assessment are based on the timing and duration of the D83W project phases:

- Construction – two years
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – two years

8.1.2 Existing conditions

Information for this assessment was gathered through a detailed review of available and collected agricultural land use data. The existing conditions described in this section include:

- Agricultural capability
- Agricultural crop types and productivity
- Cropland biosecurity
- Irrigation
- Tile drainage
- Aerial spraying
- Livestock operations
- Communal operations
- Specialty agricultural operations, and
- Shelterbelts/treed areas

8.1.2.1 Agricultural capability

Agricultural land capability for a parcel of land is influenced by the combination of climate, topography, and soil conditions. Categorization of land by agricultural capability class provides insight into the ability of soils to support cropping and the extent of limitations affecting the soils (see Table 8-1).

Table 8-1: Extents of limitations for agricultural capability classes

Agricultural Capability Class	Degree of Limitation
1	Soils in this class have no significant limitations for cropping
2	Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices
3	Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices
4	Soils in this class have severe limitations that restrict the range of crops or require special conservation practices
5	Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible
6	Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible
7	Soils in this class have no capability for arable agriculture or permanent pasture
O	Organic soils, which are not rated for agricultural capability
SOURCE: Canada Land Inventory 1969	

Proportions of agricultural capability classes for the RAA, LAA, and PDA are shown in Table 8-2. At the RAA level, the main agricultural capability classes are Class 2 (51.5%) and Class 3 (33.9%). Smaller portions of the RAA soils fall under Class 1 (8.8%), Class 4 (2.7%), Class 5 (1.4%), Class 6 (0.2%), and Class 7 (0.8%).

At the LAA level, the dominant agricultural capability classes are Class 3 (47.0%) and Class 2 (40.6%). An appreciable portion of the LAA consists of soils belonging to Class 1 (10.0%) while much smaller portions are covered by Class 7 (1.6%) and Class 5 (0.6%) soils.

For the PDA, the dominant agricultural capability classes are Class 3 (50.3%) and Class 2 (38.6%). Smaller and much smaller proportions of the PDA have soils belonging to Class 1 (9.0%), and Class 7 (1.5%) and Class 5 (0.4%).

Table 8-2: Proportions of agricultural capability classes in the RAA, LAA, and PDA

RAA		
Soil Capability	Area	%
Class 1	12184.933	8.8
Class 2	71354.092	51.5
Class 3	46860.275	33.9
Class 4	3720.801	2.7
Class 5	1887.184	1.4
Class 6	239.338	0.2
Class 7	1052.032	0.8
Unclassified	1119.553	0.8
Grand Total	**138418.208**	**100.0**

LAA		
Soil Capability	Area	%
Class 1	970.558	10.0
Class 2	3932.636	40.6
Class 3	4554.449	47.0
Class 5	54.522	0.6
Class 7	158.906	1.6
Unclassified	9.678	0.1
Grand Total	**9680.750**	**100**

PDA		
Soil Capability	Hectare	%
Class 1	52.260	9.0
Class 2	224.271	38.6

Class 3	292.075	50.3
Class 5	2.550	0.4
Class 7	8.682	1.5
Unclassified	0.588	0.1
Grand Total	**580.426**	**100**

8.1.2.2 Agricultural crop types and productivity

The RAA is comprised largely of land under annual crop production, with smaller inclusions of land under forage crops, range and grassland, and deciduous forest.

The most common crops harvested in the RAA from 2010 to 2019 include canola, red spring wheat and soybeans, followed by barley, grain corn, oats, feed wheat, and winter wheat (Manitoba Agricultural Services Corporation 2021). White pea beans were a dominant crop grown in the RAA in the RM of Portage la Prairie only. Speciality crops grown in the RAA include carrots, onions, asparagus, parsnips, beans, rutabagas, cauliflower, broccoli, peas, potatoes, various grains and oil seeds, strawberries, Saskatoon berries, and raspberries (PCRC 2018; RM of Rosser, 2021; RM of St. François Xavier).

Based on federal spatial distribution of crops data for 2021 (see Table 8-3), at the RAA level for the D83W project:

- Cereal/oilseed cropland covers 59.3% of the area under agriculture
- Row cropland covers 21.1% of the area under agriculture
- Other crops cover 8.6% of the area under agriculture
- Natural hayland covers 7.0% of the area under agriculture
- Seeded hayland covers 4.0% of the area under agriculture

The much larger agricultural area under annual cropping (almost 90% of total agricultural area) versus perennial cropping in the RAA reflects the high agricultural capability of the area (i.e., mainly Class 2 and 3 soil capability). The RM of Portage la Prairie accounts for the largest areas under cereal/oilseed, row, and other crops.

Table 8-3: Crop types grown in the Regional Assessment Area in 2021

Rural Municipality	Cereal/ Oilseed Crops[1]	Row Crops[2]	Other Crops[3]	Natural Hayland[4]	Seeded Hayland[5]	Total
	hectares					
RM of Cartier	9,839	4,044	786	332	237	15,238
RM of Portage la Prairie	34,006	10,227	9,577	5,357	1,278	60,445
RM of Rosser	9,701	3,314	93	854	717	14,679
RM of St. François Xavier	8,202	4,397	63	531	220	13,414
RM of Woodlands	12,469	4,388	265	1,687	2,608	21,417
Total	74,216	26,370	10,784	8,763	5,061	125,193
Total Area under Agricultural production (%)	59.3	21.1	8.6	7.0	4.0	100
% of RAA	53.6	19.1	7.8	6.3	3.7	90.4

NOTES:

[1] Cereal/Oilseed includes spring wheat, winter wheat, canola, oats, rye, millet, canary seed, and flaxseed.
[2] Row crops includes corn, potatoes, soybeans, and sunflower.
[3] Other crops includes beans, peas, hemp, and crops grown in greenhouses.
[4] Natural Hayland includes grassland.
[5] Seeded Hayland includes pasture/forages and vetch.

As shown in Table 8-4, of the agricultural land within the LAA:

- 53.5% is under cereal/oilseed cropland
- 23.6% is under row cropland
- 14.8% is under other crops
- 4.2% is under seeded hayland
- 3.9% is under natural hayland

Table 8-4: Crop types grown in the Local Assessment Area in 2021

Rural Municipality	Cereal/ Oilseed Crops[1]	Row Crops[2]	Other Crops[3]	Natural Hayland[4]	Seeded Hayland[5]	Total
	hectares					
RM of Portage la Prairie	2134.3	812.4	1356.4	132.1	140.1	4575.3
RM of Rosser	909.9	245.6		34.7	162.6	1352.8
RM of St. François Xavier	1198.7	750.4	13.9	69.6	31.1	2063.8
RM of Woodlands	723.6	385.8		125.9	55.8	1291.2
Total	4966.5	2194.2	1370.3	362.3	389.7	9282.9
Total area under agricultural production (%)	53.5	23.6	14.8	3.9	4.2	100
% of LAA	50.6	22.3	13.9	3.7	4.0	94.5

Notes:

[1] Cereal/Oilseed includes spring wheat, winter wheat, canola, oats, rye, millet, canary seed, and flaxseed.
[2] Row crops includes corn, potatoes, soybeans, and sunflower.
[3] Other crops includes beans, peas, hemp, and crops grown in greenhouses.
[4] Natural Hayland includes grassland.
[5] Seeded Hayland includes pasture/forages and vetch.

As shown in Table 8-5, of the agricultural land within the PDA:

- 53.4% is under cereal/oilseed cropland
- 24.5% is under row cropland
- 14.7% is under other crops
- 4.3% is under seeded hayland
- 3.1% is under natural hayland

Table 8-5: Crop types grown in the Project Assessment Area in 2021

Rural Municipality	Cereal/ Oilseed Crops[1]	Row Crops[2]	Other Crops[3]	Natural Hayland[4]	Seeded Hayland[5]	Total
	hectares					
RM of Portage la Prairie	108.2	49.7	77.1	12.9	6.1	254.0
RM of Rosser	41.5	15.9		2.2	7.0	66.6
RM of St. François Xavier	86.1	50.7	0.5	1.6	1.6	140.3
RM of Woodlands	45.9	12.7		6.0	1.8	66.4
Total	281.8	129.0	77.5	22.6	16.5	527.3
Total area under agricultural production (%)	53.4	24.5	14.7	4.3	3.1	100.0
% of PDA	47.8	21.9	13.1	3.8	2.8	89.4

Notes:
[1] Cereal/Oilseed includes spring wheat, winter wheat, canola, oats, rye, millet, canary seed, and flaxseed.
[2] Row crops includes corn, potatoes, soybeans, and sunflower.
[3] Other crops includes beans, peas, hemp, and crops grown in greenhouses.
[4] Natural Hayland includes grassland.
[5] Seeded Hayland includes pasture/forages and vetch.

8.1.2.3 Irrigation

As mentioned in Section 7.3.1, within the RAA, crops in the RMs of Rosser, Woodlands and St. François Xavier are generally rainfed, but irrigation is common in the RMs of Portage la Prairie and Cartier.

During the public engagement process, lands under irrigation were identified by concerned agricultural producers and were considered during the routing process through which the final preferred route was determined. Currently, there are four parcels of land under irrigation (or planned for irrigation development) that would be traversed by the D83W project (see Table 8-6).

Table 8-6: Irrigation land parcels that occur within the PDA

Legal Land Location	Rural Municipality	Irrigation Status
NW-34-12-3-W	St. François Xavier	Active
NE-6-13-4-W and SE-6-13-4-W	Woodlands	Planned for irrigation
NE-23-12-7-W	Portage la Prairie	Active
NW-23-12-7-W	Portage la Prairie	Active
SOURCE: Windshield survey conducted by Manitoba Hydro staff on December 1, 2021, and public engagement feedback.		

8.1.2.4 Aerial application

Aerial application of crop protection products is important to producers in the RAA, particularly in areas with soils that experience prolonged wetness and have fine texture, characteristics that may limit the use of ground application during the growing season. The production of high-value crops such as soybeans, canola, wheat, and corn, which are common in the RAA, is typically associated with aerial spraying.

Eight runways, some, or all of which could be used for aerial applications, were identified as occurring within the RAA (see Map 7-6). Runways are typically associated with glide paths that extend up to 2 km in two or four directions, and the locations of the noted runways were considered during the routing process of the D83W project. Consequently, the PDA of the D83W project avoids these runways and the closest runway is located 800 m north of the FPR.

8.1.2.5 Tile drainage

Tile drainage is subsurface drainage using perforated pipes installed below the ground surface to aid in the removal of excess water from the soil. This provides agricultural benefits including allowing farmers to be able to plant crops earlier and quicker. It allows uniform soil drying and warming which reduces soil erosion. All these factors lead to potentially higher yields (PAMI, 2022).

During the public engagement process for the D83W project, concerns were raised regarding the potential for impacts to tile drainage systems during construction of the D83W project. The PDA traverses two adjacent parcels of land with legal land locations NE-24-12-7-W and SE-24-12-7-W in the RM of Portage la Prairie that were identified as having tile drainage systems during public engagement and are shown on Map 7-6.

8.1.2.6 Livestock operations

The RAA is host to various types of livestock operations, including but not limited to beef, dairy, hog, sheep, and poultry. Based on the reported Census of Agriculture data from 2021, the RM of Portage la Prairie has the highest number of livestock operations while the RM of St. François Xavier has the least (see Table 8-7). Because the specific locations of the livestock operations presented in Table 8-7 are not publicly available, a combination of desktop review and windshield survey were used to identify some of the livestock operations within the RAA (see Map 7-6).

Table 8-7: Reported livestock operations for Rural Municipalities traversed by the D83W project

Rural Municipality	Beef	Dairy	Hog	Sheep	Poultry	Egg	Total
Cartier	6	3	12	2	14	11	48
Portage la Prairie	92	10	11	8	21	17	159
Rosser	13	7	1	4	5	5	35
St. François Xavier	5	0	0	0	1	1	7
Woodlands	73	14	7	11	16	15	136
Total	189	34	31	25	57	49	385

Note: 1. The livestock operations data presented were reported for entire rural municipalities. As a result, some of the reported livestock operations may fall outside of the regional assessment area adopted for the project. SOURCE: Statistics Canada (2022)	

Associated with pig operations is the land application of liquid manure to agricultural fields which in some cases might involve the use of surface drag lines or permanently installed underground pipes connected to sprinkler risers, center-pivot irrigators, or hose attachment points for traveling guns or drag-hose applicators.

8.1.2.7 Communal operations

There are four communal operations within the RAA, namely, Little Creek Hutterite Colony (RM of St. François Xavier); Woodland Colony (RM of Woodlands); Sommerfeld Colony (RM of Portage la Prairie); and Rosedale Hutterite Colony (RM of Cartier). Based on desktop review, while land base portions of some colonies fall within the LAA, there are no livestock buildings or other buildings or structures within the PDA.

8.1.2.8 Risk to biosecurity

With a wide range of agricultural operations in the D83W project area, biosecurity is a concern for both cropping and livestock operations. Manitoba Hydro understands the importance of adhering to biosecurity procedures during transmission activities, including surveying, construction, and line maintenance. Manitoba Hydro will implement its standard operating procedures to protect the biosecurity of croplands and livestock.

As previously mentioned, clubroot which affects canola, is the primary disease of concern for field crops in the RAA and was raised as a concern during public engagement. The RM of Portage la Prairie has the highest risk for clubroot since it has had fields that were soil sampled and observed as having clubroot symptoms (i.e., galls on canola roots) and or found to have >80,000 spores per gram of soil (see Table 8-7). Clubroot can cause devastating economic losses for producers especially because its spores can survive in soil for up to two decades even in the absence of the canola crop. However, with the implementation of agronomic mitigation practices as well as biosecurity measures, it is possible to limit the spread and reduce the incidence and severity of clubroot.

Table 8-8: Clubroot distribution in the Regional Assessment Area

Rural Municipality	Spores per gram of Soil	No. of Fields with Symptoms
Cartier	10,001 - 80,000	None, but clubroot detected
Portage la Prairie	>80,000	1 to 9
Rosser	<1,000	None
St. François Xavier	Not tested	Not tested
Woodlands	<1,000	None

Notes:

2. Clubroot symptoms are typically observed in canola growing in soils with >80,000 spores per gram of soil.
3. The tabulated data are based on soil and canola plant tissue from 2009 to 2019 and shows the highest concentration of clubroot spores found.

SOURCE: Manitoba Agriculture available from https://www.gov.mb.ca/agriculture/crops/plant-diseases/pubs/sept-2020-clubroot.pdf (accessed October 25, 2022).

While the distribution and occurrence of livestock diseases that could be spread in the RAA due to compromised biosecurity is unknown, there is potential for diseases like PED and anthrax to occur in the RAA. The implementation of biosecurity measures will limit the spread and reduce the incidence and severity of such diseases.

8.1.2.9 Other speciality agricultural operations

In addition to irrigation, tile drainage, and aerial application which were discussed earlier in this section, there are other specialty agricultural operations within the RAA.

During public engagement for the D83W project, landowners raised concerns for impacts to organic farming due to project-related introduction of disease pathogens or weeds that would compromise biosecurity. There is one known organic operation (wheat) within the RAA, in the RM of Woodlands that is registered as an organic producer with the Organic Producers Association of Manitoba (Organic Producers Association of Manitoba website, 2022). There is the potential for more organic farms to be located within the RAA.

Other known specialty farm operations in the RAA include:

- A honeybee farm (RM of Portage la Prairie), approximately 2.5 km west of the FPR
- One fruit farm in the RM of St. François Xavier, approximately 2.7 km south of the FPR at its closest point, and
- One vegetable produce farm in the RM of St. François Xavier., approximately 4.8 km southwest of the FPR at its closest point.

There is the potential for other specialty farm operations, such as mushroom, fish and sod farms as well as additional apiary and fruit and/or produce farms to occur in the RAA.

8.1.2.10 Shelterbelts/treed areas

Shelterbelts and treed areas that protect soil from erosion and are found throughout the RAA. The construction of a linear project parallel to a shelterbelt, results in the clearance of a wider portion of the shelterbelt compared to when the project is constructed perpendicular to the shelterbelt. As a result, the construction of the D83W project might increase the risk of soil erosion through the removal of windbreaks that were planted along field edges or between fields.

The preferred D83W project transmission line route (i.e., PDA) traverses eight areas of shelterbelt and one private treed area, which will result in a reduction of vegetation in these areas (see Table 8-9).

Table 8-9: Locations of shelterbelts and treed areas along the final preferred route

Location	Notes
NE6-12-1E	Planted shelterbelt
W6-12-1E	Planted shelterbelt
RL-201 to 214	Planted shelterbelt
N4-13-3W	Planted shelterbelt
RL-103-BP	Planted shelterbelt
SE17-12-6W	Planted shelterbelt
SE13-13-7W	Planted shelterbelt
NE22-12-7W	Trees in yard site
NE7-12-7W / NW8-12-7W	Remnant shelterbelt

8.1.3 Effects assessment

8.1.3.1 Significance thresholds

A residual effect on agriculture is considered significant if the project results in the loss of agricultural land or degradation of soil quality such that existing agricultural production cannot continue at current levels for extended periods of time (beyond the construction phase) without adequate compensation.

8.1.3.2 Project interactions

The project activities that will interact with agriculture (Table 6-2) include:

Construction

- Vehicle and equipment use
- Marshalling and fly yards
- Transmission tower construction

Operations and Maintenance

- Transmission line presence
- Vehicle and equipment use
- Inspection patrols

- Vegetation management
- Decommissioning

8.1.3.3 Effects pathways

As a result of the final preferred route traversing dominantly agricultural land, the D83W project will interact with agriculture operations with the potential for effects to occur. Effects to agriculture can occur during both construction and operations and maintenance activities (Table 6-2, Chapter 6) and include the following:

- Loss and/or degradation of agricultural land due to the transmission line structures and activities during construction and operation
- Inconvenience, nuisance, and increased production costs associated with operating farming equipment, aerial spraying, tile drainage systems, irrigation equipment, and crop production around structures.
- The potential for increased biosecurity risk which can compromise existing crop and livestock operations
- Perceived interference of GPS signal reception due to the presence of the transmission line
- Concerns related to potential impacts of EMF exposure on livestock

8.1.3.3.1 Loss and/or degradation of agricultural land

During the engagement process, landowners raised concerns that the proposed D83W transmission line project would negatively affect the productivity of land through the loss of agricultural land and/or degradation of agricultural land from soil compaction.

During construction of the transmission line, activities such as vehicle and equipment use, right-of-way clearing, establishment of marshalling/fly yards and transmission tower construction can result in the degradation or loss of agricultural land. The timing and the duration of the construction activities will determine the extent of potential effects to agricultural land.

Soil compaction is the squeezing of soil particles that results in a reduction in pore spaces between soil particle and causes changes in soil structure (Wolkowski and Lowry, 2008). Effects from soil compaction include a reduction in soil porosity, limitations to the infiltration of air and water, and the restriction to root penetration, which all contribute to a reduction in crop yields (Wolkowski and Lowry, 2008).

Potential effects from construction activities that could occur within the right-of-way, such as the establishment of access (if required), tower foundation construction, and conductor stringing include soil compaction, rutting and admixing. These effects can

result in changes to land capability, soil productivity, decreased crop growth and reduced crop yields (MAFRI 2008). The potential for soil compaction is greatest in areas of poorly drained fine textured soils or when soils are under high moisture conditions. Wheel use from heavy equipment on saturated soils increases the potential for compaction as well (Wolkowski and Lowry, 2008). In addition to soil compaction, soil that becomes exposed from construction activities are susceptible to erosion by water and wind, leading to a change in soil and crop productivity. There is also the potential for soil disturbance / degradation to occur during operations and maintenance when vehicle and equipment is used for inspection patrols, specifically when soils are under high water conditions. Timing of the inspection patrols and limiting the use of vehicle and equipment to winter or frozen ground conditions can greatly reduce the impact to soils during operation and maintenance.

The presence of the transmission line structures will result in approximately 4.5 ha of agricultural land being lost because of the tower footprint. The hectares of agricultural land lost because of the presence of the towers comprises <1% of the entire transmission line right of way. Manitoba Hydro's compensation policy (i.e., the structure impact portion) takes into consideration the lost production underneath and directly adjacent to the towers situated on agricultural land for directly affected landowners. Although tower footprints will result in an area of land removed from production, due to the small size of the project and towers, the loss of land from production is anticipated to be low.

8.1.3.3.2 Inconvenience, nuisance, and increased costs from presence of structures

Impacts to agricultural activities was identified by landowners during the public engagement program. Construction and operations and maintenance activities may interfere with agricultural activities, including the operation of farming equipment for crop operations, aerial spraying, irrigation systems, and tile drainage systems. These interferences can result in inconvenience, increased time, and an increase in costs to landowners. The extent and degree of the interactions of construction with agricultural activities will depend on timing of construction with less interactions occurring during winter compared to the summer.

Farming around towers presents several challenges. Crop production is reduced within the immediate vicinity of the tower due to overlap around each structure (PAMI 2015); there are increased costs associated with the time it takes to farm around transmission towers, the application of seed, fertilizer, and chemicals in the area of overlap around each structure, and decreased weed control around the towers.

Previous studies have found that approximately 70% of the costs of structures to farmers were the result of the non-productive area or area lost for production around

the tower (Gustafson, et al. 1980); the other 30% of the costs were the result of lost time, crop damage and increased input costs from double coverage (Scott 1981).

As mentioned in Section 8.1.2.4, aerial spraying is a common way to seed, apply fertilizers and pesticides to crops, when ground conditions are unfavorable for ground spraying. During the engagement process, the interference of the transmission line with aerial spraying activities was raised as a key issue of concern. Locations of known airstrips were obtained through discussions with landowners and review of desktop resources and were considered in the routing process. As a result, the final preferred route avoids all known airstrips used for aerial spraying. However, runways are located within half a mile of the preferred transmission line route and there is the potential for interference in flight paths from the transmission line presence.

Within the RAA, there are approximately four parcels of land with irrigation. During the public engagement process, irrigation was identified as a key issue and was considered during the selection of the final preferred route. Along the final preferred route, there are three known parcels of land that currently are being irrigated with pivot irrigation systems and two parcels of land that are planned for future irrigation systems. There is the potential for construction and operations and maintenance activities to interfere with existing irrigation systems along the final preferred route.

The potential impacts to tile drainage systems from the construction of the transmission line was a key issue raised during the engagement program conducted for the project. Along the final preferred route, there is one location where tile drainage systems are being used. There is the potential for the disruption or destruction of the tile drainage systems during construction activities using heavy equipment or during tower foundation installation. Any disruption or destruction to the tile drainage can result in a change in the effectiveness of the system in the field unit.

8.1.3.3.3 Increased biosecurity risk

Soil transport is an important mechanism for the spread of weeds and soil-borne diseases from one field or region to another. Movement of equipment and workers in croplands provides a potential pathway for disease and weed transmission to previously non-affected soils, compromising biosecurity for affected lands. The introduction of pests can have lasting adverse effects on production value (reductions in yield); production cost (increased input and management costs) effects. They can negatively affect yield, quality, value, and sale of raw and processed commodities into domestic and international markets (Howard 2013). Diseases can spread quickly within and between fields by natural means (e.g., wind, rain, water and soil erosion

and insects) or human-related means through transport of infested seed, soil, and crop residues.

There is potential for soil to be transferred from field to field or from another region to the project site during the construction and operations and maintenance phase because of construction equipment, other vehicles and people moving between fields.

8.1.3.3.4 Interference with GPS signal reception

Potential interference by transmission lines with the reception of global positioning satellite (GPS) used on farm equipment is a concern that has been expressed on past projects by landowners. Farmers rely on the GPS to provide guidance with their field operations and to support "auto-steer" functions on their equipment (Manitoba Hydro 2015). Precision agriculture involves applying material (fertilizer, seed, pesticides) at a variable rate in different parts of a field and as a result requires precise calibration of the field equipment. Therefore, precision agriculture is a type of farming that requires technological innovations, including GPS to grow more crops in a more efficient way (Crop Life Agriculture, 2019). A continuous reception of GPS signals from satellites and reference stations on the grounds is required to determine the precise locations in the field and theoretically, electromagnetic sources could interfere with the GPS affecting the precision of field operations (Wisconsin DATCP 2009; MMTP 2015). However, a study in 2002 on the "Use of Global Positioning Systems receivers under power-line conductors", found that power line conductors are unlikely to cause any degradation to GPS signals because GPS receivers rely on at least four dispersed satellites. It was noted further in the study that there was no loss of satellite signals when the GPS received was moved across an easement with a power-line (Silva and Olsen, 2002). In 2011, studies were conducted by researchers at the University of Calgary along with a team of land surveyors to analyze has DGPS receivers performed under high voltage direct current power line and an AC transmission line (Lachapelle et al. 2011l Pollock and Wright, 2011). The study concluded that even though minor effects on the reception of the GPS receivers was detected, no power line effect was found on measurement of the Global Navigation System Satellite and therefore no effect to the quality of the navigation solutions.

8.1.3.3.5 Concerns related to potential impacts of EMF exposure on livestock and bees

8.1.3.3.5.1Livestock

For the Manitoba Hydro Manitoba-Minnesota transmission project, dairy farmers of Manitoba expressed concerns about stray voltage due to the proximity of the right-of-

way to some dairy operations (Wiens 2015, pers. comm.). Since stray voltage can be caused by on-farm (e.g., poor wiring in the farm's electrical system) or off-farm sources (e.g., transmission lines), identification of the source can be difficult (Manitoba Hydro 2006). Manitoba Hydro can investigate using controlled, standard test procedures to determine to what extent electrical distribution or other off-farm sources contribute to stray voltage levels (Manitoba Hydro 2006).

Potential impacts of EMF exposure on livestock because of the operation of the transmission line was a key issue identified during the public engagement program for the project. Available literature reports EMF effects as being non-substantive and unlikely to occur during the operation and maintenance phase of the transmission line (Ganskopp et al. 1991; Burchard et al. 2006; Serecon Valuations Inc. 2010; Exponent Inc. 2011; Exponent 2015). Recent findings indicate:

"...the available research results to date do not suggest that magnetic or electric fields (or any other aspect of high-voltage transmission lines, such as audible noise) result in adverse effects on the health, behavior, or productivity of fauna, including livestock such as dairy cows, sheep, pigs, and a variety of other species, including small mammals, deer, elk, birds, and bees. Studies were also conducted to evaluate whether EMF could affect crops or plants, but did not suggest any adverse effects on growth or viability." (Exponent 2015)."

Other studies undertaken by scientific agencies and groups such as the World Health Organization (2007), Federal and Provincial Territorial Radiation Protection Committee (2005) and Health Canada (2010) support that there are no known adverse health effects associated with EMF on animal health.

At the request of the government of Québec, Hydro-Québec funded researchers at McGill University to conduct a series of experiments to better understand the possible effects of EMF generated by transmission lines in rural areas on dairy cattle production (Exponent Inc. 2008). Overall, the researchers were cautious in their interpretation of the data from these experiments, stating that while biological responses were observed, no health hazards had been indicated (Exponent Inc. 2008). For example, Burchard et al. (2006) conducted an experiment to monitor dairy cows' thyroxine plasma concentrations as a means of determining the effects of EMF on dairy cows on pasture if standing continuously under a 735 kV AC power line. They found exposure of dairy cattle to EMF to influence the blood levels of thyroxine. However, they concluded that in light of worst-case scenario conditions, the variation in thyroxine levels did not represent a health hazard for dairy cows.

Manitoba Hydro will continue to work with landowners affected by the project to address concerns with respect to EMF.

8.1.3.3.5.2Bees

Potential impacts of EMF exposure on bees because of the operation of the transmission line was also identified as a key issue during the public engagement program implemented for the project. Current research suggests that EMF associated with powerlines may contribute to a decline in bee populations (Shepherd et al., 2019). Shepard et. al (2019) found that when honeybees were exposed to low frequency EMF levels that were like what they would experience under power transmission lines, the bees exhibited aggressive behaviour and tended to react slower to threats that were introduced compared to a control group. Increased aggression in bees can result on bees attacking other bees from other hives, while slower reactions to perceived threat can result in colonies become more susceptible to predatory attacks. The group that completed this recent research (Shepherd et al.) also found in 2018 that bees were less successful foragers and fed less after flying through EMF levels of 100 microteslas which is the maximum level EMF that can be found at ground level below a power transmission line.

8.1.3.4 Mitigation measures

The following outlines the measures that will be implemented to mitigate potential effects to agriculture during project construction and operation/maintenance activities:

Mitigation for temporary loss of agricultural land includes the following:

- Manitoba Hydro will pay compensation pursuant to the Landowner Compensation Program for damage to infrastructure/crops from construction or maintenance activities.
- Where possible, construction schedules will take into consideration the timing of agricultural activities.
- The structure impact portion of the compensation policy accounts for reduced productivity, additional time required to maneuver farm machinery around each structure, double application of seed, fertilizer, and chemicals in the area of overlap and additional weed control around each structure.
- Compensation will be provided according to the Manitoba Hydro Land Compensation Program for:
  - damage to property, any relocation of incompatible agricultural buildings (e.g., grain bins and livestock overwintering shelter)
  - temporary loss of agricultural land
- Areas of temporary soil disturbance on agricultural lands will be rehabilitated in accordance with the Rehabilitation and Weed Management Plan. This plan

will be developed before construction and would be part of the overall Environmental Protection Program, as described in Chapter 12.
- Compensation will be provided according to Manitoba Hydro Land Compensation Program for land permanently removed from agriculture due to structure presence
- Manitoba Hydro will contact directly affected landowners to discuss how to reduce effects on their agriculture activities.

Mitigation for degradation of agricultural land includes the following:

- Effects of soil compaction and rutting will be mitigated by managing equipment traffic routes and activities for access route and bypass trail development, temporary sites' setup, clearing of the transmission right-of-way, installation of the transmission structures, and station site preparation. In accordance with the Access Management Plan, the Contractor will be restricted to established roads and trails and cleared construction areas.
- The transmission line will be constructed in agricultural areas when soils are not saturated to limit compaction, rutting and admixing, particularly in areas of high compaction risk. If this is not possible, other mitigation or rehabilitation measures will be conducted to reverse effects.
- If working on saturated soils during non-frozen ground conditions, equipment and techniques that distribute ground pressure (e.g., swamp mats, geofabric and padding and corduroy) will be used to avoid compaction and admixing.
- Contractor-specific Erosion Protection and Sediment Control Plans will be prepared by the Contractor, and reviewed and accepted by Manitoba Hydro prior to construction

Mitigation for permanent loss of agricultural land primarily involves reducing area of loss through design mitigation and compensation for land permanently removed from agriculture due to structure presence.

As part of design mitigation Manitoba Hydro:

- Uses self-supporting steel lattice towers for use in agricultural land to reduce the extent of permanent land loss since they have a smaller footprint than guyed towers, which are used in non-agricultural areas.
- Has provided opportunities to discuss and identify areas of concern and potential tower spotting preferences with potentially affected landowners.

Mitigation for inconvenience, nuisance, and increased costs from presence of structures includes the following:

- Manitoba Hydro will pay compensation pursuant to the Landowner Compensation Program for damage to infrastructure/crops from construction or maintenance activities. Where possible, construction schedules will take into consideration the timing of agricultural activities.
- Ancillary compensation can be provided for damage to irrigation and tile drainage systems and yield reductions due to limited access for ground application of crop protection products or other field operations, and because of construction or operations and maintenance activities.
- Manitoba Hydro will continue correspondence with landowners to determine locations of irrigation networks and other watering and tile drainage infrastructure to be considered during the siting of transmission line towers.
- Manitoba Hydro can investigate using controlled, standard test procedures to determine to what extent electrical distribution or other off-farm sources contribute to stray voltage levels (Manitoba Hydro 2006). If an abnormal contribution is found from electrical distribution or other off-farm source contributing to stray voltage, Manitoba Hydro will take action to help reduce the level of voltage on an affected farm (Manitoba Hydro 2006).

Mitigation for biosecurity includes the following:

- Manitoba Hydro employees and contractors will follow the Biosecurity Management Plan. Measures to be implemented in line with general considerations of the Transmission Line Business Unit biosecurity SOP (Manitoba Hydro 2015a) include:
  - completion of a risk assessment to identify the perceived risk to agricultural land from maintenance and construction activities using frequency of activities and consequence levels (field conditions, e.g., wet or frozen);
  - 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
  - regular maintenance activities (including patrols) on agricultural lands will typically be scheduled after crops have been harvested and conducted primarily after freeze-up
  - avoiding access through areas that may contain manure

8.1.3.5 Characterizing residual effects

The following outlines the residual effects on agriculture after the implementation of the mitigation measures outlined above in Section 8.1.3.4.

8.1.3.5.1 Temporary and permanent land loss and degradation of agricultural land

Construction

It is assumed that temporary loss of agricultural land will affect the entire agricultural portion of the PDA for the duration of construction. Approximately 98% of the PDA consists of land with agricultural capability in Class 1, Class and Class 3 (see Table 8-2) which are deemed to be prime agricultural land.

The total area covered by the PDA (i.e., 580.4 ha) constitutes almost 6% of the total area covered by the LAA (i.e., 9,680.8 ha). Temporary land loss is anticipated to affect the noted small proportion of the LAA for not more than two growing seasons because of the duration of construction. Manitoba Hydro will provide compensation for affected crop production or activities to further reduce residual effects due to temporary land loss. Temporary losses associated with the PDA represent less than one percent of the RAA.

Operations and Maintenance

The self-supporting steel-lattice tower, used in agricultural areas, will have a footprint ranging from 6 m × 6m to 14 m x 14 m, for suspension towers and 10 m × 10 m to 19 m 19 m, for angle and dead-end structures (Chapter 2). Areas of permanent land loss were estimated using the transmission line length, tower numbers presented in the Project description (Chapter 2) and buffered tower footprint areas. Using a buffer of 3 m (PAMI 2015) around the towers the total land loss because of the tower footprints and buffers is approximately 5 ha for all the land uses identified along the proposed transmission line route. For agricultural land, which includes agricultural forage crops, approximately 4.5 ha will be lost because of the transmission towers and buffers.

When compared to the total area contained within the PDA and LAA (Table 8-2), the areas of permanent loss from tower structures is considered small. However, to individual landowners or producers with relatively small parcels of land, these areas are of relative importance.

Anticipated effects of soil degradation that result in a reduction in land capability will be minimal if mitigation measures outlined in Section 8.1.3.4 are implemented. Based on the frequency, timing and intensity of operation and maintenance activities along the right-of-way, residual effects are not anticipated as these activities are not anticipated to occur during the growing season or during spring and fall periods when the potential for a change in soil conditions such as compaction is greater.

8.1.3.5.2 Inconvenience, nuisance, and increased costs from presence of structures

Even after the implementation of the mitigation measures outlined in Section 8.1.3.4 above, the proposed D83W project will have the potential to conflict with agricultural activities through:

- Interference with future irrigation system
- Interference with aerial spraying activities
- Future or unknown tile drainage systems
- Interference with the use of field equipment

However, even though there is the potential for interference with the above-mentioned agricultural activities, the magnitude of these effects will be reduced. Continual correspondence with landowner prior and during construction may result in the identification of additional mitigation measures to help reduce effects from the inconvenience and nuisance of the transmission line on agricultural activities. In addition, compensation will be provided by Manitoba Hydro for any damages that result during construction activities.

The following summarizes the agricultural residual effects that remain after the implementation of the above-described mitigation measures (see Table 8-10):

- Direction: Adverse
- Magnitude: Small
- Geographic extent: Project Footprint
- Duration: Medium-term
- Frequency: Regular/continuous
- Reversibility: Reversible after decommissioning of project

Table 8-10: Summary of the residual environmental effects on agriculture

Project phase	Residual environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Loss and/or degradation of agricultural land						
Construction	A	S	PF	MT	R/C	R
Operations and Maintenance	A	S	PF	MT	R/C	R
Inconvenience, nuisance, and increased costs from presence of structures						
Construction	A	S	PF	MT	R/C	R
Operations and Maintenance	A	S	PF	MT	R/C	R
Reduction in areas of trees/shelterbelts						
Construction	A	S	PF	MT	R/C	R
See Table 6-3 for a detailed description of criteria definitions **Direction:** P: Positive; N: Neutral; A: Adverse **Magnitude:** S: Small; M: Moderate; L: Large **Geographic Extent:** PF: Project Footprint; L: Local; R: Regional	**Duration:** ST: Short-term; MT: Medium-term LT: Long-term **Frequency:** I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous			**Reversibility:** R: Reversible; IR: Irreversible		

With the implementation of mitigation measures the residual effects from the D83W project on agriculture are anticipated to be of low magnitude. In terms of the residual effect relating to a loss of agricultural land as a result of tower foundations, the overall total amount of land lost is minimal in comparison to the total amount of agricultural land that remains or currently exists within the RAA.

8.1.3.6 Follow-up and monitoring

Manitoba Hydro's practice is to develop project-specific environmental protection plans where mitigation measures are stipulated for construction, operation, and maintenance activities. These measures are regularly reviewed for their effectiveness as part of a process of adaptive management in project monitoring and follow-up.

Manitoba Hydro has provided and will continue to provide project information to relevant agencies and organizations as required and requested. Manitoba Hydro will also continue to discuss the D83W project with potentially affected landowners if concerns are raised.

Potential follow-up related to agriculture may involve biosecurity cleaning audits and through construction inspection. Inspection will determine whether the item or activity is in conformance with mitigation requirements.

8.1.3.6.1 Monitoring of effects for other projects

In addition to the project specific mitigation measures that are identified for the potential effects from construction and operations and maintenance activities for the D83W project, Manitoba Hydro reviews the monitoring work from other projects and the success mitigation measures had in reducing, minimizing, or negating project effects.

Additional mitigation measures (from other projects that are successful) will be implemented. Through an adaptive approach, mitigation that is effective in reducing, minimizing, and negating effects from other projects, as identified through monitoring of other projects, will be included, if applicable, to mitigate effects for D83W project and other future projects.

8.1.4 Collective effects

While Section 8.1.3 focuses on valued component-based effects assessment and Section 8.1.5 considers cumulative effects at a regional scale, this section considers D83W project effects on agriculture from a system perspective through a qualitative adoption of an additional lens of assessment called collective effects. As described by Ehrlich (2021), collective effects assessment considers the multiple impacts of a single project which may not be individually significant, but may be collectively significant, particularly when considered as interrelated parts of a system.

In recognition of the importance of agriculture to the D83W project RAA as well as the provincial economy, this section outlines two system-wide, collective effects that affect agriculture, namely effects to agricultural productivity and effects to rural life (see Figure 8-1).

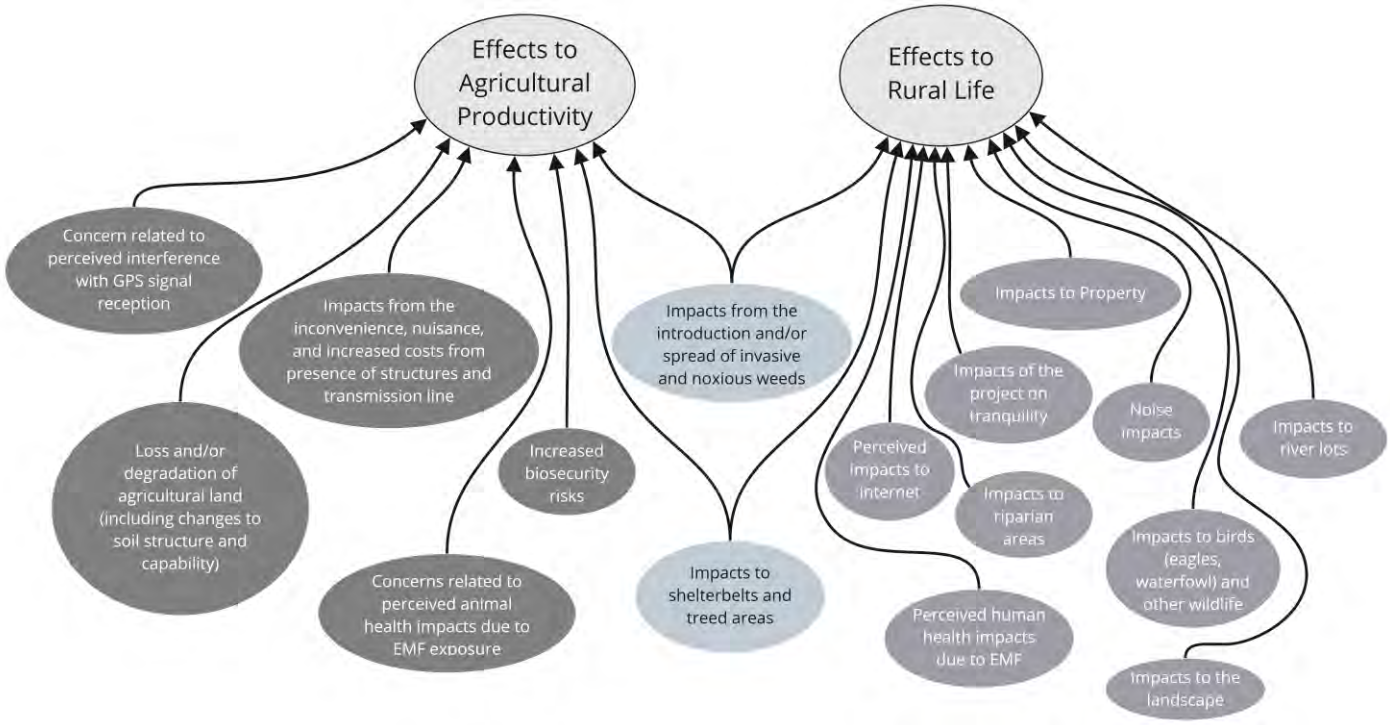


Figure 8-1 Collective effects considered for D83W project effects to agriculture

8.1.4.1 Effects to agricultural productivity

During public engagement, concerns were raised on the potential effects of the D83W project on agriculture through loss and or degradation of agricultural land; impacts from the inconvenience, nuisance, and increased costs from the presence of structures and transmission line; increased biosecurity risks including impacts from noxious weeds; perceived interference with GPS signal reception for agricultural equipment; perceived livestock health impacts due to EMF exposure; and impacts to shelter belts. While some of the concerns are quantifiable and could be reasonably substantiated (e.g., loss and/or degradation of agricultural land, increased biosecurity risk) and be mitigated or compensated for, other concerns are based on perception and lack substantiation (e.g., GPS signal interference and EMF exposure for livestock), and are difficult to address. These concerns collectively result in a system-level effect to agricultural productivity. Agricultural productivity refers to the ratio of agricultural outputs (e.g., market value of crops and livestock) to agricultural inputs (e.g., labour, land, seed, animal feed, pesticides, and technology/equipment).

A sentiment that Manitoba Hydro has heard through other recent transmission projects (e.g., Bipole III, Manitoba-Minnesota Transmission Project, St. Vital Transmission Complex) is that when individual producers are faced with multiple and sometimes concurrent effects from the same project (e.g., a combination of loss

and/or degradation of land due to tower footprints and construction activities in the right-of-way, increased biosecurity risk, loss of shelterbelts), the effect on their individual operations' agricultural productivity can be substantial. Manitoba Hydro acknowledges that project effects may be more pronounced at individual agricultural operation level than across the whole land base of a project. The implementation of mitigation measures outlined in Section 8.1.3.4 will reduce the potential for adverse effects.

8.1.4.2 Effects to rural life

Rural life refers to the lifestyle of residents of nonurban areas such as small towns and country areas. Associated with rural life are many attributes that distinguish it from city life, for example, peaceful surroundings, ample space, rustic pleasing simplicity, fresh air, and low crime.

Construction and operational phases of the D83W transmission line have the potential to impact rural life through project effects on various components that contribute to rural life. During construction, noise impacts from vehicles and equipment; visual impacts to the landscape due to construction activities and erection of tower structures; and reduced presence of wildlife and birds due to removal of treed areas that provided habitat and construction activities could adversely affect the calmness and serenity that landowners typically experience. While some effects to rural life would occur over the lifetime of the project (e.g., landscape impacts due to presence of the transmission line), some impacts like noise from construction activities would be temporary. The implementation of mitigation measures outlined in Section 8.1.3.4 will reduce the potential for adverse effects.

8.1.5 Cumulative effects

The D83W project will mostly be routed through agricultural land. This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on agriculture.

8.1.5.1 Project residual effects and cumulative interactions

Residual effects to agriculture attributable to the D83W project include the loss and/or degradation of agricultural land and the conflict of the proposed project with agricultural activities (see Table 8-10). The potential interactions between the residual effects of the D83W project and similar residual effects for other projects are identified in Table 8-11.

The proposed D83W project occurs in a region where native ecology has been substantially changed because of human-driven development. Most of the original native land has been converted to agricultural lands with agriculture being the dominant land use in the RAA. Remnants of the natural landscape in the form of riparian areas or small treed areas remain scattered throughout the RAA.

Agriculture contributes to the economy within and beyond the RAA, in conjunction with other developments and associated activities. Currently, approximately 81% of the RAA is under agricultural cropping.

Existing/ongoing projects, such as linear (railway, highways, pipelines, etc.) as identified in Table 8-10, have resulted in agricultural land loss through the conversion of agricultural lands to other land uses. In addition to agricultural loss, these same projects also have interfered with agricultural activities (e.g., aerial spraying) and the effectiveness of these operations. Therefore, the D83W induced agricultural residual effects have the potential to act cumulatively with the residual effects from existing projects within the RAA.

In addition to existing projects, the residual effects of the D83W project have the potential to act cumulatively with future planned projects (Table 8-11). These future projects may also result in the loss of agricultural land as well as conflict with agricultural operations.

Table 8-11: Potential cumulative effects on agriculture attributable to the D83W project and other existing and future projects/activities

	Potential cumulative effects	
Other Projects	Loss and/or degradation of agricultural land	Inconvenience, nuisance and (conflict) and increased costs with agricultural activities
Existing/ongoing projects and activities		
Agriculture	-	-
Domestic Resource Use Activities	-	-
Recreational activities	-	-
Infrastructure	✓	✓
Water Treatment/Lagoons	✓	✓

Industrial and Processing Development/Facilities	✓	✓
Foreseeable future projects		
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	✓	✓
BP6/7 Transmission Project	✓	✓
Wash'ake Mayzoon Station Project	✓	✓
RM of Cartier Rural Water Pipelines	✓	✓
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	✓	✓
Poplar Bluff Industrial Park Expansion	✓	✓

8.1.5.2 Cumulative effects assessment for loss and/or degradation of agricultural land

The existing projects which are listed in Table 8-11 above and have the potential to act cumulatively with the loss and/or degradation of agricultural land identified for the D83W project include linear infrastructure projects such as railway lines, other transmission lines, and pipelines. These types of projects have all or portions of their project development areas not returned to agricultural land use after construction and therefore contribute to the loss of this type of land use in the RAA. Even though these projects in conjunction with the D83W project act together cumulatively with respect to the loss and/or degradation of agricultural land, overall the amount of land that will be lost cumulatively, is much less than the amount of agricultural land that has not been altered by existing infrastructure projects and will not be altered by the D83W project.

Besides the proposed D83W Project, other foreseeable future projects within the RAA include a hazardous waste depot, rural water pipelines, an agricultural processing complex, an industrial park expansion, and a hydroelectric station.

The hazardous waste depot will be built in the RM of Rosser at the existing transfer station in SW 30-12-1E. The hazardous waste depot will collect household hazardous waste including paint, aerosols, lithium batteries and other items. Even though the hazardous waste depot will be located at the existing transfer station, additional land is required for the expansion and as a result there is the potential that agricultural land will be lost, and this project will act cumulatively with the D83W project.

The RM of Cartier is proposing to supply areas in the rural municipality with potable, sustainable water by replacing the existing water system and developing water treatment plants, reservoirs and constructing water transmission lines. The rural water pipeline expansion project will result in the loss/degradation of agricultural land from construction of the transmission lines. However, the loss of land will be temporary as the land will be returned to agricultural use following construction, and the implementation of mitigation to minimize soil compaction and admixing will reduce the potential for soil degradation. Permanent loss of agricultural land for this planned project will occur from the development or expansion of water treatment plants and reservoirs resulting in a cumulative effect with the D83W project.

Azure Sustainable Fuels Corp. is proposing to construct an agricultural processing complex to be located adjacent to the Poplar Bluff Industrial Park, approximately 9 km west of Portage la Prairie. This facility will convert vegetable oils and animal fats into a renewable fuel in pursuit of the decarbonization of the aviation industry. Even though this type of project is important in helping Canada meet its promise of decarbonization and reach its goal in greenhouse gas reduction commitments, the development will result in the loss of agricultural land. This loss of agricultural land will act cumulatively with that due to the D83W project.

Poplar Bluff Industrial Park (located approximately 4 km west of Portage la Prairie) is a new expansion to the existing industrial park and includes fully serviced lots that are available for commercial tenants. The expansion of the park and development of the lots for commercial uses will result in the loss of a relatively small amount of agricultural land and act cumulatively with the D83W project.

Manitoba Hydro is proposing to build a 230-66kV station, called Wash'ake Mayzoon, in the RM of Portage la Prairie which will serve as the termination point for the D83W project's transmission line. Approximately 6.5 ha of agricultural land will be permanently lost to the footprint of the Wash'ake Mayzoon station and this loss will

act cumulatively with the permanent agricultural land loss due to tower footprints of the D83W project.

8.1.5.2.1 Mitigation for cumulative effects for loss and/or degradation of agricultural land

In addition to the mitigation outlined in Section 8.1.3.4 which will reduce D83W project's effects on agriculture and its contribution to cumulative effects on agricultural, additional mitigation measures that have the potential to reduce cumulative effects on the loss and/or degradation of agricultural lands include the following:

- Manitoba Hydro will continue to evaluate design mitigation, including tower types, tower spacing, and tower placement to reduce agricultural land loss
- Manitoba Hydro will continue to engage the agricultural community and stakeholders in project planning and identification of issues of concern, route selection, and the identification of mitigation measures.
- Manitoba Hydro has and will continue to support studies to understand the effects of its projects on agricultural land use and use study outcomes to reduce effects of future projects on conflict with agricultural activities.

8.1.5.2.2 Residual cumulative effects for loss and or degradation of agricultural land

Existing projects in the RAA have resulted in the loss and/or degradation of agricultural land because of their development. However, the RAA is dominantly used for agriculture, with approximately 112,042 ha (81%) under agriculture field and agricultural forage crop land uses. Approximately 4,769 ha (3.4%) is considered developed in the RAA and therefore these non-agricultural land uses have a low magnitude effect on the loss and/or degradation of agricultural land in comparison to the amount of land in the RAA identified as agricultural land use. Existing developments in the RAA that contribute to the loss and/or degradation of agricultural land have not substantially impaired the amount of agricultural that currently exists in the RAA.

The future projects proposed within the RAA will result in additional permanent losses of agricultural land. The proposed RM of Rosser transfer station hazardous waste depot; RM of Cartier rural water pipeline expansion; Azure agricultural processing complex; Poplar Bluff industrial park expansion and Wash'ake Mayzoon Station have the potential to interact cumulatively with the D83W project because their plans include permanent structures in areas currently under agricultural land use. The effects of these projects are anticipated to act cumulatively with the D83W project residual effects primarily through permanent land loss. The amount of

agricultural land that will be lost from the Wash'ake Mayzoon station is 6.5 ha and from the BP6/7 transmission project will be <1 ha while the amounts of agricultural land that will be lost from the other noted future projects is unknown.

Considering the effects of the D83W project and other projects, cumulative effects on loss of agricultural land are anticipated to be low in magnitude. While the D83W project will result in land loss that is considered permanent, this effect will be reversible upon the decommissioning of the project at some future date. The D83W project's contribution to land loss will be small relative to losses from other past and future projects and is not expected to measurably affect the capacity for agriculture in the RAA. The combined cumulative environmental effect will be measurable but is not anticipated to result in an impairment to the capacity of agriculture in the RAA and agriculture is anticipated to continue at or near pre-disturbance levels.

8.1.5.3 Cumulative effects assessment for inconvenience, nuisance, and increased costs from the project on agricultural activities

Existing and future projects in the RAA have the potential to interact cumulatively with the D83W project if their plans include the development of facilities in areas under agriculture. The residual effect of the inconvenience, nuisance, and increased costs from permanent structures for past and future projects will act cumulatively with that from the D83W project due to permanent tower structures resulting in a potential conflict with agricultural activities like aerial spraying, irrigation, crop production, manure application, and drainage tiles.

8.1.5.3.1 Mitigation for cumulative effects for the inconvenience, nuisance and increased costs from the project on agricultural activities

The implementation of the mitigation measures described in Section 8.1.3.4 will reduce the effects on agriculture from the D83W project and the project's contribution to cumulative effects on agriculture.

Additional mitigation measures proposed to reduce the cumulative environmental effects on conflict with agricultural activities include the following:

- Consideration of agricultural land use as a transmission line route- and other facilities' site selection criteria for Manitoba Hydro projects occurring in the same geographic area.
- Manitoba Hydro will continue to evaluate design mitigation, including tower types, tower spacing, and tower placement to reduce conflict with agricultural activities.

- Manitoba Hydro will continue to engage the agricultural community and stakeholders in project planning and identification of issues of concern, route selection, and the identification of mitigation measures.
- Manitoba Hydro will continue to support studies to understand the effects of its projects on agricultural land use and use study outcomes to reduce effects of future projects on conflict with agricultural activities.

8.1.5.3.2 Residual cumulative effects for the inconvenience, nuisance and increased costs from the project on agricultural activities

Even though portions of the land in the RAA have already been disturbed due to other non-agricultural development, most of the land in the RAA is under agriculture. Based on the residual characterizations defined in Table 8-11 existing land use activities have had a moderate magnitude effect on conflict with agricultural activities, as they have resulted in interference/nuisance with agricultural activities in the RAA.

Future projects proposed within the RAA (can result in additional inconvenience, nuisance and associated costs with agricultural activities. The effects from these developments have the potential to interact cumulatively with the D83W project if their development include permanent structures in areas of agricultural land use.

With the addition of effects form the D83W project as well as other future projects, cumulative effects from the inconvenience, nuisance and associated costs with agricultural activities are anticipated to be of low magnitude. While the D83W project will result in land loss that is considered permanent during operations, this loss will be reversible upon the decommissioning of the project at a future date. The D83W project's contribution to land loss will be small relative to losses from other past and future projects and is not expected to measurably affect the capacity for agriculture in the RAA. The combined cumulative environmental effect will be measurable but is not anticipated to result in an impairment to the capacity of agriculture in the RAA and agriculture is anticipated to continue at or near pre-disturbance levels.

With the addition of effects from the D83W project and other projects, cumulative effects on conflict with agricultural activities will be moderate in magnitude and will not result in an impairment of the capacity of agriculture in the RAA and production is anticipated to continue at near pre- disturbance levels. It is anticipated that much of the D83W project's contribution to this cumulative effect will be permanent, but reversible upon the decommissioning of the project at some future date. Agriculture is considered to have a moderate capacity to accommodate or recover from changes anticipated from the cumulative effects of past, current, and reasonably foreseeable future projects. While these projects will act cumulatively and increase the level of conflict with agricultural activities, agricultural production is anticipated to return and

continue near pre- disturbance levels. The D83W project's contribution to cumulative environmental effects is not expected to measurably affect the capacity for agriculture within the RAA.

8.1.5.4 Summary of cumulative effects on agriculture

Most of the RAA has been modified through agricultural conversion and, to a lesser extent, industrial and residential development over more than the past 200 years. The cumulative effects through loss or degradation of agricultural land and conflict with agricultural activities are not anticipated to occur at levels that widely disrupt or restrict agricultural operation. As a result, that the existing agricultural production is anticipated to continue within the RAA at current levels for extended periods. The cumulative effects on agriculture are assessed as not significant.

It is anticipated that much of the D83W project's contribution to the cumulative effects, including permanent land loss and conflict with agricultural activities, will be permanent in duration and will reversible upon decommissioning. The effects of permanent land loss will occur only at the tower and station footprints and represent a small proportion of the LAA and RAA. The permanent agricultural land loss from the D83W project is estimated to be 2.8 ha. Therefore, the D83W project's contribution to cumulative effects is not expected to appreciably affect the land available for agricultural land use and agricultural activities in the RAA. The D83W project is not anticipated to impair the capacity of agriculture within the RAA. Table 8-12 provides a summary of the residual cumulative effects on agriculture.

Table 8-12: Summary of cumulative effects on agriculture

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Loss and/or degradation of agricultural land						
Cumulative environmental effect with the D83W project	A	M	RAA	LT	R/C	R
Inconvenience, nuisance, and increased costs from presence of structures						
Cumulative environmental effect with the D83W project	A	M	PF	LT	R/C	R
Reduction in areas of trees/shelterbelts						
Cumulative environmental effect with the D83W project	A	S	PF	LT	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.1.6 Sensitivity to future climate change scenarios

Effects of climate change relate to the anticipated increase in temperature and precipitation. Winter months are projected to experience greater relative changes in precipitation than summer months. Normal precipitation coupled with higher temperatures in July and August could result in increased water deficits for crops in these summer months.

Given the timelines associated with the predicted precipitation and temperature changes (2050s and 2080s), crop type or variety selection and new variety options (i.e., continued advances in breeding and genetics) will likely be able to overcome these challenges.

The predicted climate change scenarios would not change the significance determinations of the assessment.

8.2 Economic opportunities

Economic opportunities are a valued component because of their importance to local and provincial residents, business owners, communities, and governments.

The construction of the D83W project will generate employment opportunities for the local and regional labour force. Direct employment opportunities may include limited construction opportunities, management and supervisory roles, inspection services, equipment operators, health and safety, trades, and semi-skilled and unskilled labour.

Project spending during construction will generate indirect and induced employment opportunities. Indirect employment is generated within industries supplying intermediate components such as raw materials, while induced employment is generated by household spending (e.g., consumer products, restaurants) from wages earned by direct and indirect workers.

Project spending will also generate subcontracting opportunities and the demand for goods and services from local and regional businesses. Such opportunities include the provision of accommodations, parts supply, and concrete foundations materials.

Project spending and employment will contribute to the regional, provincial, and national economies. It will also contribute to federal, provincial, and local government revenue through taxation on income and on goods and services procured for the project.

This chapter presents baseline conditions for the D83W project's RAA; assesses the potential effects of the project's construction, operation, and maintenance; and addresses cumulative effects.

Economic opportunities, including economic benefits, employment opportunities, long-term positions over short term, as well as impacts to commercial trapping, wood harvesting and hunting lodges were raised during the Public and First Nation and Métis Engagement programs.

8.2.1 Scope

8.2.1.1 Spatial boundaries

The spatial boundaries (i.e., PDA, LAA, and RAA) for the environmental assessment of the D83W project's effects on economic opportunities are described below.

PDA: footprint of the proposed project including the tower footprints and the 60 m right-of-way and any additional areas such as staging areas (Map 8-1).

LAA: consists of a 1 km buffer around the transmission line right-of-way (500 m from centreline on either side of the right-of-way) and other project components (Map 8-2). This covers an area that generally will encompass the basic field management unit commonly used, the quarter section, or an area of land 800 m × 800 m.

RAA: The regional assessment area includes the project study area identified on Map 8-2. This includes portions of the RM of Woodlands, Rosser, St. François Xavier, Cartier and Portage la Prairie. The project study area or regional assessment area, represents the region that encompasses the communities within which changes in socioeconomic parameters attributable to project effects on economic opportunities might occur.

8.2.1.2 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – two years

8.2.2 Existing conditions

8.2.2.1 Economy and population

The five municipalities found in the project's RAA (Map 8-2) include: Rosser, St. François Xavier, Cartier, Woodlands, and Portage la Prairie. Each of these RMs are home to several businesses and services as well as other prominent employers that support the local and regional economy. In addition, agriculture and agricultural business are dominant with a variety of businesses throughout the RAA including grain elevators, agriculture fertilizer sales, cattle ranches, cattle sales, seed cleaning companies, and aerial application seed plant cleaners, farm equipment suppliers and implement dealers. In addition to crops, cattle, hog, dairy, and berry farms can also be found throughout the RAA.

Although CentrePort Canada is located outside and adjacent to the RAA for the D83W project, it is partially within the RM of Rosser, and is one of North America's largest inland ports with approximately 22,000 acres of industrial land. It is accessed by a tri-modal transportation which encompasses the Canadian National, Canadian Pacific and BNSF Railway, a global cargo airport and an international trucking hub.

Within the RAA, the reported 2016 populations vary in the RMs, with Rosser having a population of 1,372, St. François Xavier with a population of 1,411, Woodlands population of 3,416 and Cartier having a population of 3,368.

The RM of Portage la Prairie had the largest population in the RAA, which was approximately 6,975.

Throughout the RAA, smaller communities can be found including: Grosse Isle, Rosser, Meadows, Marquette, Gordon, Lilyfield and Little Mountain in the RM of Rosser; unincorporate Local Urban District of Warren, Marquette, Woodlands, Meadow Lake, Reaburn, Oswald, Lake Francais, Woodridge and Erinview in the RM of Woodlands; community of St. François Xavier and village of Pigeon Lake in the RM of St. François Xavier; Elie, St. Eustache and Springstein in the RM of Cartier; and St. Ambrose, High Bluff, Newton, Oakville, Poplar Point, Skelding and Edwin in the RM of Portage la Prairie.

The largest population centre that is adjacent but not included in the RAA is the city of Portage la Prairie. According to the 2016 census (Statistics Canada 2021), the City of Portage la Prairie had a population of 13,304, which represents a 2.3% increase over the reported population of 12,996 in 2011. According to Crown-Indigenous Relations and Northern Affairs Canada the total population of Dakota Tipi First Nation is 347 with 180 living on reserve. The Long Plain First Nation population was 3853, with 2,135 on reserve. Dakota Plains Wahpeton First Nation population was 239, with 168 on reserve (Crown-Indigenous Relations Northern Affairs Canada, 2021).

8.2.2.2 Commercial trapping

The D83W project falls within Manitoba's "Open Trapping Area Zone 3". Those with a valid trapping license can commercially trap furbearers on land they have permission to access. Typical furbearing species which are harvested in this zone include beaver, muskrat, coyote, fox, marten, raccoon, and weasel (Trapping Guide, 2021-22).

8.2.2.3 Wood harvesting

Manitoba Hydro is unaware of any wood harvesting areas close to the final preferred route. However, there is the potential that private landowners may manage woodlots on their own properties.

8.2.2.4 Hunting lodges

According to Travel Manitoba, there are no hunting lodges in the RAA. Manitoba Hydro is unaware of any hunting lodges close to the final preferred route.

8.2.3 Effects assessment

8.2.3.1 Significance thresholds

The Sustainable Development Act (S270) requires Manitoba Hydro to prepare and adopt a corporate sustainable development code of practice. Manitoba Hydro has adopted a sustainable development policy and 13 guiding principles that influence corporate decisions, actions, and day-to-day operations to achieve environmentally sound and sustainable economic development. Manitoba Hydro applies the principles of sustainable development in all aspects of its operations. Through corporate decisions and actions to provide electrical services, Manitoba Hydro endeavors to meet the needs of the present without compromising the ability of future generations to meet their needs.

8.2.3.2 Project interactions

The project activities that will interact with economic activities (Table 6-2) include:

Construction

- Mobilization and staff presence
- Transmission tower construction

Operations and maintenance

- Transmission line presence

8.2.3.3 Effects pathways

With respect to economic opportunities, there will be a positive effect resulting from the generation of both direct (construction, management, inspection services etc.), indirect (e.g., industries supplying raw materials) and induced (household spending from wages earned during direct and indirect workers) employment opportunities. In addition, positive effects will result from the D83W project spending from subcontracting opportunities and the demand for goods and services provided from local and regional businesses. The positive effects attributable to the above-mentioned economic opportunities can benefit the regional, provincial, and national economies as well as contribute to federal, provincial, and local government revenue.

The D83W project also has the potential to interact with areas that are potentially used for wood harvesting areas (personal use) during both construction and operations and maintenance activities (Table 6-2).

The effects to economic opportunities include the following:

- Positive direct, indirect, and induced economic opportunities from employment opportunities, supply for materials for project construction and spending from workers employed on the project.
- Loss of treed areas and shelterbelts that may be used for harvesting of wood for personal use or resale during construction activities.

8.2.3.3.1 Economic opportunities

During the public and First Nation and Métis engagement for the D83W project, comments were received relating to the potential for increased growth in the community and the potential to support industrial growth.

Effects to population, employment and economy are experienced primarily during construction, with the potential for employment opportunities and presence of the workforce in the regional assessment area. The transmission line construction workforce will range in number from about 45 monthly, during mobilization and de-mobilization phases, to over 100 personnel per month during peak construction periods.

Potential direct benefits from the D83W project would be associated with construction employment; however, these opportunities will be limited due to the small workforce required. There may also be opportunities for indirect benefits to communities in the vicinity of the Project (City and communities in the Regional Assessment Area) through the provision of goods and services to the construction workforce (e.g., fuel, food).

During the operations and maintenance phase there will be no employment opportunities since the existing Manitoba Hydro workforce will be used to patrol the transmission line and conduct any maintenance activities. Effects on economy during operations will therefore be negligible as no new operation or maintenance jobs will be created.

Direct D83W project employment will be generated through the hiring of residents within the LAA by either Manitoba Hydro or its contractors. Other direct employment will be generated by providers of equipment used in product construction, while indirect employment will be generated within industries supplying intermediate components. Induced employment is created by the household spending of the direct and indirect workforce.

Project construction will increase demand for goods and services and will generate direct and indirect opportunities for local and regional businesses. Examples of local goods and services provision include the purchase of food (e.g., from grocers and

restaurants), fuel and materials. In addition to D83W project construction contracts, there is potential for sub-contracting opportunities for local and regional businesses.

The D83W project will generate federal, provincial, and local government revenue during construction, operation, and maintenance. Revenue includes federal and provincial consumption taxes (e.g., goods and services tax [GST] and provincial sales tax [PST] payable by Manitoba Hydro).

Federal and provincial income taxes will be payable by workers and on taxable income earned by suppliers (direct and indirect) and companies whose earnings are attributed to household spending (i.e., induced income).

Economic opportunities associated with the D83W project will include Indigenous-related provisions regarding training, employment, and business opportunities, with a focus on trades training for Indigenous women, and Indigenous content will be included as a tender evaluation criterion. Specifics around the various contracts and Indigenous-related provisions and opportunities are currently under review but based on our previous experience it is anticipated that this approach to Indigenous procurement will provide opportunities for Indigenous contractors to participate in the work as prime or sub-contractors.

8.2.3.3.2 Commercial trapping

The interruption to commercial trapping during construction activities was a key issue raised by landowners during the public engagement program. The Project falls within Manitoba's "Open Trapping Area Zone 3" and those people with a valid trapping license can commercially trap furbearers on land they have permission to access. Trapping activities along the route may be temporarily interrupted during construction for safety reasons. However, once the D83W project is in operation, trapping activities along the route would continue as they did prior to the D83W project.

8.2.3.3.3 Wood harvesting

Currently, Manitoba Hydro is unaware of any wood harvesting occurring close to the final preferred route. Any wood harvested is from private treed areas and likely for private use only. landowners may harvest wood from shelterbelts or treed areas on their property for personal use. The effects of construction on wood harvesting was identified as a key issue during the public engagement program and even though there is no effect from the D83W project on wood harvesting it was still acknowledged in this assessment.

8.2.3.4 Mitigation measures

- Manitoba Hydro will work with the interested First Nations and the MMF to prepare a list of skilled labor, equipment, services, and ancillary supports available for use on the project.
- Manitoba Hydro will notify landowners of construction schedules prior to construction start.

8.2.3.5 Characterizing residual effects

The following outlines the residual effects on economic opportunities after the implementation of the mitigation measures outlined above in Section 8.2.3.4.

D83W project construction will generate direct and indirect income and employment opportunities for the local and regional labour force. Transmission line and facility construction typically requires skilled and unskilled labour for short-term employment. Construction employment will require education or trades certification, or applicable construction experience for some positions. Employment opportunities typically associated with transmission line construction include:

- Management and supervisory personnel (e.g., supervisor, foreperson)
- Transmission line inspection services
- Equipment operators (e.g., heavy equipment, bulldozers, cranes)
- Trades and apprentices (e.g., mechanics, technicians)
- Semi-skilled and unskilled labour (e.g., labourer, mechanic's helper)
- Health and safety (e.g., health and safety coordinator)

During construction, right-of-way clearing could include short-term contracts to clear the transmission line right-of-way. These opportunities could be available to businesses or individuals in local communities.

The D83W project will generate direct, indirect, and induced employment in Manitoba. Project direct employment is employment onsite by Manitoba Hydro and its contractor employees. Other direct employment is the employment of suppliers of components and materials used directly in Project construction. Indirect employment is with suppliers of raw materials and intermediate goods (i.e., not finished products). Induced employment is associated with household spending from wages earned by direct and indirect workers.

Employment opportunities for clearing and construction may include qualified individuals in construction jobs including site and camp development (labourers, operators, and teamsters) for clearing, grubbing, excavation and earthmoving; and foundation preparation (labourers, carpenters, and steelworkers) for construction of building, structure, and equipment foundations.

Communities near the D83W project will experience induced economic benefits from the purchase of meals, fuel, and accommodations by the contractor(s) when work is being performed. Incidental purchases of repairs and parts for construction vehicles and equipment, as well as the purchase of some materials required for construction will produce economic benefits in nearby communities.

During operations and maintenance, Manitoba Hydro staff and contractors will be used as required. Typical employment opportunities will include staff positions, operators, electrical technicians, mechanical technicians, and maintenance utility workers. Contractor staff could include patrollers, and equipment operators. The average workforce requirement will be small, unless there is damage to towers and replacement is required. The size of the workforce is largely dependent on the work required during emergencies.

During operations, maintenance activities could include short-term contracts for maintaining the transmission line right-of-way. Labour force from local communities may be used for these activities.

During the operation and maintenance phase for the transmission line, the D83W project is expected to result in employment annually in Manitoba (direct, indirect, and induced) and no employment elsewhere in Canada (MBSEAD, 2015).

The effects of the D83W project in terms of economic opportunities are summarized as follows (Tale 8-13):

- Direction: Positive
- Magnitude: Small
- Geographic extent: Regional Assessment Area
- Duration: Short-term
- Frequency: Continuous during construction
- Reversibility: Reversible

Table 8-13: Summary of the residual project effects on economic opportunities

Project phase	Residual environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Employment and purchase of goods and services						
Construction	P	S	RAA	ST	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.2.3.6 Follow-up and monitoring

Manitoba Hydro monitors employment and business effects associated with the development of new projects. The objective of monitoring is to track employment and business outcomes on labour income.

Monitoring employment and labour income for the Project will occur for each year of construction and will include actual or estimated payments to government associated with the Project (e.g., provincial sales tax, goods and services tax, payroll tax, corporate capital tax and fuel tax).

8.2.4 Cumulative effects

This section discusses the D83W project's residual effects that are likely to interact cumulatively with the residual effects of other past and future projects and activities within the RAA (see Table 6-4, Figure 6-2, and Map 8-3) on economic opportunities.

8.2.4.1 Project residual effects and cumulative interactions

The existing and future projects and activities identified in Table 8-14 will overlap spatially and temporally with the D83W project RAA and will result in the potential for positive cumulative effects for employment and economy. The D83W project effects for employment and economy are anticipated to be greater during the construction phase and limited during operations and maintenance.

Table 8-14: Potential cumulative effects on economic opportunities between the Dorsey Wash'ake Mayzoon transmission project and past and future projects in the RAA

	Potential cumulative effects	
Other existing and foreseeable future projects	Changes in local employment	Changes in goods and services
Existing/ongoing projects and activities		
Agriculture	-	-
Domestic Resource Use Activities	✓	✓
Recreational activities	-	-
Infrastructure	✓	✓
Water Treatment/Lagoons	✓	✓
Industrial and Processing Development/Facilities	✓	✓
Foreseeable future projects		
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	✓	✓
BP6/7 Transmission Project	✓	✓
Wash'ake Mayzoon Station Project	✓	✓
RM of Cartier Rural Water Pipelines	✓	✓

RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	✓	✓
Poplar Bluff Industrial Park Expansion	✓	✓

8.2.4.2 Cumulative effects assessment for employment and economy

The D83W project has the potential to act cumulatively with the existing projects identified in Table 8-14 above with respect to employment and economy. It is anticipated that employment will increase because of the construction of the proposed D83W project and this outcome will result in an increase in employment potential in the RAA. In addition to employment, the increase in the number of workers on the D83W project and materials required for the project can result in an increase in the goods and services purchased which in return act cumulatively with other goods and services currently being purchased in the RAA. The cumulative effect between the D83W project and existing/ongoing projects is positive for employment and economy in the RAA.

Reasonably foreseeable projects that will occur in the RAA are anticipated to hire labour and purchase goods and services in the RAA and elsewhere in Manitoba. The increase in labour and increase in goods and services is anticipated to be a positive benefit to the RAA and therefore the potential for adverse cumulative effects on employment and economy will be limited. Therefore, reasonably foreseeable projects in the RAA will generate cumulative positive direct, indirect, and induced economic effects through employment and purchase of other

Future projects whose construction and/or operations period are known and overlap with the construction and operations' timeframe for the D83W project will act cumulatively with respect to employment and the economy and include the following: Rural Water Pipelines, agricultural processing complex, and the Wash'ake Mayzoon Station.

The RM of Cartier proposes to supply areas in the municipality with potable, sustainable water by replacing the existing current water system and develop water treatment plants, reservoirs, and construct water transmission lines. The rural water pipeline expansion project will result in an increase in employment and purchase of goods and services during construction of the project and therefore will act cumulatively with the employment opportunities created and increase in goods and services purchased during construction of the D83W project in the RAA.

The construction of the Azure Sustainable Fuels Corp. agricultural processing complex west of Portage will result in the need for 1,500 construction workers during development of the complex and 150 full time employees to run the facility. This increase in employment and benefits to the economy from the agricultural processing complex will act cumulatively with the D83W project yielding positive benefits in the RAA.

The yet-to-built Wash'ake Mayzoon Station, in the RM of Portage la Prairie will require up to 45 construction workers and goods and services will be purchased during the construction and a smaller amount during operations. As a result, the D83W project will act cumulatively with the D83W project positively for employment and benefits for the economy in the RAA.

8.2.4.2.1 Mitigation for cumulative effects for economic opportunities

No mitigation measures for the employment and economy effects of the D83W project are proposed as the cumulative effects are a positive effect.

8.2.4.2.2 Residual cumulative effects for employment and economy

Reasonably foreseeable future projects and activities in the RAA are anticipated to result in positive residual cumulative effects on employment and the economy. This includes opportunities for people and businesses living and operating in the RAA to gain employment or procurement contracts and well as increased revenue from the purchase of good and services. In addition to direct spending, indirect and induced economic benefits are anticipated in the RAA. The cumulative environmental effect on the change in local employment is considered low in magnitude, short-term in duration and continuous while for economic benefits the cumulative effects on the provision of goods and services and economic activities is anticipated to be moderate in magnitude, short-term in duration and continuous. The cumulative effects that relate to employment and economy occur mainly during construction with minimal employment and economic benefits during operation of projects.

8.2.4.3 Summary of Cumulative Effects on Economic Opportunities

Residual cumulative effects on employment and economy will be positive rather than adverse. The D83W project's residual effects on labour and economic activity will act cumulatively with the economic effects of existing and future projects. Projects in the RAA will provide economic benefits, increased business opportunities and revenue generation. Therefore, cumulative effects on employment and economy are considered not significant. Table 8-15 provides a summary of the residual cumulative effects characterization on economic opportunities.

The D83W project's residual cumulative effects on employment and economy will be positive. Therefore, the D83W project's contribution to cumulative effects will be positive and will not adversely affect employment and economy within the RAA.

Table 8-15: Summary of residual cumulative environmental effects on economic opportunities

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Cumulative change in employment						
Cumulative environmental effect with the Project	P	L	RAA	ST	R/C	N/A
Cumulative change in goods and services						
Cumulative environmental effect with the Project	P	L	RAA	ST	R/C	N/A

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

NA: Not Applicable

8.2.5 Sensitivity to future climate change scenarios

Climate change is not anticipated to affect employment or economic effects associated with the construction or operation of the D83W project.

8.3 Human health

Human health was selected as a valued component because it was identified as an important issue during public engagement and by other effects assessments on similar projects in the region. Concerns relating to potential impacts to human health include impacts due to:

- EMF from operation of the transmission line
- Change in air quality from construction and maintenance activities
- Change in groundwater quality from construction and maintenance activities, and
- Noise from construction, operation, and maintenance activities

Perceived health effects, including stress related to human health concerns and stress related to changes in tranquility, are discussed under community well-being in Section 8.4.

8.3.1 Scope

8.3.1.1 Spatial boundaries

The spatial boundaries (i.e., PDA, LAA, and RAA) for the environmental assessment of D83W project effects on human health are described.

PDA: footprint of the proposed D83W project including the tower footprints and the 60 m right-of-way and any additional areas such as staging areas (Map 8-1).

LAA: consists of a 1 km buffer around the transmission line right-of-way (500 m from centreline on either side of the right-of-way) and other project components (Map 8-2). It represents the area where EMF, noise, air, and groundwater quality will be most impacted during construction and operation activities.

RAA: The regional assessment area includes the project study area identified on Map 8-2. This includes portions of the RM of Woodlands, Rosser, St. François Xavier, Cartier, and Portage la Prairie. The RAA represents the region where potential changes in human health attributable to project effects might occur.

8.3.1.2 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years;
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life; and

- Decommissioning – two years.

8.3.2 Existing conditions

8.3.2.1 Electric and magnetic fields

Extremely low frequency electric and magnetic fields (ELF EMF) are produced from the generation, transmission, and use of electric power (NIEHS, 2002). ELF EMF are considered to be within the frequency range of 1 Hertz (Hz) to 3 kilohertz (kHz). The ELF EMF associated with electricity in Canada has a frequency of 60 Hz (Health Canada, 2020). Electric fields are created via voltage and often exist if an appliance is plugged into an electric power source, even when it is turned off (NIEHS, 2002). Magnetic fields are produced from the flow of current through electrical devices and thus are typically only present when electrical appliances are turned on (NIEHS, 2002). Most objects such as buildings, trees, and fences, easily block electrical fields but not magnetic fields.

Typical household exposures to ELF EMF associated with electricity are from wiring, appliances that use electricity (such as a toaster or a television), and electrical boxes (Health Canada, 2020). Household electrical wiring typically represents a large proportion of an individual's total EMF exposure; however, this exposure is difficult to estimate as it depends on electricity usage throughout the house, the time of day, and the types of appliances used (NIEHS, 2002). A study in the United Stated determined that the average person was exposed to a household magnetic field of less than 2 milligauss (mG) for a 24-hour average, and this remained true throughout the country and regardless of gender (NIEHS, 2002).

Both magnetic and electrical fields decrease in strength with increasing distance from the source (NIEHS, 2002). For example, a dishwasher can produce a magnetic field of 100 mG six inches (15 cm) from the source, but the magnetic field is reduced to background levels (similar levels to when the appliance is turned off) at 4 feet (1.2 m) from the source (NIEHS, 2002).

Farming and livestock equipment can also create ELF EMF. For example, compressors for milking machines can create a magnetic field ranging from 4 to 620 mG, 30 to 60 cm from the source, and a silo unloader can create a magnetic field of 6 mG, 30 to 60 cm from the source (Hydro Quebec, 1999).

8.3.2.2 Air quality

Manitoba generally has good air quality, with poorer air quality being due to exceptional events such as wildfire smoke and transboundary pollutants from south of the border or from other Canadian provinces. As the RAA is primarily in an

agricultural setting, air quality in the area may also be affected by dust created from harvesting activities and from smoke generated by local crop burning programs (Government of Manitoba, 2021). The RAA has also experienced diminished air quality due to smoke from forest fires (CBC News, 2021). The primary chemicals of concern to human health from crop burning and forest fire smoke include asphyxiant and irritant gases, and particulate matter of less than 2.5 µm ($PM_{2.5}$) (USEPA, 2021).

The D83W project is routed close to provincial highways or roads. Passenger vehicles on roads and highways may emit various air pollutants including ozone precursors (volatile organic compounds (VOCs) and nitrogen oxides (NOx)), carbon monoxide (CO), sulphur oxides (SOx) and PM (Government of Canada, 2017).

Comparison of PM2.5 and ozone for the three-year period from 2013 to 2015, as part of the national Air Quality Management System (AQMS), indicated that these parameters complied with the Canadian Ambient Air Quality Standards (CAAQS) at five air monitoring stations located across the province of Manitoba (Manitoba Conservation and Climate, 2020). Two of the air quality monitoring stations from the study were in northern Manitoba and three were closer to the project area. Air quality data from a monitoring station in downtown Winnipeg and a monitoring station in a residential neighbourhood in Winnipeg, as well as a monitoring station in the parking area of a community college in Brandon were deemed representative of the air quality in the RAA. Transportation, agriculture, and industrial combustion were listed as the primary sources of $PM_{2.5}$ emissions and transportation and industrial activities were listed as the primary sources of ozone precursors (NOx and VOCs) in the Winnipeg area.

In the Brandon area, transportation, agricultural and industrial activities (electric power generation and fertilizer production) were listed as the primary sources of emissions (Manitoba Conservation and Climate, 2020). Except during exceptional events (forest fire, wildfire smoke and transboundary flow), air quality complied with the CAAQS 24-hour and annual standards for $PM_{2.5}$ and with the CAAQS 8-hour standard for ozone during the reporting period.

8.3.2.3 Water quality

The project falls within the Manitoba lowland physiographic region, which lies to the east of the Manitoba escarpment (Betcher and Pupp, 1995). The area has gentle relief and is underlain by gently southwestward dipping Paleozoic and Mesozoic sediments consisting mainly of carbonate rocks with some clastic and argillaceous units (Betcher and Pupp, 1995). Bedrock is overlain by glacial tills and proglacial lacustrine sediments" and the overburden is generally less than 10 m thick, increasing with proximity to the escarpment.

Groundwater aquifers in the bedrock of the regional assessment area are typically not a significant water source as they are generally very saline, with total dissolved solids concentrations ranging between 5,000 mg/L and 100,000 mg/L (Smith et al., 1998; Manitoba Hydro, 2021).

The principal source of water is good quality groundwater extracted from shallow, sandy, surface deposits and gravelly aquifers associated with till (Smith et al., 1998). These shallow groundwater aquifers occurring in some sand and gravel lenses in the project area have depths ranging from a few meters to more than 100 m. They typically produce well yields between 0.1 L/s and 10 L/s, with groundwater quality ranging from very poor to excellent (Manitoba Hydro 2021). There are several groundwater wells that are registered for domestic use within the LAA. These are indicated on Map 7-2.

8.3.2.4 Noise

Existing noise levels in the RAA are typical of urban and rural settings. Noise levels in urban areas near Portage la Prairie, especially those near industrial, commercial, and high-traffic areas, may be higher than noise levels in rural areas. Noise in rural areas may be due to highway traffic, harvesting activities, airplanes, and recreational activities. Based on a noise assessment conducted for the Selkirk Generating Station, typical baseline noise levels for an urban-rural mixed setting are between 40.4 and 44.5 dBA in the daytime (Stantec, 2015). Health Canada (2017) considers day-night noise levels to vary from less than 45 dBA for a typical quiet rural area to 53 to 57 dBA for a typical suburban residential area.

8.3.3 Effects assessment

8.3.3.1 Significance thresholds

Important thresholds include relevant provincial and federal guidelines, objectives, and criteria. Health Canada's guidance for conducting human health risk assessments was also consulted. A residual effect on human health is considered important if the thresholds described below are exceeded.

8.3.3.1.1 Electric and magnetic fields

Human exposure limits are available for ELF EMF from the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 2010) for occupational and general public exposure (Table 8-16). These limits were set to ensure electrical currents generated by ELF EMF are not stronger than those naturally generated by the human body (Health Canada, 2020). Health Canada (2020) states that Canadian exposures to

ELF EMF are well below the ICNIRP guidelines and, therefore, precautions are not required for these levels of exposures.

Table 8-16: ICNIRP human exposure limits for EMF

Magnetic field				Electric field			
General public (edge of Right of Way)		Worker (within Right of Way)		General public (edge of Right of Way)		Worker (within Right of Way)	
Magnetic Flux Density for 25 Hz- 400 Hz (T)	Magnetic Flux Density for 25 Hz- 400 Hz (mG)	Magnetic Flux Density for 25 Hz- 300 Hz (T)	Magnetic Flux Density for 25 Hz- 300 Hz (mG)	Electric Field Strength (Kv/m) Guideline Formula	Electric Field Strength (Kv/m)	Electric Field Strength (Kv/m) Guideline Formula	Electric Field Strength (Kv/m)
2.00E-04	2,000	1.00E-03	10,000	250/f	4.2	500/f	8.3

ICNIRP, 2010 T, Tesla; mG, Milligauss; kV, Kilovolt; m, meter; Hz, hertz; f, frequency (60 Hz assumed)

8.3.3.1.2 Air quality

Passenger vehicles and machinery are expected to be the primary project-related air pollutants during the construction phase. Air pollutants include ozone precursors (volatile organic compounds (VOCs) and nitrogen oxides (NOx)), PM, carbon monoxide (CO), and sulphur oxides (SOx) (Government of Canada, 2017). Dust generated from construction and from road use may also contribute to PM. PM in various emissions exists in various sizes. PM2.5 is of most concern for human health since it can penetrate deep into the respiratory system when inhaled (Health Canada, 2017).

Table 8-17 lists the important provincial and federal standards for air quality parameters. Manitoba ambient air quality criteria and the Canadian Council of Ministers of the Environment (CCME) Canadian Ambient Air Quality Standards (CAAQS) are listed in Table 8-16. The CAAQs are non-binding objectives under the Canadian Environmental Protection Act (Government of Canada, 2022). The purpose of the CAAQS is to drive continuous improvement in air quality. A significant effect would occur if project-related contributions result in an increase above the Manitoba ambient air quality criteria listed in Table 8-17.

Table 8-17: Human exposure limits for criteria air contaminants

Chemical	Source[a]	Time Period	Exposure Limit Value
Carbon Monoxide	Manitoba AAQC	1-hour	30 ppm[b]
		8-hour	13 ppm[b]
Nitrogen Dioxide	Manitoba AAQC	1-hour	213 ppb[b]
		24-hour	106 ppb[b]
		Annual arithmetric mean	53 ppb[b]
	CCME CAAQS	1-hour	60 ppb (2020), 42 ppb (2025)
		Annual	17.0 ppb (2020), 12.0 ppb (2025)
Ground-Level Ozone	Manitoba AAQC	1-hour	82 ppb[b]
		Annual arithmetric mean	15 ppb[b]
		8-hour average	65 ppb[b]
	CCME CAAQS	8-hour	62 ppb (2020), 60 ppb (2025)
Particulate Matter Less than 2.5 µm	Manitoba AAQC	24-hour	30 µg/m^{3}[b]
	CCME CAAQS	24-hour	27 µg/m^{3}
		Annual	8.8 µg/m^{3}
Sulphur Dioxides	Manitoba AAQC	1-hour	344 ppb[b]
		24-hour	115 ppb[b]
		Annual arithmetric mean	23 ppb[b]
	CCME CAAQS	1-hour	70 ppb (2020), 65 ppb (2025)
		Annual	5.0 ppb (2020), 4.0 ppb (2025)

[a]CCME, 2019; Manitoba Environment, Climate and Parks, 2005
[b]Maximum acceptable levels

8.3.3.1.3 Water quality

A residual effect on water quality is considered significant if the project contributes to an increase in water quality parameters that are above Manitoba's Drinking Water Quality Standards (Environment, Climate and Parks, 2007) or the Guidelines for Canadian Drinking Water Quality (Government of Canada, 2020).

8.3.3.1.4 Noise

Health Canada recognizes four endpoints with a demonstrated reasonable causal relationship between noise exposure and adverse human health effects (Health Canada, 2017). These are described below along with the threshold for each endpoint.

1) Noise-induced hearing loss: the World Health Organization (WHO) recommends that peak sound pressures do not exceed 140 decibels (dBA) for adults and 120 dBA for children (WHO, 1999).
2) Sleep disturbance: the World Health Organization suggests an indoor night-time sound level of 30 dBA as a threshold for sleep disturbance, or an outdoor level of 45 dBA (Berglund, Lindvall, & Schwela, 1999). An annual average of 40 dBA is recommended by the WHO (2009) for night-time noise.
3) Interference with speech comprehension: According to the World Health Organization (1999), speech in relaxed conversation can be understood fairly well in background levels of 45 dBA and is 100% intelligible in background levels of 40 dBA. For effective outdoor speech comprehension, the US Environmental Protection Agency (EPA) advises that background outdoor sound levels be kept below 55 dBA for continuous noise (US EPA 1974).
4) Noise Complaints and Long-Term High Annoyance: These are discussed in Section 8.4.3.1 as part of community well-being.

- Construction activities increase ambient noise levels immediately adjacent to the construction site.
- Corona noise occasionally exceeds existing noise levels slightly but is barely discernible (within 3 dBA of existing levels).
- Maintenance activities increase ambient noise levels in a localized area over a short period of time.

8.3.3.2 Project interactions

The D83W project activities that will interact with human health (Table 6-2) include the following:

Construction

- Vehicle and equipment use;
- Right-of-way clearing;
- Transmission tower construction;
- Implodes, and
- Helicopter use.

Operations and Maintenance

- Transmission line presence;
- Vehicle and equipment use;
- Vegetation management, and
- Decommissioning.

8.3.3.3 Effects pathway

The following project interactions are anticipated for human health:

- Change in EMF during operation of the transmission line;
- Change in air quality during construction, operations and maintenance activities;
- Change in groundwater quality during construction and maintenance activities; and
- Change in noise during construction, operation and maintenance activities.

8.3.3.3.1 Electric and magnetic fields

EMF from the operation of the D83W project was a key issue raised by landowners during the public engagement process. Landowners expressed concern about various health effects due to EMF during the operation of the transmission line, particularly childhood leukemia.

Extensive research, spanning several decades, has been conducted on the effect of ELF EMF on human health. The only confirmed effect from EMF (nerve and muscle stimulation) is related to acute or short-term exposure to high levels (Exponent, 2019). These levels of EMF exposure are higher than the ICNIRP guidelines and would not be encountered in publicly accessible areas near electrical facilities.

An analysis of relevant studies related to childhood leukemia and magnetic field exposure has shown there is no association at low exposure levels and a weak

association between childhood leukemia and average magnetic field exposures greater than 3 to 4 mG (Ahlbom et al., 2000; Greenland et al., 2000). However, with the inherent difficulty of performing these studies under controlled conditions, chance, bias, and confounding factors could not be ruled out and a direct causal relationship between magnetic field exposures and leukemia has not been established. In vivo studies conducted in a controlled environment using animals exposed to magnetic fields for their entire life spans have not found evidence of magnetic fields inducing or promoting cancer (Exponent, 2019).

Both magnetic and electrical fields decrease in strength with increasing distance from the source (NIEHS, 2002). Most objects such as buildings, trees and fences, easily block electrical fields but not magnetic fields. Magnetic fields associated with household electrical appliances that are close to people are often stronger than those experienced indoors from power lines (NIEHS, 2002). For example, a dishwasher can produce a magnetic field of 100 mG six inches from the source, but the magnetic field is reduced to background levels at 4 feet (0.3 m) from the source (NIEHS, 2002).

Three years of EMF data for Manitoba Hydro's 230 kV transmission lines (including D83W, D12P-D83W, D12P, D54N, A4D-D54N and V38R) have been analyzed and indicated the 95th percentiles for the magnetic and electrical fields at the edge of the right-of-way (ROW) to be between 9.7 and 25.3 mG and 0.2 to 0.3 kV/m, respectively (D Reske 2022, personal communication, 9 February). These values are well below the ICNIRP (2020) guidelines discussed above.

The National Institute of Environmental Health Sciences (NIEHS, 2002) measured magnetic and electrical fields from 321 power lines in 1990 during periods of average electricity demand. The mean magnetic field reported 15 m from a 230 kV transmission line was 19.5 mG, (at 1 m above ground), which is of similar magnitude to the 95th percentiles (9.7 and 25.3) measured at the edge of the right-of way (ROW) for Manitoba Hydro's transmission lines (D Reske 2022, personal communication, 9 February). The NIEHS (2002) reported that the mean magnetic field decreased to below 2 mG by 61 m from the transmission line and to less than background exposure levels (0.01 mG) at a distance of 91 m from the transmission line (Figure 8-2). All mean values for the magnetic field, including those measured within the ROW (within 15 m of the center line of the transmission tower in the study) were below the ICNIRP (2020) guidelines. In the RAA, all but four occupied houses are greater than 95 m from the centerline of the transmission line (Map 8-4). At this distance, magnetic fields from the transmission line are expected to be near background levels. The four occupied houses are located between 63 and 90 m from the centerline of the transmission line. In comparison to these levels, a study in the

United Stated determined that the average person was exposed to a household magnetic field of less than 2 mG over a 24-hour average.

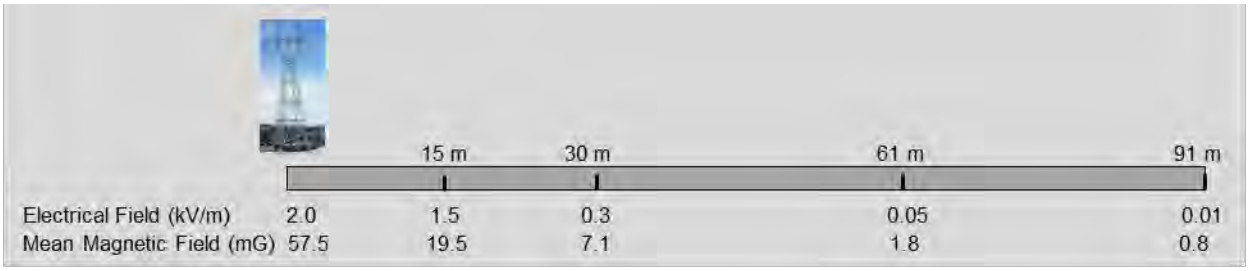


Figure 8-2: Typical mean EMF levels with increasing distance from a 230kV power transmission line (figure adapted from NIEHS, 2002)

8.3.3.3.2 Air quality

Exposure to airborne contaminants may induce adverse respiratory health effects such as asthma, chronic bronchitis, and decreased pulmonary function as well as cardiovascular events, increased hospital admissions, and increased mortality (Government of Canada, 2021). Whether or not any health problems occur from exposure to airborne contaminants depends on factors that include the nature of the contaminant substance, the amount of exposure, and the sensitivity of the person who comes in contact with the contaminant. Sensitive individuals include people with respiratory and cardiovascular disease, infants and young children, older adults, pregnant or breastfeeding women, elderly people, smokers, people with a high body mass index, and outdoor athletes and workers (Health Canada, 2016).

Project-related contribution to outdoor and indoor air quality may occur during the construction, operation and maintenance phases due to worker vehicle emissions, machinery emissions, and during the construction phase due to dust.

Passenger vehicles and machinery may emit various air pollutants including VOCs, NOx, PM, CO, SOx, and ozone (Government of Canada, 2017). PM in various emissions is classified according to particle size. $PM_{2.5}$ poses a greater health risk since it is not easily cleared by the body and can penetrate deep into the respiratory system when inhaled (Health Canada, 2016).

Based on similar projects completed previously, the construction workforce is estimated to be between 46 to 112 people. Project related emissions during construction, operations and maintenance are not expected to differ from current physical activities in the area (i.e., current vehicle emissions, agricultural operations, and industrial emissions).

8.3.3.3.3 Water quality

The D83W project has the potential to result in a change to groundwater quality in the LAA. In general, groundwater quality will not be affected under normal conditions of construction and operation of the project; however, there is potential for accidents, malfunctions and unplanned events during construction and maintenance operations that may affect groundwater quality.

Under normal conditions, tower foundation installation procedures may intercept an aquifer but are not expected to negatively affect groundwater flow or quality. However, there is potential risk of interconnection with artesian wells or springs during construction (geotechnical drilling or foundation installations), specifically if boreholes are not sealed properly or quickly enough. If this occurs, groundwater from a more pressurized aquifer could intrude into a less pressurized one resulting in groundwater chemistry changes. Intrusion of saline water into a freshwater aquifer may result in the local loss of groundwater resources.

There is also potential for the release of herbicides during vegetation maintenance activities and for the release of hazardous materials due to spills. In the event of improper application of herbicides or the release of hazardous materials, the potential exists for these chemicals to enter shallow aquifers, resulting in an indirect effect (groundwater contamination) and possible exceedance of regulatory guidelines for drinking water.

8.3.3.3.4 Noise

Noise was a key issue raised by landowners during the public engagement process. Project-related noise levels may increase during construction, operation, and maintenance of the transmission line. Health Canada considers four noise induced endpoints for potential health effects: noise-induced hearing loss, sleep disturbance, interference with speech comprehension, and complaints and a change in the percentage of the population at a receptor location who become highly annoyed. Complaints and annoyance due to noise are discussed within the community well-being section (see Section 8.4.3). Noise related sleep disturbance is expected to be minimal as construction activities will be limited to daytime hours.

During construction, a change in noise levels may result from project-related vehicles and machinery, including during ROW clearing, access road construction and improvement, installation of tower footings, assembly and lifting of towers into place, helicopter assistance during tower installation and from the splicing of conductors.

In rocky areas, where a conventional tower footing would be impractical, blasting may be required and would produce noise that would be audible for several

kilometers for a short duration. Noise levels will lessen the further away the receptor is from the active construction area.

Construction activities will be limited to daytime hours; therefore, nighttime sleep disturbance will not be affected by these activities. The potential effects from construction noise are expected to be temporary and intermittent in the vicinity of the ROW, as the construction progresses along the ROW. Although project construction will occur over 2 years, most construction activities will only last 7 to 10 days at any one tower location. Human receptors along the ROW will be exposed to noise from the construction of only one or two transmission line towers (typically constructed between 200 m and 500 m apart, depending on the terrain) as noise generated from construction further down the line will attenuate with distance.

For the splicing of conductors, Manitoba Hydro utilizes implosives to join the conductors together. The sound produced from the use of implosive sleeves would constitute a short and very loud bang (Table 8-18).

A helicopter may be used to assist with tower installation. A loaded cargo helicopter flying 250 feet away produces a sound of approximately 95 dBA (Helicopter Association International, 1993). If used, towers would be preassembled at a staging area and then transferred by helicopter to tower sites. The helicopter would hover at the central staging area for 2 to 5 minutes per tower to pick up each tower. It would hover at each tower site for 2 to 10 minutes while the tower is placed on the foundation.

Table 8-18: Typical noise emission rates for construction equipment

Type of Equipment	Equivalent Sound Level at 15 m (dBA)
Implosive Sleeve	110
Road Grader	85
Bulldozer	85
Heavy Truck	88
Backhoe	80
Pneumatic Tools	85
Crane	85
Combined Equipment*	89

Stantec, 2015

*Does not include helicopters or implosive sleeves

The thresholds for noise-induced hearing loss are 140 dBA for adults and 120 dBA for children (WHO, 1999). The outdoor predicted construction noise is below these thresholds at 15 m from the construction site (Table 8-18) and within the ROW. Construction noise in vicinity of the ROW may be higher than baseline day noise levels of 45 dBA for a quiet rural area of 53 to 57 dBA for a normal suburban residential area (Health Canada, 2017). Speech comprehension in vicinity of the construction site may be reduced. Noise associated with construction, operation and maintenance is expected to be primarily within the PDA. Noise within urban and rural areas in the LAA will be minimal and of short-term duration (Stantec, 2015).

A change in noise levels may also result from annual maintenance/inspections and vegetation control processes. Maintenance activities would include inspection of each tower and line by field crews at least once annually. A helicopter would patrol the transmission line corridor twice a year to look for problems. Field vehicles would be dispatched to trouble spots. Occasional vegetation maintenance will also be conducted along the line and may require the use of chainsaws, roller choppers and brush hogs.

During operation of the transmission line, noise may also be generated from corona discharges at transmission line conductors. Audible noise from corona discharges

along the edge of the ROW is generally expected to be approximately 23 dBA during medium to fair-weather conditions (Exponent, 2015). This will result in an inaudible increase above the ambient noise level of 45 dBA for a quiet rural area (Health Canada, 2017). Three years of data from a parallel transmission line to the project (230 kV Dorsey to Wash'ake Mayzoon Transmission Line) have been analyzed and indicated the 95th percentiles for audible noise at the edge of the ROW to be 53.7 dBA (D Reske 2022, personal communication, 9 February). The highest audible noise levels from corona discharges are produced during wet weather conditions. Rain and wind, that typically occur during foul weather conditions, generate noise levels of 41 to 63 dBA (Miller, 1978). Thus, noise from the transmission lines would be masked by background noise during foul weather conditions.

Anticipated noise levels for the D83W project are below thresholds for noise-related hearing loss. Construction and maintenance activities will be limited to daytime hours; therefore, nighttime sleep disturbance will not be affected by these activities. Interference with speech comprehension may occur and is expected to be of greatest concern to receptors within 500 m of the ROW. However, noise generated by the project is expected to be limited in duration for all project phases. Map 8-4 shows the location of homes and sensitive receptors (hospitals, schools, and worship sites) within the LAA. There are 21 homes within 500 m of the construction site (Map 8-4). One school, Rosser Elementary School, is approximately 600 m and one place of worship, in Portage La Prairie, is located over 1.5 km from the final preferred route for the D83W project footprint.

8.3.3.4 Mitigation measures

8.3.3.4.1 Electric and magnetic fields

National and international agencies have reviewed the research on ELF EMF, including the following:

- Health Canada;
- The World Health Organization;
- The International Agency for Research on Cancer;
- The National Institute of Environmental Health Sciences;
- The Health Protection Agency of Great Britain (now Public Health England);
- The Federal-Provincial-Territorial Radiation Protection Committee of Canada; and
- The European Union's Scientific Committee on Emerging and Newly Identified Health Risks).

Based on the weight of evidence of the entire body of research, these agencies have concluded that there is no causal relationship between adverse health effects (childhood leukemia, childhood brain cancer, breast cancer and adult cancers) and typical ELF EMF levels in residential areas close to electrical transmission lines (Exponent, 2019).

Exposures to ELF EMF from the transmission line are expected to be well below the ICNIRP guidelines, including within the ROW. Based on Health Canada's (2020) recommendation that precautions are not required for these levels of exposures and conclusions reached by national and international agencies that no causal relationship has been identified between typical ELF EMF levels in residential areas and health effects, mitigation is not required.

8.3.3.4.2 Air quality

Change in air quality resulting from construction and maintenance activities will be short-term in duration, limited in vicinity of the right-of-way, and is not expected to produce emissions that differ greatly from current physical activities in the area (i.e., current vehicle emission, agricultural operations, industrial emissions). The D83W project is not expected to produce emissions that will result in an increase in air quality parameter concentrations that are above Manitoba's Ambient Air Quality Guidelines.

Vehicles and heavy machinery will generate fugitive dust particulate matter, and combustion products during the construction phase but the magnitude of change in health risk from air quality will be negligible and confined to the PDA. During the operations and maintenance phase, project-related activities that may contribute to a change in air quality are expected to be temporary and along highways and the transmission line ROW.

Health Canada (Health Canada, 2016) encourages the use of all available mitigation measures that are technically and economically feasible to limit negative impacts to air quality. The following mitigation will be applied to minimize potential effects to air quality:

- Mud, dust, and vehicle emissions will be managed in a manner that allows for safe and continuous public activities near construction sites; and
- Dust suppression procedures will be implemented, when requested.

8.3.3.4.3 Water quality

Project construction, operation and maintenance may affect groundwater quality during accidents, malfunctions, and unplanned events. A reduction in groundwater

quality may occur during the installation of tower foundations, from herbicide use and from potential spills of hazardous materials. The following mitigation will be applied to minimize potential effects to groundwater quality:

- A qualified driller with appropriate experience will be contracted during the installation of tower foundations.
- Emergency response plans for sealing/grouting and pumping will be implemented as required.
- Follow up inspections of installed foundations will be undertaken to monitor for excess moisture.
- All applicable permits will be obtained, and provincial regulations will be adhered to for herbicide use.
- In the event of a release, contractors will follow their own spill response plans, which will have been reviewed as part of their contracts with Manitoba Hydro. Manitoba Hydro employees will follow the procedures for spill response outlined in the company's spill response and prevention plan. Spill kits and spill containment plans will be available, including a combination of nonpoint and point containment for oil-filled equipment.

With the implementation of these mitigation measures, residual effects on groundwater are not anticipated during project construction, operation and maintenance.

8.3.3.4.4 Noise

Construction noise in vicinity of the right-of-way may be higher than baseline day noise levels of 45 dBA for a quiet rural area and of 53 to 57 dBA for a normal suburban residential area (Health Canada, 2017). Noise levels outside the LAA are expected to approach background levels for most construction equipment and activities. Noise from construction activities will be temporary and intermittent (5 to 7 days at any one tower location) and may be of similar magnitude to other activities taking place in the area (i.e., agricultural activities).

Proximity to residences and sensitive receptors, including schools, hospitals, and worship sites, were considered during the transmission line routing process. The final preferred route will still intersect with rural residential areas, with 21 homes within 500 m, one school approximately 600 m and one place of worship over 1.5 km from the construction site. Mitigation measures for noise emissions will include the following:

- Construction activities will be conducted in accordance with noise bylaws;

- Landowners in the vicinity of where implosives are to be used for the splicing of conductors or when blasting is required during the installation of tower footings will be notified.

8.3.3.5 Characterizing residual effects

Given the application of the above-described mitigation measures the overall effect of the Project on human health is outlined in Table 8-19 and summarized as follows:

- Direction: Adverse
- Magnitude: Moderate
- Geographic extent: Local
- Duration: Medium-Term
- Frequency: Sporadic/Intermittent
- Reversibility: Reversible following decommissioning

Table 8-19: Residual environmental effects for human health

	Residual environmental effects characterization					
Project phase	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Electric and magnetic fields						
Construction	N	-	-	-	-	-
Operations and Maintenance	N	-	-	-	-	-
Air quality						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LT	R/C	R
Water Quality						
Construction	N	-	-	-	-	-
Operations and Maintenance	N	-	-	-	-	-
Noise						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LTMT	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.3.3.6 Follow-up and monitoring

Manitoba Hydro's practice is to develop project-specific environmental protection plans where mitigation measures are stipulated for construction, operation, and maintenance activities. These measures are regularly reviewed for their effectiveness as part of a process of adaptive management in project monitoring and follow-up.

Manitoba Hydro has provided and will continue to provide project information to relevant agencies and organizations as required and requested.

Potential follow-up will be through construction inspection. Inspection will determine whether the item or activity is in conformance with mitigation requirements.

8.3.4 Cumulative effects

This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on human health.

The residual project effects identified for human health include minor contributions to a change in air quality and a change to noise levels associated with interference with speech comprehension (see Table 8-19). The potential interactions between the residual effects identified for the D83W project and similar residual effects for other projects are identified in Table 8-20.

The proposed D83W project occurs in a region with a lot of distinguishable development. There are industrial sites west of Portage la Prairie, the TransCanada highway is south of the final preferred route, and there are other major developments in the area that are identified in Table 8-20 that may contribute to changes to human health. Therefore, for the D83W project, human health residual effects have the potential to act cumulatively with the residual effects from past projects within the RAA.

In addition to past projects, the residual effects for the D83W project have the potential to act cumulatively with future planned projects (Table 8-20). These future projects may also contribute to a change in air quality and noise levels.

Table 8-20: Potential cumulative effects on human health for the D83W project and other past and foreseeable future projects

Other past and foreseeable future projects	Air quality	Noise levels – interference with speech comprehension
Existing/ongoing projects and activities		
Agriculture	✓	✓
Domestic Resource Use Activities	-	-
Recreational activities	-	-
Infrastructure	✓	✓
Water Treatment/Lagoons	-	-
Industrial and Processing Development/Facilities	-	-
Foreseeable future projects		
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	✓	✓
BP6/7 Transmission Project	✓	✓
Wash'ake Mayzoon Station Project	✓	✓
RM of Cartier Rural Water Pipelines	✓	✓
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	✓	✓
Poplar Bluff Industrial Park Expansion	✓	✓

8.3.4.1 Cumulative effects assessment for air quality

Past projects identified near the proposed D83W project that have the potential to act cumulatively to affect air quality include agricultural activities (such as cropping, livestock operations, aerial spraying, dairy, and organic farming) and air emissions associated with current infrastructure (existing rail lines, provincial highways and roads, and operation and maintenance activities associated with existing transmission lines and stations). These projects may generate fugitive dust, particulate matter, and combustion products that lead to a potential change in ambient air quality.

With respect to cumulative effects in the area, data for $PM_{2.5}$ and ozone were available for the three-year period from 2013 to 2015, as part of the national Air Quality Management System (AQMS). Two of the air quality monitoring stations were in vicinity of the project area in downtown Winnipeg and in a residential neighbourhood in Winnipeg. In the Brandon area, air quality was measured in the parking area of a community college (Manitoba Conservation and Climate, 2020). With the exception of exceptional events (forest fire, wildfire smoke and transboundary flow), air quality was in compliance with the CAAQS 24-hour and annual standards for $PM_{2.5}$ and with the CAAQS 8-hour standard for ozone during the reporting period Transportation, agriculture and industrial combustion were listed as the primary sources of $PM_{2.5}$ emissions and transportation and industrial activities were listed as the primary sources of ozone precursors (NOx and VOCs) in the Winnipeg area. In the Brandon area, transportation, agricultural and industrial activities (electric power generation and fertilizer production) were listed as the primary sources of emissions (Manitoba Conservation and Climate, 2020). These data would be relevant for past projects that were present during the monitoring period (2013 to 2015), including agriculture and infrastructure projects that were present during this time (rail lines, provincial highways and roads, some transmission lines and stations).

Besides the D83W project, future projects that have started or are starting in the foreseeable future include the following:

- A hazardous waste depot to be built in the RM of Rosser at the existing transfer station in SW 30-12-1E. It will collect household hazardous waste including paint, aerosols, lithium batteries and other items. This project is proposed four miles north of the D83W project.
- A rural water pipelines to supply areas in the rural municipality with potable, sustainable water by replacing the existing current water system and developing water treatment plants, reservoirs and constructing water

transmission lines in the RM of Cartier. This project is proposed two miles south of the D83W project.

- An agricultural processing complex by Azure Sustainable Fuels Corp to be located adjacent to the Poplar Bluff Industrial Park, approximately 9 km west of Portage la Prairie. The purpose of the facility is to convert vegetable oils and animal fats into clean, environmentally sustainable renewable fuels to aid in the decarbonization of the aviation industry. This project will help Canada meet its promise of decarbonization and reach its goal in greenhouse gas reduction commitments. This project is proposed one mile south of the D83W project.
- An industrial park expansion of the Poplar Bluff Industrial Park located approximately 4 km west of Portage la Prairie. This is a new expansion to the existing industrial park including fully serviced lots that are available for commercial tenants. This project is proposed two miles south of the D83W project.
- Manitoba Hydro's 230-66kV Wash'ake Mayzoon Station in the RM of Portage la Prairie which will be the termination point for the D83W project.

For all the above future projects, ambient air quality may be marginally affected from vehicles, and heavy machinery that will generate fugitive dust particulate matter, and combustion products, particularly during the construction phase. These may act cumulatively with the proposed D83W project.

8.3.4.1.1 Mitigation for cumulative effects for air quality

Implementation of the mitigation measures described in Section 8.3.3.4 will reduce the effects of the D83W project on change to ambient air quality. Other proponents may adopt measures to mitigate their own project effects. Manitoba Hydro will work with other proponents and government agencies, where appropriate, to address cumulative effects.

8.3.4.1.2 Residual cumulative effects for air quality

The projects listed in Table 8-20 may contribute to a change in air quality and related human health risk. Residents living near the proposed D83W project and near other existing and future projects are most likely to experience cumulative health risk from projects-related change to air quality. However, these effects are expected to be negligible in magnitude, short-term in duration and reversible.

8.3.4.2 Cumulative effects for interference with speech comprehension from noise

Past projects identified in the RAA that have the potential to act cumulatively with the proposed D83W project (Table 8-20) to affect speech comprehension include

agricultural activities (such as cropping and aerial spraying) and current infrastructure (existing rail lines, provincial highways and roads, and operation and maintenance activities associated with existing transmission lines). Interference with speech comprehension is expected to be of greatest concern to receptors within 500 m of the projects. Therefore, potential cumulative effects would be of greatest concern for receptors who are within 500 m of the D83W project as well as other past projects.

Future projects identified near the proposed D83W project (Table 8-20) may have the potential to act cumulatively to affect noise levels, primarily during the construction phase of each project. Interference with speech comprehension may occur and is expected to be of greatest concern to receptors within 500 m of the projects. Therefore, potential cumulative effects would be of greatest concern for receptors who are within 500 m of the D83W project as well as other future projects.

8.3.4.2.1 Mitigation for cumulative effects for interference with speech comprehension from noise

Implementation of the mitigation measures described in Section 8.3.3.4 will reduce the effects of the proposed D83W project on the change to speech comprehension due to noise. Other proponents may adopt measures to mitigate their own project effects. Manitoba Hydro will work with other proponents and government agencies, where appropriate, to address cumulative effects.

8.3.4.2.2 Residual cumulative effects for interference with speech comprehension from noise

The projects listed in Table 8-20 may contribute to a change in speech comprehension due to noise. The cumulative effects from these projects will be experienced primarily near construction areas until the end of construction. Residents living within 500 m of the D83W project and within 500 m of other existing and future projects are most likely to experience the cumulative effects for interference with speech comprehension. Although there are multiple existing projects within 500 m of the D83W project, all but one future project (the Wash'ake Mayzoon Station in the RM of Portage la Prairie) are located greater than 1.5 km from the D83W project. Project-related cumulative effects to speech comprehension are expected to be negligible to small in magnitude, short-term in duration and reversible.

8.3.4.3 Summary of cumulative effects on human health

A change in air quality resulting from cumulative projects-related effects will be limited to residents living near the proposed D83W project and near other existing and future projects. Other proponents will likely develop their own measures to

mitigate changes to air quality for all phases of their projects. Cumulative effects are not expected to produce emissions that will result in an increase in air quality parameter concentrations that are above Manitoba's Ambient Air Quality Guidelines. Cumulative effects from the change in air quality are expected to be negligible.

Interference with speech comprehension resulting from cumulative effects is expected to be of greatest concern to receptors within 500 m of the D83W project and near other existing and future projects. Although there are multiple existing projects within 500 m of the D83W project, all but one future project (the Wash'ake Mayzoon Station in the RM of Portage la Prairie) are located greater than 1.5 km from the D83W project. The cumulative effects from future projects will primarily be experienced during overlapping construction phases. It is anticipated that other proponents will adopt measures to mitigate their own project effects, including consideration of sensitive receptors during site location. Project-related cumulative effects to speech comprehension are expected to be negligible to small in magnitude.

Table 8-21 summarizes cumulative effects on human health due to the D83W project, existing and future projects.

Table 8-21: Cumulative environmental effects for human health

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Air quality						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LT	R/C	R
Interference with speech comprehension from noise						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LT	R/C	R

See Table 6-3 for a detailed description of criteria definitions **Direction:** P: Positive; N: Neutral; A: Adverse **Magnitude:** S: Small; M: Moderate; L: Large **Geographic Extent:** PF: Project Footprint; L: Local; R: Regional	**Duration:** ST: Short-term; MT: Medium-term LT: Long-term **Frequency:** I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous	**Reversibility:** R: Reversible; IR: Irreversible

8.3.5 Sensitivity to future climate change scenarios

Climate change scenarios such as project changes in the growing season may result in a change in species composition along the final preferred route, potentially affecting vegetation management activities and the use of herbicides. Herbicide use is not expected to pose an increased risk to human health as mitigation measures outlined in Section 8.3.3.4 will be in place. Climate change scenarios are not expected to affect a change in EMF, air quality, water quality or noise that will change significance determinations for human health in this assessment.

8.4 Community well-being

Community well-being was selected as a valued component because it was identified as an important issue during public engagement and by other effects assessments on similar projects in the region. Concerns relating to potential impacts to community well-being include impacts due to:

- Stress from perceived health effects from the operation of the transmission line
- Changes to tranquility
- Noise annoyance during construction, operation, and maintenance
- Visual impact due to the presence of the transmission line

8.4.1 Scope

8.4.1.1 Spatial boundaries

The spatial boundaries for the environmental assessment consist of the project development area, local and regional assessment areas. Valued component specific details are described below.

PDA: footprint of the proposed D83W project including the tower footprints and the 60 m right-of-way and any additional areas such as staging areas (Map 8-1).

LAA: consists of a 500 m buffer (foreground) and 1.5 km buffer (midground) around the transmission line right-of-way (Map 8-5). It represents the area where noise and visual impacts are likely to be most pronounced or identifiable.

RAA: The regional assessment area includes areas within 15 km of the project, corresponding to the areas with a potential view of the line to the maximum extent of visibility (Map 8-6).

8.4.1.2 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years;
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life; and
- Decommissioning – two years.

8.4.2 Existing conditions

Stress from perceived risk and environmental annoyance are key determinants for mental health and well-being in the context of development projects (Baldwin and Rawstorne, 2019). Both stress and annoyance are factors that can erode mental well-being and affect physical health. The links between stress, mental health and physical health are well-documented. Research shows that:

- Unmanaged stress has physical health consequences that include weakened immune systems, weakened functioning of the circulatory and metabolic systems, and increased incidence of cardiovascular disease and Type 2 diabetes (Brunner & Marmot, 2006).
- Stress can lead to the adoption of health-threatening coping behaviours such as tobacco use and alcohol consumption (Mikkonen & Raphael, 2010).
- Impaired mental health has a worsening effect on other conditions such as cardiovascular disease, diabetes, and addictions; as well it can influence the onset and transmission of infectious disease due to its lowering of the immune system and significantly reduce life expectancy (Wilson & Wilkerson, 2011).

Self-rated health is an important indicator of well-being in a community (Health Canada, 2020). Statistics for self-rated health from the project area were compared to provincial and national statistics. The project area is located within the health region for the Southern Manitoba Regional Health Authority. This health region extends from the 49th parallel up to the Trans-Canada Highway, from the Manitoba/Ontario border to Winnipeg and then follows the southwest edge of Lake Manitoba down to the

Pembina Escarpment in the west. The most current data sets available from Statistics Canada's Canadian Community Health Survey (Statistics Canada, 2022) were used (Table 8-2). All data were for ages 12 years and older for the 2017-2018 reference period and were segregated based on sex.

As summarized in Table 8-22, the Southern Manitoba health region had similar rates for self-rated health and self-rated mental health as provincial and national rates for both males and females. Perceived life stress for males in the Southern Health region was comparable to the national and provincial rates, whereas perceived life stress for females was significantly lower than the national rate and comparable to the provincial rate. The percentage of people who rated their sense of belonging to the local community as somewhat strong or very strong was higher than the national rate for males in the Southern Health Region and comparable to the provincial rate. The sense of belonging for females within the Southern Health Region was comparable to the national and provincial rates. Thus, self-rated health indicators in the Southern Manitoba health region are similar to or better than provincial and national rates.

Table 8-22: Indicators for community well-being

Health Characteristics for the Health Regions of Manitoba and Canada, two-year period estimates, age 12+																		
Geography	Canada						Manitoba						Southern Health, Manitoba					
Sex	Males			Females			Males			Females			Males			Females		
Characteristics	Percent	Statistically different from the Canada rate[1]	Statistically different from the provincial rate[1]	Percent	Statistically different from the Canada rate[1]	Statistically different from the provincial rate[1]	Percent	Statistically different from the Canada rate[1]	Statistically different from the provincial rate[1]	Percent	Statistically different from the Canada rate[1]	Statistically different from the provincial rate[1]	Percent	Statistically different from the Canada rate[1]	Statistically different from the provincial rate[1]	Percent	Statistically different from the Canada rate[1]	Statistically different from the provincial rate[1]
Perceived health, very good or excellent	61.1	...	...	60.6	...	...	61.6	0	...	58.7	0	...	63.4	0	0	60.6	0	0
Perceived health, fair or poor	10.6	...	...	11.6	...	...	10.6	0	...	12.3	0	...	10.2E	0E	0	11.7	0	0
Perceived mental health, very good or excellent	71.9	...	...	67	...	...	72.2	0	...	64.2	-1	...	70.9	0	0	68.9	0	0
Perceived mental health, fair or poor	6.4	...	...	8.3	...	...	5.6	0	...	8.9	0	...	5.3E	0E	0	9.3E	0E	0
Perceived life stress, most days quite a bit or extremely stressful	19.9	...	...	22.8	...	...	17.1	-1	...	20.4	-1	...	17.4	0	0	17.9	-1	0
Sense of belonging to local community, somewhat strong or very strong	68	...	...	69.8	...	...	74.6	1	...	72.6	1	...	77.9	1	0	74.3	0	0

Source: Statistics Canada, 2022)

All data were for Total, 12 years and over, for 2017/2018 reference period

[1]This variable provides direction and statistical significance of the difference between estimates ($p < 0.05$). A value of +1 means the difference observed is significantly higher, -1 means the difference is significantly lower and 0 means the difference is not statistically significant

…, not applicable; E, use with caution

8.4.2.1 Stress from perceived health effects related to electric and magnetic fields

Stress from perceived health effects related to EMF may contribute to changes in mental well-being. Several concerns were raised during the public engagement process related to the potential negative effects of EMF on human health. Health Canada (2020) states that Canadian exposures to extremely low frequency electric and magnetic fields (ELF EMF) are well below the ICNIRP guidelines and, therefore, precautions are not required for these levels of exposures. However, the perception of risk by the public from EMF still exists.

8.4.2.2 Tranquility

Tranquility refers to perceptions of how much individuals think a particular setting is quiet, peaceful, and attractive. Tranquility encompasses aural and visual factors. Both noise and the visual intrusion of man-made structures into perceived natural environments can affect tranquility (Watt and Phesant, 2015). As such, noise complaints and annoyance, and visual impacts were considered in assessing tranquility.

8.4.2.3 Noise complaints and annoyance

Community reactions to project-related noise may represent potential indicators of adverse health if experienced over a long period of time (Health Canada, 2017). Noise-related concerns were raised during the public engagement process. In general, intermittent, higher frequency, short duration, intense sounds have greater effects than do continuous low frequency, long duration, low intensity sounds (London Health Commission, 2003).

Existing noise levels in the D83W project RAA will be typical of urban and rural settings. Noise levels in urban areas, especially those near industrial, commercial, and high-traffic areas, may be higher than noise levels in rural areas. Noise in rural areas may be due to highway traffic, harvesting activities, airplanes, and recreational activities.

Based on a noise assessment conducted for the Selkirk Generating Station, typical baseline noise levels for an urban-rural mixed setting are between 40.4 and 44.5 dBA in the daytime (Stantec, 2015). Based on Health Canada (2017), day-night noise levels may vary from less than 45 dBA for a typical quiet rural area to 53 to 57 dBA for a typical normal suburban residential area.

8.4.2.4 Visual impacts

Concerns related to visual impacts were raised during the public engagement process. Land use within the local assessment area is primarily agricultural and pastureland with some rural residential development. Agricultural land provides views of open spaces and visually appealing rural landscapes characteristic of open prairie landscapes (Benson, 2008; Fleischer and Tsur, 2000). Some other visible land uses include industrial developments, residential developments, and utility corridors. The City of Portage la Prairie is located outside the LAA.

There are no provincial parks within the foreground or midground views and no recreation facilities (Map 8-5). Major infrastructure within the foreground and midground views include transmission and distribution lines and a railway line. There is a lot of distinguishable development in the LAA beyond the midground view, including industrial sites west of Portage la Prairie and the TransCanada highway, located south of the final preferred route.

8.4.3 Effects assessment

8.4.3.1 Significance thresholds

Important thresholds include relevant provincial and federal guidelines, objectives, and criteria. Health Canada's guidance for conducting human health risk assessments was also consulted. A residual effect on human health is considered important if the thresholds described below are exceeded.

8.4.3.1.1 Stress from perceived health effects related to electric and magnetic fields

Health Canada (2020) states that Canadian exposures to ELF EMF are well below the ICNIRP guidelines and, therefore, precautions are not required for these levels of exposures. There are no guidelines or guidance for perceived health effects from EMF.

8.4.3.1.2 Tranquility

Health Canada states that certain community reactions to project related noise (complaints and annoyance) may increase the risk of developing health effects for noise experienced over a long period of time (Health Canada, 2017). Health Canada uses a normalized day-night sound level over a 24-hour period of 62 dBA for effects related to widespread complaints. Sound levels greater than a normalized day-night sound level of 75 dBA can be expected to include strong appeals to authorities to stop the noise (Health Canada, 2017).

Health Canada also uses "percent highly annoyed" (% HA) to calculate a dose-response relationship between noise and annoyance for long-term high annoyance (Health Canada, 2017) but specifies that % HA only be calculated for receptors exposed to long-term noise (more than one year). Although the D83W project construction will occur over 2 years, most activities will only last 7 to 10 days at any one tower location. Tower maintenance activities will take place for a limited duration of time once or twice a year, and vegetation maintenance will be occasional. Based on the limited duration of these activities, % HA was not considered in the assessment.

8.4.3.1.3 Visual impacts

The magnitude of visual impacts depends on the anticipated magnitude of the visual alteration created by the project and anticipated viewer response to the visual alteration. The thresholds for assessing the significance of effects on visual quality, defined below, consider the effect of the project within the planning context, and intended management vision for the area, as well as the degree of change from existing conditions.

A residual effect was considered important if the following conditions occur:

- The average visual landscape character changes from relatively undisturbed to disturbed (Table 8-23).
- Visual quality is an important planning objective for government authorities.

A "relatively undisturbed" visual landscape is one that is either rural/pastoral in character, or rural/pastoral with minimum development (Table 8-23). A disturbed visual landscape exceeds the rural pastoral with distinguishable development class, becoming more semi-urban/industrial in character.

Table 8-23: Landscape character class description

Landscape Character Class	Description
Rural/Pastoral	The central field of view toward the project has a rural/pastoral character. Built interventions, when assessed from a viewpoint, are (1) not visible or (2) very small in scale, and not easily distinguished from the predevelopment conditions.

Landscape Character Class	Description
Rural/Pastoral with minimal development	The central field of view toward the Project has a rural/pastoral character. Built interventions, when assessed from a viewpoint, are (1) difficult to see and (2) low in prominence.
Rural/Pastoral with distinguishable development	The central field of view toward the Project has a rural/pastoral character. Built interventions, when assessed from a viewpoint, are (1) easy to see and (2) low to moderate in prominence.
Semi-Urban/Industrial	The central field of view toward the Project is dominated by a semi-urban or industrial character. Built interventions, when assessed from a viewpoint, are (1) easy to see and (2) high in prominence.
Urban/Industrial	The central field of view toward the Project has an urban or industrial character. Built interventions when assessed from a viewpoint, begin to dominate the view as they are (1) very easy to see and (2) very high in prominence.

8.4.3.2 Project interactions

The project activities that will interact with community well-being (Table 6-2) include the following:

Construction

- Mobilization and staff presence
- Vehicle and equipment use
- Right-of-way clearing

- Transmission tower construction
- Implodes
- Helicopter use

Operations and Maintenance

- Transmission line presence
- Vehicle and equipment use
- Vegetation management
- Decommissioning

8.4.3.3 Effects pathways

The following project interactions are anticipated for community well-being:

- Stress from perceived health effects related to electrical and magnetic fields;
- Perceived changes to tranquility:
- Noise complaints and annoyance.
- Potential changes to the visual environment.

8.4.3.3.1 Stress from perceived health effects related to electric and magnetic fields

The existence of a transmission line close to their property and the associated EMF were a key issue raised by landowners during the public engagement process. Landowners expressed concern about various health effects due to EMF, particularly childhood leukemia.

Experts have concluded that there is no causal relationship between adverse health effects (childhood leukemia, childhood brain cancer, breast cancer and adult cancers) and typical ELF EMF levels in residential areas close to electrical transmission lines (Exponent, 2019). However, public risk perception for exposure to ELF EMF may not reflect risk conclusions reached by experts (WHO, 1998).

Several factors may increase the perceived magnitude of an individual's risk, including the involuntary nature of potential exposure, lack of personal control over the situation, lack of familiarity with the situation, dread (e.g., due to perceived health effects) and unfairness (e.g., exposure to EMF from power lines that do not supply power to their community) (WHO, 1998).

8.4.3.3.2 Changes to tranquility

8.4.3.3.2.1Noise complaints and annoyance

Community reactions to project-related noise represent potential indicators of adverse health if the noise is experienced over a long period of time (Health Canada, 2017).

Although project construction will occur over 2 years, most transmission line construction activities are anticipated to last between 7 to 10 days at any one tower location. Noise from combined construction equipment is anticipated to be approximately 89 dBA 15 m from the construction site and is anticipated to dissipate to below 60 dBA 500 m from the construction site (Stantec, 2015). Outdoor-to-indoor transmission will result in an additional loss of 15 dBA with windows at least partially open and 27 dBA with fully closed windows (Health Canada, 2017). In the project area, 20 houses will be located within 500 m of the transmission line construction.

Maintenance activities will occur for a limited duration of time, once or twice a year. Vegetation maintenance may require the use of chainsaws, roller choppers and bush hogs, but will be conducted occasionally.

During operation of the transmission line, noise may be generated from corona discharge at transmission line conductors. Audible noise from corona discharge along the edge of the ROW is approximately 23 dBA during medium to fair-weather conditions (Exponent, 2015). Occasional corona discharges at transmission line conductors are not expected to be an issue over a long period of time due to their infrequent nature and masking by background noise from foul weather conditions when they are most likely to occur and generate noise levels of 41 to 63 dBA (Miller, 1978).

Anticipated project-related noise annoyance will be limited to daytime hours and is of greatest concern to receptors within 500 m of the ROW in the LAA. However, project-related noise is of limited duration for all the phases of the project.

Map 8-4 shows the location of homes and sensitive receptors (hospitals, schools, and places of worship) within the LAA. There are 20 houses within 500 m of the construction site. No hospitals, schools or places of worship were located within 500 m of the construction site.

8.4.3.3.2.2Visual impacts

The construction of transmission towers and conductor wires will add to the human-caused visual disturbance in the environment.

Based on a review of the literature for visual quality and transmission line visibility (Palmer, 2016); (Driscoll et al., 1976); (Sullivan et al., 2014) a 500 m buffer was considered the area where the transmission towers would be in the foreground view and, therefore, most intrusive. Structures in the foreground view have recognizable detail and are readily identified. There are 20 houses with a foreground view of the transmission line (Map 8-5) There are no recreational sites, or other public spaces within 500 m of the transmission line.

A 1.5 km buffer was placed around the transmission line (Map 8-5) representing the area where the station would be in the midground view. Structures in the midground view have muted colours, and details become subordinate to the whole structure. There are several houses with a midground view of the transmission line (Map 8-5). There are no recreational sites, or other public spaces within 1.5 km of the transmission line.

Project components will become more visible to varying degrees as construction progresses from site preparation to overhead construction and stringing conductors. The effects of the project on visual quality recognizes that there will be increasing levels of alteration to viewsheds from the visibility of the station and contrast with the landscape during project construction, but focuses on the final alteration (i.e., during operations and maintenance) when all project components are constructed and operational.

Existing major infrastructure within the foreground and midground views include transmission and distribution lines, a railway line, and a major highway (Map 8-5). Thus, the existing landscape character class in the project area is rural/pastoral with distinguishable development.

8.4.3.4 Mitigation measures

8.4.3.4.1 Stress from perceived health effects related to electric and magnetic fields

Exposures to ELF EMF from the transmission line are expected to be well below the ICNIRP guidelines, including within the ROW. Health Canada (2020) states that precautions are not required for these levels of exposures.

However, public risk perception for exposure to ELF EMF may not reflect risk conclusions reached by experts (WHO, 1998). Factors that may increase the perceived magnitude of an individual's risk include the involuntary nature of potential exposure, lack of personal control over the situation, lack of familiarity with the situation, dread (e.g., due to perceived health effects) and unfairness (e.g., exposure to EMF from power lines that do not supply power to their community) (WHO, 1998).

Landowner concerns were taken into consideration during the project route selection process. Mitigation measures for perceived health effects related to EMF will include:

- On-going engagement to provide increased familiarity with EMF, including EMF related to typical household exposures, the effect of distance on decreasing EMF levels, and information on actual risk from ELF EMF exposure.

Perceived health effects related to EMF exposure are at acceptable levels because:

- most of the occupied houses in the project area are outside of the 95 m distance from the right-of-way and located where magnetic fields from the transmission line are expected to be near background levels
- there is on-going community engagement to provide increased familiarity with EMF
- according to Health Canada (2020), precautions are not required for typical ELF EMF exposures from transmission lines, and
- self-rated health indicators in the Southern Manitoba health region (where transmission lines and other developments predominantly occur) are similar to or better than provincial and national rates as shown in Table 8-21.

8.4.3.4.2 Tranquility

8.4.3.4.2.1Noise complains and annoyance

Project-related noise is expected to be temporary and intermittent since construction activities will be limited to daytime hours, most transmission line activities will only last 7 to 10 days at any one tower location and maintenance activities will be infrequent and temporary. Proximity to residences and sensitive receptors was considered during the transmission line routing process. The selected route will still intersect with urban/rural residential areas, with 20 occupied homes being located within 500 m of the final preferred route. Mitigation measures for noise emissions will include the following:

- Construction activities will be conducted in accordance with noise bylaws.
- Noise complaints will be monitored, and additional mitigation will be enacted if greater than 5 complaints are received.
- Landowners in the vicinity of where implosives are to be used for the splicing of conductors or when blasting is required during the installation of tower footings will be notified.

8.4.3.4.2.2Visual impacts

Visual quality considerations were factored into the selection of the final route. Manitoba Hydro will continue to work with a range of interested parties (residents, interested parties, and provincial government agencies as applicable) in development of the proposed line with the goal to reduce potential visual concerns. Based on concerns raised during the engagement process, Manitoba Hydro has committed to plant trees to reduce visual and noise concerns at one landowner's home adjacent to the D83W project.

Given the existing landscape character class in the project area (rural/pastoral with distinguishable development), the visual impact from the project is small.

8.4.3.5 Characterizing residual effects

Given the application of the above-described mitigation measures, the project is expected to result in low magnitude of stress and annoyance. The overall effect of the D83W project on community well-being is outlined in Table 8-24 and summarized as follows:

- Direction: Adverse
- Magnitude: Small
- Geographic extent: Local
- Duration: Medium to long-term
- Frequency: Sporadic/Intermittent
- Reversibility: Reversible after decommissioning of project

Table 8-24: Residual environmental effects for community well-being

	Residual environmental effects characterization					
Project phase	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Stress from perceived health effect from EMF						
Construction	N	-	-	-	-	-
Operations and Maintenance	A	S	L	LT	R/C	R
Noise complaints and annoyance						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	MT	R/C	R
Visual impacts						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LT	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.4.3.6 Follow-up and monitoring

Manitoba Hydro's practice is to develop project-specific environmental protection plans where mitigation measures are stipulated for construction, operation, and maintenance activities. These measures are regularly reviewed for their effectiveness as part of a process of adaptive management in project monitoring and follow-up.

Manitoba Hydro has provided and will continue to provide project information to relevant agencies and organizations as required and requested.

Potential follow-up will be through construction inspection. Inspection will determine whether the item or activity is in conformance with mitigation requirements.

8.4.4 Cumulative effects

This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on community well-being.

The residual project effects identified for community well-being include stress from perceived health effects related to EMF and change to tranquility (due to noise complaints and annoyance and visual impacts) (see Table 8-2-4 above). The potential interactions between the residual effects identified for the proposed D83W project and similar residual effects for other projects are identified in Table 8-25.

The proposed D83W project occurs in a region where native ecology has been substantially changed because of human development. Much of the original native land has been converted to agricultural lands, such that agriculture is the dominant land use in the project area. The RAA occurs in a broader regional area with a lot of distinguishable development. There are industrial sites west of Portage la Prairie, the TransCanada highway is south of the final preferred route, there are other transmission lines and stations within the RAA, and there are other major developments identified in Table 8-25. These past projects and disturbances to the original landscape have the potential to act cumulatively with residual effects identified for community well-being for the proposed D83W project.

In addition to past projects, residual effects for the proposed D83W project have the potential to act cumulatively with future planned projects (Table 8-25). These future projects have the potential to act cumulatively with residual effects identified for community well-being for the proposed D83W project.

Table 8-25: Potential cumulative effects for community well-being

Other past and foreseeable future projects	Stress from perceived health effects from EMF	Noise complaints and annoyance	Visual impacts
Existing/ongoing projects and activities			
Agriculture	-	✓	-
Domestic Resource Use Activities	-	-	-
Recreational activities	-	-	-
Infrastructure	✓	✓	✓
Water Treatment/Lagoons	-	-	-
Industrial and Processing Development/Facilities	-	-	-
Foreseeable future projects			
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	-	✓	-
BP6/7 Transmission Project	✓	✓	✓
Wash'ake Mayzoon Station Project	✓	✓	✓
RM of Cartier Rural Water Pipelines	-	✓	-
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	-	✓	-
Poplar Bluff Industrial Park Expansion	-	✓	-

8.4.4.1 Cumulative effects assessment for stress from perceived health effects related to electric and magnetic fields

Past projects identified near the proposed D83W project that have the potential to act cumulatively to affect stress from perceived health effects related to EMF will be limited to electrical transmission lines and stations in the RAA. These include the BP6/BP7 transmission line (between Brandon and Portage la Prairie), the Bipole III transmission line (from Gillam in northern Manitoba to the RM of Springfield), the Poplar Bluff transmission line (between an existing transmission line to the Roquette pea processing plant in Portage la Prairie) and associated stations. Cumulative perceived health effects are of greatest concern to receptors close to the transmission lines and associated stations (500 m). Therefore, potential cumulative perceived effects would be of greatest concern for receptors who are close to both the D83W project and other past projects.

Besides the D83W project, future projects that have the potential to act cumulatively to affect stress from perceived health effects related to EMF include the Wash'ake Mayzoon Station, the approved and yet-to-built station at which the D83W project will terminate. Both future projects are part of Manitoba Hydro's Portage Area Capacity Enhancement Project. Cumulative effects for stress from perceived health effects are of greatest concern to receptors who are close to the transmission line and associated station (500 m). Therefore, potential cumulative effects would be of greatest concern for receptors who are close to both the D83W project and the Wash'ake Mayzoon Station.

8.4.4.1.1 Mitigation for cumulative effects for stress from perceived health effects related to electric and magnetic fields

Implementation of the mitigation measures described in Section 8.4.3.4.1 will reduce the effects of the D83W project on cumulative effects for stress from perceived health effects related to EMF. Proximity to residences and sensitive receptors were considered during the transmission line routing process for the different hydroelectric projects by Manitoba Hydro. Manitoba Hydro will work with government agencies and other stakeholders, where appropriate, to address cumulative effects for stress from perceived health effects related to EMF. Manitoba Hydro will also continue to monitor new studies related to perceived health effects from EMF.

8.4.4.1.2 Residual cumulative effects for stress from perceived health effects related to emf

The transmission projects listed in Table 8-25 may contribute to cumulative effects for stress from perceived health effects related to EMF. Based on consideration of proximity to residences during the routing process, on-going community engagement to provide increased familiarity with EMF, Health Canada's statement that precautions are not required for typical ELF EMF exposures from transmission lines (Health Canada, 2020), and health indicators for community well-being in the Southern Manitoba health region being similar to or better than provincial and national rates (Table 8-22), perceived health effects related to EMF exposure are small in magnitude and at acceptable levels.

8.4.4.2 Cumulative effects assessment for noise complaints and annoyance

Past projects identified near the proposed D83W project (Table 8-25) that have the potential to act cumulatively to affect noise complaints and annoyance include agricultural activities (such as cropping, livestock operations, aerial spraying, dairy and organic farming) and noise associated with current infrastructure (existing rail lines, provincial highways and roads, and operation and maintenance activities associated with existing transmission lines). Noise complaints and annoyance are expected to be of greatest concern when receptors are close to the noise source (500 m). Potential cumulative effects would be of greatest concern for receptors who are close to both the proposed D83W project and other existing and ongoing projects or activities.

Future projects identified near the proposed D83W project (Table 8-25) may have the potential to act cumulatively to affect noise complaints and annoyance. The potential for noise complaints and annoyance may be highest during the construction phase of future projects.

Noise complaints are of concern when receptors are close to the noise source (500 m). Therefore, potential cumulative effects are a concern for receptors who would be close to both the D83W project and other future projects with overlapping construction schedules.

8.4.4.2.1 Mitigation for noise complaints and annoyance

Implementation of the mitigation measures described in Section 8.4.3.4 will reduce the effects of the D83W project on cumulative effects for noise complaints and annoyance. Other proponents may adopt mitigation measures to mitigate their own project effects. Manitoba Hydro will work with government agencies and other stakeholders, where appropriate, to address cumulative effects related to noise.

8.4.4.2.2 Residual cumulative effects for noise complaints and annoyance

The projects listed in Table 8-25 may contribute to a change in noise complaints and annoyance. The cumulative effects from these projects for noise complaints and annoyance will be experienced primarily near areas with overlapping construction, until the end of construction. Residents and others within 500 m of the proposed D83W project and within 500 m of other existing and future projects are most likely to experience the cumulative effects that result in noise complaints and annoyance.

There are multiple existing projects within 500 m of the D83W project; however, all but one future project (i.e., the Wash'ake Mayzoon Station in the RM of Portage la Prairie) are greater than 1.5 km from the D83W project. Therefore, cumulative effects from construction noise will be limited to the proposed D83W project and Wash'ake Mayzoon Station. Cumulative effects for noise complaints and annoyance are small in magnitude, short-term in duration and reversible.

8.4.4.3 Cumulative effects assessment for visual impacts

8.4.4.3.1 Past projects

Past projects identified close to the proposed D83W project (Table 8-25) that have the greatest potential to act cumulatively to cause a visual impact include current infrastructure such as existing rail lines, provincial highways and roads, and transmission lines. Although agricultural activities have also resulted in a large change to the original landscape, agricultural land provides views of open spaces and rural landscapes and may be visually appealing (Benson 2008; Fleischer and Tsur 2000). Existing industrial and processing development/facilities are not within the foreground view (within 500 m) of the D83W project, with the nearest existing project (the Roquette Pea Processing Facility) being greater than 3 km from the proposed D83W project.

8.4.4.3.2 Future projects

Future projects (Table 8-25) that have the potential to cause a cumulative visual impact include those close (especially those within the foreground view of 500 m) to the D83W project. This includes the Wash'ake Mayzoon Station.

Other future projects are located greater than 1.5 km from the proposed D83W project and are not considered to cause cumulative visual impacts. Cumulative effects for visual impacts are small in magnitude, long-term in duration and reversible.

8.4.4.3.3 Mitigation for visual impacts

Implementation of the mitigation measures described in Section 8.4.3.4 will reduce visual impacts from the D83W project. Other proponents may adopt mitigation measures to mitigate their own project effects. Manitoba Hydro will work with government agencies and other stakeholders, where appropriate, to address cumulative visual impacts.

8.4.4.3.4 Residual cumulative effects for visual impacts

Past and future projects listed in Table 8-25 within the foreground view of the proposed D83W project will have the greatest contribution to a cumulative change in visual impacts. These include past linear development projects and the proposed 230-66kV Wash'ake Mayzoon Station. The effects of these projects are anticipated to act cumulatively with the D83W project residual effects primarily through the presence of "permanent" structures. These visual impacts will be reversible upon decommissioning of these structures.

8.4.4.4 Summary of cumulative effects on community well-being

Cumulative effects for change in stress from perceived health effects related to EMF will be limited to past and future electrical transmission lines and stations in the RAA. Landowner concerns were taken into consideration during the project route selection process for each of these projects. Based on on-going community engagement to provide increased familiarity with EMF, Health Canada's statement that precautions are not required for typical ELF EMF exposures from transmission lines (Health Canada, 2020), and current indicators for community well-being in the Southern Manitoba health region being similar to or better than provincial and national rates (Table 8-22), perceived health effects related to EMF exposure are considered to be at acceptable levels.

Noise complaints and annoyance are expected to be of greatest concern when receptors are close to the source of noise (with 500 m). Therefore, potential cumulative effects would be of greatest concern for receptors who are close to both the D83W project and other past and future projects. The cumulative effects from future projects will primarily be experienced during overlapping construction phases. It is anticipated that other proponents will adopt measures to mitigate their own project effects, including consideration of sensitive receptors during site location and limiting construction and other noisy activities to daytime hours. Project-related cumulative effects to noise complaints and annoyance are expected to be negligible to small in magnitude, primarily short term (mostly during construction) and reversible.

Cumulative visual impacts are expected to be of greatest concern where past and future projects are within the foreground view of receptors (500 m). Therefore, potential cumulative effects would be of greatest concern for receptors who are close to both the proposed D83W project and other past and future projects. The existing landscape character class in the project area is rural/pastoral with distinguishable development. Cumulative visual impacts were considered during the routing process to minimize the change in visual cumulative effect from the D83W project. The cumulative visual impacts are small in magnitude and reversible upon decommissioning of the projects.

Table 8-26 summarizes cumulative effects on community well-being due to the Dorsey to Wash'ake Mayzoon transmission line, existing and future projects.

Table 8-26: Cumulative environmental effects for community well-being

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Stress from perceived health effects from EMF						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LT	R/C	R
Noise complaints and annoyance						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	MT	R/C	R
Visual impacts						
Construction	A	S	L	ST	R/C	R
Operations and Maintenance	A	S	L	LT	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.4.5 Sensitivity to future climate change scenarios

Climate change scenarios are not expected to affect a change in EMF, noise or visual quality that will change significance determinations for community well-being in this assessment.

8.5 Property and services

Property and Services was selected as a valued component because of the importance of these aspects to communities and property owners. The subdivision of river lots from the proposed D83W project which can affect property value was a key land-related issue raised during the project's public engagement. Concerns related to the potential interference of the proposed transmission line with internet service were also raised by landowners

Property and services were represented by:

- Property
  - land tenure, property ownership and property value
  - conflict with land development potential
- Interference with internet service

8.5.1 Scope

8.5.1.1 Spatial boundaries

The spatial boundaries (i.e., PDA, LAA, and RAA) for the environmental assessment of the D83W project's effects on property, infrastructure and services are described below.

PDA: footprint of the proposed D83W, including the tower footprints and the 60 m right-of-way and any additional areas such as staging areas (Map 8-1).

LAA: consists of a 1 km buffer around the transmission line right-of-way (500 m from centreline on either side of the right-of-way) and other project components (Map 8-2). This covers an area that generally will encompass the basic field management unit commonly used, the quarter section, or an area of land 800 m × 800 m.

RAA: The regional assessment area includes the project study area identified on Map 8-2. This includes portions of the RM of Woodlands, Rosser, St. François Xavier, Cartier, and Portage la Prairie. The project study areas, or regional assessment area, represents the region that encompasses the communities within which changes in socioeconomic parameters attributable to project effects on economic opportunities might occur.

8.5.1.2 Temporal boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years;

- Operations and maintenance – for the life of the project, estimated to be a 75-year design life; and
- Decommissioning – two years.

8.5.2 Existing conditions

Most land along the proposed transmission line route are divided using the section-township-range system, however in the RM of St. François Xavier, the proposed transmission line route, for a portion, traverses river lots, which were derived from the long lot river land-use survey system.

The dominant land use traversed by the proposed D83W project is agriculture. Publicly owned parcels of land are scattered throughout the RAA and are used for a range of purposes including municipal infrastructure, cemeteries, landfills, and lagoons.

Crown land within the RAA is located along the Portage Diversion in the RM of Portage la Prairie. The proposed D83W project traverses the Portage Diversion and will therefore cross Crown land.

Throughout the RAA, there are various local parks and recreation areas and opportunities within the RM of Rosser, Woodlands, St. François Xavier, Cartier, and Portage la Prairie. See Section 7.3.4. for a description of the various parks and recreation areas. The proposed D83W project does not affect any parks or recreation areas.

As mentioned in Section 7.3.4, within the RAA, there is one Wildlife Management Areas (WMA), two provincial parks and portion of a community pasture. The proposed D83W project does not traverse any provincially or federally protected areas.

Infrastructure within the RAA, includes several provincial trunk highways (PTHs), provincial roads (PRs), railways, transmission lines, underground pipelines, licensed airstrips and runways, communication facilities, municipal water and solid waste disposal facilities and flood protection area. Much of rural Manitoba has internet service provided by companies such as Xplornet and Bell MTS. Internet services are continually being added, upgraded, and improved with additional towers being placed to service additional rural areas.

The City of Portage la Prairie is serviced by both larger internet companies (i.e., Shaw, Bell MTS) and smaller internet companies (Xplornet, CIKTelecom, MapleWIFI, CommStream).

8.5.3 Effects assessment

8.5.3.1 Significance thresholds

A residual effect on property, infrastructure and services is considered significant if the project results in an effect that remains after mitigation is implemented. Currently there are no specific government thresholds (criteria) that are available for residual effects on property and services, however Manitoba Hydro will implement their compensation policies if landowners incur damages.

8.5.3.2 Project interactions

The D83W project activities that will interact with property and services (Table 6-2) include:

Construction

- Right-of-way clearing
- Marshalling/fly yards
- Transmission tower construction

Operations and Maintenance

- Transmission line presence
- Decommissioning

8.5.3.3 Effects pathways

The construction and operation of the proposed D83W project can potentially affect property including proximity to residences, damage to property, a decrease in the value of the property and sufficient compensation for land.

Another key issue raised during public engagement for the project was the potential effects of the operation of the transmission line and potential nuisance (noise annoyance covered Section 8.4) and interference with internet services.

The assessment of a change in property and services focuses on the following effects:

- Property value
- Conflict with land development potential
- Interference with internet service

8.5.3.3.1 Property value

The physical presence of transmission line infrastructure could affect the value of residential property near the right-of-way. Factors that can influence property values include change in aesthetics; real or perceived nuisances and health risks; real or

perceived change in the use and enjoyment of the property; and distance from the property to the transmission line.

Literature is inconclusive on whether transmission lines affect property values. Some studies show a small, negative effect on property values immediately after construction that diminish over time and distance (Cowger et al., 1996; Jackson and Pitts, 2010; Headwaters Economics, 2012).

In a review of transmission line effects on housing prices, Bottemiller and Wolverton (2013) found a small, negative effect occurring when rights-of-way abut single-family homes. Effects on property values were more substantive for higher priced homes and negligible for average priced homes.

While transmission line easements were found to have a consistent small negative effect on the value of adjacent affected properties, the statistical significance of this finding has varied (Elliot Grover & Co. Ltd., 2008).

Effects on property value varied depending on the location and visibility of transmission towers to properties (Colwell 1990; Cowger et al., 1996; Bottemiller et al., 2000; Elliot Grover & Co. Ltd., 2008; Chalmers and Voorvart, 2009; Jackson and Pitts, 2010). Other studies have found no evidence that proximity to, or visibility of, high voltage transmission lines affect property values (Elliot Grover & Co. Ltd., 2008).

Manitoba Hydro conducted a property value-monitoring program in the Birds Hill and Lister Rapids areas in the RMs of East and West. St. Paul. The monitoring program was initiated in response to property owner concerns regarding the construction of the Dorsey-St. Vital 230 kV transmission line within an existing right-of-way. Real estate transactions for developed single-family residential properties within the monitoring area were tracked from January 1, 1992, to December 31, 2013 (Manitoba Hydro, 2014). The monitoring area was divided into:

- Adjacent – properties located immediately next to the transmission right-of-way without any other properties in between
- Nearby – properties located between the adjacent property and the next property line
- Other – all other property located within the project development area

The 2014 monitoring report noted that housing prices fluctuated within range of adjacent, nearby, and other properties (Manitoba Hydro, 2014).

The findings of an econometric analysis conducted for Manitoba Hydro by Prairie Research Associates (PRA) on the effect of transmission lines on residential property values were consistent with the existing literature. PRA found mixed evidence that transmission lines affect property values. Evidence that pointed to a negative effect

suggests that any effect is small and diminishes rapidly as distance to the transmission line increases. While the analysis indicates a small, negative correlation between transmission line proximity and assessed value, no such negative correlation occurs regarding sales price (Prairie Research Associates, 2015).

There is the potential for construction activities and operations and maintenance activities to affect river lots traversed by the proposed transmission line in RM of St. François Xavier. Concerns were raised during the public engagement program regarding the presence of the transmission line and potential interference and reduction in property value on these lands.

8.5.3.3.2 Conflict with land development potential

The development of a cleared right-of-way for the D83W project could reduce development potential due to the fragmentation of lots. The transmission line could also result in less interest in wanting to buy a lot or build a residence near the line, thus lowering the development potential of land or land nearby. These changes could influence development in localized areas adjacent to the project or potentially affect the location of future developments within the local assessment area.

8.5.3.3.3 Internet services

The operation of the proposed D83W project's 230 kV transmission line will generate radio noise that has the potential to interfere with radio frequency signals, received by electronic devices such as radios, televisions, cell phones and wireless internet (Manitoba Hydro, 2015). A study completed and included in the Manitoba Hydro Manitoba-Minnesota Transmission Project EIS report (Manitoba Hydro, 2015) identified that there would be no interaction with the frequency of radio noise produced by AC transmission lines and those frequencies used by FM radio, television, or cell phones.

Wireless internet operates at a frequency that is higher than AM or FM radio, from 2, 400 MHz (2.4 GHz) to 5,000 MHz (5 Ghz) depending on speed of the service. As a result of the study completed for the Manitoba Hydro Manitoba-Minnesota Transmission Project (Manitoba Hydro, 2015), it was determined that radio noise from an AC transmission lines does not overlap with the wireless internet signals used and as a result, does not affect wireless internet function near an AC transmission lines (Manitoba Hydro, 2015).

The D83W project will be designed and constructed to comply with Canadian Standards Association Standard CAN3-C108.3.1-M84. This standard limits worst-case radio interference levels to 53 dB at a distance of 15 m from the high voltage conductors (Canadian Standards Association 2010). The maximum radio interference

levels specified by Industry Canada as part of its spectrum management and telecommunications policy (Industry Canada 2001) will not be exceeded by the D83W project.

Manitoba Hydro generally does not anticipate there being any potential for adverse effects on internet service from D83W project development. Manitoba Hydro will attempt to resolve any interference problems traceable to the new lines. Interference complaints from the public will be investigated and repairs made as needed to resolve complaints.

8.5.3.4 Mitigation measures

8.5.3.4.1 Property value and land development

Transmission line routing considered the occurrence of homes within the right-of-way, proximity to homes and the number of proposed subdivisions potentially affected.

During construction, Manitoba Hydro will notify landowners, Indigenous communities and interested parties prior to construction start and will share information about planned construction activities.

On a case-by-case basis, a voluntary purchase can be considered for residences where the proximity of the transmission line on new right-of-way is within 75 m of the residence.

For private land parcels within the PDA for which access will be needed for right-of-way purposes, Manitoba Hydro will obtain an easement and pay lease payments based on current land values.

The effect of the D83W project activities can be reduced through scheduling and logistics planning (e.g., use of implosives during daytime hours during the week). Mitigation measures of potential project effects on property and land development include the following:

- Use existing rights-of way where possible to route the transmission line across river lots.
- A communication protocol will be developed to notify affected parties of implode conductor splicing.
- Construction, operation, and maintenance personnel will undertake activities in such a way to avoid affecting neighbouring properties, structures, or operations. In the unlikely event that a landowner incurs damages, they would be subject to compensation through Manitoba Hydro's existing compensation policies.

8.5.3.4.2 Internet service

Even though it has been determined that the D83W project will not interfere with the radio frequencies used by wireless internet, Manitoba Hydro will implement the required design standards and guidelines for the construction and operation of the proposed project.

8.5.3.5 Characterizing residual effects

The following outlines the residual effects on property and services after the implementation of the mitigation measures outlined above in Section 8.5.3.4

8.5.3.5.1 Property value

Transmission line routing for the D83W project considered interactions with residences and residential development, including areas designated for future urban and rural landscape development. The final preferred route's footprint also avoids existing schools, hospitals, and churches. While overlap between the proposed new right-of-way for the transmission line route and properties and residential communities was reduced through the routing process, it was not possible to avoid all private residences. Residences located within 100 m of the PDA have the highest potential to be affected by the D83W project due to their proximity to the right-of-way. No residences need to be relocated, however there are 6 residences located within 100 m from the edge of the right-of-way. There are 36 residences between 100 m and 400 m from the edge of the right-of-way.

Operation and maintenance activities have low potential for affecting property value. Research is inconclusive as to whether the presence or proximity to transmission lines adversely affects real estate values. Effects that have been observed tend to diminish with distance from the transmission line and disappear with time. In consideration of the low number of residences and private land parcels that could be affected, and mitigation options, the D83W project is anticipated to have a low effect on property values. To the extent that any effects occur on property values, they are anticipated to diminish over time and will be spatially limited to the LAA.

Given the implementation of the mitigation measures described above in Section 8.5.3.4, the residual effects on property and services outlined in Table 8-27 are as follows:

- Direction: Adverse
- Magnitude: Small/Moderate
- Geographic extent: Project Footprint
- Duration: Long term

- Frequency: Regular/continuous
- Reversibility: Reversible after decommissioning of project

Table 8-27 provides a summary of the residual environmental effects on property and services.

Table 8-27: Residual environmental effects on property and services

Project phase	Residual environmental effects characterization					
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Change in property (property value)						
Construction	A	S-M	PF	ST	R/C	R
Operations	A	S	LAA	MT	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.5.3.6 Follow-up and monitoring

Manitoba Hydro's practice is to develop project-specific environmental protection plans where mitigation measures are stipulated for construction, operation, and maintenance activities. These measures are regularly reviewed for their effectiveness as part of a process of adaptive management in project monitoring and follow-up.

Manitoba Hydro has provided and will continue to provide project information to relevant agencies and organizations as required and requested.

8.5.4 Cumulative effects

This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on property and services.

The D83W project's residual effects, described in Section 8.5.3.5, are likely to interact cumulatively with residual environmental effects of other physical activities, identified in this section.

8.5.4.1 Project residual effects and cumulative interactions

The residual D83W project effect identified for property and services is a change in property (i.e., property value).

The proposed D83W project occurs in a region that contains a broad range of agricultural land uses, industrial and residential development. As transmission lines, railways and provincial roads and highways are found in the RAA, the D83W project increases the cumulative interaction with these projects on the land.

Existing linear projects, such as transmission lines, railways, highways, and pipelines, as identified in Table 8-28, have resulted in effects to property through the permanent presence of linear structures on the land, interference with land development that result from construction activities using heavy machinery and equipment. Therefore, the D83W project residual effects identified for property and services have the potential to act cumulatively with the residual effects from past projects within the RAA.

In addition to existing projects, the residual effects for the D83W project have the potential to act cumulatively with future planned projects (Table 8-28). These future projects may also result in an effect to property value, land development as well as nuisance effects (noise annoyance).

Table 8-28: Potential cumulative effects on property and services for the D83W project and other existing and foreseeable future projects

	Potential cumulative effects
Other existing and future projects	Change in property (including nuisance)
Existing/ongoing projects and activities	
Agriculture	✓
Domestic Resource Use Activities	-
Recreational activities	-
Infrastructure	✓
Water Treatment/Lagoons	✓
Industrial and Processing Development/Facilities	✓
Foreseeable future projects	
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	✓
BP6/7 Transmission Project	✓
Wash'ake Mayzoon Station Project	✓
RM of Cartier Rural Water Pipelines	✓
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	✓
Poplar Bluff Industrial Park Expansion	✓

8.5.4.2 Cumulative effects assessment for change in property

The existing projects, listed above in Table 8-28, have the potential to act cumulatively with the D83W project with respect to property value and reduced land development potential due to fragmentation of parcels of land.

The presence of existing projects can also act cumulatively and result in less interest in purchasing land or lots near these projects lowering development potential in the RAA. Depending on how much noise is generated from each existing project, there is the potential for cumulative nuisance effects between existing projects and the D83W project to occur.

Future projects in the RAA (Table 8-28) have the potential to interact cumulatively with the D83W project if their plans include the development of facilities in areas of existing residences, residential development, including effects on property value. Cumulative effects arising from future activities have similar effects pathways as effects arising from the D83W project, including residential development (i.e., proximity) and property values (i.e., presence).

The nature and extent of cumulative effects will likely differ depending on the project. For example, pipelines have little visible infrastructure and thus could be expected to have less effects on property and land development than transmission lines. Highway infrastructure development can cause both positive and negative effects.

8.5.4.2.1 Mitigation for cumulative effects for change in property

The implementation of the mitigation measures identified above in Section 8.5.3.4 will reduce the proposed D83W project effects on residences and property. Application of similar mitigation for future project by other proponents would help to mitigate similar project effects that may result, reducing the potential for cumulative effects.

8.5.4.2.2 Residual cumulative effects for change in property

Existing projects (Table 8-28) have resulted in potential changes to property value and conflict with land development and may create nuisance effects because of their own development and operation. Developments that continue in the RAA will contribute to changes in property value and land development however the magnitude of the contribution will depend on the footprint of each new development in conjunction with the proposed D83W project and existing projects in the RAA.

Future projects that overlap spatially and temporarily with the D83W project can contribute to cumulative effect on land development potential. The cumulative effects in these areas may extend for a longer period or be of greater magnitude than with just the D83W project alone due to presence of multiple projects. However, the projects will affect a very small proportion of the developable land within the RAA and will not substantially alter overall land development patterns.

Potential effects associated with a change in property (e.g., property value) are primarily related to the operation and maintenance phase from the presence of infrastructure. Research is inconclusive as to whether the presence or proximity to transmission lines adversely affects real estate values. Effects that have been observed tend to diminish with distance from the transmission line and disappear with time. Therefore, effects on property value are anticipated to be low magnitude as a result of the D83W project in combination with other projects.

While the construction periods of some of the projects identified in Table 8-28 overlap with the D83W project (Table 6-4 Chapter 6.0), there is low likelihood that cumulative effects will occur at the same time for a prolonged period because linear development (water pipelines and transmission lines) construction activity generally occupies a particular area only for a relatively short period of time

The development of a cleared right-of-way for transmission lines could reduce development potential due to fragmentation of lots. Multiple projects near residential areas or existing residences also result in less interest in wanting to buy a lot or build a residence, thus lowering the development potential of land or land nearby. These changes could influence development in localized areas adjacent to the Projects or potentially affect the location of future developments within the RAA.

A summary of the characterization of the cumulative effects on change in property/development potential, is presented in Table 8-29. With the addition of D83W project effects and those of other projects, cumulative effects from the development of the required footprints for these infrastructure projects would be over the medium term and low-moderate in magnitude. D83W project's contribution to cumulative environmental effects is not anticipated to result in a change that widely disrupts continued residential land and property use or potential development overall within the RAA.

8.5.4.3 Summary of Cumulative Effects on Property and Services

The D83W project's contribution to property and services cumulative environmental effects are a result of conflict or disruption to residences and property for the medium term. Even with the identification of potential cumulative effects between the project and existing and future projects it is expected that a change or disruption to residential land and property use will be minimal

While D83W project will have a cumulative environmental effect, with the implementation of mitigation measures, cumulative effects are anticipated to be of low to moderate magnitude. Cumulative effects will be medium term to permanent, occurring on a continuous basis and are reversible upon decommissioning. Table 8-

29 provides a summary of residual cumulative environment effects for property and services.

Table 8-29: Summary of cumulative effects on property and services

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Change in property (including land development)						
Construction	A	S/M	RAA	MT	R/C	R
Operations and Maintenance	A	S/M	RAA	MT	R/C	R
See Table 6-3 for a detailed description of criteria definitions **Direction:** P: Positive; N: Neutral; A: Adverse **Magnitude:** S: Small; M: Moderate; L: Large **Geographic Extent:** PF: Project Footprint; L: Local; R: Regional	**Duration:** ST: Short-term; MT: Medium-term LT: Long-term **Frequency:** I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous			**Reversibility:** R: Reversible; IR: Irreversible		

8.5.5 Sensitivity to future climate change scenarios

Climate change is not anticipated to affect the residual property effects identified for property and services with the construction or operation of the D83W project.

8.6 Fish and fish habitat

Transmission line construction and operation has limited potential to affect aquatic habitat. This valued component is included to address the 15 stream crossings. Aquatic resources could also be negatively affected by spills, accidents, or herbicide application for vegetation control.

This assessment of fish and fish habitat focuses on surface-water quality and fish and fish habitat, with attention given to SOCC.

8.6.1 Scope

8.6.1.1 Spatial boundaries

The spatial boundaries for the environmental assessment consist of the project development area, local and regional assessment areas. Valued component specific details are described below:

PDA: Footprint of the proposed D83W project including the transmission line right-of-way, any additional areas such as borrow pits or marshalling yards and access road allowances (Map 8-1).

LAA: The local assessment area for stream crossings extends 100 m upstream and 300 m downstream from the closest point of the transmission line centreline to the river (Map 8-7), and 30 m up-bank from the high-water mark. The 30 m distance is listed in Table A-1 of the Canada Energy Regulator Filing Manual (Canada Energy Regulator 2020) and is recommended as an acceptable distance to protect the riparian area and to buffer effects that construction could have on fish and fish habitat (Alberta Environment and Sustainable Resource Development 2012).

The LAA represents the area where direct effects on fish and fish habitat would be most pronounced or identifiable.

The Government of Manitoba does not provide guidance on the spatial study area boundaries related to transmission line construction. Therefore, the boundaries for the D83W project were derived from the Alberta Code of Practice for Pipelines and Telecommunication Lines Crossing a Water Body (Alberta Environment 2001); (Alberta Environment and Sustainable Resource Development 2013). The Code of Practice guidelines establish an expected zone of impact for watercourse crossings. The zone of impact is the area of direct disturbance at the watercourse crossing site (i.e., the PDA) plus the area where 90% of the sediment potentially generated during construction would be deposited.

The RAA encompasses the boundaries of the Lower Assiniboine, Shoal Lake/Delta Marsh, and Whitemud River sub-watersheds (Map 8-7). The sub-watershed based RAA boundary was selected to encompass regional aquatic health.

The RAA is the area where any cumulative environmental effects for fish and fish habitat relevant to the D83W project are likely to occur. This includes portions of a watercourse or waterbody where the zone of influence of other projects within the watershed could interact with the project or where population effects could be seen.

8.6.1.2 Temporal Boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – two years

8.6.2 Existing conditions

As mentioned in Section 7.2.4, the D83W project is in the Assiniboine River watershed and the RAA includes the lower Assiniboine River, Shoal Lakes/Delta Marsh, and Whitemud River sub-watersheds (see Map 7-3).

The RAA is contained within the Prairie ecozone (Smith et al. 1998) and surface water hydrology is characterized by large, turbid rivers and streams along with many smaller rivers and creeks that drain the area in a north-easterly direction through the Nelson River drainage system, ultimately draining to the Hudson Bay. Many of the major watercourses in these ecozones have been modified or developed to some extent by hydropower, irrigation, flood protection or water management (Smith et al. 1998).

The hydrology of the Assiniboine River Basin is consistent with that of prairie river systems with large variability in annual stream flows with peaks occurring during the spring freshet and low flows during fall and winter (Genivar 2012).

The Water Quality Index (WQI) for the Assiniboine River, upstream of the RAA, was within categories of 'Fair' and 'Good', with total phosphorous typically responsible for driving down the WQI (AHCD n.d.).

The Assiniboine River and its tributaries have 65 species of fish (Cleator et. al. 2010), including many recreationally important species (Nelson and Franzin 2000). Section 7.2.4 provides more detail on the types of species found.

Fish habitat on the banks of most watercourses, north of the Assiniboine River and passing through the RAA, have been cleared of native vegetation cover. Agricultural activities, including cultivation, pasture, and hay production, occur to the waterline of many watercourses.

The riparian zones of watercourses within the route planning area are composed of grassland/rangeland (34%), cultivated (23%), forested (21%), water / wetland (18%) and developed (roads / urban – 4%) land cover types.

The proposed D83W transmission line traverses 15 streams. Table 7-3 in Section 7.2.4.4 provides a list of the streams crossings as well as the landcover classes (hectares) within the riparian area of each stream crossing.

In the RAA, three aquatic SOCC may be found. One species (Mapleleaf) is protected provincially and federally while the other two species (Chestnut Lamprey and Bigmouth Buffalo) are protected federally. Section 7.2.4 provides a description of the three aquatic SOCC.

8.6.3 Effects assessment

8.6.3.1 Significance thresholds

8.6.3.1.1 Fisheries Act (1985)

The federal *Fisheries Act* (1985) provides the basis for the protection of fish habitat. This is done through Fisheries and Oceans Canada's Fisheries Protection Policy Statement (Fisheries and Oceans Canada 2019), which explains the fish and fish habitat protection provisions of the Act and outlines how the department will implement these provisions.

The Act prohibits the harmful alteration, disruption or destruction of fish habitat and the deposition of deleterious substances.

8.6.3.1.2 Species at Risk Act (2002)

The federal SARA provides the basis for the protection of species at risk. 'Endangered,' 'Threatened,' and 'Species of Special Concern' fish species protected federally by the Act are listed in Schedule 1. The purpose of the Act is to protect wildlife species at risk and their critical habitat.

8.6.3.2 The Endangered Species and Ecosystem Act (2018)

Endangered species are protected provincially under *The Endangered Species and Ecosystems Act* (2018). The purposes of this Act are:

a) to ensure the protection and to enhance the survival of endangered and threatened species in the province

b) to enable the reintroduction of extirpated species into the province

c) to designate species as endangered, threatened, extinct or extirpated.

The Threatened, Endangered and Extirpated Species Regulation (M.R. 25/98) lists plants and wildlife considered threatened, endangered, and extirpated in the province. The mapleleaf (*Quadrula quadrula*) has been classified as Endangered under this regulation.

8.6.3.2.1 The Canadian Council of the Ministers of the Environment (1999) and The Water Protection Act (2005)

Surface-water quality is managed through federal guidelines and provincial standards, objectives, and guidelines. The Canadian Council of the Ministers of the Environment maintains guidelines for the protection of aquatic life for many water quality parameters. These guidelines are generally accepted in environmental assessment to mitigate project activities such that the guidelines (Canadian Council of Ministers of the Environment 2001) are not exceeded, where it is considered technically and economically feasible to do so. The water quality of watercourses in Manitoba is protected under *The Water Protection Act* (2005) through the Manitoba Water Quality Standards, Objectives, and Guidelines (Manitoba Water Stewardship 2011).

8.6.3.3 Project interactions

As outlined in Table 6-2 the D83W project activities that will interact with fish and fish habitat include:

Construction

- All vehicle and equipment use
- Right-of-way clearing
- Watercourse crossings
- Transmission tower construction

Operations and Maintenance

- Vehicle and equipment use
- Vegetation management
- Decommissioning

8.6.3.4 Effects pathway

Fisheries and Oceans Canada pathways of effects (DFO 2018) were used to determine potential effects to fish and fish habitat. Figure 8-3combines the two land-based activities relevant to the proposed project:

- Vegetation clearing
- Use of industrial equipment

There is no in-water work planned for the D83W project. The final preferred route will create fifteen water crossings where the project will interact with fish and fish habitat.

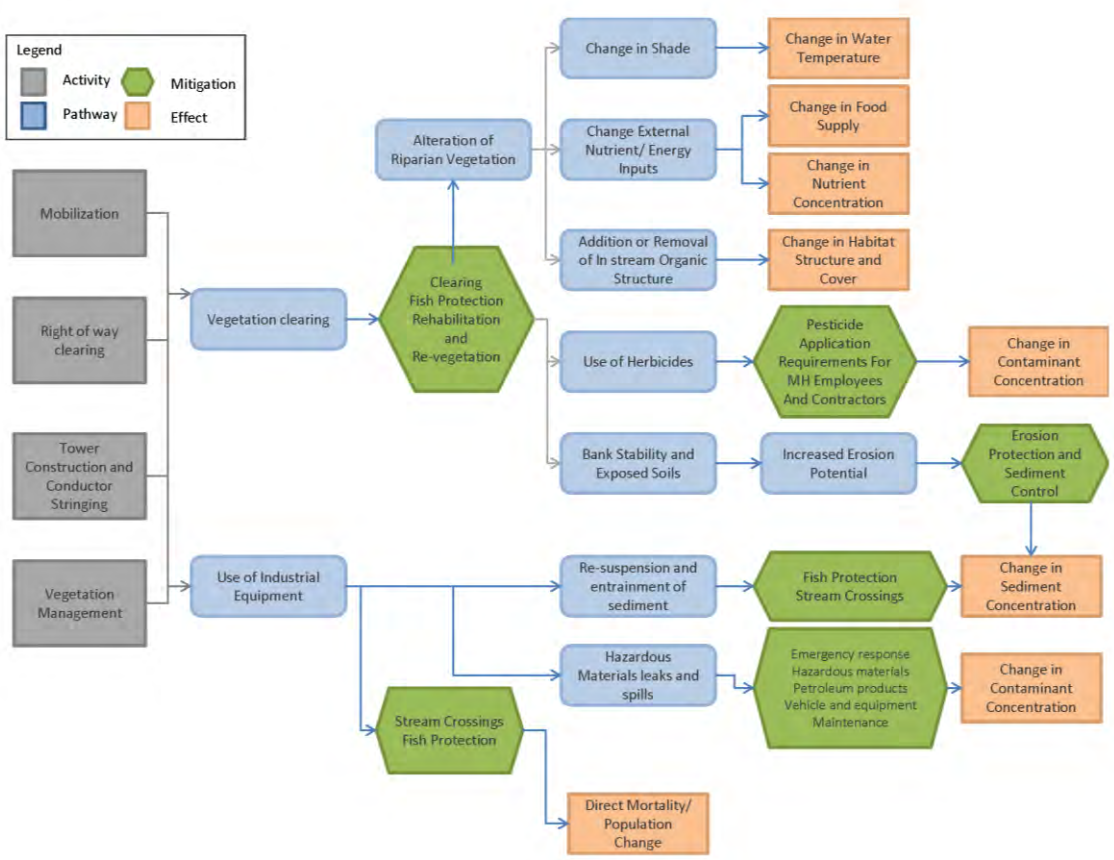


Figure 8-3: Pathways of effects for fish and fish habitat

8.6.3.4.1 Vegetation clearing

The right-of-way is cleared to accommodate the construction of the transmission line. Post-construction, trees and understory vegetation are cleared to allow for safe and reliable operation. Clearing requirements may also require selective clearing of danger trees beyond the right-of-way.

Clearing of riparian vegetation, particularly the tree canopy that overhangs watercourses, could reduce cover for fish, reduce shade, which moderates water temperature, and reduce habitat for insects, which can be a food source for fish (Manitoba Water Stewardship 2021); (Manitoba Riparian Health 2015). Increases in water temperature can diminish egg survival in species with lower thermal thresholds, as well as increasing fungal growth on eggs of summer spawning species (Carter 2005). Increases in water temperature can encourage the microbial breakdown of organic matter, leading to a depletion of dissolved oxygen in the watercourse, which is essential for sustaining aquatic life.

Low order stream communities in deciduous woodlands are energetically dependent upon litter materials (e.g. leaves and branches) contributed by riparian vegetation (Vannote, et al. 1980); (Benfield and Webster 1985); (Malmqvist and Oberle n.d.). Changes in litter inputs can have effects on invertebrate abundance, and in turn decrease food availability for fish.

The potential effects of tree clearing will decrease with increasing stream size. As stream size increases, the reduced importance of terrestrial organic input coincides with enhanced importance of primary production within the waterbody and organic transport from upstream (Vannote, et al. 1980).

The loss of riparian vegetation can also increase erosion and sedimentation, resulting in a change in substrate composition, and altering food supply through turbidity-related reductions in algae and aquatic insect production (Studinksi, et al. 2012). Increased siltation can also damage spawning grounds for species that require cobble substrate for spawning (Fudge, Wautier and Palace 2008). Increased turbidity can decrease light transmission through the water column, decreasing in-water vegetation growth, which is habitat for young fish.

High sediment concentrations may cause fish mortality because of heavy gill abrasion Herbert and Merkins, 1961; Robertson et al., 2006). At lower suspended sediment concentrations, the effects could include subtle behavioral changes in fish, such as avoidance reactions. These reactions could lead to higher energy expenditures by individual fish and affect territorial responses in some species (Newcombe and Jensen, 1996; Robertson et al., 2006). At higher sublethal concentrations, the introduction of fine suspended sediment, such as silts and clays that increase

turbidity, could induce effects such as reduced feeding efficiency, sense of smell, decreased visual acuity and predator/prey interactions (Newcombe and Jensen 1996). Silt and clay from erosion can carry contaminants such as pesticides into watercourses increasing fish exposure and causing harm to fish (increased mortality, reduced physiological function in adult fish and reduced egg survival (Levasseur, et al. 2006).

Increased sedimentation could also change the availability of invertebrates needed as food sources for fish (Suttle, et al. 2004); (Ramezani, et al. 2014). The reduced food source can affect fish mortality and health by reducing growth (Harvey, White and Nakamoto 2009); (Sullivan and Watzin 2010); (Kemp, et al. 2011).

Herbicide treatment, during operations, in areas close to water could result in accidental (through spills) or unintentional (through aerial drift or runoff) entry into watercourses. Once in a waterbody, herbicides can reduce photosynthesis or other processes in primary producers (e.g., algae, macrophytes), thereby reducing biomass and distribution.

Table 8-30 provides the land cover types at each of the fifteen water crossings. There will be no clearing requirements at any of the crossings, as there are no forested areas within 30 m of any of the water crossings.

Table 8-30: Landcover classes within the riparian area of each stream crossing

Site	Watercourse name	Existing land cover within the riparian PDA (hectares)			
		Agriculture	Developed	Grass / shrubs	Forested
1	Unnamed drain	0	0.17	0.88	0
2	Old Sturgeon Creek	0.24	0.12	0	0
3	Sturgeon Creek	0	0	0.51	0
4	Elkers Drain	13.17	5.034	0.76	0
5	Long Lake Drain	0.026	0	0.35	0
6	Long Lake Drain	0.17	0.0053	0.63	0
7	East Blind Channel	0.065	0	0.31	0
8	East Blind Channel	0	0.31	1.10	0
9	East Blind Channel	0	0.27	0.88	0
10	West Cram Creek	0.37	0.067	0	0
11	East Outside Drain	0.14	1.066	2.48	0
12	Portage Diversion	0	0	0.36	0
13	Unnamed Drain	0.71	0.99	0.41	0
14	Unnamed Drain	0.0084	0.16	0.20	0
15	Unnamed Creek	0	0.080	0.28	0
TOTALS		15	8	9	0

8.6.3.4.1.1Vegetation management

During operation and maintenance, the primary activity that could interact with fish and fish habitat is vegetation management within the transmission line right-of-way.

Riparian vegetation management and potential use of herbicides to control noxious or invasive riparian vegetation species could affect fish health and mortality if the chemicals were sprayed, rinsed, or carried by sediment into a watercourse. The pH of watercourses may also be altered if contaminated sediments are washed into the watercourse. A change in watercourse pH can affect fish mortality and health.

8.6.3.4.2 Use of industrial equipment

Machinery operating near watercourses can create ruts and compact soils, especially in saturated, floodplain areas next to watercourses. Compacted soils can channelize water flow, leading to less infiltration and greater soil erosion which can cause increased sedimentation in watercourses.

8.6.3.4.2.1Hazardous materials spills and leaks

Petroleum products such as gasoline and diesel fuels, oil, lubricants, and hydraulic fluids can leak from machinery, be released through maintenance and refuelling activities, and be released through accidental spills. If these situations occur close to a watercourse, these deleterious substances can enter a watercourse, and directly or indirectly affect aquatic organisms (including fish).

Many hydrocarbon products are persistent and will remain in sediments for long periods of time and accumulate in higher organisms in the aquatic food web.

During the operational phase of the D83W project, potential effects relate to herbicides entering the watercourse from vegetation management activities. The use of herbicides, if not applied according to label and pesticide use permit instructions, could lead to release of contaminants to adjacent waterways.

Effects from deleterious substances entering the watercourse can range from lethal to sub-lethal, depending on the volume, concentration, and the substance in question.

8.6.3.4.2.2Decommissioning

Project decommissioning will likely have a positive overall effect. At decommissioning, the right-of-way would be allowed to revegetate, thereby improving fish habitat overall. The effects of riparian clearing would be reversed, and the site would return to a somewhat natural state.

8.6.3.4.2.3Species at risk

Species at risk in the LAA include:

- Mapleleaf (*Quadrula quadrula*)
- Bigmouth Buffalo (*Ictiobus cyprinellus*)

In Manitoba, Mapleleaf are threatened by habitat loss and degradation and the effects of invasive species, particularly zebra mussel (COSEWIC 2016). Habitat changes associated with zebra mussels and modifications to the banks of the Assiniboine River (e.g., riprap and dikes) that alter the flow hydrology of these rivers are also threats (COSEWIC 2016).

Bigmouth Buffalo are secure in Manitoba; however, major threats include loss of / access to spawning / rearing habitat, and habitat fragmentation (Fisheries and Oceans Canada 2019), (COSEWIC 2009).

Threats to Chestnut Lamprey include; destruction of spawning habitat through soil erosion and concomitant siltation; eutrophication through runoff of fertilizers; and pesticide and herbicide pollution affecting both Chestnut Lamprey and its hosts (COSEWIC 2010).

Both species are found primarily in the Assiniboine River in the regional study area. The proposed route does not cross the Assiniboine River. It is unlikely that siltation in the tributaries would be enough to cause habitat alterations or direct physical effects to health therefore the project poses minimal risk to species at risk.

8.6.4 Mitigation measures

Selection of the final preferred route took a balanced approach to minimize overall project effects. In addition to routing, standard industry practices and avoidance measures, along with project-specific mitigation as summarized in Chapter 12 will be implemented during project construction and operation. This section highlights the key mitigation measures to be implemented during construction and operation to limit effects to riparian areas and riparian habitat, which will minimize potential effects to fish and fish habitat.

Application of proven and effective mitigation measures will be implemented as part of the project to avoid or minimize the environmental effects on fish and fish habitat. Project-specific mitigation measures with respect to aquatic resources will be outlined in detail in the construction environmental protection plan, which will form part of the construction contract. Mitigation will include, but not be limited to:

- Designation of a buffer zone, at least 30 m from the ordinary high-water mark (Figure 8-4), around all waterbodies, which limits riparian vegetation removal to trees and tall shrubs
- Designating machine-free zones, seven (7) m from the ordinary high-water mark, in riparian areas
- Marking sensitive areas prior to clearing
- Maintaining or promoting the growth of shrub species in riparian areas

- Keeping root systems intact during tree removal (thereby not disturbing the soil)
- Implementing erosion and sediment control measures where required for sensitive sites
- Training work crews in spill prevention
- Ensuring all petroleum and allied products will be handled in compliance with the requirements of Manitoba Regulation 188/2001
- Storing petroleum and other products more than 100 m from the ordinary highwater mark of watercourses
- Ensuring machinery is in good working order and free of leaks
- Having emergency spill kits on site
- Using only licensed applicators when herbicides are used
- Siting marshalling yards and borrow sites at least 30 m from watercourses to avoid interaction with fish and fish habitat.

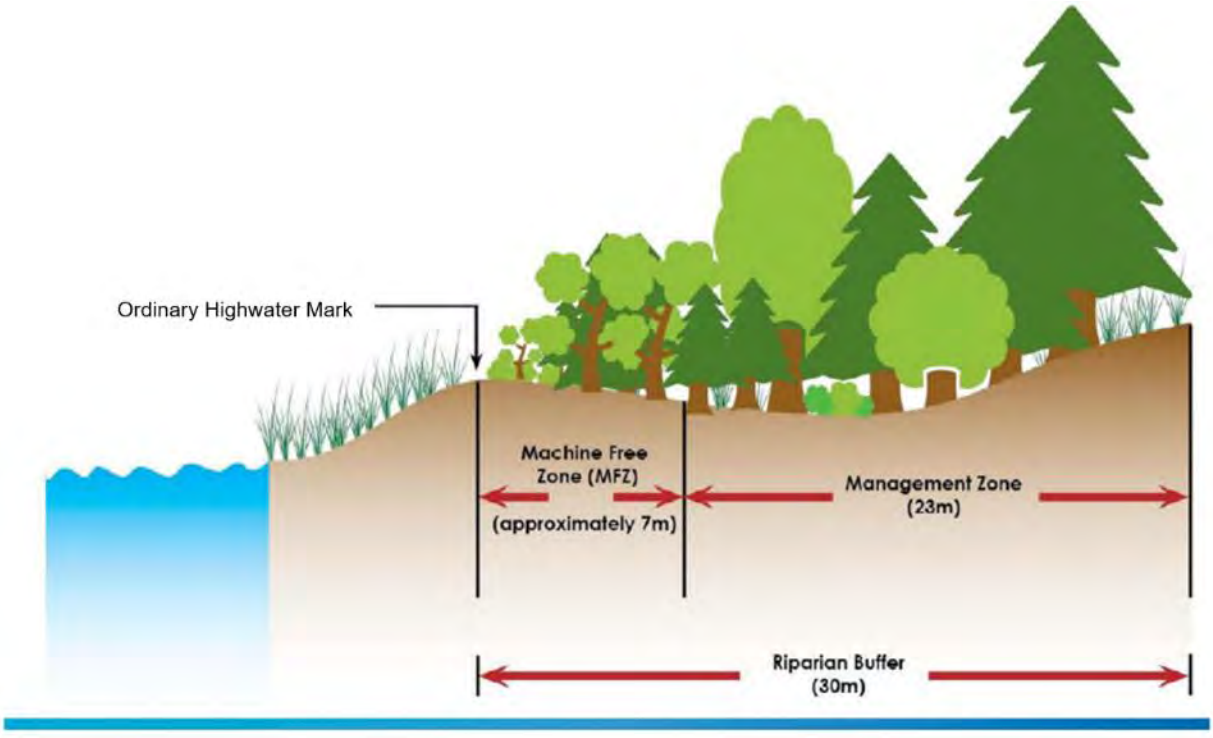


Figure 8-4: Riparian buffers and machine free zones

8.6.5 Characterizing residual effects

Table 6-2 describes the factors used to characterize the interactions among the project and fish and fish habitat.

Existing land use in the LAA can be characterized as disturbed, because it is largely dominated by agricultural development. Activities associated with this existing dominant land use can increase suspended sediments and sediment in the bedload of adjacent watercourses.

8.6.5.1 Vegetation management

Fish could have life processes affected by increased sedimentation, particularly sensitive early life stages.

Analysis of the potential change in percent coverage of riparian vegetation types is focused on land cover categories in which the D83W project will have the largest potential impact.

Development of the right-of-way involves the removal of trees (forested areas), whereas grasses and shrubs will not be cleared. Land cover within the riparian area was predominately agriculture, developed (roads) and grassland/ shrubland. At all waterbody crossings, there will be no requirement for clearing within the 30 m riparian buffer and therefore no change from the current land cover.

8.6.5.2 Use of industrial equipment

The effects of the use of industrial equipment relate to accidental spills which would alter water quality and cause direct harm and potentially death

8.6.5.3 Summary

This assessment considers residual effects on fish and fish habitat after mitigation is implemented. There will be no harmful alteration, disruption, or destruction of fish habitat. There is no net change in fish habitat availability because similar habitat is available within and beyond the LAA. For project effects on fish and fish habitat, the residual environmental effects have been characterized as follows:

- Direction: Adverse
- Magnitude: Small
- Geographic extent: Local
- Duration: Long term
- Frequency: Regular
- Reversibility: Permanent

Due to the lack of any riparian vegetation clearing required, and the well tested mitigation measures to minimize erosion potential, the residual effects for fish and fish habitat are not anticipated to be significant.

8.6.5.4 Follow-up and monitoring

Due to limited project interactions and well-established mitigation measures, monitoring related to fish and fish habitat concerns is not proposed for the D83W project. If significant damage is observed, remediation efforts will be implemented, and a monitoring plan developed to address concerns at each site. Protections for fish and fish habitat will be implemented as part of the environmental protection program.

8.6.6 Cumulative effects

This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on fish and fish habitat.

Table 6-5 lists the interactions between current and future projects/activities and fish and fish habitat. Three of these have potential interactions including agriculture, infrastructure, and water treatment lagoons. Ongoing agriculture, existing infrastructure, and existing lagoons all have the potential for deleterious inputs into adjacent waterbodies, decreasing water quality. However, these inputs have been ongoing for decades or more and therefore would be considered part of the baseline conditions.

The MMF (2022) reports changes (decrease) to fish populations and the habitat needed to support them. This speaks directly to previous development and the cumulative effects it has had on fish and fish habitat.

8.6.7 Sensitivity to future climate change scenarios

Effects of climate change on fish and fish habitat are expected to relate to the anticipated increase in temperature and associated extreme weather events (e.g., flooding). Resulting effects on fish and fish habitat in the RAA may result in substantial change, from increases in maximum water temperatures that could exceed the lethal threshold for some species-to-species shifts. Subtle changes in flow and temperature will alter thresholds of susceptibility; however, the predicted climate change scenarios would not change the significance determinations for fish and fish habitat, as they are not anticipated to measurably increase the magnitude of Project-related effects on fish habitat availability or fish health and mortality.

8.7 Vegetation

Within the RAA, most of the land has been previously disturbed and is currently under agricultural use. However, there are inclusions of deciduous forest, and wetland marsh, in the form of wooded areas on private property, shelterbelts or riparian areas along watercourses. Vegetation was chosen as a valued component for the following reasons:

- There is potential for the D83W project to interact with SOCC that may be found in the RAA, during construction and operation. Species of conservation concern already exist in low numbers and are listed either by the MCDC or COSEWIC and/or are protected provincially or federally through the ESEA and/or SARA.
- Through the First Nation and Métis engagement process, vegetation was identified as important for gathering and harvesting.
- Through the engagement process, the potential for interaction between the D83W project and shelterbelts during construction activities was identified. Shelterbelts were identified as being aesthetically important as a noise and wind barrier and visual barrier as well. In addition to aesthetic benefits, shelterbelts also provide important wildlife habitat for areas used for nesting, feeding, and breeding by many bird species, other animals, and species at risk.
- Concerns about potential project effects to protected lands was also raised during the engagement process.

8.7.1 Scope

8.7.1.1 Spatial boundaries

The spatial boundaries for the environmental assessment consist of the PDA, LAA and RAA. Valued component specific details are described below.

PDA: footprint of the proposed D83W project including the footprint of the station, the approach (access), including the tower footprints and the 60 m right-of-way and any additional areas such as staging areas (Map 8-1).

LAA: consists of a 1 km buffer around the transmission line right-of-way (500 m from centreline on either side of the right-of-way) and other project components (Map 8-8). The LAA covers an area that would generally encompass the basic field management unit commonly used, the quarter section, or an area of land 800 m × 800 m.

RAA: The RAA includes the project study area identified on Map 8-8. This includes portions of the RM of Woodlands, Rosser, St. François Xavier, Cartier and Portage la

Prairie. The project study areas, or regional assessment area, represents the region that encompasses the communities within which project effects on vegetation might occur.

8.7.1.2 Temporal boundaries

The temporal boundaries for the environmental assessment are based on the timing and duration of project phases:

- Construction – two years
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – two years

8.7.2 Existing conditions

The proposed D83W project is in the Prairies Ecozone, Lake Manitoba Plain Ecoregion and Portage, Winnipeg, Lundar, Gladstone and MacGregor Ecodistricts (Smith et. al) and within the Aspen-Oak Section of the Boreal Forest Region (Rowe 1959). This area is a transition zone between forest and prairie vegetation of west-central Canada. Information on vegetation species important to Métis people is found in Section 7.2.5

Within the RAA, 10 land use/land cover classes are identified from the Manitoba Land Cover Classification (Map 7-4). Table 7-5 shows the broad land use/ land cover types (Manitoba Conservation 2006) determined (calculated) for the assessment areas. These classes include native vegetation of range and grassland, deciduous forest, and marsh wetland. The water class includes rivers and streams. Agricultural fields, cultural features, and roads and rail lines are also identified.

More than 90% of the land in the RAA is used for agriculture, with the majority consisting of cropland. Less than five percent of the RAA consists of forested stands, and these are mainly in the northcentral portion of the RAA and along waterways. Less than 1% of the LAA is forested. Wetlands and waterbodies make up less than one percent of the RAA.

Vegetation community types delineated from field surveys conducted in June and July 2022 in the RAA include bur-oak-black ash/wild sarsaparilla; trembling aspen/tall shrub; green ash-Manitoba maple/tall shrub; riparian forest; marsh wetland; meadow wetland; prairie grassland and disturbed ground.

A detailed description of these vegetation community types is found in Section 7.2.5. The community types identified have the potential to provide habitat for several vegetation and animal and birds species.

Information on invasive and noxious plant species was collected by reviewing relevant legislation and sources identifying these species (e.g., Invasive Species Council of Manitoba; *The Noxious Weeds Act*). Forty vegetation species that are considered non-native or invasive were observed during vegetation surveys. Two of the species were also identified as being Tier 2 noxious weeds as per the *Noxious Weeds Act* and include leafy spurge and oxeye daisy. A list of all non-native and invasive species can be found in Section 7.2.5.

Three SOCC, common milkweed, cottonwood and basswood were observed on or adjacent to the final preferred route. These three species are ranked as vulnerable (S3S4 to S3S5) by the Manitoba Conservation Data Centre. No plant communities of conservation concern were identified in the PDA during surveys and no federally (SARA) or provincially (ESEA) protected species were identified along the final preferred route during surveys.

8.7.3 Effects assessment

8.7.3.1 Significance thresholds

8.7.3.1.1 Species at Risk Act (2002)

The federal SARA provides the basis for the protection of species at risk. 'Endangered,' 'Threatened,' and 'Species of Special Concern', protected federally by the Act are listed in Schedule 1. The purpose of the Act is to protect wildlife species at risk and their critical habitat.

8.7.3.1.2 The Endangered Species and Ecosystems Act (2018)

Endangered species are protected provincially under *The Endangered Species and Ecosystems Act* (1998). The purposes of this Act are:

a) to ensure the protection and to enhance the survival of endangered and threatened species in the province
b) to enable the reintroduction of extirpated species into the province
c) to designate species as endangered, threatened, extinct or extirpated.

8.7.3.1.3 Noxious Weeds Act

The Noxious Weeds Act of Manitoba requires by law that municipalities inspect, monitor and control (or destroy) noxious weeds within their borders. This is because noxious weeds pose a threat to the economy (i.e., agriculture), the environment (e.g., invasive species) and human and animal health (e.g., poisonous weeds) (RM of St. Andrews website 2022).

8.7.3.2 Project interactions

The D83W project activities that will interact with vegetation (Table 6-2) include:

Construction

- Right-of-way clearing
- Watercourse crossings
- Vehicle and equipment use
- Watercourse crossings
- Marshalling and fly yards
- Transmission tower construction

Operations and Maintenance

- Inspection patrols
- Vegetation management

8.7.3.3 Effects pathways

As outlined in Table 6-2 (Chapter 6), the D83W project is predicted to interact with vegetation during the project construction activities of right of way clearing, watercourse crossings, vehicle and equipment use and marshalling and fly-yards. The project is predicted to interact with natural vegetation during operation and maintenance activities of inspection patrols, and vegetation management.

The loss of natural vegetation and habitat in the region was identified as a concern within both the First Nation and Métis, and public engagement processes.

The loss of natural vegetation is a concern for maintaining biodiversity and wildlife habitat. Changes in plant community structure (e.g., loss of trees or shrubs) can also affect plant community composition and wildlife habitat suitability.

Most of the project footprint is in previously disturbed lands (agriculture); therefore, potential effects to natural vegetation and native vegetation cover classes are limited. However, effects to vegetation will occur during the clearing activities as part of construction, and during vegetation management activities once the project is in place. In addition, vegetation effects can also occur from soil compaction or dust during operation of vehicles or equipment.

Clearing within the right-of-way will remove all treed vegetation if present, contributing to potential direct wildlife mortality and habitat loss, specifically in areas of shelterbelts and wooded areas on private property and riparian vegetation along watercourse crossings. A total of 4 hectares will be cleared. Classification for other

portions of the project footprint (e.g., shrubland, grassland, pasture) will not be changed because of the project.

8.7.3.3.1 Protected Lands

Concerns about potential effects to protected lands was identified as a key issue during the engagement process. Currently, the final preferred route for the transmission line does not traverse any areas that are protected provincially or federally.

8.7.3.3.2 Shelterbelts/Treed Areas

Along the final preferred route, six treed areas and two shelterbelts will be affected by construction of the transmission line from clearing of the right-of-way. In addition to the potential loss of a portion of the treed areas and shelterbelts that provide valuable habitat for birds and plant species, the provision of wind erosion protection to soil, would also be affected by clearing of this vegetation.

8.7.3.3.3 Change in invasive/non-native species

Invasive plant species are a subset of weedy plant species that require control or eradication based on provincial or federal legislation. These species are of concern because they can cause economic losses, damage to native plant communities, or human illness or injury (Royer and Dickinson 1999). Clearing vegetation, e.g., shelterbelts or treed areas, can create soil disturbance, which can lead to colonization of the cleared areas by invasive or non-native weedy species that can outcompete native plant species and cause changes in vegetation distribution.

Tower installation and stringing conductors also have the potential to change vegetation distribution and for the spread of non-native/invasive plant species. During construction, the establishment and use of materials and equipment have the potential to spread non-native/invasive plants, create changes to vegetation distribution and loss of wetland vegetation.

Soil compaction due to the presence of the equipment and vehicles may affect natural vegetation through direct mortality of native plants, which may allow for the proliferation of non-native or invasive species. Soil contamination from spills/debris may cause direct mortality of natural vegetation, and allow for the colonization of affected areas by non-native or invasive plant species and changes in vegetation distribution.

Project activities associated with operation and maintenance including inspection patrols and vegetation management, and decommissioning will potentially interact

with natural vegetation. The presence of the D83W project has the potential for the spread of non-native/invasive plants. Vegetation management, which may include mowing, cutting and/or use of herbicides, may cause changes in vegetation distribution. Vegetation maintenance along the right-of- way may act as a barrier for the spread of native prairie plants from one side of the right-of-way to the other. Frequent mowing and cutting may affect slower growing native vegetation species and allow for the establishment of fast-growing non-native or invasive plant species. Use of herbicides may also allow for fast-growing invasive plants to outcompete native plants. Herbicides may get into adjacent ditches and wetlands, which could cause direct mortality and loss of wetland vegetation.

Project decommissioning at future date, would have a similar effect on vegetation as tower construction and stringing of conductors, including the potential to change vegetation distribution and for the spread of non-native/invasive plant species.

8.7.3.3.4 Change in rare plant species (including SAR) abundance and distribution

Rare plant species are vulnerable to disturbance and are protected by provincial and federal legislation. Threats to rare plant species include trampling, invasive plant species encroachment, soil compaction from vehicle use, and habitat loss (Henderson 2011). Loss of native vegetation areas is correlated with increases in the number of endangered species (Kerr and Deguise 2004) and is considered the greatest threat to endangered species in Canada (Venter, et al. 2006).

Some rare plants were identified in the RAA. Construction of the transmission line could change the abundance and distribution of rare plant species because of right-of-way clearing, vehicle and heavy equipment use, tower construction or vegetation management. Clearing within the right-of-way to remove treed vegetation and ongoing maintenance activities may result in the loss of some rare plants. Heavy equipment and vehicle use on access trails and temporary workspaces could remove or crush rare plant species or affect them through soil compaction and rutting. Tower construction requires the removal of vegetation at tower footprints and at foundation excavations at some locations. Vegetation management activities such as herbicide application or mowing could kill or remove rare plants. However, since the PDA mostly traverses previously developed lands, the potential for adverse effects to rare plants is limited.

8.7.3.3.5 Riparian Health

Disruption to riparian vegetation can come from various project activities such as clearing, construction and maintenance for the transmission line and construction activities for other project components. The lack of riparian vegetation along a river,

stream or shoreline can lead to the degradation of its banks and can result in further changes to the riparian zone and the species which it can support...

The proposed D83W project will not require the removal of any vegetation (clearing) adjacent to any of the watercourses or drainage ditches paralleled or traversed by the proposed transmission line (Table 7-3, Chapter 7). However, there is a potential for disturbance to ground vegetation, from equipment, during construction activities, specifically stringing of the transmission line.

8.7.3.4 Mitigation measures

The selection of the final preferred route took a balanced approach to minimize overall project effects. In addition to routing, standard industry practices and avoidance measures, along with project-specific mitigation will be implemented during project construction and operation. This section highlights the key mitigation measures to be implemented during construction and operation to limit effects to vegetation.

Application of proven and effective mitigation measures will be implemented as part of the D83W project to avoid or minimize the environmental effects on vegetation. Project- specific mitigation measures with respect to vegetation will be outlined in detail in the construction environmental protection plan, which will form part of the construction contract.

8.7.3.4.1 Shelterbelts and Treed Areas

- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed during right-of-way clearing.
- Minimize disturbance to shrub and herb layers in areas where tree clearing occurs to maintain habitat for plants and wildlife.
- Windrows of grubbed materials will be piled at least 15 m from standing timber.
- 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.
- Grubbing will be limited within the right-of-way to reduce root damage, except at tower foundation sites and centerline trail.
- 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.

- Non-herbicide methods such as hand cutting, mechanical cutting or winter shearing will be used to clear the transmission line right-of-way and other sites. If herbicides are required to control vegetation growth, such as noxious/invasive weeds during construction, all applicable permits, and provincial regulations (*The Noxious Weeds Act*) will be followed.
- Trees will be felled to avoid damaging standing trees. Trees will not be felled into waterbodies. Danger trees will be flagged or marked for removal using methods that do not damage soils and adjacent vegetation.
- Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the Access Management Plan (to be developed for the project as part of the environmental protection program).
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the Rehabilitation and Weed Management Plan (to be developed as part of the EPP).

8.7.3.4.2 Change in invasive/non-native species

- All equipment must arrive at the right-of-way or Project site clean and free of soil or vegetation debris.
- Using construction materials, such as gravel, from clean sources
- Weed control along access roads and trails, at temporary construction camps, marshalling yards and borrow sites will be conducted in accordance with the Rehabilitation and Weed Management Plan.
- Equipment will be cleaned before moving from locations with identified invasive weed infestation. Manitoba Hydro employees and contractors will follow the Biosecurity Management Plan to prevent the spread of invasive weeds.
- Where appropriate, regional native grass mixtures will be used to assist revegetation of disturbed areas to control erosion and prevent invasion of non-native species. The mixtures will not contain non-native or invasive species.

8.7.3.4.3 Change in rare plant species (including SAR) abundance / distribution

- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed during ROW clearing.
- Buffers and sensitive areas (where applicable) will be clearly marked with stakes and/or flagging tape prior to clearing.
- 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.

- Grubbing will be limited within the ROW to reduce root damage, except at tower foundation sites and centerline trail.
- Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the Access Management Plan (to be developed for the project as part of the environmental protection program).
- Protecting plant species at risk and critical habitat in accordance with provincial and federal legislation guidelines.
- If construction does not occur during winter, applying a buffer to mapped SOCC within the PDA. Setbacks and buffers along the right-of-way will be clearly identified by signage or flagging prior to construction, and signage or flagging will be maintained during construction to alert crews to the presence of the setback or buffer.
- Siting towers to avoid confirmed locations of SOCC, where possible.
- Contacting Manitoba Natural Resources and Northern Development if avoidance of listed rare plant species is not possible, to determine the most appropriate mitigation action

8.7.3.4.4 Riparian Health

- Rights-of-way will be cleared when the ground is frozen or dry to limit rutting and erosion where applicable. In situations where the ground is not dry or completely frozen, alternative methods, such as the use of construction mats, will be employed during ROW clearing.
- Contractors will be restricted to established roads and trails, and cleared construction areas in accordance with the Access Management Plan (to be developed for the project as part of the environmental protection program).
- Maintaining vehicles and equipment in designated areas located at least 100 m from the ordinary high-water mark of a waterbody or riparian area.
- Delineating natural low-growing shrub and grass vegetated buffer areas of 30 m or greater around riparian areas.

8.7.3.5 Characterizing residual effects

As discussed in Section 7.2.5, the majority of the proposed D83W project traverses agricultural land, and as a result, the clearing of natural vegetation will be minimal. Small areas of shelterbelts and private treed areas do occur along the proposed transmission line route and these vegetated areas will require clearing for the transmission line right-of-way (see Table 8-31).

Table 8-31: Vegetated areas that will be affected by the D83W project footprint

Location	Vegetated Area Description
NE6-12-1E	Planted shelterbelt
W6-12-1E	Planted shelterbelt
RL-201 to 214	Planted shelterbelt
N4-13-3W	Planted shelterbelt
RL-103-BP	Planted shelterbelt
SE17-12-6W	Planted shelterbelt
SE13-13-7W	Planted shelterbelt
NE22-12-7W	Trees in yard site
NE7-12-7W / NW8-12-7W	Remnant shelterbelt

Project construction and presence will affect a total land area of approximately 4 ha of shelterbelts and treed areas from the PDA. Most of the affected treed areas or shelterbelts provide noise, wind, and visual barriers, and in addition to these aesthetic benefits, shelterbelts also provide important wildlife habitat and are used for nesting, feeding, and breeding by many bird species, other animals and species at risk. Avoiding removing the shrub and herb during clearing will help to maintain habitat for plant and wildlife species.

While the effects on treed areas and shelterbelts at the RAA level will be negligible these effects may be more prominent at the individual landowner level. The removal of shelterbelts will be small and limited to the PDA. The reduction in shelterbelt area will be a single event and, as the right-of-way will remain clear during operations, this effect will remain for the duration of the D83W project.

Given the application of the above-outlined mitigation measures, the residual effects of the D83W project in terms of vegetation are summarized as follows:

- Direction: Adverse
- Magnitude: Small
- Geographic extent: Project Footprint
- Duration: Long term
- Frequency: Regular/continuous

- Reversibility: Reversible after decommissioning of project

Table 8-32 below provide a summary of the residual environmental effects on vegetation.

Table 8-32: Residual environmental effects on vegetation

Project phase	Residual environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Reduction in area of trees/shelterbelts						
Construction	A	S	PF	LT	R/C	R
Operations and Maintenance	A	S	PF	LT	R/C	R
See Table 6-3 for a detailed description of criteria definitions **Direction:** P: Positive; N: Neutral; A: Adverse **Magnitude:** S: Small; M: Moderate; L: Large **Geographic Extent:** PF: Project Footprint; L: Local; R: Regional	**Duration:** ST: Short-term; MT: Medium-term LT: Long-term **Frequency:** I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous			**Reversibility:** R: Reversible; IR: Irreversible		

8.7.3.6 Follow-up and monitoring

Manitoba Hydro's practice is to develop project-specific environmental protection plans where mitigation measures are stipulated for construction, operation, and maintenance activities. These measures are regularly reviewed for their effectiveness as part of a process of adaptive management in project monitoring and follow-up.

Manitoba Hydro has provided and will continue to provide project information to relevant agencies and organizations as required and requested.

Potential follow-up related to vegetation may involve pre- and post-construction monitoring of SOCC and noxious weeds. Inspection will determine whether the item or activity is in conformance with mitigation requirements.

8.7.4 Cumulative effects

This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on vegetation.

The D83W project's transmission line will largely be routed through agricultural land. However, along the proposed transmission line route there are areas of planted shelterbelts and private treed areas that represent different land use other than agriculture. This section discusses the cumulative effects of the residual effect due to loss of treed- and shelterbelt areas.

8.7.4.1 Project residual effects and cumulative interactions

The residual project effect identified for vegetation includes a reduction in shelterbelts and treed areas (see Table 8-32).

The proposed D83W project occurs in a region where native ecology has been substantially changed because of human development. Much of the original native land has been converted to agricultural lands with agriculture being the dominant land use in the RAA. Remnants of the natural landscape in the form of riparian areas or small treed areas remain scattered throughout the RAA.

Shelterbelts are planted for a variety of reasons including protection of yards, soil erosion control, wildlife habitat, and livestock protection, and can be found around farmyards, adjacent to roadsides, on property boundaries or around livestock facilities (Agriculture and Agri-Food Canada, 2010). Existing projects, such as linear (railway, highways pipelines etc.) as identified in Table 8-33 may have resulted in the reduction of shelterbelts particularly if they have been constructed across agricultural land or along mile and half mile lines. As a result, the residual effect of the reduction in shelterbelt and treed areas that is attributable to the D83W project has the potential to act cumulatively with the residual effects from existing as well as future planned projects within the RAA (Table 8-33).

Table 8-33: Potential cumulative effects on vegetation due to the D83W project and other existing and foreseeable future projects

	Potential cumulative effects
Other existing and foreseeable future projects	Reduction of shelterbelts and treed areas
Existing/ongoing projects and activities	
Agriculture	-
Domestic Resource Use Activities	-
Recreational activities	-
Infrastructure	✓
Water Treatment/Lagoons	✓
Industrial and Processing Development/Facilities	✓
Foreseeable future projects	
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	✓
BP6/7 Transmission Project	✓
Wash'ake Mayzoon Station Project	-
RM of Cartier Rural Water Pipelines	✓
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	-
Poplar Bluff Industrial Park Expansion	-

8.7.4.2 Cumulative effects assessment for a reduction in shelterbelts and treed areas

Existing projects

The existing projects listed in Table 6-4, have the potential to act cumulatively with the reduction in shelterbelts and treed areas identified for the D83W project, and include linear infrastructure projects such as railway lines, roads, transmission lines and pipelines. These types of projects have all or portions of their project development areas not returned to their pre-construction condition and therefore contribute to the loss of shelterbelts and treed areas in the RAA. Even though these existing projects in conjunction with the D83W project will act together cumulatively with respect to the reduction of areas that are treed or shelterbelts, overall the amount of treed areas and shelterbelts that will be lost cumulatively in the RAA, will not be substantial.

Future Projects

Besides the D83W project, future projects that have started or are starting in the foreseeable future include a hazardous waste depot, rural water pipelines, agricultural processing complex, industrial park expansion and a hydroelectric station. Of these foreseeable future projects, two projects have the potential to act cumulatively with the D83W project to cause a reduction in shelterbelts and or treed areas.

The hazardous waste depot in the RM of Rosser will be located at the existing transfer station in SW 30-12-1E. Even though the hazardous waste depot will be located at the existing transfer station, additional land is required for the expansion and as a result there is the potential for the treed perimeter of the site reduced to for the development's expansion.

The rural water pipeline expansion project proposed for the RM of Cartier will result in water lines being located throughout the municipality to supply potable water. While the water lines will largely be in road allowances, there is potential for the reduction of shelterbelts and private treed areas during construction, if the pipeline's footprint traverses such areas.

A review of current Google Earth imagery indicates that there are no shelterbelts or treed areas that will be affected by the development of the Azure Sustainable Fuels Corp. agricultural processing complex, the Poplar Bluff Industrial Park expansion, or the Wash'ake Mayzoon Station. Therefor these future projects will not act cumulative with the D83W project.

8.7.4.2.1 Mitigation for cumulative effects for a reduction in shelterbelts and treed areas

Implementation of the mitigation measures outlined in Section 8.7.3 will reduce the effects to shelterbelts, specifically a reduction in shelterbelts and treed areas due to their clearing for construction. A reduction in the potential cumulative effect from future projects can occur if other proponents implement mitigation that reduces or compensates for the reduction in shelterbelts and treed areas.

8.7.4.2.2 Residual cumulative effects for a reduction of shelterbelts and treed areas

Existing projects (Table 8-32) potentially caused a reduction in the area covered by shelterbelts and trees because of their development. However, the RAA is extensively developed, primarily for agriculture which currently covers about 112,042 ha or 81% while a much smaller area of 5,523.4 ha (4%) is covered by deciduous forest. Within the PDA, as per the land cover classification, only 1.9ha, (<1%) is considered forested.

The future projects proposed within the RAA (Table 8-32) have the potential to reduce areas of high forest sites including woodlots, shelterbelts, and private forestland during the construction phase. While the construction periods of other identified projects overlap with the D83W project, there is low likelihood of cumulative effects occurring. It is anticipated that there could be some cumulative overlap with the addition of the D83W project effects and those of other projects. Any potential for cumulative effects would be related to the amount of forested areas affected or removed by development. Given the renewable nature of the resource, activities would have limited additive interaction. The potential for cumulative interactions is limited as most of the future projects would largely avoid high value forest sites altogether.

A summary of the characterization of the cumulative effects on a reduction of shelterbelts and treed areas is presented in Table 8-33. The effects of a reduction in shelterbelts and treed areas can be mitigated through negotiation of appropriate compensation or re-establishment of vegetation (i.e., shelterbelts) in such areas where possible. With the addition of D83W project effects and those of other projects, cumulative effects from the development of the required footprints for these infrastructure projects on shelterbelts and private treed areas would be low in magnitude. D83W project's contribution to cumulative environmental effects is not anticipated to measurably result in a change that widely disrupts continued land use or degrades the quality of sites or present land use activities within the RAA that is not mitigated.

8.7.4.3 Summary of cumulative effects on vegetation

While the D83Wproject will have a cumulative environmental effect, with the implementation of mitigation measures, cumulative effects are anticipated to be of low magnitude and are anticipated to potentially occur throughout the RAA. Cumulative effects will be long-term (during the project's lifespan) occurring on a continuous basis but reversible after decommissioning.

The D83W project's contribution to cumulative environmental effects are a reduction in shelterbelts and treed areas in the long-term. The project's contribution to the cumulative environmental effects is not expected to change the quality of shelterbelts and private treed area in the RAA. Table 8-34 provides a summary on residual cumulative environmental effects on vegetation.

Table 8-34: Summary of cumulative effects on vegetation

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Reduction in shelterbelts and treed areas						
Construction	A	S	RAA	LT	R/C	R
Operations and Maintenance	A	S	RAA	LT	R/C	R
See Table 6-3 for a detailed description of criteria definitions **Direction:** P: Positive; N: Neutral; A: Adverse **Magnitude:** S: Small; M: Moderate; L: Large **Geographic Extent:** PF: Project Footprint; L: Local; R: Regional	**Duration:** ST: Short-term; MT: Medium-term LT: Long-term **Frequency:** I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous			**Reversibility:** R: Reversible; IR: Irreversible		

8.7.5 Sensitivity to future climate change scenarios

Projected climate change will not change the significance determinations for vegetation because the projected changes are not expected to measurably increase

the magnitude of D83W project effects on native vegetation, invasive species introduction, rare or traditional use plant species. Abundance and distribution of native cover classes, rare plants and traditional use plants will likely change, but the D83W project is anticipated to affect a small portion. Some invasive plant species may increase in abundance and established native cover will help reduce spread.

8.8 Wildlife and wildlife habitat

Wildlife in the D83W project area is a vital part of the ecosystem and environmental processes and was identified as important in the First Nation and Métis engagement program. Within the RAA, there is the potential for SOCC (i.e., birds) and there is the presence of important areas for wildlife, including Grant's Lake WMA and other waterbodies such as rivers and creeks. Just north of the RAA, large WMA's and environmental sensitive areas like the Delta Marsh WMA, an important bird area (IBA) which is home to many waterfowl and migratory bird species, can be found along the shores of Lake Manitoba. There is potential for the D83W project to create nuisance effects to wildlife and cause changes to wildlife habitat, wildlife mortality and wildlife disturbance as identified in concerns from the public engagement process.

8.8.1 Scope

8.8.1.1 Spatial Boundaries

The spatial boundaries for the environmental assessment consist of the PDA, LAA and RAA Valued component specific details are described below:

PDA: Footprint of the proposed D83W project including the transmission line right-of-way, any additional areas such as marshalling yards and access road allowances (Map 8-1).

LAA: The local assessment area is defined as 1 kilometer from either side of the project centreline (Map 8-8). Benitez-lopez et al. (Benitez-lopez, Alkemade and Verweij 2010) reported that most songbirds and waterbirds have lower abundances within 1 km of infrastructure.

It represents the area where indirect or secondary effects of construction and operation and maintenance are likely to be most pronounced or identifiable.

RAA: The RAA is defined as the project study area see on Map 8-8 and includes the project development area and local assessment area as well. The regional assessment area includes the project study area identified on Map 8-8. This includes portions of the RM of Woodlands, Rosser, St. François Xavier, Cartier, and Portage la Prairie. The RAA represents the region where potential changes in human health attributable to project effects might occur.

8.8.1.2 Temporal Boundaries

The primary temporal boundaries for the assessment are based on the timing and duration of project activities as follows:

- Construction – two years
- Operations and maintenance – for the life of the project, estimated to be a 75-year design life
- Decommissioning – two years

8.8.2 Existing conditions

The proposed D83W project is in the Prairies Ecozone, Lake Manitoba Plain Ecoregion and Portage, Winnipeg, Lundar, Gladstone and MacGregor Ecodistricts (Smith et. al) and within the Aspen-Oak Section of the Boreal Forest Region (Rowe 1959). This is a transition zone between forest and prairie vegetation of west-central Canada.

A description of the ecozone, ecoregion, ecodistricts and wildlife important to First Nation and Métis people can be found in Section 7.2.5.

Within the RAA, 10 land use/land cover classes are identified from the Manitoba Land Cover Classification (Map 7-4, Chapter 7). Table 7-5 (Chapter 7) shows the broad land use/ land cover types (Manitoba Conservation 2006) determined (calculated) for the assessment areas. These classes include native vegetation of range and grassland, deciduous forest, and marsh wetland. The water class includes rivers and streams. Agricultural fields, cultural features, and roads and rail lines are also identified.

More than 90% of the land in the RAA is used for agriculture, (more than 94% in the LAA and 85% in the PDA) with the majority consisting of cropland. Less than five percent of the RAA consists of forested stands, and these are mainly in the northcentral portion of the RAA and along waterways. Less than 1% of the LAA is forested. Wetlands and waterbodies make up less than one percent of the RAA.

The field surveys completed in June and July 2022 (see Section 7.2.5) delineated the following vegetation community types that can provide habitat for wildlife species:

- Bur-oak-black ash/wild sarsaparilla;
- Trembling aspen/tall shrub;
- Green ash-Manitoba maple/tall shrub;
- Riparian forest; marsh wetland; meadow wetland;
- Prairie grassland; and
- Disturbed ground

8.8.2.1 Amphibians and reptiles

Amphibians and reptiles are not typically found in intensively developed agricultural areas, and generally prefer natural habitats such wetlands, forests, and grasslands. Other than the few watercourses traversed by transmission lines and ditches adjacent

to the municipal roads, there is only marginal habitat for amphibians or reptiles in the RAA. During winter months, reptiles and amphibians are dormant and concentrated primarily in moist sites, specifically those located near or adjacent to watercourses and drainage ditches.

Amphibians with a reported distribution area which overlaps with the RAA include the mudpuppy (*Necturus maculosus*), western tiger salamander (*Ambystoma mavortium*), Canadian toad (*Anaxyrus hemiophrys*), gray treefrog (*Hyla versicolor*), Cope's gray treefrog (*Hyla chrysoscelis*), boreal chorus frog (*Pseudacris maculata*), wood frog (*Lithobates sylvaticus*), and northern leopard frog (*Lithobates pipiens*). No amphibians were incidentally observed during the mammal surveys conducted for the D83W project in the RAA.

Reptiles that may occur in the RAA include the snapping turtle (*Chelydra serpentina*), western painted turtle (*Chrysemys picta bellii*), red-bellied snake (*storeria occipitomaculata*), plains gartersnake (*Thamnophis radix*), red-sided gartersnake (*Thamnophis sirtalis parietalis*), and smooth green snake (*Opheodrys vernalis*). No reptiles were incidentally observed during the mammal surveys conducted for the D83W project in the RAA.

8.8.2.2 Birds

Suitable habitats for many bird species, including several of the SOCC may be found within the D83W project RAA. Grasslands provide habitat for many bird species, including Bobolink (*Dolichonyx oryzivorus*), Sprague's Pipit (*Anthus spragueii*), and Short-eared Owl (*Asio flammeus*). Native prairie is rare and unlikely to be found in the RAA. However, pastures, hay lands, and even no-till agricultural lands can support many grassland bird species. Forests, forest edges, and shelter belts within the RAA, provide suitable habitat for many bird species, including Olive-sided Flycatcher (*Contopus cooperi*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Eastern Wood Pewee (*Contopus virens*), and Whip-poor Will (*Antrostomus vociferus*).

Although most of the RAA is comprised of land under agricultural use, some forested areas remain, including riparian forest along the Assiniboine River, and deciduous stands and shelterbelts that are interspersed within the agricultural areas. Wetlands can be utilized as nesting and foraging habitat for many birds, including Yellow Rail (*Coturnicops noveboracensis*), Chimney Swift (*Chaetura pelagica*), and Barn Swallows (*Hirundo rustica*). Grant's Lake Wildlife Management Area (WMA), an important bird area (IBA) that is located within the RAA, is a marsh wetland which is important for supporting large populations of geese, ducks, and other wetland birds. The RAA also has riparian wetlands along the Assiniboine River and several smaller watercourses that can support wetland bird species.

Migration surveys were conducted in April 2022 and breeding bird surveys were conducted between June and July 2022. Thirty-three bird species were recorded during migration surveys and fifty-eight species during breeding bird surveys. A complete list of species observed during the migration and breeding bird surveys can be found in Section 7.2.6 and Appendix C.

Information on bird species important to Indigenous peoples (for hunting) was received through the First Nation and Métis engagement process (Chapter 5.0). Public engagement documents were also reviewed (Chapter 4.0).

8.8.2.3 Mammals

The proposed D83W project's PDA primarily occurs on private agricultural land in the Lower Assiniboine, Shoal Lake, Delta Marsh and La Salle River watersheds. These watersheds are known to support a variety of mammal species that are widespread across Manitoba in natural habitat areas including forests, grasslands, wetlands and have adapted to the agricultural land use that dominates the RAA. These species include eastern cottontail (*Sylvilagus floridanus*), eastern grey squirrel (*Sciurus carolinensis*), red squirrel (*Tamiasciurus hudsonicus*), raccoon (*Procyon lotor*), red fox *(Vulpes vulpes*), coyote (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), beaver (*Castor canadensis*), and woodchuck (*Marmota monax*).

Although there are areas of forests, grasslands, and wetlands in the RAA, large expanses of these habitats are not common in the LAA and PDA (Map 8-1 and 8-9 and Table 7-5. Shelterbelts and small treed areas on private lands are found sporadically along the PDA and can provide habitat for wildlife.

A mammal survey was conducted in August 2022, to record species observed and evidence of species (tracks) in the RAA. Eight mammal species were recorded, and a list of observations can be found in Section 7.2.6.

8.8.2.4 Species of conservation concern

Based on a review of provincial and federal databases and existing literature, a list of SOCC that may be found in the RAA are presented in Appendix D.

8.8.2.4.1 Birds

During the migration and breeding bird surveys, twelve SOCC were observed (Table 8-35). Of those twelve SOCC, only the rough-legged hawk was listed as an S2S3 (breeding) while the remaining 11 SOCC were S3 and/or S4 (breeding or migration). Four of the SOCC are listed federally (SARA) and include the barn swallow

(threatened), bobolink (threatened), eastern wood-pewee (special concern), and the red-headed woodpecker (threatened).

Table 8-35: List of SOCC found during migration and breeding bird surveys along the final preferred route

Survey Type	Species	Common Name	Count (#)	MBCDC Rank	SARA
Migration	*Buteo lagopus*	Rough-legged Hawk	6	S2S3B,S4M	-
Migration	*Limosa fedoa*	Marbled Godwit	5	S3S4B	-
Breeding	*Tringa semipalmata*	Willet	3	S3S4B	-
Breeding	*Icterus galbula*	Baltimore Oriole	3	S3S4B	-
Breeding	*Hirundo rustica*	Barn Swallow	26	S4B	Threatened
Breeding	*Dolichonyx oryzivorus*	Bobolink	11	S3S4B	Threatened
Breeding	*Contopus virens*	Eastern Wood-pewee	1	S3B	Special Concern
Breeding	*Eremophila alpestris*	Horned Lark	7	S3B	-
Breeding	*Stelgidopteryx serripennis*	Northern Rough-wing Swallow	6	S3S4B	-
Breeding	*Melanerpes erythrocephalus*	Red-headed Woodpecker	1	S3B	Threatened
Breeding	*Tyrannus verticalis*	Western Kingbird	2	S3S4B	--

Migration, Breeding	*Sturnella neglecta*	Western Meadowlark	67	S3S4B	

8.8.2.4.2 Mammals

One SOCC, American Badger (*Taxidea taxus*), was observed during the mammal survey. American Badger is listed as Special Concern under Schedule 1 of the SARA. The American Badger and its den were observed approximately 60 m north of the PDA (see Figure 7-18) and are not likely to be affected by the D83W project.

8.8.3 Effects assessment

8.8.3.1 Significance thresholds

Significant effects on wildlife and wildlife habitat are those that meet any of the following criteria (based on (Lynch-Stewart 2004):

- Threaten the long-term persistence or viability of wildlife populations, including any effects that would lead to species extinction, extirpation, or up-listing to special concern, threatened or endangered status
- Diminish the potential or prolong threats to species recovery, such as effects that are contrary to or inconsistent with the goals, objectives or activities of federal recovery strategies and action plans
- Diminish the capacity of critical habitat to provide for the recovery and survival of wildlife at risk

In addition to the above, any project activity that would violate one of the following acts / regulations would be considered significant.

8.8.3.2 Migratory Birds Convention Act (1994)

The *Migratory Birds Convention Act* protects migratory birds in Canada, including damaging nests, eggs and any part of the bird and includes the harassment of species.

8.8.3.3 Species at Risk Act (2002)

The federal SARA provides the basis for the protection of species at risk. 'Endangered,' 'Threatened,' and 'Species of Special Concern' wildlife and fish species protected federally by the Act are listed in Schedule 1. The purpose of the Act is to protect wildlife species at risk and their critical habitat.

8.8.3.4 The Endangered Species and Ecosystem Act (2018)

Endangered species are protected provincially under *The Endangered Species and Ecosystems Act* (2018). The purposes of this Act are:

d) to ensure the protection and to enhance the survival of endangered and threatened species in the province
e) to enable the reintroduction of extirpated species into the province
f) to designate species as endangered, threatened, extinct or extirpated.

8.8.3.5 Project interactions

The D83W project activities that will interact with wildlife and wildlife habitat (Table 6-2) include:

Construction

- Mobilization and staff presence
- Culvert installation/changes to driveways
- Vehicle and equipment use
- Right-of-way clearing
- River crossings
- Marshalling and fly yards
- Transmission tower construction
- Project wrap up and rehabilitation

Operations and Maintenance

- Transmission line presence
- Vehicle and equipment use
- Inspection patrols
- Vegetation management
- Decommissioning

8.8.3.6 Effects pathways

Project interactions with wildlife and wildlife habitat were determined based on a review of existing transmission projects, field studies conducted along the proposed D83W project transmission line, professional judgement and from concerns raised during the public and First Nation and Métis engagement programs. During public engagement, participants shared concerns about impacts to wildlife, including the potential removal of trees for the project including important shelterbelts, concern of transmission line impacts on birds, including geese, eagles, and migratory birds and it was indicated that the rivers and creeks in the project area have high

concentrations of birds and other wildlife. During the First Nation and Métis Engagement Process, participants shared concerns about impacts to land and wildlife, including the potential disruption to small pockets of vegetation and habitat remaining in the D83W project area and the removal of trees and traditional plants and medicines. Participants also shared that the rivers and creeks in the project area have high concentrations of breeding and migrating birds and other wildlife, and that the project area is a Métis harvesting area, with both Crown and private land in the project area used for practicing rights-based activities.

For the wildlife and wildlife habitat valued component, the subtopics that were examined further include: impacts to birds and other wildlife; impacts to wildlife habitat, habitat fragmentation, predator access and SOCC. The pathways of effect were considered for each subtopic and are outlined below.

The pathways for potential effects to birds and other wildlife species are:

- Impacts to wildlife habitat
  - Change in wildlife habitat availability
- Impacts to birds and other wildlife (including SOCC)
  - Change in mortality risk
  - Change in disturbance or annoyance

8.8.3.6.1 Impacts to wildlife habitat

The pathway of effect identified for impacts to wildlife habitat is a change in habitat availability.

The D83W project's proposed footprint is within a developed environment where much of the land has been modified for agriculture, transportation, and exurban development. Much of the original natural vegetation and wildlife habitat has already been converted to other land uses.

Right-of-way clearing is the primary construction activity that may result in a direct change in remaining wildlife habitat because it involves clearing of some shelterbelts and small patches of treed areas on private land and grubbing at transmission tower sites.

A 60-m wide right-of-way will be cleared for the D83W project's transmission line and there is potential for the removal of some trees in shelterbelts and wooded areas on private lands during clearing activities. Such removal of trees would convert the affected areas to open habitat which will be recolonized by new planted tree species, grasses, forbs, and/or shrubs.

Indirect effects from the D83W project, e.g., those effects that have the potential to reduce the effectiveness of the existing or remaining habitat (i.e., shelterbelts and private treed areas) for wildlife located within and possibly beyond the RAA, may also occur.

Indirect effects to wildlife and wildlife habitat from construction activities, include project-related sensory disturbance from mobilization, vehicle/equipment use, right of way clearing, marshalling yards, transmission tower construction, implodes, and helicopter use that may result in the temporary displacement of mammals and birds. Wildlife, including some SOCC, may also avoid otherwise suitable habitat during construction or inspection patrols and vegetation management during operation. Sensory disturbance could affect wildlife and wildlife habitat during all but one construction stage; no effects are anticipated due to project wrap up and leaving the site. Decommissioning of the project at a future date would also cause sensory disturbance.

8.8.3.6.2 Impacts to birds and other wildlife

8.8.3.6.2.1Change in mortality risk

Construction

Wildlife mortality could increase due to collisions of mammals, birds, or amphibians, including SOCC, with construction vehicles. During construction, some roads will experience increased volumes, particularly during peak periods of workforce movement (e.g., between shifts) and during peak periods of materials delivery. Changes in traffic levels are not expected to elevate mortality risk to wildlife inhabiting the area because the anticipated increase in traffic volume is within the normal variation of existing traffic volumes (see Property and Services in Section 8.5). Wildlife mortality pathways also include nest mortality during clearing of shelterbelts and/or private treed areas.

Behavioural changes related to increased activity, noise and nighttime illumination from construction may cause an indirect increase in mortality risk due to disturbance to wildlife, resulting in behavioural changes that may increase chances of predation. Small mammals or birds may move from cover (i.e., behavioural change) because of disturbance from noise and vibration, putting them at greater risk of predation and mortality from exposure (Habib, Bayne and Boutin 2007).

Construction activities may also displace wildlife species, including SOCC, into areas adjacent to the PDA that may contain lesser quality habitats depending on a species' habitat requirements and dispersal abilities. This displacement may result in

increased energy expenditure potentially reducing an individual's survival and reproduction (Powlesland 2009).

Right-of-way clearing (if required), access routes, transmission tower construction and conductor stringing in and around watercourse/drainage ditches will be managed in a manner that will protect vegetation within a 30-m buffer of these areas.

Operation and maintenance

Collisions with transmission lines are among the top causes of human-related bird mortality in Canada (Calvert, et al. 2013). Per the Avian Power Line Interaction Committee (2012), 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 behaviour (flocking, aerial courtship displays. Larger-bodied species can have difficulty performing evasive manoeuvres to avoid transmission lines and structures (Bevanger 1998).

The D83W project has the potential to increase bird-wire strikes; particularly where the transmission line is in or adjacent to watercourses (e.g., Portage Diversion, Sturgeon Creek) or in the path of species that frequent waterbodies in the RAA such as Grant's Lake WMA which concentrates large-bodied birds such as geese and ducks.

In areas where birds concentrate, transmission lines, particularly those located between roosting (i.e., resting), foraging, or breeding sites, can have higher collision risk for birds (Avian Power Line Interaction Committee 2012). In these areas, waterbirds, especially ducks and geese, are particularly vulnerable to collisions due to their daily movement patterns, which peak during low light periods around sunrise and sunset.

Bird-wire interactions are most associated with the shield wires, a narrow wire that runs above the conductors and serves to dissipate the effects of lightning strikes on transmission equipment (Scott, Roberts, and Cadbury 1972); (Faanes 1987) (Savereno, et al. 1996).

The D83W project's PDA parallels the Portage Diversion for approximately 3.2 km and then crosses the diversion in SE-17-12-7WPM. In addition to the Portage Diversion, the route crosses 15 other streams (Section 7.2.4). Such proximity of the PDA to the Portage Diversion and other streams could introduce an increased risk of bird-wire collisions.

Another pathway for increased mortality could be nest mortality during the removal of trees from shelterbelts and/or small patches of treed areas from equipment used during periodic vegetation management of the right-of-way. There is also the

potential that the presence of towers will increase perching structure availability for raptors, resulting in a possible increase in mortality risk to species that they prey on (Lammers and Collopy 2007).

The physical presence of the transmission line and vegetation management or inspection activities may have minor nuisance effects causing altered movements of wildlife near and across the right-of-way, during operation.

8.8.3.6.3 Change in disturbance/annoyance

Disturbance or annoyance effects to wildlife during construction and operation may reduce the effectiveness of existing or remaining habitat for wildlife. This may occur through sensory disturbances (e.g., noise) causing temporary displacement of some wildlife, including SOCC, from otherwise suitable habitat, during right-of- way clearing, mobilization of staff and equipment, transmission tower construction, and vegetation maintenance.

8.8.3.7 Mitigation Measures

Selection of the D83W project's final preferred route took a balanced approach to minimize overall project effects. In addition to routing, standard industry practices and avoidance measures, along with project-specific mitigation as summarized in Chapter 12 will be implemented during project construction and operation. This section highlights the key mitigation measures to be implemented during construction and operation to limit effects to wildlife and wildlife habitat, including SOCC.

Application of proven and effective mitigation measures will be implemented as part of the project to avoid or minimize the environmental effects on wildlife and wildlife habitat. Project-specific mitigation measures with respect to wildlife will be outlined in detail in the construction environmental protection plan, which will form part of the construction contract.

To address the potential for changes in habitat availability due to the D83W project, the following mitigation measures will be implemented:

- Wildlife features (i.e., stick nests) will be identified in CEnvPP and mitigation applied such as buffers and/or setbacks prior to clearing.
- Clearing activities will not be carried out during the reduced risk timing windows (see Appendix E) for wildlife species without additional mitigation measures such as pre-clearing nest searches.

- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the Access Management (to be created for the project).
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing.
- Trees containing large nests of sticks will be buffered left undisturbed until unoccupied.
- Natural low growing shrub and grass vegetated buffer areas of 30 m will be established around riparian zones.
- 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 or riparian area, unless approved by Manitoba Hydro Environmental Officer, where additional mitigations measures will apply.
- 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.
- Rehabilitation plans will include objectives for restoration of natural conditions, non-native and invasive plant species management, wildlife habitat restoration and restoration of aesthetic values as required.

To address the potential for change in mortality risk due to the D83W project, the following mitigation measures will be implemented:

- Installing bird diverters at designated environmentally sensitive sites to reduce the potential for bird collisions with wires
- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the Access Management Plan.
- Clearing activities will not be carried out during reduced risk timing windows for wildlife species without additional mitigation measures.
- Trees containing large nests of sticks will be buffered and left undisturbed until unoccupied.
- Hunting and harvesting of wildlife, or possession of firearms by Project staff will not be permitted while working on the Project sites.

To address the potential for change in disturbance or annoyance due to the D83W project, the following mitigation measures will be implemented:

- Wildlife features (i.e., stick nests) will be identified in CEnvPP and mitigation applied such as buffers and/or setbacks prior to clearing.

- Clearing activities will not be carried out during the reduced risk timing windows for wildlife species without additional mitigation measures such as pre-clearing nest searches.
- Construction activities will be restricted to established roads, trails and cleared construction areas in accordance with the Access Management (to be created for the project)
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing
- Trees containing large nests of sticks will be buffered and left undisturbed until unoccupied
- Natural low growing shrub and grass vegetated buffer areas of 30 m will be established around riparian zones.

8.8.3.8 Characterizing residual effects

The following outlines the residual effects on wildlife and wildlife habitat after the implementation of the mitigation measures outlined above in Section 8.8.3.4

8.8.3.8.1 Change in Habitat Availability (Shelterbelts and Private Treed Areas)

Construction

The final preferred route for the D83W project is mostly located on agricultural land and does not traverse designated or protected lands, reducing the potential for wildlife and wildlife habitat effects. Where the project does encounter natural habitat, such as shelterbelt or private treed areas, mitigation measures (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on wildlife and wildlife habitat.

Vegetation clearing along parts of the right-of-way will be carried out in the winter to reduce effects on wildlife and wildlife habitat. A reduction in vegetation (i.e., shelterbelts and treed areas) will result in a direct, long-term change in wildlife habitat. However, the overall amount of shelterbelts and treed areas that will be reduced is minimal in size compared to the amount of shelterbelts and treed areas that occur throughout the RAA.

8.8.3.8.2 Bird Mortality from Wire Collisions

Operations and Maintenance

During operation, mortality risk to wildlife is expected to increase due to the presence of overhead transmission lines that present a collision hazard to birds, particularly in and near areas where birds congregate (e.g., Assiniboine River,

Portage Diversion, Grant's Lake WMA). The incremental change in mortality risk due to the D83W project can be mitigated by adding bird flight diverters to overhead wires at high collision risk sites like stream crossings and the Portage Diversion. Applying bird diverters to shield wires has been shown to reduce bird mortality rates by 50% to 80% (Jenkins et al. 2010; APLIC 2012).

Overall, the residual effects for operation-related change in mortality risk for wildlife are expected to be low in magnitude. Along the final preferred route and in the LAA, most of the land is under agricultural use but in the RAA, there are rivers, streams and open water wetlands, that have the have the potential to concentrate birds. Where sensitive areas occur in the PDA and LAA, e.g., stream crossings and Portage Diversion, bird diverters will be installed to reduce collision risk for birds. Bird diverters (e.g., swan flight diverters, bird flight diverters) have been proven effective at reducing bird mortality risk on other transmission line projects in Manitoba (e.g., Wuskwatim, Bipole III, MMTP), North America and other parts of the world (APLIC 2012).

8.8.3.8.3 Sensory disturbance (Noise)

Operations

Residual operation-related effects on wildlife habitat are associated with sensory disturbance from equipment used during right-of-way vegetation management. Sensory disturbance from vegetation management equipment will be intermittent over the lifetime of the D83W project. This disturbance may temporarily reduce the effectiveness of habitat by causing some species to avoid the right-of-way and adjacent areas during maintenance activities.

8.8.3.9 Characterizing residual effects

As discussed in the existing environmental chapter (Section 7.2.5) the majority of the proposed Dorsey to Wash'ake Mayzoon transmission project traverses agricultural land and as a result clearing of natural vegetation that can be considered prime wildlife habitat is minimal. However, there are small areas of shelterbelts and private treed area along the proposed transmission line route that will require clearing for installation of the transmission line.

Project construction will affect approximately 4 ha of shelterbelts/treed areas (Section 8.7.2.5). While these shelterbelts act as wind and erosion control on agricultural fields they also provide habitat for wildlife species. However, the removal of the 4 ha of shelterbelts along the FPR is small in comparison to the total amount of shelterbelts and treed areas that can be found in the RAA and therefore the effect to the effect on shelterbelts at the RAA level will be small but may be more prominent at the

individual wildlife population is considered small in magnitude and limited to the PDA.

During operation of the proposed D83W transmission line, mortality risk to birds is expected to increase due to the presence of overhead transmission lines particularly in and near areas where birds congregate (e.g., Assiniboine River, Portage Diversion, Grant's Lake WMA). However strategic locations of bird diverters have been suggested and reduce the potential for bird-wire collisions. The residual effects for operation-related change in mortality risk for wildlife are expected to be small in magnitude and reversible upon decommissioning of the project.

Sensory disturbances and annoyance (noise) can occur during operations as a result of the use of equipment during vegetation management which can temporarily displace wildlife along the FPR. However, vegetation management will only occur periodically throughout the life of the project and as a result is anticipated to be small in magnitude, contained to the FPR and reversible once the project is decommissioned. Since the residual effect of sensory disturbance will only cause potential temporary displacement of wildlife, long-term effects on wildlife species/populations are not anticipated.

Given the application of the above-described mitigation measures the residual effects of bird mortality from wire collisions and a reduction in habitat availability are summarized as follows (Table 8-36):

- Direction: Adverse
- Magnitude: Small
- Geographic extent: Project footprint
- Duration: Long term
- Frequency: Regular/Continuous (Bird collisions and reduction in habitat); Sporadic/Intermittent for Sensory Disturbance)
- Reversibility: Reversible

Table 8-36: Residual environmental effects on wildlife and wildlife habitat

Project phase	Residual environmental effects characterization					
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Reduction in habitat availability (shelterbelts and private treed areas)						
Construction	A	S	PF	MT	R/C	R
Operations and Maintenance	A	S	PF	MT	R/C	R
Bird Mortality from Wire Collisions						
Operations and Maintenance	A	S	PF	MT	R/C	R
Sensory Disturbance and Annoyance (Noise)						
Operations	A	S	PF	MT	S/I	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

With the implementation of mitigation measures, residual effects from the project on wildlife and wildlife habitat are anticipated to be of small magnitude.

8.8.3.10 Follow-up and monitoring

Due to limited project interactions and well-established wildlife and wildlife habitat protections and mitigation measures, wildlife monitoring is not proposed for the D83W project. If significant wildlife habitat damage is observed, remediation efforts will be implemented, and a monitoring plan developed to address concerns at each

site. Protections for wildlife habitat will be implemented as part of the environmental protection program.

The environmental protection program is a framework for implementation, management, monitoring and evaluation of protection activities in keeping with environmental effects identified in environmental assessments, regulatory requirements, and public expectation. It prescribes measures and practices to avoid and reduce adverse environmental effects on wildlife habitat (e.g., wildlife reduced risk timing windows, setbacks, and buffers for sensitive habitat).

8.8.4 Cumulative Effects

This section discusses the cumulative effects of the D83W transmission project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on wildlife and wildlife habitat.

8.8.4.1 Project residual effects and cumulative interactions

Residual project effects on wildlife and wildlife habitat (i.e., change in habitat availability, mortality risk and sensory disturbance and annoyance) have the potential to act cumulatively with the effects from existing and reasonably foreseeable future projects. These potential interactions are listed in Table 8-37.

Within the RAA, the proposed D83W project traverses land that has been substantially altered by agriculture. Approximately more than 95% of the RAA consists of agriculture field and forage crops. Natural wildlife habitat found in the RAA, is forested areas, typical of woodlots, shelterbelts, riparian forests along watercourses make up approximately 4% of the land use in the RAA. Wetlands (marshes) comprise less than 1% of the RAA.

Some of the existing linear infrastructure projects (i.e., Bipole III) listed in Table 8-37 below have contributed to a change in wildlife habitat availability through the clearing of vegetation (i.e., shelterbelts and treed areas) within parts of the RAA. In addition, the development of wastewater lagoons and industrial/processing facilities also have the potential to contribute to a loss of vegetation (wildlife habitat) because of clearing of the land for their development. The dominant land use of agriculture also can contribute to a loss of wildlife habitat through the clearing of forested or treed areas for agricultural activities as well as recreation and domestic resource use.

Of the reasonably foreseeable future projects listed in Table 8-37, two projects (i.e., the RM of Rosser Transfer Station Hazardous Waste Depot and the RM of Cartier Water Pipelines) will have the potential to act cumulatively with the D83W project in the reduction of wildlife habitat, specifically shelterbelts and private treed areas. Both

projects would overlap in space and time with the D83W project, and may cause the removal of vegetation due to their development, affecting the amount of available wildlife habitat in the RAA.

Existing linear infrastructure projects (transmission lines) have contributed to a change in mortality risk for birds inhabiting the RAA through increased bird-wire collisions associated with the presence of transmission lines. Currently, the future projects proposed in the RAA are not transmission projects and will likely not act cumulatively with the D83W project with respect to bird-wire collisions.

Existing projects in the RAA such as agriculture, domestic resource use, recreation activities, industrial and processing facilities and future projects (agricultural processing plant and poplar bluff industrial park) have the potential to act cumulatively with the D83W project for the effect of sensory disturbance (noise) that can contribute to habitat avoidance by wildlife species including SOCC. Vehicles and equipment used during vegetation management could create noise that would result in wildlife species temporarily avoiding use of wildlife habitat such as shelterbelt and private treed areas. This residual effect from the D83W project can act cumulatively with noise generated from existing developments that generate noise (i.e., trucks, recreation vehicles, equipment) and with future projects that will create noise (i.e., construction vehicles and equipment and operations vehicles and equipment) since their regional areas and timing of construction and operations overlap.

Table 8-37: Potential cumulative effects on wildlife and wildlife habitat for the D83W project and other existing and foreseeable future projects

	Potential cumulative effects		
Other existing and foreseeable future projects	Bird mortality from wire collisions	Reduction in habitat availability (shelterbelts and private treed areas)	Sensory disturbance (noise)
Existing/ongoing projects and activities			
Agriculture	-	✓	✓
Domestic Resource Use Activities	-	✓	✓
Recreational activities	-	✓	✓
Infrastructure	✓	✓	✓

Water Treatment/Lagoons	-	✓	
Industrial and Processing Development/Facilities	-	✓	✓
Foreseeable future projects			
Rural Municipality of Rosser Transfer Station Hazardous Waste Depot	-	✓	✓
BP6/7 Transmission Project	✓	✓	✓
Wash'ake Mayzoon Station Project	-	-	-
RM of Cartier Rural Water Pipelines	-	✓	✓
RM of Portage la Prairie - Azure Sustainable Fuels Corp. Agricultural Processing Complex	-	-	✓
Poplar Bluff Industrial Park Expansion	-	-	P

8.8.4.2 Cumulative effects assessment for a reduction in habitat availability

Existing Projects

Existing projects that are listed in Table 8-36 and have the potential to act cumulatively with the reduction in wildlife habitat availability (shelterbelts and treed areas) identified for the D83W project include agriculture, domestic resources use, recreational activities, wastewater lagoons and industrial and processing facilities. These types of projects all have the potential for the reduction in wildlife habitat from land clearing for their use or developments. Treed areas in the RAA would have been cleared for agricultural activities, while domestic resources use can include harvesting of wood for personal use and cause a potential reduction of wildlife habitat. There is also the potential that wildlife habitat was lost during development of the land for the location of wastewater lagoons, industrial and processing facilities, and recreational activities (i.e., trails, parks) which can act cumulatively with the D83W Project.

Future Projects

The future RM of Rosser Hazardous Waste Transfer Station, the RM of Cartier Water Pipeline project and the BP6/7 Transmission Project have the potential to overlap spatially and temporally with the D83W project. These projects have the potential to contribute to a reduction in wildlife habitat because of their development, and act cumulatively with the small reduction of shelterbelts and/ treed areas due to the D83W project. Currently, the other future projects do not include the removal of shelterbelts or treed areas in their development plans.

8.8.4.2.1 Mitigation for cumulative effects for reduction in habitat availability

The implementation of the mitigation measures identified above in Section 8.8.3 will reduce the proposed D83W project's adverse effects on habitat availability. Application of similar mitigation for future projects by other proponents would help to mitigate similar project effects that may result, lessening the potential for cumulative effects.

8.1.4.2.2 Residual cumulative effects for reduction in habitat availability

Land clearing is one of the key factors affecting the availability of wildlife habitat in the RAA. Approximately more than 90% of the RAA has been modified by agriculture.

The reasonably foreseeable future projects and activities that are anticipated to contribute to changes in wildlife habitat availability (reduction in shelterbelts and treed areas) in the RAA, are the RM of Rosser hazardous Waste Transfer Station, the RM of Cartier rural water pipelines and the BP6/7 Transmission Project. However, these projects will have small contribution to a reduction in wildlife habitat due to the small area of their project footprints, the developments' occurring in agriculturally dominated landscapes that support a few or small patches of habitat and implementation of mitigation. Even though the D83W project will also contribute to the reduction of wildlife habitat, the amount of shelterbelts and treed areas being reduced is minimal in size and will not negatively affect wildlife populations in the RAA.

The cumulative effect for change in wildlife habitat availability is adverse as some habitat in the RAA will be reduced because of the D83W project and reasonably foreseeable future projects. However, the magnitude of this effect is small due to the location of these projects on lands previously developed for agriculture. Residual cumulative effects of change in habitat availability will be regular/continuous yet reversible upon the removal of infrastructure and rehabilitation of affected areas.

8.8.4.3 Cumulative Effects assessment for change in mortality risk – bird-wire collisions

Of the projects listed in Table 8-37 existing linear infrastructure (transmission lines) in the RAA and the future BP6/7 transmission project have the potential to act cumulatively with the D83W project with respect to bird-wire collisions.

8.8.4.3.1 Mitigation for cumulative effects for the change in mortality risk – bird-wire collisions

Mitigation for D83W project effects on change in mortality risk is presented in Section 8.8.3.7. Existing Manitoba Hydro projects in the RAA like the Bipole III Project and future BP6/7 Transmission Project had their routing and facilities designed to reduce potential effects on the environment, including environmentally sensitive sites that support wildlife and wildlife habitat. These projects identified timing windows, setbacks, buffers, and beneficial management practices in their CEnvPPs to reduce their footprint and associated effects on wildlife. The key mitigation measure that will be implemented to reduce the cumulative effect of the Bipole III Project and BP6/7 Transmission Project in combination with effects from the D83W transmission project include collision deterrent measures (i.e., bird flight diverters) to reduce the potential for collisions with wires following wire installation. For existing projects bird diverters were placed at environmentally sensitive sites and for the D83W project, bird diverter locations have been identified and will be implemented at stream crossings, the Portage diversion and other areas with the potential for increased bird-wire collisions.

8.8.4.3.2 Residual cumulative effects for the change in mortality risk – bird-wire collisions

Contributions of existing and future projects and the proposed D83W project to the change in mortality risk (bird-wire collisions) are small, as Manitoba Hydro's transmission line routing process considers sensitive wildlife habitats, including areas that concentrate wildlife such as wetlands and watercourse. Where these areas cannot be avoided, application of appropriate mitigation measures (e.g., bird flight diverters) will be applied.

The period when a change in wildlife mortality risk would be most evident is during the operation and maintenance phase. Due to the pathways of effects, wildlife most vulnerable to cumulative effects are birds. Presence of multiple transmission line projects would increase the mortality risk to birds, particularly in areas where bird activity is concentrated (e.g., Portage Diversion, stream crossings). Project routing and application of standard mitigation (e.g., bird flight diverters) are expected to

reduce potential increases in mortality risk to birds in these areas where effects overlap with the D83W project.

The cumulative effect for change in wildlife mortality risk is adverse as mortality risk will increase for some wildlife in areas of the RAA; however, the magnitude of this effect is low due to the location of most projects on previously modified wildlife habitat. Residual cumulative effects of change in wildlife mortality risk will be regular/continuous yet reversible upon the removal of infrastructure.

8.8.4.4 Cumulative effects assessment for sensory disturbance

All the existing projects listed in Table 8-37 above have the potential to act cumulatively with the D83W project with respect to sensory disturbance. For maintenance operations undertaken for existing infrastructure, like roads, transmission lines, and rail lines, the effects of noise from vehicles and equipment may cause some wildlife to temporarily avoid suitable habitats which can act cumulatively with the D83W project's sensory disturbance due to equipment use during vegetation management and inspection patrols. In addition to the existing projects, the future projects listed in Table 8-37 also have the potential to create sensory disturbance because of their operations and maintenance activities and therefore act cumulatively with the D83W project, potentially resulting in the temporary displacement of wildlife from available habitat. Due to the large amount of previously disturbed land in the RAA (agriculture) and the minor amount of sensory disturbance over relatively short periods, the potential temporary displacement of wildlife is anticipated to be minimal.

8.8.4.4.1 Mitigation for cumulative effects for sensory disturbance

Implementation of the mitigation measures outlined in Section 8.8.37 will reduce sensory disturbance to wildlife including species of conservation because of equipment use during inspection patrols and vegetation management operations. A reduction in the potential cumulative effect from future projects can occur if other proponents implement mitigation that reduces the reduction in sensory disturbance to wildlife.

8.8.4.4.2 Residual cumulative effects for sensory disturbance

Contributions of existing and future projects and the proposed D83W project to sensory disturbance causing a temporary displacement to wildlife are small but still a residual cumulative effect. The period when the cumulative effect of sensory disturbance to wildlife will occur is during the operation and maintenance phase of existing and future projects.

The cumulative effect for sensory disturbance to wildlife is adverse and the magnitude of this effect is low due to the location of most projects on previously modified wildlife habitat. Residual cumulative effects of sensory disturbance to wildlife will be regular/continuous yet reversible upon the removal of infrastructure.

8.8.4.5 Summary of cumulative effects on wildlife

In summary, the D83W project, in combination with other future projects, will have a small contribution to cumulative effects on wildlife and wildlife habitat (see Table 8-38). The transmission line routing process considered wildlife habitat availability (including WMAs and Assiniboine River crossing), and many of the future projects are in previously disturbed, modified wildlife habitats. The portion of shelterbelts and treed areas reduced is minimal compared to the total area covered by these habitats in the RAA. Like existing transmission projects, bird diverter locations have been identified for the D83W project and will be installed at sensitive locations for birds to reduce the potential for bird-wire collisions. In addition, sensory disturbance from operation and maintenance of existing, future and this Project is minimal and will displace wildlife temporarily. Sensory disturbance is not anticipated to have long term effects on wildlife in the RAA.

Table 8-38: Summary of cumulative effects on wildlife and wildlife habitat

Cumulative effect	Residual cumulative environmental effects characterization					
	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
Reduction in habitat availability (shelterbelts and private treed areas)						
Construction	A	S	RAA	LT	R/C	R
Operations and Maintenance	A	S	RAA	LT	R/C	R
Bird mortality from wire collisions						
Operations and Maintenance	A	S	RAA	LT	R/C	R
Sensory disturbance (noise)						
Operations	A	S	PF	LT	R/C	R

See Table 6-3 for a detailed description of criteria definitions

Direction: P: Positive; N: Neutral; A: Adverse

Magnitude: S: Small; M: Moderate; L: Large

Geographic Extent: PF: Project Footprint; L: Local; R: Regional

Duration: ST: Short-term; MT: Medium-term LT: Long-term

Frequency: I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous

Reversibility: R: Reversible; IR: Irreversible

8.8.5 Sensitivity to future climate change scenarios

The predicted climate change scenarios would not change the significance determinations for wildlife, as they are not anticipated to measurably increase the magnitude of effects of the D83w project on habitat availability, wildlife mortality or disturbance/annoyance to wildlife. Effects of future climate change scenarios on wildlife and wildlife habitat will directly relate to the anticipated increase in temperature and associated extreme weather events (e.g., flooding, fires) and may include change in habitat availability resulting from extreme weather events, reduced

food availability (e.g., shifts in the seasonal timing of insect emergence, rotting of food caches due to warmer temperatures) and shifts in species ranges.

Given the timelines associated with the predicted precipitation and temperature changes, wildlife will likely be able to overcome these challenges through shifts in ranges and the narrowing of the timing imbalance between wildlife breeding seasons (e.g., timing of egg laying, insect emergence, calving) that is already being observed (Both et al. 2006).

The predicted climate change scenarios would not change the significance determinations for wildlife, as they are not anticipated to measurably increase the magnitude of effects of the D83W project on habitat availability or wildlife mortality.

8.9 Harvesting and important sites

8.9.1 Introduction

The D83W project will be built in the Portage la Prairie area on Treaty 1 territory, the traditional territory of the ancestors of the Anishinaabe, Cree, Ojibwe-Cree, and Dakota peoples, and on the traditional homeland of the Red River Métis.

First Nations people have practiced their culture including hunting, fishing and gathering rights within these traditional territories for time immemorial. Alongside these nations, Métis Citizens have inhabited this region from "its earliest roots in the fur trade" and have rights, claims, and interests to much of these territories (Manitoba Métis Federation, Birtle MLUOS, 2017). Recognizing these enduring relationships that First Nations peoples and Métis Citizens have with land in the D83W project area, this chapter assesses the potential effects of the D83W project on traditional practices, culture, and heritage.

Through the First Nation and Métis Engagement Process (FNMEP; Chapter 5.0) Manitoba Hydro sought to understand what activities, practices, customs, and sites important to First Nations peoples and Métis Citizens occur historically and contemporarily within the D83W project area. Manitoba Hydro engaged with eight First Nations, the Manitoba Métis Federation (MMF), and the Portage Urban Indigenous Peoples Coalition (PUIPC) through the FNMEP. First Nations engaged included Brokenhead Ojibway Nation, Dakota Tipi First Nation, Dakota Plains Wahpeton Oyate, Long Plain First Nation, Peguis First Nation, Roseau River Anishinabe First Nation, Sandy Bay Ojibway First Nation and Swan Lake First Nation. This engagement provided insight into the potential impacts of the D83W project on traditional practices, including different aspects of harvesting and sites considered important in the Project area. See Chapter 5.0 for summaries of the engagement and discussions with each individual First Nation, the MMF and the PUIPC.

Traditional activities and practices included within this chapter reflect traditional activities and practices that the Courts have expressly recognized would potentially be constitutionally protected under section 35 of the Canadian *Constitution Act*, 1982. The authors of this effects assessment section did not try to distinguish whether activities, customs and practices shared by First Nations or the MMF met the test to be constitutionally protected. If an activity, practice, or custom was shared with Manitoba Hydro and understood to be important, it was considered relevant to this assessment.

To fully appreciate the cultural and historical context, please read the MMF's submissions of Manitoba Métis Knowledge, Land Use, and Occupancy Study for

Manitoba Hydro Portage Area Projects (2022) as well as other FNMEP submissions and detailed feedback found in Appendix B. Where appropriate and permitted, understandings from studies completed for previous transmission projects have been included in this chapter.

Manitoba Hydro sought feedback on this effects assessment section from Dakota Tipi First Nation, Long Plain First Nation, the MMF and Peguis First Nation prior to inclusion in the assessment. Manitoba Hydro has not received feedback to date.

8.9.2 Identification of valued components

Based on experience from past projects, feedback provided through the FNMEP, and existing literature, Manitoba Hydro identified two valued components and a collective effect that are directly related to matters considered important to rights-bearing communities and of cultural or heritage importance. This chapter section will assess effects of the D83W project on these valued components:

- Harvesting;
- Important Sites; and
- a collective effect titled Cultural Landscape included in response to feedback received through FNMEP regarding limitations in using existing assessment practices to measure effects on cultural well-being

The following sections, provide a more detailed explanation of each valued component and collective effect including its rationale for inclusion and its definition for the purposes of this assessment.

Manitoba Hydro acknowledges that there may be other chapters of this assessment report that are of relevance and interest to rights-bearing communities.

8.9.2.1 Harvesting

Manitoba Hydro chose to use Harvesting as a valued component because it can broadly capture the diverse ways by which different cultural groups practice harvesting activities. On past projects, the MMF has communicated concerns that assessments should consider Métis specific valued components with one of the MMF's suggested valued components being "Harvesting".

For the purposes of this assessment, Harvesting includes hunting, fishing, trapping and the gathering of plants (including wood). Harvesting includes the practice of harvesting, the resulting knowledge gained from taking part in harvesting, harvesting success, and the harvesting experience integral to distinct First Nation and Métis cultures. These are important traditional practices for many Indigenous people and

can be central to providing food and income for one's family, as well as the transfer of culture, traditions, and knowledge in the present and for future generations.

8.9.2.2 Important sites

The value and history of the Project area, the potential of the Project to encounter heritage resources, and having appropriate processes in place to respect heritage resources were raised as issues of high importance through the FNMEP. These topics inspired Manitoba Hydro to choose 'Important Sites' as a valued component for this assessment.

For the purposes of this assessment, 'Important Sites' are tangible and intangible sites considered important to First Nations peoples and Métis Citizens such as sites or objects of cultural, historical, spiritual and sacred importance; heritage sites as defined by Manitoba's *Heritage Resources Act*; and other sites such as unoccupied Crown land and land for Treaty Land Entitlement opportunities. In this assessment, 'Important Sites' are also thought to include the practice of ceremony and the places ceremony may occur.

It is important to note that although this valued component includes assessment of project effects on heritage resources as defined by the Province of Manitoba, the scope of the assessment for 'Important Sites' is far broader and considers effects to any sites understood to be important to First Nations peoples and Métis Citizens (such as unoccupied Crown land, TLE lands, and spaces for ceremony).

Under Manitoba's *Heritage Resources Act*, heritage resources are defined as "...a heritage site, a heritage object, and any work or assembly of works of nature or of human endeavor 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" (Government of Manitoba, 1986).

Heritage sites as defined by the *Heritage Resources Act* are recorded in a provincial registry and are managed by the Department of Sport, Culture and Heritage - Historic Resources Branch. This registry includes the following categories:

- Archaeological sites;
- Provincial sites;
- Municipal sites;
- Commemorative plaques; and
- Cemeteries

It should be noted that cultural sites, while not a specific category within the registry, can be captured within the archaeological site inventory and registered as an archaeological site (e.g., a culturally-modified tree such as a tree with prayer flags or a

tree formed into a lobstick) in order to record a site's heritage value. Heritage sites may also include intangible culture.

Beyond Manitoba's *Heritage Resources Act*, heritage value may be ascribed in other ways and differently across cultures. During FNMEP, Manitoba Hydro representatives heard that the way sites and intangible characteristics are described under the Heritage Resources Act can be too narrow. This chapter works to include those heritage values described through FNMEP in community-specific words and ways.

8.9.2.3 Cultural landscape

Through conversations during the FNMEP and through past projects, Manitoba Hydro came to understand that the Project area supports a cultural well-being component through linkages between place (place naming), activities and land use (harvesting, encampments), knowledge of the area (understandings, changes over time), and cultural context (stories, spirituality, ceremony). As such, Manitoba Hydro identified cultural landscape as a third more holistic systems-level valued component.

The definition for this valued component is not as concrete. A cultural landscape is both material and intangible, representing the interconnected relationship between everything and everyone with the view that people are deeply connected to everything and everyone around them. The cultural landscape in the D83W project area has served and continues to serve as an important travel way, harvesting area, teacher, home, and final resting place for ancestors. The intactness of the cultural landscape supports Anishinaabe, Métis, and Dakota specific worldviews, ontologies, histories, and practices. A more comprehensive description of Manitoba Hydro's understanding of cultural landscapes follows in Section 8.9.9.

8.9.3 Structure of the assessment

In this section, 'Harvesting and 'Important Sites' are assessed through the standard valued component assessment approach, while cultural landscape is being considered through a collective effects lens. See Chapter 6.3 for a discussion on collective effects.

On past projects, most recently the Wash'ake Mayzoon Station, the MMF shared that incorporating Métis specific interests, including valued components related to Métis rights and interests, in Project assessments is important to be able to assess the potential effects of projects on Métis rights, claims, and interests.

In this assessment, Manitoba Hydro has broken harvesting and important sites into three separate culturally-specific valued components and individually considered impacts from the perspectives of three cultural groups that participated in the

FNMEP: Anishinaabe, Dakota, and Métis. For each valued component, the Assessment of Impacts section is structured to include a general discussion on the effects pathways and general effects followed by three separate culturally-specific assessments, which demonstrate how different cultural groups may experience Project impacts uniquely. 'Cultural Landscapes' has not been broken into three separate culturally-specific discussions at this time. Manitoba Hydro remains open to working with interested communities to further develop representations that effectively reflect the story of connection each cultural group, or individual nation, has to the landscape around the D83W project.

While this section will focus on effects directly related to the construction, operation, and maintenance of the D83W project, we seek to acknowledge and characterize that this project is just one of many projects and activities that have changed the land in this area over the last 150 years. Through the FNMEP, some participants have informed Manitoba Hydro that understanding the cumulative effects to traditional pursuits supported by the land over a longer period of time than is typically considered within a project assessment is critical to characterize the D83W project impacts to First Nations peoples and Métis Citizens.

Manitoba Hydro also learned that individual projects may have impacts to the overall fabric of the land and to the relationship of people and the land, which is built on knowledge, history, feeling, identity, and experience on that land, that are not characterized through traditional environmental assessment approaches that focus on the assessment of individual valued components in isolation.

In response to this feedback, Manitoba Hydro expanded the scope of this effects assessment section to include a more robust assessment of cumulative effects and new step in the assessment of the D83W project: a collective effects assessment that considers system-level effects of the D83W project. It is through this collective effects approach and lens that Manitoba Hydro will assess the third valued component, the Cultural Landscape.

8.9.4 Spatial boundaries

The spatial boundaries for the environmental assessment consist of the project development area, local assessment area and regional assessment area.

The project development area (PDA) encompasses the footprint of the D83W project including the transmission line right-of-way, and any additional areas, such as marshalling yards and access road allowances.

The local assessment area (LAA) represents the area where indirect or secondary effects of construction and operation and maintenance are likely to be most pronounced or identifiable.

The regional assessment area encompasses the area where project-specific environmental effects overlap with those of past, present, and reasonably foreseeable future projects and activities.

Often reference is made to a general 'Project area'. This area generally includes the region south of Lake Manitoba, west of Winnipeg to just west of the Portage Diversion and north of Highway 1.

8.9.4.1 Harvesting

The local assessment area for Harvesting includes all components of the PDA plus a 2 km buffer surrounding each component to accommodate for the distance at which implodes, which could affect the experience of traditional harvesting, can be heard during construction activities.

The regional assessment area for Harvesting includes all components of the PDA and LAA, and a 15 km buffer around all components of the project development area.

The local and regional assessment areas for Harvesting both match the respective assessment areas identified for the Wildlife and Wildlife Habitat assessment (Section 8.8) and are the largest geographical assessment areas defined for this project.

8.9.4.2 Important sites

The local assessment area for Important Sites, includes the PDA plus a 0.5 km buffer surrounding each component of the project development area.

The regional assessment area for Important Sites includes the PDA plus a 5 km buffer surrounding each component of the project development area.

Discussion provided through the FNMEP extends beyond these boundaries, including all of Treaty 1 territory, the southern portion of the Métis Natural Resource Harvesting Area and the traditional territory of the Dakota people. Events or sites considered important to First Nations and the MMF beyond the spatial scope of the D83W project have been included in this section's Cultural Landscapes discussion.

8.9.4.3 Cultural landscapes

The Cultural Landscape section provides a narrative describing effects broadly, rather than bounded to a specific area. The narrative generally describes the region south of

Lake Manitoba, west of Winnipeg to just west of the Portage Diversion and north of Highway 1.

8.9.5 Temporal boundaries

Project effects on Harvesting, Important Sites, and Cultural Landscapes are being assessed over the duration of the D83W project's construction, operation, and maintenance phases. The assessment of cumulative effects will also consider the past and potential future impacts to Harvesting, Important Sites, and Cultural Landscapes.

Phases of the D83W project life cycle are defined as follows:

Construction: activity period when there are physical disturbances in the PDA. Subject to regulatory approval, construction of the transmission line will span 18 months from summer of 2025 to spring of 2027.

Operation and maintenance: the in-service date of the transmission line is expected to be spring of 2027 and the D83W project is expected to last 75 years with ongoing maintenance occurring over this timespan.

8.9.5.1 Harvesting

Temporal boundaries for Harvesting consider each cultural group's past, current, and future use of lands within the D83W project's spatial boundaries.

For this assessment, current use is defined as within the last 25 years, or one generation. The definition of past use is limited only by the living memory of knowledge holders who provided information considered in this assessment.

Future use refers to the ability for First Nations and Métis Citizens to continue to occupy and use lands and resources for traditional pursuits beyond the life of the D83W project.

8.9.5.2 Important sites

Historical temporal boundaries for Important Sites consider the existing database of previously recorded sites and general cultural chronologies for southern Manitoba. The heritage resources historical temporal boundary spans a time of approximately 8,200 to 75 years before present (B.P.) (Nielson et al 1996; Thorleifson 1996). This timeframe corresponds to the period when glacial Lake Agassiz drained, and the environment became conducive to human habitation. Seventy-five years ago, or the end of the Second World War, was selected as the upper historical temporal boundary specific to the RAA as this is the upper date recognized by the Historic Resources Branch for a site to be recorded in the provincial inventory.

8.9.5.3 Cultural landscapes

For Cultural Landscapes, Manitoba Hydro understands that changes since colonialism should be acknowledged when considering cumulative and collective effects in the area due to the valued history and change that has taken place since that time. This timeframe includes, but is not limited to colonization, the signing of treaties between First Nations and the Crown, the Fur Trade, the Indian Act (which included the reserve system and was used to support the pass system), forced relocation, the Manitoba Act, Residential Schools, and neocolonialism. Future use refers to the ability for First Nations peoples and Métis Citizens to continually use the land and resources for traditional purposes, a Constitutionally protected right, beyond the construction phase into the operation and maintenance phases of the D83W project.

8.9.6 Impacts to harvesting

The transmission line will be developed on Treaty 1 territory, within the Métis Natural Resource Harvesting Zone and within the traditional territories of many nations who occupy and use these lands and resources for harvesting and other cultural practices. These cultural groups have connections to the land within the Project area through the practice of harvesting.

> *"Families would travel along the rivers to hunt, trap and gather medicines/berries all year round to survive and feed their families. Camps would be set up wherever the wild life would migrate or wherever the plants were plentiful at the time of seasons. Children were taught at a young age to hunt and gather. Celebration of traditional dance would happen at the camps when the hunting was good, originally the Powwow. Elders gathered the tribe to share stories of the sacred teachings by using tobacco and prayers when animals gave their life or how to properly pick the medicines so they can keep growing. Sweet grass, Sage, Seneca root, Cedar were some of the most important plants that helped cure the common ailments. Picking wild nuts and berries were commonly used for food an tea …"* (Roseau River, 2015 p. 7).

8.9.6.1 Pathways of effect

The identified pathways of effect to harvesting include:

- changes to the land, vegetation, and wildlife
- changes to available lands suitable for harvesting
- changes to access to lands for harvesting
- changes to harvesting success
- changes to knowledge of where and how to harvest

Following the below discussion of effects the D83W project may have on Harvesting through the different stages of the project life cycle, the effects of the D83W project on Anishinaabe, Dakota, and Métis harvesting are each separately assessed.

8.9.6.1.1 Construction

The mobilization and presence of staff and vehicle use in the area during construction may increase dust, noise, and traffic in the area, potentially resulting in wildlife avoiding the area during mobilization. The noise and dust created by vehicle and equipment use on the D83W project will be similar to that produced by agricultural equipment used during seeding, spraying and harvesting activities.

Although no traditional use plant gathering areas have been identified along the ROW, the following activities have potential to impact traditional plants not yet identified for this assessment:

- Equipment and vehicle movement during mobilization and demobilization as well as during the establishment of marshalling yards may cause physical damage to or decrease the quality of traditional use plants. These activities have the potential to introduce or spread invasive and non-native plant species, causing changes in vegetation community composition within the Project area. Invasive and non-native species can aggressively invade disturbed areas and may outcompete native plant species, including any traditional use plants. Heavy equipment and vehicle use on access roads may alter vegetation communities due to soil compaction, rutting and admixing.
- Clearing will be completed before tower construction to provide clearance between vegetation and the transmission line. Clearing of the ROW may result in a direct loss of traditional use plants or the alteration of vegetation communities that support these plants. The area of land in need of clearing is small due to the routing of the transmission line predominantly through previously cleared agricultural land or road allowances. A total of 1.6 ha (4 acres) of forested land along the ROW will require clearing.

While most of the transmission line will be routed on disturbed agricultural land, clearing the ROW may remove some small pockets of potential wildlife habitat. Clearing of the ROW, tower assembly, construction, and conductor stringing and associated sensory disturbances may alter wildlife movement and breeding as well as alter the experience of traditional harvesting practices in areas close to the ROW.

First Nations peoples and Métis Citizens have noted that these alterations to the land and sensory disturbances, both visual and auditory, can change traditional harvesting

experiences and decrease preference for harvesting on lands around transmission line developments.

During active construction, access to the right-of-way is prohibited to harvesters. This restriction prevents any harvesting activity from taking place in areas of the ROW actively under construction for the duration of the construction work at that site. This access restriction is intended to protect human health and safety while construction activities are underway. Once construction is complete, access permissions will return to those in existence prior to construction. Although the majority of land along the ROW is private and only accessible with landowner permission, Manitoba Hydro understands that some First Nations peoples and Métis Citizens do perform rights-based activities on these private lands in the Project area.

8.9.6.1.2 Operations

Once the D83W project is in operation, the auditory experience of harvesters may change in areas very close to the transmission line due to the potential for the presence of corona discharge, which is a hissing or crackling noise that sometimes occurs with high voltage transmission lines. Some individuals may choose to no longer use a harvesting area because they find the sound unpleasant, as some prefer to harvest "where it is quiet … where there is no development" (Manitoba Métis Federation, Birtle MLUOS, 2017). Others choose to not use the immediate area under transmission lines due to their understanding that the sound created by transmission lines is unsafe. A similar change in individual preferences may occur with harvesters who share concerns related to electromagnetic fields (EMF) or a change in the visual landscape.

Vegetation may be impacted beyond the construction phase of the D83W project due to the use of chemical means of managing vegetation along the ROW. However, because the majority of the ROW is located on private farmland, it is likely that much of the route is already being maintained through chemical vegetation controls. The landowners will continue to be responsible for weed control along portions of the ROW that cross their private land.

Effects on wildlife with harvesting values may also be affected by the presence of the transmission line through the operations phase. For example, presence of the D83W project may lead to an increase in the mortality of grassland birds and small mammals in the local area as transmission lines provide perching areas for predatory birds. The transmission line may also result in an increased risk of bird mortality due to bird-wire collisions.

Access permissions during operation of the D83W project will be similar to those applied prior to operation of the project. Due to the limited amount of clearing required for the D83W project, it is not anticipated that changes to the landscape will increase accessibility for non-Indigenous hunters and trappers to the Project area. Those who access the area now to conduct non-Indigenous harvesting are expected to be present on the landscape at a similar level post-project construction to that currently experienced.

8.9.6.2 Anishinaabe harvesting

The D83W project will be constructed on the traditional territories of multiple Anishinaabe nations including:

- Long Plain First Nation (LPFN)
- Peguis First Nation (PFN)
- Brokenhead Ojibway Nation (BON)
- Roseau River Anishinabe First Nation (RRAFN)
- Sandy Bay Ojibway First Nation (SBOFN) and
- Swan Lake First Nation (SLFN)

It is Manitoba Hydro's understanding that the representatives from the above nations who took part in the FNMEP shared information from an Anishinaabe perspective.

Historically and contemporarily, harvesting practices were and still are central to Anishinaabe ways of life.

> *"The traditional hunting, trapping and gathering of medicines/berries areas covered a large area of southern Manitoba, as the people were known to be nomad and camp where the traditional sites where at the time of the seasons for hunting, trapping and gathering of medicines/berries"* (Roseau River, 2015).
>
> *"Hunting was the way of life back then and provided a main source of food. The hunt was always shared amongst family members."* (Long Plain First Nation, 2011).

The knowledge of harvesting areas and methods is deeply engrained in culture and history. Sites of fishing, hunting, food gathering, medicine picking, and trapping are culturally and/or historically significant areas to Indigenous communities (Black River First Nation, Long Plain First Nation and Swan Lake First Nation, 2015).

In addition to the area being historically important to Anishinaabe harvesting, the Project area is also a space where harvesting practices continue today in what is often referred to as contemporary use. Traditional activities that members of Peguis First Nation continue to practice include, but are not limited to, gathering food plants,

ceremonies, cultural activities, trapping, recreation, gathering medicinal plants, hunting, camping, fishing, guiding, logging, and many more. (Peguis First Nation, 2015).

During the FNMEP, LPFN's routing feedback included concerns that LPFN traditional land use maps identify traditional use sites in the northerly part of the Project area, including areas close to the ROW. In their Traditional Knowledge Report for Manitoba Hydro's Bipole III Project (2011), LPFN shared information about their traditional harvesting activities. These traditionally important harvesting activities include the hunting of "*moose, deer, elk, bear, wolf and fox. Fur bearing animals like beaver, mink, ermine, muskrat and rabbit were trapped where both the meat and the hide was used." "Birds like the snipe, pigeon, prairie chicken, partridge, goose and duck were … hunted. Waterfowl eggs were also harvested. The people took only what they needed, never any more, and shared what they had as survival depended on cooperation*." Gardening of edible plants such as vegetables "*was a source of food for survival*" and harvesting activities of plants such as willow to create k'nick k'nick historically occurred…The tapping of "*maple trees was a past time favorite in the spring. The older ladies used to make candy out of the maple syrup and used it for treats for the youth who did work for them*" and berries were picked along the Yellowquill trail. Medicinal plants and resources such as sweetgrass, seneca root, wee-kaa root, sweet clover, red cherries, bark, and sunk grease are used in smudges and to heal ailments. (Long Plain First Nation, 2011).

Anishinaabe people would fish in nearby waterways, as "*Pickerel, catfish, gold eye, mariya, suckers, burbot, jackfish, northern pike, sturgeon used to be plentiful and were caught by means of a fishing pole. Some of the people would use a fish net (dip netting) and/or make a fish trap out of sticks. Fish would be harvested for future use*". The interviewees from LPFN's Traditional Knowledge Report for Bipole III stated that today, they would not eat the fish caught from the Assiniboine River. "*The water is too polluted. Environmental changes resulted in deteriorating water quality resulting in the disappearance of fish and have impacted on a traditional food source*."

The impacts of development over the years have caused dramatic changes to the environment that have impacted the ability to harvest natural resources and share knowledge about harvesting activities.

> *"We use to step outside the door and be able to pick fruit and berries in the summer."* - Elder (Long Plain First Nation, 2011)
>
> *"there are not many of our people who know of the medicines that our people used for healing years ago. The majority of our Elders who knew the culture have now passed on. Tobacco was always used first before picking any berries,*

> *plants and medicines. Not all band members are aware of these traditions"* (Long Plain First Nation, 2011).

It is also important to recognize the impacts that colonization has had on harvesting. The Residential School system is one of many components of colonization that continues to impact the way Anishinaabe peoples can practice their culture, including harvesting activities. *"Residential schools have had a major impact on our people of today. Our language, our traditions and our teachings have either been stolen or lost. Total generations of people have been affected."* (Long Plain First Nation, 2011).

8.9.6.3 Dakota harvesting

The D83W project will be constructed on traditional territories of the following Dakota Nations, which were part of the FNMEP:

- Dakota Tipi First Nation (DTFN)
- Dakota Plains Wahpeton First Nation (DPWFN)

The D83W project will be built within the Dakota Tipi First Nation Traditional Land Use area on unceded Dakota territory.

Bison (buffalo) were important animals to the Dakota people, and they played a key role in their diet, "clothing, tools and other materials." The Dakota followed the seasonal migration patterns of bison and "were referred to as the buffalo people." Waterways in and around the Assiniboine River are preferred fishing areas for Dakota Plains community members. While trapping was practiced in the past by Dakota people, the clearing of the land alongside "*the decline in fur prices, government restrictions to trap lines, and changes in land use*" have reduced trapping activity in the area (Dakota Plains Wahpeton Nation, 2016).

> "*In Manitoba, as of recently, we hunted, harvested, picked berries, worked in all of Southern Manitoba including in Winnipeg, out of Winnipeg and all the way to the Saskatchewan border into Saskatchewan. We harvest our food until private lands came up and reservation parks and so on*" (Dakota Plains Wahpeton Nation, 2016).

Harvesting is an integral component of traditional Dakota culture, directing where and how communities lived off of the land.

> "*Dakota's have always had a tradition of moving or migrating. When the elk, buffalo, or the deer or the weather became severe, summer or winter, wildlife reacts to it in a way where the provisions that we need are amongst the living animals and the environment so we migrate*" (Dakota Plains Wahpeton Oyate, 2016).

During the FNMEP, DTFN shared feedback and mitigation recommendations related to harvesting activities in the Project area. DTFN's routing preferences indicated a preference to follow portions of existing lines and pre-disturbed land where possible, minimizing use of Crown land, new disturbance, and river and stream crossings, but being not as concerned with crossing the floodway as it is already pre-disturbed.

DTFN's ICAC also advised that Dakota people will have reduced preference to harvest around the transmission line due to the perception of impacts from EMF.

DTFN also expressed concerns related to harvesting through their Brandon to Portage La Prairie Transmission Line Replacement (BP 6/7) routing brief stating that "*…line placement areas may reduce medicinal vegetation in such areas (sage, sweet grass, cedar, Seneca root, bear root, etc.); DTFN has concern with respect to the wildlife population alterations that may occur with the transmission line placement route. This includes concerns that the line placement areas may reduce wildlife populations such as whitetail deer, porcupines, and rabbits which are a source for food and traditional use.*" (Dakota Tipi First Nation, 2021).

8.9.6.4 Métis harvesting

The D83W project will be constructed on the traditional homeland of the Red River Métis and within the Métis Natural Resource Harvesting Zone, where Métis Citizens have and continue to practice various harvesting activities.

> *"Since the birth of the Métis Nation, we have relied on the lands, waters and natural resources of what is now known as the Province of Manitoba as well as the rest of the Métis Nation Homeland to sustain ourselves, our families, our communities, our nation and our distinct Métis culture"* (Manitoba Métis Federation, 2017).

In their submission during Round 1 of the FNMEP, Manitoba Métis Specific Concerns (Unconcluded) Manitoba Hydro Dorsey to Wash'ake Mayzoon Transmission Line, the MMF reference past project concerns and outcomes of studies, including Bipole III, the Birtle Transmission Project and the Manitoba-Minnesota Transmission Project. Information from some of these past studies that relates to harvesting and may apply in the Project area has been included here.

In their 'Manitoba Métis Federation Metis Land and Occupancy Use Study' for Bipole III (2015), the MMF describe important harvesting resources within the Métis Natural Resource Harvesting Zone to include, but not be limited to:

- Spawning locations for "pickerel, northern pike, … yellow perch, sucker, carp, goldeye and lake whitefish"

- Animal birthing & rearing locations for "deer, moose, elk, bear, wolves, coyotes, muskrat and beaver"
- Bird habitat for "ducks species, Canada goose, bald eagle, mud hens ("American coot"), sandhill cranes, great blue heron, grouse (also called "prairie chickens"), partridge, robins, humming birds, blue jays, woodpeckers, barn swallows and other waterfowl (e.g. swan)"
- Beekeeping & agriculture is practiced by some Métis Citizens in the area
- Bats have been observed by some Métis Citizens in the area

The Métis Land and Occupancy Use Study' for Bipole III (2015) also describes the importance of harvesting practices to the ways of life and culture of the Métis as *"interaction with and use of the land is an important way for … [Métis Citizens] to connect with the environment and practice their Métis way of life"*.

For Métis culture, the sharing of harvested resources is important to community development and relationships. This sharing ensures that those Métis Citizens who cannot participate in harvesting activities on the land are *"economically benefiting from harvested foods even though they are not physically harvesting the food themselves"* and can *"connect with their Métis heritage and identity through the consumption of wild foods"*.

> *"I mean, when we're fishing we give lots of fish away, you know, like big jackfish, we give that to the old people, you know, instead of selling them. They're not worth nothing, I mean, and them old people really like it, especially if they're sick, eh? You know, if they're sick and then you give them wild meat, boy, they feel better, you know, after they eat that, eh?... We give geese away here… there's hunters around that give us all their stuff and we just get them cleaned and give them to the elders, you know"* (Manitoba Métis Federation, 2015).

Gathering is an important activity for Métis Citizens with "stories about gathering a variety of plants that go back to ... childhood and centre on connections with their family and community and connections with a particular place." This traditional activity plays "a social role by strengthening the ties between Métis families" as they gather wild foods.

Foods and medicines gathered from the land are an important component in the health and well-being for some Métis Citizens. Some individuals rely on *"their ability to harvest foods in order to survive, while others supplement their food consumption with harvested food and some simply enjoy and take pride in the ability to harvest foods from the land and waters."*

Medicines derived from plants and animals found within the Métis Natural Resource Harvesting Zone alongside the wild foods, provide nutrition and the means to

remedy illness. For some Métis Citizens *"the knowledge ... of the types and uses of medicines was learned from their parents and grandparents, and it was clear that their knowledge, as well as the experience of acquiring that knowledge was an important part of their identity and connection to the land."* Hunting, trapping, and fishing are also important to Métis culture and provide similarly valued opportunities to share knowledge through experience. Again, Métis Citizens have expressed the value they obtain from *"the ways in which they learned from their parents and grandparents and their desire to pass that along in their families."* This sharing of knowledge is seen as a way to maintain traditional Métis values and culture.

> *"...My dad and my grandpa, I spent a lot of time out with hunting and, you know, just learning how to do it and how to do, you know, basically harvest for yourself and eat off the land, you know, whether it be cleaning it or processing it or...just being out and knowing how to be out in the wilderness and not...panic and oh, geez, I'm out in the middle of nowhere, what am I gonna do?...Well, you know, build a fire and whatever and...boil some water and...it's not such a big deal, it's not like a scary thing if, you know, you're say dropped from a helicopter in the middle of nowhere, it's not gonna be as big of a deal...I feel I have, you know, knowledge on what it would take, you know, to sort of live… But...I guess culturally you're exposed to just growing up and that's something that I kind of want to pass on to my kids and just-, you know, just as far as an independence type of a thing and just to have that knowledge so that they, you know, feel comfortable and they have a connection sort of to the land and to where their food comes from. You know, that's-, and that's sort of why I do is because I enjoy it and I wanna share that-, share the knowledge that I've learnt from my grandparents, you know, with them."* (Manitoba Métis Federation, 2015).
>
> *"I taught my children to live off the land and use its assets, and it's always benefitted us. I've taught them traditional things like beading and preparing and gathering and storing food. I've always tried to install them with growing up off the land."* (Manitoba Métis Federation, 2015).

While the majority of harvesting occurs on undisturbed land, the MMF shared with Manitoba Hydro that some of their Citizens harvest, with permission from landowners, on disturbed private agricultural lands. One example of this is a Métis harvester who hunts wild boar on farmland in the Project area is *"concerned about the ability to hunt in the area. Specifically, the landowners where he hunts rely on him to manage wild animal populations and control invasive wild boar from destroying their lands. This symbiotic importance to balancing wild animal populations to support the health of the ecosystem was identified as being a significant concern of this project."* (Manitoba

Métis Federation, 2021). This feedback also highlights that trapping and hunting activities can be considered as a component of environmental stewardship, as a means to ensure a balanced ecosystem. During engagement on the Manitoba-Minnesota Transmission Project, a Métis Citizen also described the importance of hunting and trapping in regard to the overpopulation of beaver.

> *"In our area, we have so many beavers 'cause nobody catches them anymore because not many – hardly nobody eats them anymore, plus the hides aren't worth anything. And what's going to happen eventually with the beavers is they're going to disease and they're going to wipe out big huge areas and anything that's – I mean, you've got do depredation of animals, certain ones, I think, no matter what. Everybody's gotta do their part"* (Manitoba Métis Federation, 2015).

The Manitoba-Minnesota Transmission Project (MMTP) Métis Interests Report (2016) explains how important unoccupied Crown land is to the MMF as it *"represents areas where they can exercise their Métis rights without permission. On all other land types, the exercise of Métis rights can be restricted from time to time under certain circumstances.*" As the Project will be primarily on private agricultural land, the exercise of Métis rights on lands that do not require permission will not be heavily impacted by this Project; however, Manitoba Hydro recognizes that changes made to private land can still impact the ability for Métis Citizens to practice their rights to harvesting.

Another harvesting concern that has consistently been shared by the MMF is the concern that transmission projects disrupt the quietude of an area and cause sensory disturbances (auditory and visual) that decrease Métis Citizens preference for harvesting in the proximity of a transmission project.

> *"You've got to find your peaceful zones. My parents, when I was younger, took me every day after supper, every, every day just to go for a walk down the road to check out the sunset. Let's go check out the sunset and then we'd all go. It's a habit. It's a calming thing. It warms your heart, your soul to see a sunset. I mean, I'm sure I'm not the only one on the planet who goes and watches the sunset. It's calming. These hydro lines...that's all I'm going to see. No matter how beautiful that sunset's going to be down the road, that hydro line's going to be right across it. I mean, who wants to look at this? Who wants to hear that humming? ..."* (Manitoba Métis Federation, 2015).
>
> *"I can pretty much guarantee [that I would stop using areas that I already use where the transmission line is going in], it's not going to look very good. It's not going to look safe enough to walk on. You're going to go and go for an*

enjoyable calming, peaceful, walk, you know, to cure the soul. Not if it's going to be all brown and gross..." (Manitoba Métis Federation, 2015).

Other harvesting-related concerns from past projects that the MMF reshared through the FNMEP for the D83W project include:

- "Concerns regarding the migration paths in the area. If chased away, they will develop a new migratory path – this could impede other migrating species, it could push them into areas of higher predators such as wolves, it could also force them to move into areas with higher disease, risking their health." (Bipole III Métis Land Occupancy and Use Study, 2015)
- "Potential changes to wildlife habitat and the ability to harvest in the area." (Bipole III Métis Land Occupancy and Use Study)
- Concerns over habitat fragmentation. (Bipole III Métis Land Occupancy and Use Study)
- Concern for bird migration & bird strikes on powerlines. Concerns of how this will impact the routes they have taken and their altered migration route risks. This will not only impact the birds and harvesters, also the Métis who work the hunting lodges in this area. Metis people take 1 – 1 ½ months off each year to work at hunting lodges owned by Americans – this is a source of profit that could disappear.
- Linear corridors caused by installing transmission lines allowing predator access, increased predation on prey species causing disturbance to predator-prey balance. (Bipole III Métis Land Occupancy and Use Study)

A more robust description of effects to Métis-specific harvesting as a result of the D83W project are provided within the Manitoba Métis Specific Concerns (Unconcluded) Manitoba Hydro Dorsey to Wash'ake Mayzoon Transmission Line (D83W) Project (2021) and the past studies this report references.

8.9.6.5 Mitigation

The primary mitigation measure for reducing adverse effects to harvesting practices is inclusive participation in the routing process. This enables Manitoba Hydro to consider preferences and concerns about the D83W project that are important to First Nation peoples and Métis Citizens early in the process. The routing methodology considers values from multiple perspectives including different First Nations, the MMF and Indigenous organizations. As a result, the final preferred route (FPR) is often a balance of perspectives.

Manitoba Hydro included First Nation and Métis concerns at each stage of routing. During Round 1 engagement, eight First Nations, the MMF, and the PUIPC were

invited to share routing preferences and concerns with the D83W project. Representatives from Dakota Tipi First Nation, Long Plain First Nation, Peguis First Nation, and the Manitoba Métis Federation were included on the Community Preference Team, a key routing decision-making team. During Round 2 engagement, the FNMEP provided the opportunity to provide feedback about the preferred route to help identify key areas of concern and suggest potential mitigative segments.

The FPR does not cross a number of key areas of concern identified through the FNMEP including the Assiniboine River, unoccupied Crown Land, an identified TLE site, the Grants Lake WMA, and an intact forested area – all features that would support harvesting. The D83W project will be routed through primarily developed lands north of the Assiniboine River and does not cross any identified plant gathering areas.

As development will occur primarily on developed agricultural lands, clearing of trees on the ROW is limited to 1.6 ha (4 acres). Dakota Tipi First Nation suggested mitigation related to clearing that includes harvesting any plants or trees that need to be removed in culturally appropriate ways and then using them for cultural purposes.

In their BP6/7 report, Long Plain First Nation expressed that: *"Long Plain First Nation would like to see an effort made to harvest any sacred medicines that may be disturbed during the project in accordance with our spiritual protocols."*

- Manitoba Hydro will engage with ICACs to identify vegetation that may serve a cultural purpose and collaborate on arrangements to harvest those plants prior to clearing.
- Manitoba Hydro will provide opportunities for First Nations and the Manitoba Métis Federation to identify sensitive sites to help inform the Environmental Protection Program for the D83W project. Manitoba Hydro will consider non-chemical vegetation management for areas on Crown lands with identified traditional plant harvesting, if any.

DTFN recommended that Indigenous monitors be hired to undertake activities related to traditional plant identification and monitoring of the transmission line construction.

- Manitoba Hydro will further discuss monitoring with First Nations and the MMF
- During construction, informational signs and warning markers will be used to identify active construction sites. Following construction there will be no restrictions on access to traditional use sites or areas within the D83W project right-of-way on Crown lands. Crown lands occupied by the project development area will remain available for traditional harvesting practices after active construction is complete.

Also relevant, are the mitigation measures outlined in Section 8.8 which include measures related to mitigating impacts to wildlife and wildlife habitat.

8.9.6.6 Characterizing residual effects

Manitoba Hydro anticipates the severity of the D83W project's residual effects on Harvesting will vary between cultural groups. Therefore, Project effects have been characterized for each cultural group separately below. Information about methodology and definitions related to characterizing residual effects is included in Chapter 6.2.4. The unique nature of harvesting practices makes it inappropriate to determine whether any effects are significant or not significant to any particular cultural group so a significance conclusion will not be made. Instead, a description of residual effects is provided.

8.9.6.6.1 Anishinaabe-specific harvesting residual effects

Although limited location-specific information about Anishinaabe harvesting in the Project area was collected through the FNMEP, Manitoba Hydro assumes that Anishinaabe harvesting activities occur throughout the entire regional assessment area. Therefore, the D83W project may decrease these activities. The routing process determined a ROW that avoids many of the lands that may support Anishinaabe harvesting such as lands adjacent to the Assiniboine River and other intact natural spaces, minimizing the residual effects on harvesting for Anishinaabe peoples. After mitigation, effects on Anishinaabe harvesting as a result of the D83W project may include:

- Restricted localized access to the PDA during construction will result in temporary suspension of harvesting activities, including rights-based harvesting.
- During operations, maintenance may result in intermittent localized access restrictions resulting in the temporary suspension of harvesting activities, including rights-based harvesting.
- The harvesting experience may be altered by the presence of the transmission line.

Given that the D83W project is routed primarily on pre-disturbed land and that Manitoba Hydro is adopting the above-described mitigation measures, the effects of the D83W project on Anishinaabe Harvesting have been characterized as follows:

- Direction: Adverse
- Magnitude: Low
- Geographic Extent: Local Assessment Area
- Frequency: Intermittent

- Durability: Short-term
- Reversibility: Reversible

8.9.6.6.2 Dakota-specific harvesting residual effects

The right-of-way for the Project aligns with the route preferences Manitoba Hydro received from Dakota Tipi First Nation during the FNMEP. The right-of-way also avoids many lands valued by DTFN (lands adjacent to the Assiniboine River or intact natural spaces) that support harvesting. Manitoba Hydro assumes that Dakota harvesting activities occur throughout the entire regional assessment area. Therefore, the Project may decrease these activities. After mitigation, effects on Dakota harvesting as a result of the Project may include:

- Restricted localized access to the PDA during construction will result in temporary suspension of harvesting activities, including rights-based harvesting.
- During operations, maintenance may result in intermittent localized access restrictions resulting in the temporary suspension of harvesting activities, including rights-based harvesting.
- The harvesting experience may be altered by the presence of the transmission line.
- A decreased preference to harvest near the transmission line may occur due to a perception that the effects of EMF may be harmful.

Given that the Project is routed primarily on pre-disturbed land and that Manitoba Hydro is adopting the above-described mitigation measures, the effects of the Project on Dakota Harvesting have been characterized as follows:

- Direction: Adverse
- Magnitude: Low
- Geographic Extent: Local Assessment Area
- Frequency: Intermittent
- Durability: Short-term
- Reversibility: Reversible

8.9.6.6.3 Métis-specific harvesting residual effects

With the routing process resulting in a right-of-way that avoids many of the MMF's valued lands (unoccupied Crown land, lands adjacent the Assiniboine River or intact natural lands) that support harvesting, there is a potential for some Métis Citizens to hold a diminished preference to use the area once the D83W Project is in operation due to sensory disturbance to the visual and auditory environment. Harvesting, including rights-based harvesting activities, can continue to occur on the right-of-way

once construction is complete; however, as the harvesting experience may change for some Métis Citizens, the Project may result in a reduction in the opportunity for these Métis Citizens to have access to the same harvesting experiences in this space. After mitigation, effects on Métis-specific harvesting because of the Project may include:

- Restricted localized access to the PDA during construction will result in temporary suspension of harvesting activities, including rights-based harvesting.
- During operations, maintenance activities may result in intermittent localized access restrictions resulting in the temporary suspension of harvesting activities, including rights-based harvesting.
- Diminished preference to conduct harvesting during operation of the project due to a change in aesthetics, quietude and perceived risk of EMF.
- Decrease in knowledge of harvesting due to decreases in the practice of harvesting in the local project area.
- Decrease in harvesting success.

Given that the project is routed primarily on pre-disturbed land and that Manitoba Hydro is adopting the above-described mitigation measures, the effects of the Project on Métis Harvesting have been characterized as follows:

- Direction: Adverse
- Magnitude: Moderate
- Geographic Extent: Local Assessment Area
- Frequency: Continuous for harvesters whose experience is diminished by the presence of the line; Intermittent for harvesters who will harvest but may be disrupted by construction and maintenance activities
- Durability: Long-term, permanent for Citizens who prefer to not practice rights-based activities on the right-of-way
- Reversibility: Permanent

8.9.6.7 Follow up and monitoring

Manitoba Hydro will continue to work with interested First Nations and the MMF to mitigate the above noted effects.

The Environmental Protection Program (EPP) is a framework for implementation, management, monitoring and evaluation of protection activities in keeping with environmental effects identified in environmental assessments, regulatory requirements, and public expectations. The EPP prescribes measures and practices to

avoid and reduce adverse environmental effects (e.g., wildlife reduced risk timing windows, setbacks and buffers for sensitive habitat).

Manitoba Hydro will provide opportunities for First Nations and the Manitoba Métis Federation to identify sensitive sites to help inform the EPP for the D83W Project.

The MMF's unconcluded report includes concerns shared in the Bipole III Métis Land Occupancy and Use Study (2015) about the administration of monitoring programs: "Several participants in this study suggested that there was an opportunity for Métis Citizens to support with 'boots on the ground' monitoring. There were concerns with monitoring programs that are led by people who do not know the area well as described in this quote from a participant: *"And that's how it should be, like some guy sitting in the office in Winnipeg, at Portage and Main, should [not] be making the calls about what's happening right here in our backyard. There should be somebody locally, no matter if there's one from each town, one each district, but there should be somebody there doing the monitoring.""*

DTFN, LPFN and SLFN also expressed interest in participating in construction monitoring opportunities.

- Manitoba Hydro acknowledges this interest and looks forward to further discussions with First Nations and the MMF about their interest in monitoring.

8.9.7 Impacts to important sites

As the Project traverses territories on which First Nations have lived since time immemorial and where Métis Citizens have lived since their roots began during the fur trade, the Project will interact with places of historical, cultural, and spiritual importance.

The value and history of the Project area and the concurrent discoveries of unmarked graves at residential schools at various locations across Canada and at the St. Andrews lock and dam site brought concerns regarding heritage value to the forefront of discussions during the FNMEP. Some First Nations and the MMF had one or more archaeologists closely involved with aspects of engagement and project assessment.

> *"O my goodness, wherever you go, we might be sitting on (looks towards the floor); I guess a lot along the river and here and there … so we find burial ground all over the place, doesn't matter where you go you're going to find a burial ground. I guess when people die long ago they just buried them there, leave them there because they're not going to carry them around every time they move, travel here and there … you'll find them all over the place and they*

were here … the Dakota people covered this land" (Dakota Plains Wahpeton Oyate, 2016).

Prior to initiating Round 1 engagement through the FNMEP, Manitoba Hydro was hearing substantial concerns about the way heritage sites[5] are defined, investigated, assessed and monitored within current proponent-led and provincially-administered heritage processes. These concerns prompted Manitoba Hydro to host two heritage workshops to enable more fulsome discussions about concerns related to heritage approaches and methodologies on the Project.

FNMEP participants were invited to attend the first heritage workshop, held on October 7, 2021. It was attended by Long Plain First Nation, Peguis First Nation and their archaeologists, the MMF and their archaeologist, Dakota Tipi First Nation and their archaeologist, Manitoba Hydro and Western Heritage (the Project archaeologist) as well as by a representative from Manitoba's Heritage Resources Branch. Points of discussion at the first workshop included:

- Findings on a different project located in the Lockport area that raised concerns for PFN. Efforts should be made to include First Nation and Métis involvement on projects prior to their development. Manitoba Hydro agreed.
- The MMF communicated a preference for archaeology to be considered through a Métis-specific lens as sometimes there are similar or different settlement patterns associated with Métis use of an area.
- Much of our understanding about archaeology has come from development projects, such as transmission lines, with specific and focused footprints mainly within previously disturbed contexts.
- PFN archaeologists have methodological preferences related to pre-construction screening activities and observations made during construction.
- There is interest from the Historic Resources Branch and Manitoba Hydro to be inclusive of other perspectives heard from archaeologists present at the workshop.
- Manitoba Hydro committed to hosting a second workshop, which would include a discussion of the adequacy of this chapter in capturing concerns.

[5] A heritage site is defined by The Heritage Resources Act to include "...a heritage object, and any work or assembly of works of nature or of human endeavor 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" (Government of Manitoba 1986).

The engaged First Nations and the MMF were invited to attend the second heritage workshop, which took place on November 9, 2022. The meeting was attended by the MMF, Peguis First Nation and their archaeologist, Manitoba Hydro, Western Heritage (the Project archaeologist), and a representative from the provincial Historic Resources Branch. The goal of the meeting was to continue discussions on how to work together to best protect sensitive sites.

Points of discussion at the second heritage workshop included:

- Planned updates to the CHRPP including a new goal statement and considering how project archaeologists may be able to support the identification of medicine communities important to First Nations and the MMF, such as families of cedar, during field work.
- The importance of protecting intangible components of culture such as First Nation and Métis worldviews, cultural landscapes, and ceremonial and sacred spaces.
- Manitoba Hydro's process for how archaeologists are selected through a 3-year framework agreement and subsequent mini bid process, and the process between the Historic Resources Branch and the project archaeologist for the heritage permit and HRIA.
- Concerns about not necessarily having the same archaeological firm working on all components of a project and the need for processes that may provide continuity throughout larger projects with multiple components.
- A key concern of PFN is having interpretable data for artifacts. PFN shared that there are old paleo channels, including an old channel of the Assiniboine River in the project area that need to be tested. Shovel tests should be systematic with excavation occurring when sites are found to develop data that will feed into greater contemporary concerns.
- The Project archaeologist discussed format of this assessment differing from past assessments and seeking feedback on how to best integrate archaeological components in future.
- Discussion about the issues of balancing keeping nations informed and protecting sites while protecting important and sacred sites from the public.
- Interest in an additional meeting(s) as we work through the process for the D83W project. It was mentioned that those nations unable to attend today may also have valuable feedback and suggestions that the group in attendance was not aware of.

Remaining steps for the D83W project and outcomes identified at the second heritage workshop included:

- Conducting heritage field observations as part of the HRIA.

- Continued opportunities to share feedback and have First Nation and Métis input on how the work will be done.
- Manitoba Hydro will be developing summaries of annual heritage reports for the D83W project that can be shared with interested nations.
- Manitoba Hydro will be reaching out for further discussion on a new communication plan for the D83W project's CHRPP.
- Arranging another heritage meeting prior to field work with the option for invitees to share questions in advance.

8.9.7.1 Pathway of effects

The identified pathways of effect to Important Sites include:

- Changes to important sites
- Changes to access those sites
- Changes to knowledge of those sites

Impacts to important sites may be understood, characterized, and experienced differently by different cultural groups. Important sites can be collectively important to the broader Indigenous community, different culture groups, individual nations or even to specific individuals. Knowledge of important sites may be confidential. Manitoba Hydro sought permission from PFN, LPFN, DTFN, and the MMF prior to including information regarding Important Sites in the assessment.

Following the discussion of D83W project effects on Important Sites during the construction and operations phases, Anishinaabe, Dakota, and Métis important sites are each separately assessed followed by a discussion on recorded heritage resources in the D83W project area.

8.9.7.1.1 Construction

During construction, there is potential for unknown important sites to be disturbed or uncovered during activities that involve ground disturbance primarily associated with construction of the right-of-way such as the mobilization of equipment, right-of-way clearing; installation of tower foundations, developing and using access routes, creating and using marshalling/fly yards, and transmission tower construction.

There will be a temporary loss of access to important sites resulting from safety restrictions applied to the work area during construction. Temporary barriers to accessing Important sites, including Crown land, due to road closures or fencing of the construction areas may temporarily restrict cultural use of the area. Once construction is complete, access permissions will return to those in existence prior to construction.

The experience when visiting important sites in the LAA may also be altered during construction due to increased noise and vehicle traffic in the area or from visual changes to the landscape.

8.9.7.1.2 Operation

The potential for the D83W project to impact important sites is substantially diminished during the operations and maintenance phase as ground disturbance is anticipated to be very low. Although access to the right-of-way will return to its pre-existing state following construction, there may be occasional temporary localized restrictions to access to allow safe working conditions during maintenance activities.

Effects during operations are generally related to maintenance activities, including vehicle usage related to line or tower repairs and vegetation management. Vehicle traffic can create ruts and expose important sites that were previously undisturbed sites. Vegetation clearing in areas previously not disturbed by construction for maintenance of tower sites have a potential to expose heritage resources.

Once the transmission line is in operation, any land that was in cultivation prior to construction will remain in cultivation.

The experience when visiting important sites in the PDA and LAA during operations may be altered due to auditory (corona discharge) and visual (presence of transmission lines and towers) disturbances. The perception of risk from EMF and associated stress related to EMF concerns may negatively impact the experience of visiting an important site.

8.9.7.2 Anishinaabe important sites

The D83W project will be constructed on the traditional territories of multiple Anishinaabe Nations including:

- Brokenhead Ojibway Nation (BON)
- Long Plain First Nation (LPFN)
- Peguis First Nation (PFN)
- Roseau River Anishinabe First Nation (RRAFN)
- Sandy Bay Ojibway First Nation (SBOFN) and
- Swan Lake First Nation (SLFN)

It is Manitoba Hydro's understanding that the representatives from these communities who took part in FNMEP shared information from an Anishinaabe perspective.

This historical significance of the land in the Portage La Prairie area and the impacts of colonialism have been expressed to Manitoba Hydro by Long Plain First Nation through their concerns about potential impacts to important sites from development Projects.

> *"The reality is after hundreds of years of socio-economic, spiritual and legal disparity, we simply do not know for certain if these plans are over for instance, a familial or community burial plot from the 1790's. Perhaps it goes through the old lodging grounds of the regions most respected Medicine Man from an even earlier time which would no doubt be in abundance of our 4 Sacred Medicines (Sage, Cedar, Sweetgrass and Tobacco). Such a plot would no doubt have old ceremonial grounds that would still be respected and protected no matter how old they are, as such sites are identified and do exist within our Long Plain Reserve No. 6 borders today"* (Long Plain First Nation, BP6/7 Report, 2021)

In the Aboriginal Traditional Knowledge Study Community Report from Black River First Nation (BRFN), LPFN, and SLFN for the MMTP (2015), important sites were categorized and described as heritage, historical, cultural and sacred sites:

- "Heritage site is described as an area of past land use by Anishinabe people for survival purposes such as camps, travel routes, gardens, events, and areas where people gathered for economic trade, but this is not a complete list of activities.
- Historical sites are areas where Anishinabe people have specific activities related to who Anishinabe people are, as an example, the following are considered historical sites: the site of the Dakota – Ojibwa peace treaty, the incident at Round Lake, or Eagles Nest, Round Plain and Grassy Lake are all regarded as Anishinabe historical sites.
- Cultural sites are areas that are used for food gathering, medicine picking, trapping, hunting areas, fishing camps, and non-spiritual activities such as recreational events like competitions.
- Sacred sites are areas where Anishinabe people held ceremonial events like sun dance grounds, Midewin areas, etc. Graves (cemetery style) are considered sacred sites as these areas would have been attached to lengthy stays by Indian people in certain locations, graves that are located in non-cemetery locations" (Black River First Nation, Long Plain First Nation, and Swan Lake First Nation, 2015).

BRFN, LPFN, and SLFN also identified the following examples of places and activities that are important to them (Table 8-39). This list helps guide Manitoba Hydro's understanding of what important sites means to these Anishinaabe communities and

with that, how impacts to these spaces and cultural aspects can potentially be mitigated from being impacted by the D83W project.

Table 8-39: Examples of important places and activities from Black River First Nation, Long Plain First Nation and Swan Lake First Nation

"What has a high Cultural Value?	• Pow wow grounds • Hunting grounds (beaver, deer) – high wildlife populated areas • Sports (lacrosse) • Wild rice picking • Ceremonial grounds • Areas where sweet grass, sage medicines grow
What is a heritage Site?	• Places where people gathered, camped, had ceremonies • Eagles Nest • Indian Gardens • Fishing areas (there is a longstanding site and tradition in one area) • Beaver hunting areas • Round Plain • Hunting camps
What is a Sacred Site? (What is a sacred value?)	• Burial grounds • Sundance ground – extremely sacred • Sweat lodges • Pow wow grounds • Where our plants grow – for medicinal purposes • Shake tents area – extremely sacred • Midawin sites • Buffalo grounds crossings • Eagles Nest • Mother Earth • Some areas remain cultural and sacred today since such things as cameras or other recording devices are not allowed.
What is a Historical Site (of Historical Significance)?	• Where Treaties were signed • Old church buildings • Eagles Nest (battle) historical • Hunting sites • Berry picking sites

	• Homesteads • First Nation language descriptions of areas should be improved for example Yellowquill trail, USA kept much of the original locations in states such as Minnesota"

(BRFN, LPFN, and SLFN, 2015)

Through the FNMEP, PFN shared a strong general concern regarding the potential for archaeological finds throughout the D83W project area. Heritage concerns remain even if paralleling existing transmission infrastructure or roads because, depending on the original date and timing of construction, the areas may not have been tested and as such there remains potential for archaeological finds with any additional disturbance. PFN shared concerns in particular with oxbows and old river systems north of Portage la Prairie that are likely to have been historic travelways and trade routes (including the Floodway) and therefore would have high potential for archaeological finds. There was a preference to avoid the old oxbows and river systems as much as possible, and especially avoid the Assiniboine River. The right-of-way does not cross the Assiniboine River and does not traverse route options that had contained the most oxbows. PFN also specifically advised about concerns related to three archaeological sites located approximately 4.25 km from the intersection of PR 240 and 227.

During the routing process, LPFN shared concerns that LPFN traditional land use maps identify traditional use sites in the northerly part of the Project area (not traversed by the right-of-way), including in close proximity to the right-of-way. These sites may have increased potential for heritage resources and sites of cultural importance to be encountered. Long Plain First Nation has also identified three important sites located near Poplar Point and High Bluff, close to the Assiniboine River that exist within the Project area (Long Plain Traditional Land Use Initiative Map, 2022).

In addition to the important sites and spaces described above, both PFN and LPFN have shared with Manitoba Hydro that impacts to current and future Treaty Land Entitlement (TLE) selections within the RAA are a concern. These sections of land have been expressed as having important potential economic and land value. LPFN shared three specific parcels under consideration for TLE in the Project area. The right-of-way does not cross these parcels.

LPFN representatives expressed concerns about projects that may impact their ability to access land for TLE selections. Preserving land parcels for current and future use is a high priority for LPFN. LPFN representatives discussed aspects of future development planning initiatives with Manitoba Hydro and highlighted both the

economic and land protection value of maintaining properties for future TLE opportunities.

PFN shared similar concerns regarding TLE selections and their ability to select TLE land within the area now and in the future on both Crown and private lands. The Project area is also included within the Peguis First Nation Notice Area. The Province of Manitoba is obligated to notify PFN of any proposed dispositions of Crown land within this Notice Area. At a November 24, 2021 meeting, a PFN representative indicated a concern regarding the Project's potential to affect TLE opportunities for their nation and the Manitoba TLE Framework Agreement ("the MFA") was later shared with Manitoba Hydro. Manitoba Hydro representatives reviewed the MFA and considered available knowledge of current TLE selections. In a January 5, 2022 letter to PFN, Manitoba Hydro requested that PFN notify Manitoba Hydro of any proposed Selections or Acquisitions in the Project area that may not be available with current geospatial information. No further information regarding TLE selections or acquisitions was provided by PFN.

During the February 3, 2022 meeting, PFN archaeological representatives asked methodological questions about heritage field sampling. Discussion occurred on the variety of methodologies that archaeologists can apply when surveying a project area, including pedestrian (walking) surveys, shovel testing, augers and other deep testing approaches to look for buried artifacts or features, on-site monitoring of development activities, and using geophysics (for example ground-penetrating radar, LiDAR or drone technology). It was shared that each 'tool' has advantages and limitations and is selected by the professional archaeologist based on recommendations by the Historic Resources Branch and other factors such as soil conditions and location of the site. Topics discussed also included addressing intangible heritage which may be known by Elders and knowledge keepers. Manitoba Hydro offered to fund an interview-based study. Manitoba Hydro continues to encourage discussion on this topic to foster mutual understanding.

Manitoba Hydro typically hires archaeologists to undertake pre-construction field assessments in areas close to known historical and archaeological sites, in areas of high heritage potential (for example near waterways) or in areas identified as being culturally sensitive by First Nations or the MMF. Manitoba Hydro welcomes participation from First Nation members and Métis Citizens during the fieldwork. PFN shared a preference to extend this participation to community archaeological advisors. Manitoba Hydro has put forward a proposed agreement to support this involvement.

PFN also shared that it would be helpful if Manitoba Hydro shared the Cultural and Heritage Resources Protection Plan (CHRPP) as a plain language document explaining Manitoba Hydro's process and when archaeologists and monitors are on site. A plain language summary of the CHRPP process was provided via email. Manitoba Hydro supports that intent and will work to update the CHRPP as a result of this discussion, including expanding the goals of CHRPP to highlight that collaboration on heritage values within a Project area works towards the broader goal of reconciliation.

8.9.7.3 Dakota important sites

The Project will be constructed on traditional territories of the following Dakota Nations, which were part of the FNMEP:

- Dakota Tipi First Nation
- Dakota Plains Wahpeton First Nation

The Project will be located on unceded lands in the Project area. Dakota Tipi First Nation "asserts and maintains that it has never ceded its Title or interests to its ancient homelands or traditional territory nor its inherent jurisdiction and decision-making authority in relation to lands, waters and resources" (Dakota Tipi First Nation, 2018).

Important sites are known through their oral histories. As detailed in the DTFN MMTP Report (2018), they can include, but are not limited to:

- Animal kill sites which are places where Dakota "hunted, trapped, fish or killed animals for personal use"
- Plants and earth sites where Dakota "collected different kinds of plants and earthen materials"
- Overnight sites where Dakota "stayed out overnight while hunting, trapping or picking berried in the region and included the following features: cabins, tent, and lean-tos"
- Cultural sites including "burial places, birth sites, old settlements, cache sites, and sacred sites" which have been known to be used.

The Project will be built adjacent to the Portage la Prairie urban area and the project area includes the lands north and west of Portage la Prairie. DTFN has shared that this region contains many sites that are historically and culturally important to the Dakota Nation, including areas near riverbanks, water crossings and undisturbed natural areas which may hold important sites. Over the course of engagement on BP 6/7, Wash'ake Mayzoon Station and the D83W project, the DTFN ICAC shared specific Important Sites with Manitoba Hydro representatives and archaeologists. These sites

are confidential; however, no Important Site is currently known to overlap with the right-of-way.

DTFN shared that a significant priority that influenced DTFN's preferred route recommendation was to largely follow open fields and existing power lines.

The DTFN ICAC has provided spiritual guidance on ceremonies for other Manitoba Hydro projects and is often asked to lead engagement meetings in prayer. He has worked to help develop the Four Winds Cultural Center located in Southport and has shared with Manitoba Hydro representatives its purpose in providing visitors an opportunity to learn about Indigenous culture and host cultural celebrations. The Four Winds Cultural Center is an important site as it includes a sweat lodge, a 30-foot community teepee, and a large community picnic shelter.

Manitoba Hydro will support recommendations of ICACs for appropriate locations to host ceremonies for the D83W project, such as the Four Winds Cultural Center site.

Throughout the FNMEP on the D83W project and other projects in the Portage la Prairie area, DTFN has consistently discussed the importance of incorporating ceremony into projects to acknowledge and respect the land and spirits affected.

8.9.7.4 Métis important sites

Métis Citizens have been working and living within the Project area since the establishment of the Métis during the Fur Trade (Manitoba Metis Federation, Birtle, 2017, p.24). Connections and relationships with the land are integral to Métis culture. *"For the Manitoba Métis Community, our historic and ongoing use of, connections to and mobility throughout our traditional territory defines who we are as a people"* (Manitoba Métis Federation, Birtle, 2017).

Métis Citizens' livelihood and culture is deeply tied to the landscape that has sites of specific importance to Métis Citizens including "sites of archaeological significance, burial sites, current and historic gathering places, historic family sites, important landscape features, areas of spiritual and ceremonial significance and trading posts" (Manitoba Métis Federation, 2015).

The MMF's archaeologist, Dr. Kisha Supernant shared during the FNMEP that Métis cultural heritage includes both tangible and intangible cultural heritage with Métis families having engaged in activities over many generations that have left material traces of Métis culture on the landscape.

Métis-specific important sites, such as overwintering settlements, homesteads, and camp sites, can be identified by the heritage objects that remain on the land. These heritage objects can be distinguished from settler or First Nation material culture by

considering the type of artifacts, such as glass beads, nails and ceramics, in combination with the use of the space at sites, such as the arrangement of materials, can reflect a Métis kinship-based social structure. It is important to note that Métis culture and heritage sites can be impacted in a multitude of ways that are not only material (Dr. Supernant, October, 7 2021).

Historic, sacred, or cultural Métis-specific important sites may be located in the vicinity of the Project area. The D83W project has the potential to impact Métis important sites through changes to access of sites, or perceived changes in access that may deter use of a site. Increased access to an area resulting from the D83W project may result in physical or spiritual disrespect or desecration of Métis Important Sites in areas previously inaccessible. As much of the project right-of-way occurs within a previously disturbed area and no Métis-specific sites have been identified along the right-of-way, risk of site desecration is considered low.

In addition to heritage objects and sites, a key concern shared by the MMF through the FNMEP and past projects has been the lack of available 'unoccupied Crown lands' in southern Manitoba to practice traditional activities. Unoccupied Crown land is considered important to the MMF and Métis Citizens as *"areas where they have access to exercise their Métis rights that does not require permission. On all other land types, the exercise of Métis rights can be restricted from time to time under certain circumstances"* (MMF, 2021). These spaces are critical to Métis culture, livelihoods, rights, claims, and interests.

In the MMF's Métis Specific Interest Report for MMTP (2016), the author writes *"During the selection process for MSIs, there was a consistent concern expressed by Workshop Contributors of having 'enough' land available for the Metis to exercise their rights."* Their report describes how Métis Citizens understand that the granting of an easement to permit the development of a transmission line, moves the land from unoccupied to occupied. It suggests that the easement land is no longer available for the exercise and enjoyment of activities which are important to the Métis Citizens and their culture. Manitoba Hydro understands that an easement does not provide any exclusive right of occupancy to, or use of, the right-of-way to Manitoba Hydro and that the granting of an easement of the nature relevant here, would not move unoccupied Crown land into the category of occupied Crown land. However, Manitoba Hydro acknowledges that Métis Citizens may not share this view. Manitoba Hydro has considered any Crown land without an occupier (as defined by the *Municipal Assessment Act*) as an Important Site. The D83W project has not been routed through any unoccupied Crown land. There are Crown lands adjacent to the Portage Diversion totalling 16.5 ha (41 acres) traversed by the D83W project's right of-way.

8.9.7.5 Heritage resources

Important sites include heritage sites defined by Manitoba's *Heritage Resources Act*. The Province of Manitoba, through the Historic Resources Branch of Sport, Culture and Heritage maintains a database of known heritage resources. The Historic Resources Branch required Manitoba Hydro to screen the Project area for potential impact on known heritage resources within this database, as well as areas having potential for undiscovered heritage resources. The Historic Resources Branch provided results of the screening of preferred route alternatives and determined that the FPR avoids several of the major areas of concern identified during preliminary routing. There are still heritage resource concerns along the FPR, and a Heritage Resource Impact Assessment (HRIA) is required. Any heritage sites/objects identified by the Historic Resources Branch are included in this section.

The purpose of an HRIA is to help identify heritage resources and provide mitigative strategies to protect these resources. It should be noted that due to preservation issues and limitations of sampling techniques, not all heritage resources are discoverable.

The Historic Resources Branch provided a list of all discovered heritage resources located within 5 km of the FPR. The information included Indigenous heritage resources and heritage resources related to the fur trade and settlement periods, which could have importance to Métis Citizens.

There are 57 heritage resources located within 5 km of the FPR. Most of these were discovered during the 1980s by students and staff from the University of Winnipeg. It appears that they spoke to landowners who had archaeological artifacts on their property. Since then, there has been relatively few archaeological surveys in the study area.

Of the known heritage resources, most could not be assigned to a specific time period other than to a Pre-European Contact period. Eight sites were historic/settlement era, three dated to the last 2000 years (Woodland) and seven dated back as far as the Archaic period, which in the Project area, follows the draining of Lake Agassiz.

The historic sites include Oak Point Trail, Lane's Post, Belcourt Mission, Portage Indian Residential School No.1, a women's prison and three farmsteads.

Lane's Post was established by the Hudson's Bay Company (HBC) in 1855, as an experimental farm along a cart trail in the Parish of St. Francois Xavier.

Belcourt Mission was established as an agricultural mission in 1831 with the objective of introducing new religious beliefs and European farming practices to the Indigenous populations in the area.

Other historic farmsteads in the site inventory do not have their history documented. These historic farmsteads could belong to either Métis or European settlers.

The precontact, early contact sites (campsites and isolated finds) make up the bulk of the sites. The majority of the precontact and early contact sites were not tested and mapped because the objective of those surveys was to identify sites located in cultivated fields. Therefore, even the isolated finds may be more significant than indicated in the current site listing. Only four sites are located within 500 m of the FPR. It should be noted that the locational accuracy on early recorded sites is often within 100 m of the true location. As a result, these four sites would need to be resurveyed to confirm location and evaluated as part of the pre-construction heritage assessments.

Table 8-40: Sites located within 500 m of the D83W project final preferred route

Site	Site type	Description
EaLo-1	Isolated find	A small, poorly documented site.
EaLo-4	Isolated find	A small, poorly documented site.
EaLo-6	Isolated find	A small, poorly documented site.
EaLo-7	Campsite	A multicomponent site in an area of flat prairie. Not a very good camping spot, but surprisingly productive of artifacts.

In addition to these heritage resources, there are 14 designated Municipal and Provincial heritage sites, none of which are within 500 m of the FPR. Except for the Flee Island Dakota Entrenchment (EaLm-002), all of the designated sites are representative of the growth of settlements in the area.

Table 8-41: Designated sites within 5 km of the D83W project final preferred route

Locality	Name
St. Francois Xavier	Warkentin Blacksmith Shop
St. Francois Xavier	St. Paul's Anglican Church
Portage la Prairie	Taylor House
Portage la Prairie	Portage la Prairie Canadian Pacific Railway Station
Poplar Point	St. Anne's Anglican Church
Portage la Prairie	St. Mary's la Prairie Anglican Church
Marquette	Robertson House
Poplar Point	Poplar Point and District Memorial Rink
Poplar Point	St. Anne's Anglican Church
Portage la Prairie	Portage la Prairie Dominion Post Office
Portage la Prairie	Portage la Prairie Land Titles Building
Portage la Prairie	Flee Island Dakota Entrenchment
Portage la Prairie	Hill's Drug Store
Portage la Prairie	McCowan House

Although not specifically archaeological sites (some cemeteries can be recorded as such), there are a number of cemeteries within 5 km of the FPR. The dates of first burial reflects the early settlement in this area.

Table 8-42: Cemeteries within 5 km of the D83W project final preferred route

Name	Denomination	First Burial date
Burnside Cemetery	United	First burial 1877.
High Bluff Presbyterian Church	Presbyterian	
St. Margaret's Anglican Cemetery	Anglican	First burial 1873.

High Bluff Municipal Cemetery (Old)	Non-Denominational	First burial 1942. Adjacent to St. Margaret's Anglican Cemetery. Markers destroyed by fire in 1979.
High Bluff Methodist Cemetery	Methodist	First burial 1872.
MDC (Manitoba Developmental Centre) Cemetery	Institutional	First burial 1918.
McKenzie Cemetery	United	First burial 1878.
Prospect Plains Cemetery	Methodist	Has also been incorrectly referred to as "Portage Little Neelin Cemetery". As of spring 2008 this cemetery was undergoing restoration with many of the broken stones being pieced together. First burial 1883.
Setter United Cemetery	United	First burial 1845 [sic., possibly 1876]
St. Anne's Anglican Cemetery	Anglican	First burial 1859.
Poplar Point Cemetery	United	
Prospect Presbyterian Cemetery	Presbyterian	Established 1897.
Iberville Hutterite Colony Cemetery	Hutterite Schmiedeleut	
Maxwell Hutterite Colony Cemetery*	Hutterite Schmiedeleut	
Sommerfield Hutterite Colony Cemetery	Hutterite Schmiedeleut	First burial 1980.
Rosser Cemetery		First burial 1903.

Pigeon Lake Schoenfelder Mennonite Cemetery	Mennonite	First burial 1925
St. Paul Roman Catholic Cemetery; Baie Saint Paul Old Cemetery	Roman Catholic	First burial 1874.
St. Paul's Anglican Cemetery	Anglican	First burial 1913
Marquette Mennonite Brethren Cemetery	Mennonite	First burial 1953
Welch Burial Site		First burial 1876.
Turton Burial Site		
Woodland Hutterite Colony Cemetery	Hutterite Schmiedeleut	First burial 1971
Poplar Point Hutterite Brethren Colony Cemetery	Hutterite Schmiedeleut	

As indicated previously, there has been limited archaeological survey in the study area. Archaeologists have developed an understanding of where pre-contact settlement sites are likely to be located subject to some limitations. This knowledge is expressed in the form of archaeological potential. Areas with archaeological potential are more likely to contain archaeological sites than areas without it; however, there are some caveats to this understanding. The archaeological potential of an area:

- May be difficult to predict for settlement era sites, which are more closely correlated with roads and property boundaries
- May not work well for burials as it takes a large number of sites to build a knowledge base of archaeological potential and the archaeological record does not contain a large number of burial sites. Indigenous Knowledge is often the best source of knowledge on burials.
- Is affected by the archaeological knowledge of a landscape as it is now, rather than the landscape in early post-glacial times. The present day landscape has been modified by the construction of drainage features.

In looking at the D83W project area, the key determinants of archaeological potential are active or relic crossings of streams and rivers. The area of potential would be the banks on either side of the crossing. This understanding was supported by information provided by PFN where they shared heritage concerns in areas of relic oxbows identified north of the Assiniboine River. A review of the FPR indicates at least 16 areas of high archaeological potential. In comparing the areas of potential with the existing sites, almost all of the existing heritage sites are located on the banks of active or relic waterways.

Engagement activities initiated by Manitoba Hydro with landowners in the LAA has provided information that a projectile point was found on River Lot 106 in the Parish of Baie St. Paul. This site has not been registered with the Province and will require field assessment. Continued engagement with landowners to capture additional information on this find, as well as any other heritage information in the PDA will continue throughout the project.

8.9.7.6 Mitigation

The primary mitigation measure for reducing adverse effects to important sites is the routing process. Manitoba Hydro reviewed available geospatial data regarding heritage sites and considered important sites identified through the FNMEP during the routing process. The right-of-way does not cross any known sites.

Manitoba Hydro understands that both Crown and private land contribute to the fulfillment of TLE agreements in Manitoba. The potential effects of routing on both Crown and private lands were considered during the routing process. Manitoba Hydro reviews TLE selections and Addition to Reserve selections through geospatial information (mapping) provided by the Province of Manitoba and through the FNMEP. Any TLE selections within the Project area are identified as areas of least preference during the transmission line routing process. No part of the right-of-way crosses reserve lands or any TLE selections or Addition to Reserve selections.

Manitoba Hydro considered how the MMF value Crown lands without occupiers. Any Crown land without an occupier as defined by the Municipal Assessment Act was considered during routing. No lands of this nature are present in the Project study area.

Manitoba Hydro recognizes that there is a potential for unrecorded important sites to be inadvertently exposed or impacted during either construction or operation and maintenance. The Construction Environmental Protection Plan (CEnvPP) and the Cultural and Heritage Resources Protection Plan (CHRRP) will provide a detailed plan for follow up and monitoring of known and discovered Important Sites during the

construction phase. PFN has recommended that a plain language version of the CHRPP be prepared.

Manitoba Hydro supports implementing the following recommendations related to the CHRPP:

- A CHRPP that describes the protocols to follow if potential culture or heritage sites /objects are discovered will be developed, shared for review to FNMEP participants, and implemented.
- During the February 3, 2022, meeting with PFN, the group discussed expanding Manitoba Hydro's heritage program goals to expand to include working towards reconciliation. Manitoba Hydro will revise the CHRPP to include this goal.
- During the October 7, 2021 Heritage Workshop, Dr. Supernant noted that there is a need for a collective solution in order for communities to get information they need but still protect sites. It was suggested that perhaps a Communication Plan Addendum to the CHRPP be added and circulated to the group for review – this might address the challenge of balancing the need for information and protecting sites. Manitoba Hydro will prepare an addendum to the CHRPP for group review.
- Pre-construction heritage surveys will be conducted with invitations extended to interested FNMEP participants.
- First Nations and the MMF continue to be able to identify sensitive sites in the EPP should any be discovered during construction or operation of the Project. The EPP can identify ways in which adverse effects to Important Sites will be further mitigated.

As mentioned above, there will be no changes in access to important sites within the project development area once construction activities are over. Following construction, the accessibility of important sites will not be diminished.

- During construction activities, information signs and warning markers will be used to identify active construction sites.

Sensory disturbances from construction activities are expected to be short-term and notifications will be sent to FNMEP communities prior to implode use. Manitoba Hydro will continue to work with First Nations and the MMF to better understand the effects of a transmission line on the experience of important sites to determine additional mitigation measures if required.

- Manitoba Hydro will provide notification through the FNMEP prior to construction start and any implode use.

In their BP6/7 report (2021), Long Plain First Nation suggested an additional mitigation measure: *"In regard to any spiritual lodgings or landmarks, we would like the opportunity to consult with local Elders and knowledge-keepers on proper protocol if such an issue were to arise. There are many constructs we use on our spiritual journey through this world including but not limited to, Arbours, Ceremonial Lodges, Rock Paintings and formations etc."*

- If any spiritual lodgings or landmarks are found within the project area, Manitoba Hydro will engage FNMEP communities to provide opportunities for First Nations and the MMF to consult with local Elders and knowledge-keepers to find appropriate mitigation measures.
- Manitoba Hydro will support recommendations of ICACs for appropriate locations to host ceremonies for the D83W project, such as the Four Winds Cultural Center site.
- Manitoba Hydro will reach out to First Nations and the MMF to arrange pre-construction and post-construction ceremonies to acknowledge the land and spirits that will be affected by the D83W project. Manitoba Hydro will also reach out to discuss heritage monitoring opportunities.
- The CHRPP will be provided to DTFN and any concerns / comments will be discussed at the community request.
- First Nation and Métis participants will be invited to observe construction activities at a frequency commensurate with construction activities.
- DTFN, and other Indigenous communities engaged on the D83W project, will be notified if any artifacts are encountered during project construction.

8.9.7.7 Characterizing residual effects

Manitoba Hydro anticipates the severity of the D83W project's residual effects on important sites will vary between cultural groups. Therefore, D83W project effects have been characterized for each cultural group separately below. Information about methodology and definitions related to characterizing residual effects is included in Chapter 6.

8.9.7.7.1 Anishinaabe-specific important sites residual effects

Although the right-of-way does not overlap any known Anishinaabe important sites, Manitoba Hydro recognizes there is the potential for the D83W project to encounter important sites during development. Potential effects of the D83W project on important sites include:

- Unknown heritage sites and values of the land may be impacted

- Concerns about the process for protecting important sites, including heritage resources, may remain
- Decrease in the desirability of land for TLE selection
- Changes to access to important sites during construction and occasionally during operation
- Changes in the experience at important sites due to sensory disturbances, auditory (corona, implodes), visual (presence of the transmission line), and
- Diminishment of the experience at important sites due to perceived impacts of EMF

Considering the mitigation measures that Manitoba Hydro will implement, the effects of the D83W project on Anishinaabe important sites have been characterized as follows:

- Direction: Adverse
- Magnitude[6]: Moderate
- Geographic Extent: Local Assessment Area
- Frequency: Potential for intermittent disruptions to unknown Important Sites; Potential continual disruption to the experience of Important Sites and desirability of nearby land for TLE selection
- Durability: Short-term for physical disruption; Long-term for impacts to experience and TLE desirability
- Reversibility: Permanent

8.9.7.7.2 Dakota-specific important sites residual effects

Although the right-of-way does not overlap any known Dakota important sites, Manitoba Hydro recognizes there is the potential for the D83W project to encounter important sites during development. Potential effects of the D83W project on important sites include:

- Unknown heritage values of the land may be impacted
- Concerns about disruption to the spirits of the land
- Concerns about the process for protecting important sites

[6] Low: There have been no Important Sites identified along the FPR, but the Project has potential to modify or impact undiscovered Important Sites.
Moderate: There have been no Important Sites identified along the FPR, but the Project has potential to modify or impact undiscovered Important Sites and may impact culturally-specific interests and experiences related to Important Sites in the RAA.
High: Known Important Sites are located along the FPR and will be physically modified by the Project.

- Changes to access to important sites during construction and occasionally during operation
- Changes in the experience at important sites due to sensory disturbances, auditory (corona, implodes) and visual (presence of the transmission line)
- Diminishment of the experience at important sites due to perceived impacts of EMF

Given that Manitoba Hydro is adopting the above-described mitigation measures, the effects of the D83W project on Dakota important sites have been characterized as follows:

- Direction: Adverse
- Magnitude: Moderate
- Geographic Extent: Local Assessment Area
- Frequency: Potential intermittent disruptions to unknown important sites; Potential for continual disruption to the experience of Important Sites and disrespect to spirits
- Durability: Short-term for physical disruption; Long-term for impacts to experience and spirits
- Reversibility: Permanent

8.9.7.7.3 Métis-specific important sites residual effects

Although the right-of-way does not overlap any known Métis important sites, Manitoba Hydro recognizes there is the potential for the D83W project to encounter important sites during development. Potential effects of the D83W project on important sites include:

- Unknown heritage values of the land may be impacted.
- Concerns about the process for protecting heritage resources.
- Changes to access to important sites during construction and occasionally during operation
- Changes in the experience at important sites due to sensory disturbances, quietude (corona, implodes) and visual (presence of the transmission line)
- Diminishment of the experience at important sites due to perceived impacts of EMF

Given that Manitoba Hydro is adopting the above-described mitigation measures, the effects of the D83W project on Métis important sites have been characterized as follows:

- Direction: Adverse
- Magnitude: Low

- Geographic Extent: Local Assessment Area
- Frequency: Potential for intermittent disruptions to unknown important sites; Potential continual disruption to the experience of and preference for important sites
- Durability: Short-term for physical disruption; Long-term for impacts to experience and preferences
- Reversibility: Permanent

8.9.7.8 Follow up and monitoring

Manitoba Hydro will continue to work with interested First Nations and the MMF to mitigate the above noted effects.

Manitoba Hydro will provide opportunities for First Nations and the MMF to inform the CHRRP.

Manitoba Hydro will reach out to First Nations and the MMF to invite them to observe construction activities at a frequency commensurate with construction activities and will reach out to arrange pre- and post-construction ceremonies for those interested.

8.9.8 Collective effects and cumulative effects to harvesting and important sites

Manitoba Hydro heard that the manner in which cumulative effects are typically assessed in impact assessments is too narrow, and that a broader set of socio-political events and policies over a longer period of time should be considered. The below section assesses cumulative effects to harvesting and important sites and expands on the methodology used for other VCs in this assessment to include a narrative of events that may contribute to cumulative impacts to harvesting and important sites.

When contemplating the different effects that may occur as an outcome of residual project effects and cumulative effects to harvesting and important sites, a collective effect termed the cultural landscape was established.

8.9.8.1 Cumulative effects

The D83W project residual effects on harvesting and important sites are likely to interact cumulatively with residual effects of other physical activities occurring in the RAA and beyond. Other valued components (e.g., vegetation and wildlife and wildlife habitat) also may also contribute to the understanding of effects on harvesting and important sites. This section describes the resulting cumulative effects to harvesting and important Sites.

Manitoba Hydro understands that views on how to understand and describe cumulative effects to harvesting and important Sites may change based on cultural backgrounds and preferences. Through the FNMEP, Manitoba Hydro understood that in addition to the physical activities described in Table 6-2, a more inclusive list of projects, policies, legislation, and world events contribute to how cumulative effects are experienced by First Nation people and Métis Citizens in the area. An additional discussion is included that references these events and how they may impact connections to the land in the area (see Figure 8-4).

Figure 8-5: Collective effects timeline

Timeline

Events that may contribute to a disconnection with the cultural landscape

The fur trade

Beginning in the 1600s and extending for 250 years, the fur trade brought significant changes to the way of life of many First Nations peoples and communities as people adapted to new tools and a more commercially driven way of life (Royal Commission on Aboriginal Peoples, 1996). From their 2016 MLOUS report the MMF share how "*The Metis Nation in general, and in southern Manitoba in particular, finds its earliest roots in the fur trade. In the eighteenth century, both the Hudson Bay Company and the Northwest Company created a series of trading posts that stretched across the upper Great Lakes, through the western plains, and into the northern boreal forest. Inevitably, unions between European men — explorers, fur traders, and pioneers — and indigenous women were consummated. More remarkably, however, was that "[w]ithin a few generations the descendants of these unions developed a culture distinct from their European and Indian forebears" and the Metis Nation was born — a new people, indigenous to the western territories*." (pg. 40)

15th Century

During the Pope's visit to Canada in July of 2022 discussion arose about the Doctrine of Discovery, a series of Papal Bulls (formal statements from the Pope) originating in the 1400s that divided up "uncivilized" Indigenous lands for European powers. The principles of this doctrine made its way into Canadian law in the 1880s through the *St. Catherine's Milling* decision and supported colonization and the dispossession of sovereign Indigenous nations from their large territorial lands to the British and Canadian colonial governments. Past and ongoing colonial and assimilative strategies that have served to disconnect, relocate, and displace First Nation and Métis people from the land within the Project area can draw a through line to this early doctrine.

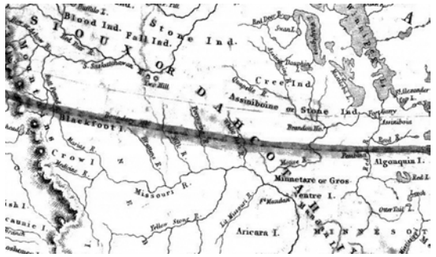
1738 - Fort la Reine

In 1738, La Vérendrye built Fort la Reine by the Assiniboine River and just west of the Yellowquill Trail (near present-day Portage la Prairie). The Fort was used for fur trading and as a base for further exploration of the Canadian prairies.

19th Century – Eradication of the buffalo

Eradication of the buffalo led to starvation and loss of culture, ultimately having "a profound influence on the lives of Indigenous peoples" (Phillips, 2018). Political views at the time encouraged hunting for safer train passage and it was understood that if the buffalo were decimated, the Indigenous people on the prairie would be more "submissive without their main source of subsistence." The Project area is within the lands previously inhabited by buffalo.

1862 - Dakota War



After the Dakota War of 1862 and the U.S. government expelling the Dakota Sioux from Minnesota and abolishing their reservations, many Sioux families entered what is now Manitoba and settled in and around the town of Portage la Prairie. With the arrival of settlers, the Sioux sought to secure a land base by asking the lieutenant governor for a reserve. The federal government, saw the Sioux as 'U.S. Indians' without rights in the territory and did not want to cede any land to them before settling with the Ojibway people (also called Saulteaux, Anishinaabe, or Chippewa) of southern Manitoba. *"[The Sioux] cannot justly be treated on the same footing as the Chippewas, Crees, and other tribes of the North-West, but it is open to doubt whether it is advisable to leave them entirely uncared for when the absence of game, the scarcity of grain, or other causes tend to reduce them to a starving and therefore desperate condition*," the Indian commissioner wrote in an 1871 dispatch (Simpson, 1871). After Treaty 1 was reached with Ojibway and Cree representatives, the government offered reserves to the Sioux in Sioux Valley, Birdtail Creek, Oak Lake (Canupawakpa) and to reserves in Saskatchewan. A number of families decided to stay in Sioux Village (Lot 99) and in 1893, they bought 26 acres of land there, using white settlers as proxies for the purchase. (https://thechildrenremembered.ca/school-histories/portage-la-prairie/#ftn3-ref accessed Oct 4, 2022)

1871 – Treaty 1

In 1871, Treaty 1 was signed. Treaty 1 was the first numbered treaty signed in Canada between the Crown and the Anishinaabe and Swampy Cree of southern Manitoba. Treaties are intended to be solemn agreements that set out promises, obligations and benefits for both parties. While First Nations understood (and currently understand) the Treaties to be a series of negotiations through which they safeguarded their languages, traditions and cultures, while also agreeing to share the land with Canadians, the federal government may see Treaties as contracts in which First Nations "ceded" territories to the Crown in exchange for specific rights such as the continued rights to hunting, fishing, trapping and harvesting. Some Treaty 1 nations feel that the spirit of the agreement and any oral commitments that were made are more important than the written text and that the spirit of the agreement has not been met. In their 2015 report, Roseau River Anishinabe First Nation shared that "*When Treaty (1) was signed in 1871, people were forced to move into a parcel of land selected by the Government and were not allowed to live elsewhere. Anyone who did not abide by this law, were arrested or forced back to this parcel of land called the reserve. The customs and traditions of the Ojibway were still practiced but in secrecy*."

1885 – Métis Scrip

1885, the federal government offered Métis families what was called 'scrip' in exchange for their land title. Scrip could be issued as land scrip (typically a quarter section of land), or it could also be issued as money scrip, valued at $160 or $240. Métis people were moved to create space for European settlers with the vision of reaching Canada's 'manifest destiny', as noted in a letter from Sir John A. MacDonald (MLOUS, 2016). Métis identity has been challenged through the creation of provincial and territorial boundaries, including changes to pre-existing Indigenous geographies.

Treaty Land Entitlement

Some First Nations within the Project area may not have received all the land they were entitled to under Treaty 1 and have outstanding Treaty Land Entitlement (TLE), or land that which is owed to First Nations under the treaties signed with the Government of Canada. Communities with outstanding TLE included in the FNMEP are Brokenhead Ojibway Nation and Peguis First Nation (from https://www.sac-isc.gc.ca/eng/1305306991615/1611939771671 accessed October 5, 2022). Peguis First Nation continues to share concerns about outstanding Treaty Land Entitlement, including within the Project area.

1876 – The Indian Act

The Indian Act, first introduced in 1876, is a Canadian federal law that governs in matters pertaining to Indian status, bands, and Indian reserves. A new version of the Act was passed in 1951, and since then, has been amended several times, with changes mainly focusing on the removal of discriminatory sections. It is an evolving, paradoxical document that has enabled trauma, human rights violations and social and cultural disruption for generations of Indigenous peoples. The Indian Act has also enabled the government to determine the land base for nations in the form of reserves, and defines who qualifies as 'Indian' in the form of Indian status. The Act outlawed traditional governance systems in favour of Band Chief and Councils with governing authority limited to Indian Reserve land. The Act also restricted Indigenous peoples from voting in federal elections until 1960, continued to take up and put laws on Indigenous land, and enfranchised those First Nations (especially women) who the government deemed to no longer have "status" (Assembly of First Nations, 2021c).

Residential Schools

Residential Schools were created under the *Indian Act* as a tool of assimilation. Indigenous children were forcefully sent to institutions where they would "have their hair cut, their language killed, their relationships with family and community severed, their sense of belonging destroyed, and their physical, emotional, mental and spiritual health compromised" (Assembly of First Nations, 2021c). Many of these students never returned. Residential Schools were characterized by the Truth and Reconciliation Commission as a cultural genocide and "*a systematic, government-sponsored attempt to destroy Aboriginal cultures and languages and to assimilate Aboriginal peoples so that they no longer existed as distinct peoples*."

To the best of our knowledge, there was one residential school and four 'Indian' day schools in the Project area. Built in 1914-1915, the former Portage La Prairie Indian Residential School is located on Keeshkeemaquah Reserve, part of the reserve lands of Long Plain First Nation. Parks Canada and Long Plain First Nation worked collaboratively to identify the historic values of this former residential school. The school closed in 1975 and six years later, the building and its surrounding lands were transferred to Long Plain First Nation to fulfill part of their treaty land entitlement.

1872 – The Dominion Lands Act

In 1872, the Dominion Lands Act was signed, which outlined specific policies to encourage homestead settlement throughout the west. This Act allocated *"millions of prairie acres for homesteads, railway construction, and colonization companie*s" (Brglez, 2021). As a result, hundreds of thousands of settlers moved into the region. Canada intended to use natural resources and lands in the west to promote Western settlement and railway construction. The Act outlined a standard measure for surveying and subdividing land. The Dominion land survey divided the prairie lands into square townships. Each township comprised of 36 sections, where each section contained 640 acres (260 ha), which were further broken down into 160 acre (65 ha) quarter-sections.

This division of the landscape led the way for the development of infrastructure along this square grid, including roads, drains, towns and sometimes, transmission lines. The Project area is characterized by this grid system supporting agricultural development. Where the Project area was once a native prairie landscape with meandering waterways that included the Assiniboine River, native prairies were converted to agricultural lands, then by urban and rural settlements and public infrastructure. As a result of this physical change, there has been a gradual displacement of natural features and heritage features that may have remained on the land. Lands cleared of standing vegetation for development, conversion to agriculture and roads have acted cumulatively to affect heritage sites and objects either by partially disturbing or completely removing the site. Most of these activities took place before heritage legislation was enacted to manage and protect archaeological resources.

1988 – The Environment Act

With the enactment of The Environment Act in 1988, environmental assessment became a legislated requirement for certain types of development in Manitoba. The consideration of cumulative effects is central to environmental assessment as a tool for sustainability, particularly in areas where multiple large-scale projects operate or are planned. It is acknowledged as a best practice, but cumulative effects assessment is methodologically complex and there are challenges to its effective implementation. Manitoba's Environment Act and regulations are silent on the need for cumulative effects assessment at either the development or strategic level; however, it is not uncommon for proponents to address cumulative effects in their applications, such as this one.

2021 – Unmarked graves

Since the Tk'emlups te Secwepemc announced in May of 2021 that the remains of as many as 215 children were found using ground-penetrating radar around the former Kamloops Indian Residential School in British Columbia, heritage concerns in the Project area increased dramatically. Manitoba Hydro is learning new ways to better include First Nation and Métis input in all aspects of understanding heritage concerns and values.

2021 – UNDRIP Act

On June 21st, 2021, the United Nations Declaration on the Rights of Indigenous Peoples Act received Royal Assent and came into force. This Act provides a roadmap for the Government of Canada and Indigenous peoples to work together to implement the Declaration based on lasting reconciliation, healing, and cooperative relations. Through 24 preambular provisions and 46 articles, UNDRIP affirms and sets out a broad range of collective and individual rights that constitute the minimum standards to protect the rights of Indigenous peoples and to contribute to their survival, dignity and well-being. Article 32 (2) of UNDRIP provides that "states shall consult and cooperate in good faith with the Indigenous peoples concerned through their own representative institutions in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources, particularly in connection with the development, utilization or exploitation of mineral, water or other resources."

1982 – The Constitution Act

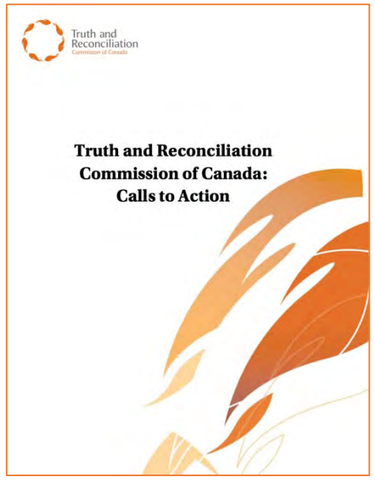
The Constitution Act, 1982 enshrined the Charter of Rights and Freedoms into Canada's Constitution. Section 35 of the Act protects Aboriginal and Treaty rights and requires the Crown to act honourably in all its dealings with Indigenous peoples. Canadian courts, including the Supreme Court of Canada have made judgments clarifying the meaning of Section 35. One element of these judgments is the recognition that the Crown has a legal duty to consult with Aboriginal peoples about any decision or action that might adversely affect the exercise of an Aboriginal or Treaty right, before taking that action or making that decision.

The duty to consult is generally triggered in relation to decisions or actions that have the potential to adversely affect lands and resources utilized to exercise Aboriginal or Treaty rights such as hunting, fishing and trapping for food.

The Manitoba government recognizes that the Crown has a duty to consult in a meaningful way with Indigenous communities when any proposed provincial decision or action may adversely affect the exercise of an Aboriginal or Treaty right of that Indigenous community. The Crown will ensure that potential adverse effects of the decision or action on the

2007 - 2015 – TRC

Between 2007 and 2015, the Truth and Reconciliation Commission (TRC) provided those directly or indirectly affected by the legacy of the Indian Residential Schools system with an opportunity to share their stories and experiences. The TRC spent 6 years travelling to all parts of Canada and heard from more than 6,500 witnesses. The TRC developed a guiding set of ten principles for truth and reconciliation that are applicable to advancing the process of reconciliation in Canada and made 94 Calls to Action.



2021 – MMF-Canada Agreement

On July 6, 2021 the MMF signed the Manitoba Métis Self-Government Recognition and Implementation Agreement with Canada at Upper Fort Garry. The agreement provided immediate recognition of the MMF as the democratically elected Métis Government for the Red River Métis.

2016 – The Path to Reconciliation Act

In 2016, the Government of Manitoba passed The Path to Reconciliation Act, which sets out the government's commitment to advancing reconciliation that is informed by, but not limited to the TRC calls to action.

8.9.8.1.1 Project residual effects likely to interact cumulatively

The residual D83W project effects identified for harvesting include effects of the D83W project on harvesting to First Nation people, including Anishinaabe and Dakota community members who use the project area including:

- Restricted localized access to the PDA during construction and periodically during operational maintenance activities resulting in temporary suspension of harvesting activities, including rights-based harvesting;
- A decreased preference to harvest near the transmission line may occur due to a perception that the effects of EMF may be harmful;
- The harvesting experience may be altered by the presence of the transmission line.

As well, Métis-specific effects on harvesting for Métis Citizens who use the project area to include:

- Restricted localized access to the PDA during construction and periodically during operational maintenance activities resulting in temporary suspension of harvesting activities, including Métis rights-based harvesting;
- Diminished preference to conduct harvesting during operation of the D83W project due to a change in aesthetics, quietude and perceived risk of EMF;
- Decrease in knowledge of harvesting due to decreases in the practice of harvesting in the local project area; and
- Decrease in harvesting success.

The D83W project occurs in a region where native ecology has been substantially changed as a result of human development. Much of the original native prairie landscape has been converted to agricultural lands. Currently, approximately 81% of the RAA is under agricultural cropping. Remnants of the natural landscape in the form of riparian areas or small treed areas remain scattered throughout the RAA. The D83W project's contribution to cumulative effects will be taking place within a disturbed landscape. Through FNMEP we understand that harvesting does occur in the RAA; however, use is limited due to the scarcity of Crown land and access restrictions to potential harvesters on private lands.

Understanding the changes that have taken place in the Project area over time is relevant to understanding effects that may result from D83W project and the cumulative effects resulting from past, current, and future projects. The timeline provided in Figure 8-5 illustrates major events or periods that contribute to the past and present narrative of change to the cultural landscape; a change that impacts the connection and importance of places, cultural practices, and traditional knowledge for Indigenous peoples. Manitoba Hydro also understands that truth-telling and

education regarding our colonial histories that shape our project approval systems are initial steps to support reconciliation. Figure 8-5 is a non-exhaustive summary of major events or periods of change to the geographical and political environments that have taken place in the Project area, which have ultimately affected the landscape and the relationships Indigenous peoples have with land in the Project area.

Prior to arrival of early settlers, harvesting activities such as hunting, fishing trapping, gathering traditional plants were central to the way of life for Indigenous peoples in the area. Different Anishinaabe, Cree, Ojibway-Cree and Dene bands lived, camped and traveled throughout the RAA. In addition to the sustenance provided by successful harvests, the act of harvesting provided a sense of community, culture, and spiritual connection to the land. Since colonialization the traditional economies of these communities has changed dramatically. Bands who once followed the movement patterns of wildlife were required to live on reserves. Eradication of the buffalo removed a main source of food, fur and housing, and with that loss came a loss of community autonomy. With the Dominion Lands Act, settlement of this part of the Canadian prairies resulted in homesteading and settlers moved into the region. The Dominion land survey divided the prairie lands into square township grids, which made way for infrastructure development along those surveyed townships. Agriculture on private lands expanded in the region, created barriers to harvesting by both increasing land access restrictions and by reducing the success of harvesting due to the conversion of natural habitat to cultivated lands that changed habitat for native species in the region.

More recently, agriculture and agricultural support industries have grown in the Portage la Prairie area. The area is a major center for strawberry and potato production and supports the worlds largest pea-protein processing plant (Roquette Pea Plant). In addition to agricultural land use, there are other activities and projects that occur in the RAA. The RAA includes existing industrial sites located in the Poplar Bluff Industrial Park (including Simplot and the Roquette Pea Plant), the TransCanada highway, located south of the right-of-way, and the Portage Diversion. There are existing transmission lines, railways, airstrips, and recreational activities that occur within the RAA, including recreational and commercial hunting. This development further displaces harvesters from accessing lands suitable for harvesting.

The assessment of D83W project effects on vegetation (Section 8.7) identified that the D83W project has the potential to interact cumulatively with other projects and permanently reduce any treed areas, shelterbelts, and private forestland during the construction phase. Traditional use plant species may exist within these vegetated areas.

The assessment of D83W project effects on wildlife and wildlife habitat (Section 8.8) noted that the D83W project will contribute wildlife mortality risk and sensory disturbance at a small magnitude over a medium-term duration in the RAA.

Recreational hunting, particularly for waterfowl, is prevalent in the RAA and there is potential for interactions with rights-based Harvesting activities.

In addition to past projects, residual effects of the D83W project on harvesting have the potential to act cumulatively with future planned projects. For the purposes of this assessment, we have assumed the residual project effects overlap with the residual effects of all projects listed in Table 6-4.

All future projects have potential to interact with the effects of the D83W project where more infrastructure on the landscape may impact harvesting.

In their Manitoba Métis Specific Concerns (Unconcluded) (2021) report, the MMF includes that *"Métis concerns identified through past studies … are evidence of the potential for impact to the Métis way of life due to the cumulative impacts of the proposed D83W project in addition to the PACE and BP6/BP7 project and other development components in the project area. The cumulative effects of these components and others before it, have the potential to significantly impact Métis Citizens' Constitutionally protected rights to harvest, and any further impact on these rights, claims or interests needs to be adequately and appropriately assessed and, if necessary, accommodated and mitigated for"* (Manitoba Métis Federation, 2021).

Many of the proposed future projects planned in the area will be built upon this previously disturbed environment. Through the FNMEP, First Nation and Métis representatives in the area have indicated the importance of retaining remaining pockets of intact natural vegetation in the project area, particularly along the Assiniboine River; however, no traditional plant species were identified along the right-of-way.

Construction related effects on vegetation related to future projects include clearing, the potential to spread non-native/invasive plants and loss of wetland vegetation. There may be further land conversion for agricultural purposes and additional industrial park developments on undeveloped landscapes in the RAA; however, much of the area is already converted. Any further land conversion may decrease the preference of harvesters to practice rights-based harvesting in the area.

These future projects will contribute additional sensory disturbances that may act cumulatively with a change in the harvesting experience. Additional runways, irrigation structures and processing complexes that may create noise and aesthetic

changes to the landscape may further contribute to a decreased preference to harvest in the area.

Other feedback related to cumulative effects shared through the FNMEP included an interest from PFN to host climate change workshops with other Indigenous communities in the area. SLFN also expressed interest in climate change discussions. Climate change is playing an increasingly significant role in influencing harvesting activities because of its impact to long term weather patterns that may influence flood events, precipitation, frost free days and maximum temperatures in the area – factors that may influence wildlife and plant species harvested in the area.

The MMF also shared concerns about cumulative effects to agriculture, particularly to Citizens with smaller agricultural operations said to be likely "to experience a greater relative impact to the loss of lands, while imposing tougher personal financial decisions due to having smaller margins and capital than larger agriculture producers in the area… With the recent drought conditions of 2021 causing significant financial burden to our farmers and ranchers, the MMF has a multitude of concerns that must be further addressed regarding the impacts of this new transmission line. These concerns go beyond those previously addressed by the MMF and must continue to be identified and monitored to avoid all financial and cultural impediments." (MMF, 2021) Cumulative effects on agriculture have been assessed in Section 8.1.5.

Although the D83W project's contribution to cumulative effects to harvesting is small due to routing within previously developed lands and the limited change to access associated with the project, understanding the full context of impacts to harvesting over time is important for potentially affected harvesters.

8.9.8.1.1.1Mitigation for cumulative effects to harvesting

In addition to the measures described in Section 8.9.6.5, Manitoba Hydro has identified the following additional mitigation measures to mitigate cumulate effects to harvesting.

- Manitoba Hydro has adopted a pre-disturbance condition as the historical temporal limit. When assessing impacts to harvesting a more inclusive temporal boundary was adopted to accommodate this view.
- Please see Section 8.9.6.5 for information on mitigation related to harvesting.

8.9.8.1.1.2 Monitoring for cumulative effects to harvesting

- Based on the FNMEP and experience on past projects, Manitoba Hydro will further discuss interests in First Nation and Métis monitoring with First Nations and the MMF.

Table 8-43 summarizes Manitoba Hydro's interpretation of potential residual cumulative effects on Harvesting due to the Project and other past, present, and future projects.

Table 8-43: Residual cumulative environmental effects characterization on harvesting

Cumulative Effect	Direction	Magnitude	Geographic Extent	Duration	Frequency
First Nation Residual Cumulative Effects					
Restricted localized access to the PDA to First Nation Harvesters					
Construction and Operation	A	S	PF	ST	R/C
A decreased preference harvest near the transmission line due to a perception that the effects of EMF may be harmful					
Construction and Operation	A	S	PF	LT	R/C
Altering the First Nation harvesting experience					
Construction and Operation	A	M	L	LT	R/C
Métis-Specific Residual Cumulative Effects					
Restricted localized access to Métis Citizens in the PDA					
Construction and Operation	A	S	L	LT	R/C
A diminished preference for Métis Citizens to conduct harvesting					
Construction and Operation	A	M	L	LT	R/C
Decreased knowledge of harvesting due to decrease Métis harvesting practice in the area					
Construction and Operation	A	M	L	LT	R/C
Decrease in Métis harvesting success					
Construction and Operation	A	M	L	LT	R/C

Direction: *P: Positive; N: Neutral; A: Adverse* ***Magnitude:*** *S: Small; M: Moderate; L: Large*	***Geographic Extent:*** *PF: Project Footprint; L: Local; R: Regional*	***Duration:*** *ST: Short-term; MT: Medium-term LT: Long-term*	***Frequency:*** *I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous* ***Reversibility:*** *R: Reversible; IR: Irreversible*

8.9.8.1.2 Project residual effects and cumulative interactions with important sites

The residual project effects identified for important sites include indirect and direct effects of the D83W project on important sites to First Nation people. Although the right-of-way does not overlap with any known Anishinaabe, Dakota or other First Nation Important Sites, residual effects of the project include:

- Unknown heritage sites and values of the land may be impacted.
- Concerns about the process for protecting important sites, including heritage resources remain.
- Decrease in the desirability of land for TLE selection.
- Changes to access to important sites during construction and occasionally during operation.
- Changes in the experience at important sites due to sensory disturbances, auditory (corona, implodes) and visual (presence of the transmission line).
- Diminishment of the experience at important sites due to perceived impacts of EMF, and
- Concerns about disruption to the spirits of the land.

Although the right-of-way does not overlap any known Métis important sites, Manitoba Hydro recognizes there is the potential for the D83W project to encounter important sites during development. Residual effects of the D83W project related to Métis-specific important sites include:

- Unknown heritage values of the land may be impacted.
- Concerns about the process for protecting heritage resources.
- Changes to access to important sites during construction and occasionally during operation.
- Changes in the experience at important sites due to sensory disturbances, quietude (corona, implodes) and visual (presence of the transmission line), and
- Diminishment of the experience at important sites due to perceived impacts of EMF.

Many of the proposed future projects planned in the area will be built upon a previously disturbed environment, reducing the likelihood of interactions with future projects.

Table 6-4 summarizes other past, present and future projects and activities and their potential interaction with important sites. Changes in the landscape over time that have contributed to cumulative effects to harvesting also contributed to a diminished experience at important sites.

Lands cleared of standing vegetation for conversion to agriculture, livestock operations, cropping and land drainage, have acted cumulatively in the past to affect tangible and intangible heritage sites either by partially disturbing or completely removing the site. Agricultural conversion has had the largest footprint and was primarily done before heritage legislation was enacted to manage and protect archaeological sites. None of these past activities has interacted with known cemeteries.

A number of developments have been proposed for in the RAA that will overlap spatially and temporally with the D83W project. Projects that are likely to cause ground disturbance include the hazardous waste depot, rural water pipelines, agricultural processing complex, industrial park expansion and the Wash'ake Mayzoon station.

Future industrial development projects may reduce the appeal of lands for TLE selections. This reduction on TLE selection value will act cumulatively with the D83W project's residual effect to important sites.

8.9.8.1.2.1Mitigation for cumulative effects to important sites

Active monitoring of project potential effects on heritage sites / objects will occur during construction, and any effects will be addressed through implementation of the mitigation measures documented in the project specific CEnvPP and the CHRPP.

In addition, other proponents in the project area are also responsible for reporting project activities to Manitoba Environment, Climate and Parks and the Historic Resources Branch, and these regulators can inform Manitoba Hydro if it appears that there are unanticipated adverse cumulative effects occurring. The Historic Resources Branch also reviews land-based developments through the heritage resource impact assessment program as mandated by the *Heritage Resources Act*. Therefore, additional mitigation for cumulative effects is addressed by the provincial regulators as they determine whether future projects will require heritage investigations. The future projects proposed within the project footprint and the local assessment area

are primarily located on lands that have already been altered by agricultural and development activities.

8.9.8.1.2.2Residual cumulative effects to important sites

The future projects proposed within the RAA are primarily located on lands that have already been altered by agricultural activities. Therefore, residual cumulative effects for change in Important sites are anticipated to be minimal. No residual cumulative effects are anticipated within the RAA.

8.9.8.1.2.3Monitoring for cumulative effects to important sites

Monitoring of D83W project activities will include observations for heritage sites / objects during construction, and any effects will be addressed through implementation of the mitigation measures documented in the project-specific construction environmental protection plan and the CHRPP.

First Nations and the MMF will be invited to take part in monitoring related to important sites during relevant pre-construction and construction activities.

Table 8-44 summarizes Manitoba Hydro's interpretation of potential residual cumulative effects on important sites due to the D83W project and other existing and future projects.

Table 8-44: Residual cumulative environmental effects characterization on important sites

Cumulative effect	Direction	Magnitude	Geographic extent	Duration	Frequency	Reversibility
First Nation residual cumulative effects						
Unknown heritage sites and values of the land may be impacted						
Construction and Operation	A	S	L	ST	R/C	I
Concerns about the process for protecting Important Sites, including heritage resources remains						
Construction and Operation	A	S	PF	LT	R/C	R
Decrease in the desirability of land for TLE selection						

Construction and Operation	A	S	PF	LT	R/C	R
Changes to access to Important Sites						
Construction and Operation	A	S	PF	LT	R/C	R
Changes in the experience at Important Sites due to sensory disturbances, auditory (corona, implodes) and visual (presence of the transmission line)						
Construction and Operation	A	S	L	LT	R/C	R
Diminishment of the experience at Important Sites due to perceived impacts of EMF						
Construction and Operation	A	S	PF	LT	R/C	R
Concerns about disruption to the spirits of the land						
Construction and Operation	A	M	L	LT	R/C	I
Métis-Specific Residual Cumulative Effects						
Unknown heritage values of the land may be impacted						
Construction and Operation	A	S	L	LT	R/C	R
Concerns about the process for protecting heritage resources						
Construction and Operation	A	S	L	LT	R/C	R
Changes to access to Important Sites during construction and occasionally during operation						
Construction and Operation	A	S	L	LT	R/C	R
Changes in the experience at Important Sites due to sensory disturbances, quietude (corona, implodes) and visual (presence of the transmission line)						
Construction and Operation	A	M	L	LT	R/C	R
Diminishment of the experience at Important sites due to perceived impacts of EMF						

Construction and Operation	A	M	PF	LT	R/C	R

Direction: *P: Positive; N: Neutral; A: Adverse* ***Magnitude:*** *S: Small; M: Moderate; L: Large*	***Geographic Extent:*** *PF: Project Footprint; L: Local; R: Regional*	***Duration:*** *ST: Short-term; MT: Medium-term LT: Long-term*	***Frequency:*** *I: Infrequent; S/I: Sporadic/Intermittent; R/C: Regular/Continuous* ***Reversibility:*** *R: Reversible; IR: Irreversible*

8.9.8.2 Summary of cumulative effects on harvesting and important sites

Land in the RAA has been modified through agricultural conversion and, to a lesser extent, industrial and residential development over the past 150- 200 years. These changes have occurred alongside broader socio-political events that have contributed to the disconnection of harvesters from the landscape and have potentially impacted Important sites. Although the D83W project's contribution to residual cumulative effects to Harvesting is not anticipated to be measurable or create conditions that would be different than current conditions, Manitoba Hydro understands that acknowledging this broader change is important in its assessment.

It is anticipated that much of the D83W project's contribution to the cumulative effects, including changes to harvesting and important sites will be adverse. Effects will be potentially moderate in magnitude when contemplated over the broader span of time. The effects will extend to the local area for the long term and be regular/continuous until decommissioning. The effects will be potentially irreversible if a heritage find is impacted.

Through conversations during the FNMEP, Manitoba Hydro came to understand that there exists a unique type of project effect that cannot effectively be characterized by assessing effects on individual valued components of the environment separately. There are ways in which our projects may have impacts related to the multi-faceted and interconnected relationship between different components of the environment that may be missed when looking only at individual valued components of the environment and linear effects pathways. The overall environment, the past and present relationships people have with their environment (through the broad lens of land), and the way they experience the environment in the Project area may be changed even if individual valued components assessments found expected impacts to be negligible or low. This effect is described below under Cultural landscape – a collective effect.

8.9.9 Cultural landscape – a collective effect

Cumulative effects assessment looks at incremental, compounding disturbances that can cause landscape change due to multiple projects occurring across time. Manitoba Hydro has learned through discussion with First Nations and the MMF and recent literature (Ehrlich, 2021), that another type of effect may be experienced by projects like D83W, one that is built on the foundational understanding that environment, culture, spirits, and identity are interwoven and arises from an individual project when individuals, groups, or nations simultaneously experience multiple effects of the Project, rather than effects to only one valued component in isolation. Taking a systems thinking approach as a way to better assess the collective effects of impacts arising from an individual project may work to better describe effects.

For example, First Nations peoples and Métis Citizens living or harvesting in the D83W project area may concurrently experience loss of harvesting areas, loss of food sources, changes to access and experience at sites of traditional and cultural importance, an interruption of the ability to transmit knowledge through harvesting in the D83W project area, a loss of quietude, a change to the visual landscape, a multi-faceted sense of stress that may occur due to a perceived change in long term access to an area and perceived risk due to the presence of the transmission line. Different individuals or cultural groups may experience a different combination of effects arising from the D83W project.

When contemplating how to assess the D83W project's effects on the Cultural Landscape, Manitoba Hydro reviewed current literature on cultural landscapes, including those provided by Peguis First Nation on previous projects (Miller & Davidson-Hunt, 2010), asked questions of FNMEP community representatives and sought to understand assessment practices that may better suit this concept.

While many of these events and activities described in this section have been immensely harmful to and impactful to First Nations people, Métis Citizens, and their traditional lands, it is important to note that the land overlapped by the project area is not singularly defined by the inflicted damage. Indigenous peoples' resilience in the face of change continues to grow. Globally and within Canada there are increasing efforts to protect Indigenous rights (UNDRIP, calls for reconciliation nationally, and renewed interest in protecting language, culture, and constitutionally protected rights). Strong leaders of nations present in the Project area continue to work to protect the rights of their communities by creating new nation to nation relationships (Manitoba Metis Self-Government Recognition and Implementation Agreement, July 6, 2021). Communities recognize the importance of knowledge holders fostering the transmission of traditional knowledge among members through new developments,

such as Four Winds Cultural Centre, created for the purpose of supporting ceremonial activities and providing a place for Indigenous-focused learning and gathering.

8.9.9.1 Collective effects

8.9.9.1.1 Cultural landscapes as a collective effect

Following the assessment of individual valued components, Manitoba Hydro held a collective effects assessment workshop during which individual valued components' effects assessments were reviewed and then participants "zoomed out" to consider the D83W project from a big picture perspective and considered what potential individual impacts could potentially interact and result in a broader systems-level collective impact.

Manitoba Hydro considered aspects often shared by First Nations peoples and Métis Citizens through engagement for transmission line projects that aren't effectively captured by environmental assessment through an individual valued component. Through this exercise, a third valued component was identified, which is formed by the culmination of a multitude of individual project impacts that have the potential to interact and result in an overarching collective impact. The collective effects valued component has been termed 'Cultural Landscape.' Figure 8-6 illustrates some of the individual Project effects that contribute to the broader effect to the Cultural Landscape.

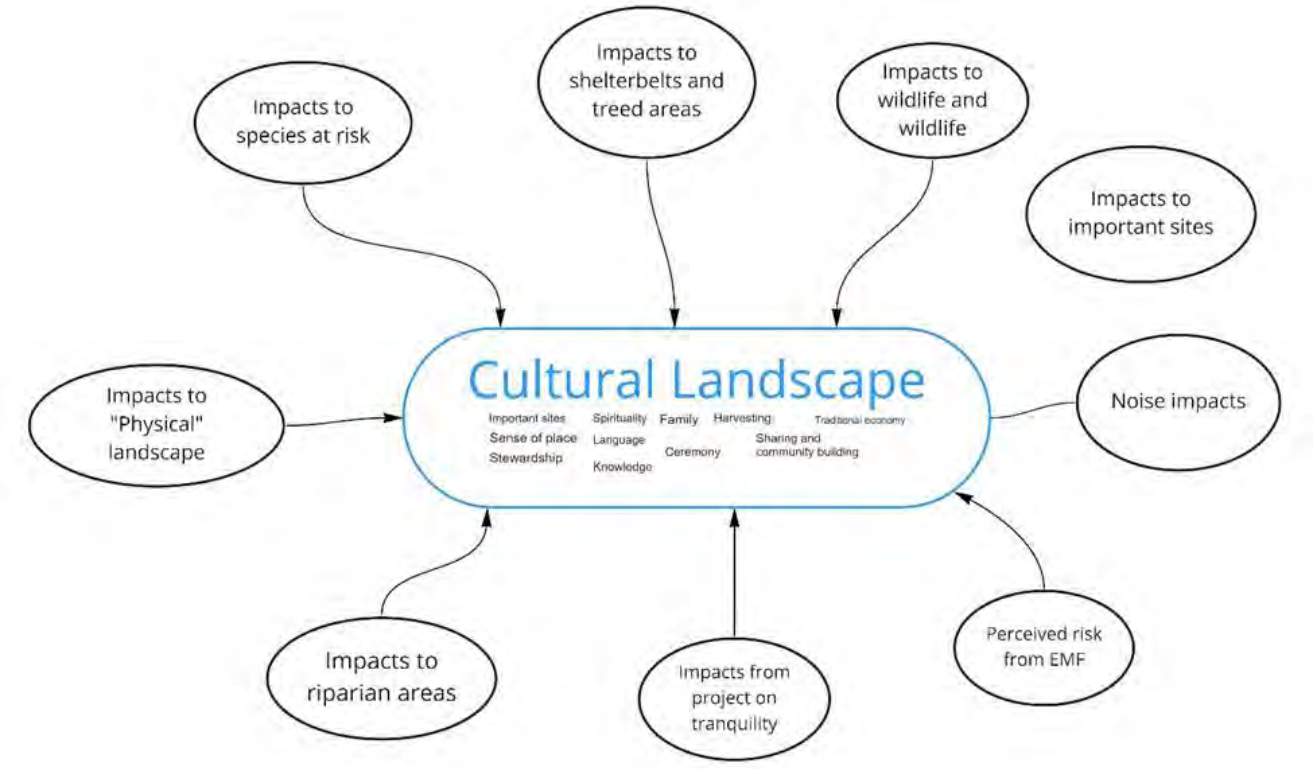


Figure 8-6: Illustration of a sample of impacts to individual valued components that interact and contribute to a collective effect on the cultural landscape

The cultural landscape is a broad, complex system with many interrelated components, and is impacted by the valued components in this chapter, other valued components assessed for the D83W project and numerous other factors in the environment. Although the definition is not concrete, one definition offered by the Forest Stewardship Council of Canada is as follows:

> *"Indigenous Cultural Landscapes [ICL] are living landscapes to which Indigenous peoples attribute social, cultural and economic value because of their enduring relationship with the land, water, fauna, flora and spirits, and their present and future importance to their cultural identity. An ICL is characterized by features that have been maintained through long-term interactions with the landscape based on land-care knowledge, and adaptive livelihood practices. They are landscapes over which Indigenous peoples exercise responsibility for stewardship." (Wahkohtowin Development Group Inc. FCC Canada Aboriginal Chapter, 2021, p. 34)*

This long and deep connection to the land is the basis for traditional knowledge, as *"First Nations people who have lived on the land have vivid and detailed memories*

and sensory perceptions, and this information constitutes the basis for traditional knowledge." "The consideration of potential effects of a proposed project on traditional lands and activities is of cultural, environmental, and, ultimately, socio-economic relevance, because it pertains to the social and physical well-being of affected First Nation communities" (Black River First Nation, Long Plain First Nation and Swan Lake First Nation, 2015).

A cultural landscape can include different aspects for different individuals or cultural groups. In this assessment, Manitoba Hydro is discussing the concept of cultural landscapes broadly rather than attempting to illustrate and assess effects on diverse culturally specific cultural landscapes. Manitoba Hydro acknowledges that *"various nations have distinct cultures, with unique knowledge and understandings of the world around them"* (Royal Commission on Aboriginal Peoples, 1996) and recognizes that accurately presenting such a culturally specific discussion of cultural landscapes is dependent on voices from those cultural groups. While some early discussions about cultural landscapes occurred through the FNMEP, Manitoba Hydro is cognizant that the concept deserves additional and deeper discussion. Therefore, Manitoba Hydro intends to continue to work with First Nations and the MMF, if interested, to further develop a meaningful presentation of what the cultural landscape entails for each cultural group or community and determine how to assess and characterize the broader collective effect to the cultural landscape.

Cultural landscapes are both tangible and intangible and often described as living landscapes. The concept identifies important landscape features and builds outwards from those features through narratives or a broader network of stories and collective memory to illustrate enduring connections to the land and the broader cultural importance and meaning of an area by emphasizing the interconnectedness of land, culture and identity as demonstrated visually in the Figure 8-7.

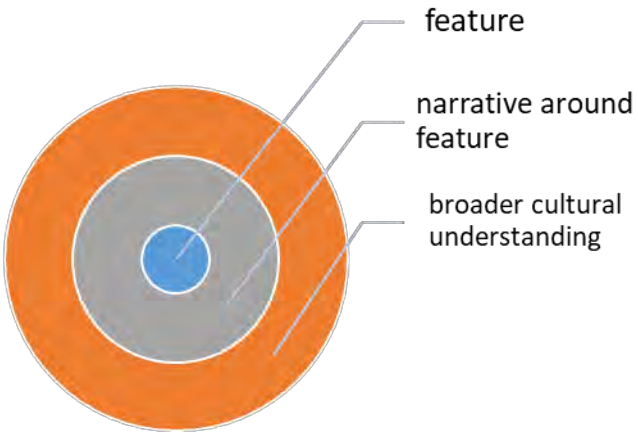


Figure 8-7: A simple illustration of the concept of cultural landscape where relationships with a place may provide a foundation for belief systems, identity, knowledge, and broader cultural understanding

Some of the less tangible and intertwined values or attributes that are often associated with cultural landscape include:

- Sense of place:
  - Referring to the deep connections people develop to particular locations through their experiences living or spending time there. A sense of place can contribute to feelings of comfort, safety and well-being associated with a place.
  - Strong connection with the history of place through persistent use, occupation and adaptation to changes as time progresses.
- Language:
  - The Assembly of First Nations describes that "Our languages allow us to share and communicate culture, world views, knowledge systems, values, traditions, customs, history, spirituality, and social and political identity to future generations" (Assembly of First Nations, n.d.)
  - "Language, furthermore, is not only a communication tool, it is often linked to the land or region traditionally occupied by indigenous peoples; it is an essential component of one's collective and individual identity and therefore provides a sense of belonging and community. When the language dies, that sense of community is damaged." (United Nations, 2019)
- Spirituality:
  - Spirituality is closely bound with culture and ways of living in Indigenous communities.
- Family:

    - Family and cultural landscape are closely related as land-based learning through activities across families and generations is an integral part of cultural and personal development through the sharing of traditions, language, activities, etc. It maintains the relationship of people and the land and the understanding that land is also part of the family as all are connected and related.
- Stewardship:
    - Refers to a responsibility for the well-being of the territory or natural environment and all of its creatures and spirits. This sense of responsibility for the environment permeates all aspects of the Indigenous way of life from languages to cultural practices to oral traditions to the wisdom passed down through generations. Any impacts to the relationship of people and the land impacts the ability to care for the land and consequently will impact the cultural landscape.
- Harvesting:
    - “Indigenous peoples’ overall health, well-being and cultural continuity are directly related to their ability to consume their traditional foods and continue their traditional food practices” (United Nations, 2019)
- Ceremony:
    - "Indigenous ceremonies seek to strengthen a person's connection to the physical and spiritual world, provide healing or clarity, mark significant life moments, or offer remembrance and gratitude.” (Tribal Trade, n.d.)
    - “Ceremony is an essential part of traditional Native healing. Because physical and spiritual health are intimately connected, body and spirit must heal together. Traditional healing ceremonies promote wellness by reflecting Native conceptions of Spirit, Creator, and the Universe. They can include prayer, chants, drumming, songs, stories, and the use of a variety of sacred objects.” (National Library of Medicine, n.d.)
- Traditional Economy
    - small-scale economies based on livelihood activities such as fishing, hunting, gathering, agriculture or some combination. This type of economy relies on customs, history, and long held beliefs to guide decisions such as how much to produce or gather and how much to keep, trade or sell.
- Traditional Knowledge
    - “People come to understand the ecology of their surrounding environment through years of firsthand experience and inherent cultural understandings of relationships between humans, animals, lands and waters and/or teachings that have been passed down through relations or within a community” (Manitoba Métis Federation, Bipole III MLUOS, 2015)

8.9.9.1.2 Impacts to cultural landscapes

Due to the complexity and diversity of cultural landscapes, impacts to the cultural landscape are also complex and do not follow simple linear pathways of effects. The D83W project may generally affect cultural landscape through:

- Changes to harvesting, important sites, and other individually assessed valued components including wildlife and wildlife habitat, vegetation, fish and fish habitat, agriculture, human health, and community well-being.
- Changes to the relationships between interrelated components of the environment, and
- Changes to overall experience of the area.

To assess potential impacts to the cultural landscape, Manitoba Hydro identified individual effects of the D83W project that have the potential to impact the broader system as experienced by First Nations peoples and Métis Citizens and considered the role each effected valued component plays in that broader system. Through this process, the individual impacts described below have been identified as contributing to collective effects that may be experienced by First Nations peoples and Métis Citizens connected to the Project area:

Impacts on vegetation: Clearing the right-of-way and the presence of heavy equipment during construction may result in a direct loss of traditional use plants or the alteration of vegetation communities that support traditional use plants. Additionally, the impacts to vegetation will continue past the construction phase and through the life cycle of the D83W project by using chemical maintenance of vegetation along the right-of-way. While the project will result in some change in vegetation, there were no traditional plant harvesting areas identified along the right-of-way, therefore the risk of impacting traditional use plants is low. Manitoba Hydro understands that the presence of the D83W project may affect the spirits of traditional use plants in the area, and in the case of medicinal plants, their potency.

Impacts on wildlife and wildlife habitat: Most of the transmission line will be routed on disturbed agricultural land but clearing the right-of-way may affect some small sections of vegetation by removing small pockets of potential habitat. Alterations to vegetation and the presence of additional perching sites for predators along transmission line may contribute to a decrease in local grassland bird population. Clearing of the right-of-way, tower assembly, construction and conductor stringing may also alter wildlife movement and breeding, as well as alter the experience of traditional practices. Indirect effects on wildlife may occur because of sensory disturbances, activity associated with site preparation, site access, as well as the mobilizing and demobilizing of staff equipment.

Impacts to the physical landscape: First Nations peoples and Métis Citizens have noted that visual alterations to the land (including the presence of a transmission line) can change traditional harvesting experience and can result in a decreased preference for harvesting on land in and around transmission line developments.

Impacts to perceived health risks: There is a perception that EMF is dangerous to human health and cause health issues. While the misconceptions that transmission lines and their electromagnetic fields are dangerous are not supported by scientific literature, the perceived health risks continue to manifest as stress, and there is a distrust in the accuracy of information provided on the topic. Fear of these perceived health risks means that the mere presence of transmission lines can deter people from using spaces located in close proximity to the line.

Impacts on the tranquility of an area: First Nations peoples and Métis Citizens have noted that auditory changes to the environment, such as the presence of corona effect and noise during construction and maintenance activities changes the traditional harvesting experience and decreases their preference for harvesting on land in and around transmission line developments. In the MMF's Bipole III MLUOS, a Citizen shared that *"I can pretty much guarantee [that I would stop using areas that I already use where the transmission line is going in], it's not going to look very good. It's not going to look safe enough to walk on. You're going to go and go for an enjoyable calming, peaceful, walk, you know, to cure the soul. Not if it's going to be all brown and gross..."* (Manitoba Métis Federation, 2015)

Impacts to harvesting: The change in ability to harvest is low as the transmission line is mainly built on developed, agricultural lands. There have been no harvesting sites identified on the right-of-way, however, Manitoba Hydro assumes that there is harvesting occurring and recognizes that any impacts to harvesting impact the broader cultural landscape and experience of the area.

Impacts to Important Sites: There is potential for the D83W project to encounter heritage resources or sites of historic, cultural, or spiritual importance. There are no known Important Sites along the right-of-way, but the potential exists throughout the route and Manitoba Hydro recognizes that any impacts to important sites impact the broader cultural landscape and experience of the area.

Figure 8-8 provides a visual illustration of some of these complex and multidirectional paths through which impacts to the cultural landscape may take place.

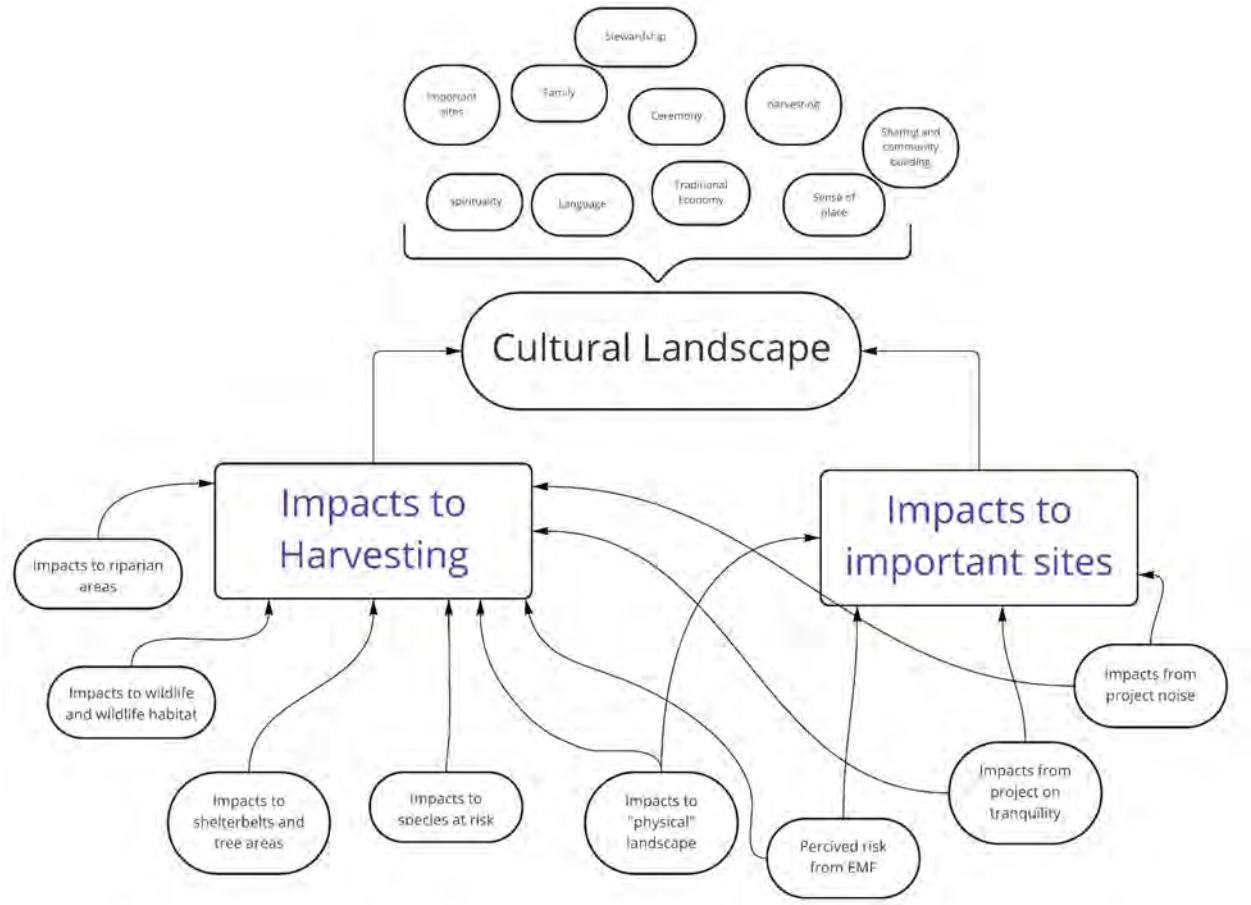


Figure 8-8: Visual illustration of impacts to cultural landscape as a collective effect

In considering impacts to the individual components that affect the cultural landscape, Manitoba Hydro then assessed whether those individual predicted impacts will collectively effect system functioning.

Due to the high level of pre-existing development and disturbance in the project area, there is anticipated to be low potential for the individual impacts resulting from the D83W project to significantly damage the cultural landscape as a functioning system. However, it is important to acknowledge that the changes in the project area over time resulting from colonization and development have severely impacted the cultural landscape.

8.9.9.1.3 Mitigation

Manitoba Hydro understands that mitigation of impacts to the cultural landscape cannot be achieved in full by Manitoba Hydro. It is through the enduring connection of First Nations people and Métis Citizens with the land and their consistent efforts

and dedication that cultural landscapes in the project area remain resilient. Manitoba Hydro would like to work with First Nations and the MMF to understand how Manitoba Hydro can support with the maintenance and repair of cultural landscapes affected by transmission projects.

In addition to mitigation proposed to address impacts to individual valued components including wildlife and wildlife habitat, vegetation, fish and fish habitat, agriculture, human health, and community well-being, Manitoba Hydro is proposing the following additional mitigation measures to help address potential collective effects on Indigenous cultural landscapes in the Project area:

- Continue to work with First Nations and the MMF to understand ways which Manitoba Hydro can better assess and illustrate system-level impacts of Manitoba Hydro development projects in the environmental assessment process.
- In future assessments, work with interested First Nations and the MMF, if interested, to document and meaningfully characterize each unique cultural group's connection to the land, or the cultural landscape, in the project area and the impacts of development occurring on the land over time. The intention is to create separate space for each engaged nation that discusses the historical and cultural importance of the project area and assesses project effects on individual valued components and the broader cultural fabric through their unique perspectives. ArcGIS StoryMaps may be a useful tool to help bring together geospatial, visual, written, and audio information.
- The inclusion of ceremony prior to and following construction of the D83W project.
- Education of proponents who develop in the RAA, including Manitoba Hydro, of the long history of political change and how development plays a role in changing the cultural landscape of a people.

Due to the complex and unique nature of cultural landscapes, Manitoba Hydro hopes to improve understanding of this collective effect in collaboration with FNMEP nations over time. Developing understanding of this type of impact will improve the understanding of effects in future assessments.

8.9.9.1.4 Follow-up and monitoring

Manitoba Hydro is committed to continue sharing information with FNMEP nations and to continue working with interested parties to monitor D83W project effects and develop new mitigation measures that may address unanticipated effects to the cultural landscape. Manitoba Hydro will also work with First Nations and the MMF, if

interested, to further understandings of collective Project effects, how to assess them, and how to mitigate effects.

8.10 Cumulative effects

This section discusses the cumulative effects of the D83W project and other existing or foreseeable future projects and activities (see Table 6-4, Figure 6-2, and Map 8-3) on harvesting and important sites.

The D83W project is in a region of southern Manitoba where the original native ecology has been substantially affected by more than one hundred years of human development. This change has been dominated by conversion of native prairie to agricultural lands, accompanied by urban and rural settlements, public infrastructure, and various other land uses. As a result, there has been a gradual displacement of natural features. Any remaining natural features are highly valued in the RAA both from wildlife and local communities (public and Indigenous).

All of the existing and proposed future projects planned in the RAA will be built upon this previously disturbed environment, converting agricultural lands to industrial, processing or linear (water pipeline) infrastructure. As a result, there will be permanent loss of agricultural land from the Dorsey to Wash'ake Mayzoon transmission line that acts cumulatively with the agricultural land lost from the existing and future proposed projects in the RAA. In addition, the presence of this Project in conjunction with existing and future project has the potential to cumulative create inconvenience, nuisance and additional costs to agricultural activities such as aerial spraying, irrigation and drainage tiles.

Residual cumulative effects on employment and economy will be positive rather than adverse. Project residual effects on labour and economic activity will act cumulatively with the economic effects of existing and future projects. Projects in the RAA will provide economic benefits, increased business opportunities and revenue generation. Therefore, cumulative effects on employment and economy are considered not significant.

The D83W project's contribution to property and services cumulative environmental effects are a result of conflict or disruption to residences and property for the medium-term during construction and operation. Even with the identification of potential cumulative effects between the project and existing and future projects it is expected that a change or disruption to residential land and property use will be minimal.

For the valued component human health, a change in air quality resulting from cumulative projects-related effects will be limited to residents living near the D83W project and near other existing and foreseeable future projects and are expected to be negligible. Interference with speech comprehension resulting from cumulative

effects is expected to be of greatest concern to receptors within 500 m of the D83W project and near other existing and future projects. For future projects the cumulative effects from speech comprehension will primarily be experienced during overlapping construction phases. Project-related cumulative effects to speech comprehension are expected to be negligible to small in magnitude.

For community well-being, the cumulative effects for change in stress from perceived health effects related to EMF will be limited to past and future electrical transmission lines and stations in the RAA. Based on Health Canada's statement that precautions are not required for typical ELF EMF exposures from transmission lines (Health Canada, 2020), and current indicators for community well-being in the Southern Manitoba health region being similar to or better than provincial and national rates perceived health effects related to EMF exposure are considered to be at acceptable levels. For noise complaints and annoyance potential cumulative effects would be of greatest concern for receptors who are close to both the D83W project and other past and future projects. The cumulative effects from future projects will primarily be experienced during overlapping construction phases. Project-related cumulative effects to noise complaints and annoyance are expected to be negligible to small in magnitude, primarily short term (mostly during construction) and reversible. For visual impacts, potential cumulative effects are expected to be of greatest concern where past and future projects are within the foreground view of receptors (500 m), therefore receptors who are close to both the proposed D83W project and other past and future projects. The cumulative visual impacts are small in magnitude and reversible upon decommissioning of the projects.

For fish and fish habitat, cumulative impacts that have the potential to occur between the D83W project and current and future projects/activities including agriculture, infrastructure, and water treatment lagoons. Ongoing agriculture, existing infrastructure, and existing lagoons all have the potential for deleterious inputs into adjacent waterbodies, decreasing water quality. However, these inputs have been ongoing for decades or more and therefore would be considered part of the baseline conditions.

Construction and operations related effects on vegetation attributable to the D83W project include a reduction in shelterbelt and treed areas. This residual cumulative effect is also likely to occur due to other foreseeable future projects, including the RM of Rosser Hazardous Waste Transfer Station and the RM of Cartier rural water pipeline project.

The D83W project will remove wildlife habitat though the reduction of shelterbelts and treed areas. This could act cumulatively with future projects whose development

area may also affect shelterbelts and treed areas. Noise and traffic from equipment use during vegetation management and inspection controls during operations between existing, future and this project may create a cumulative temporary disturbance to wildlife.

It is anticipated that the number of bird-strikes due to collisions with transmission lines will remain low and not change from past conditions due to planned installation of bird diverters. Any bird-wire collisions that occur during D83W project operation may act cumulatively with existing projects. It is estimated that potential wildlife habitat loss or disturbance will be minimal and short term and therefore no further mitigation is proposed to address cumulative effects.

Through discussions that took place during the FNMEP, it is understood that cumulative effects to traditional practices, culture and heritage have extended across a broad span of time, and these effects will continue. Future projects have the potential to interact with the effects of the D83W project in that the presence of more infrastructure on the landscape may impact harvesting, important sites, and therefore culture.

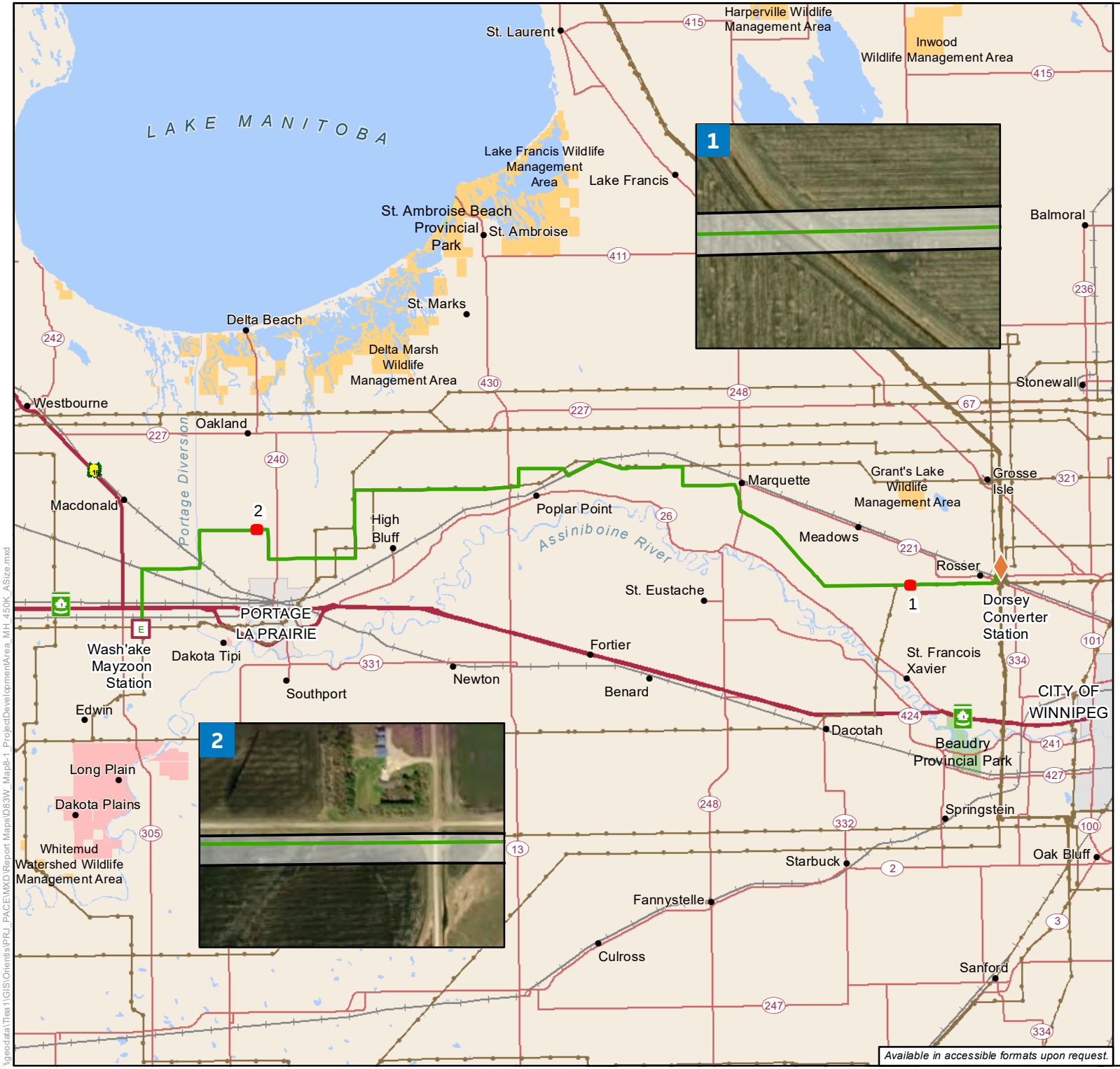
Although the D83W project's contribution to cumulative effects is small due to routing within previously developed lands and the limited changes to access, when considered cumulatively with other infrastructure on the landscape, this project contributes to the loss of available land to both harvest and access important sites.

It is important to understand the full context of impacts to First Nation and Métis values and ways of life, over time. Manitoba Hydro understands that views on how to understand and describe cumulative effects may differ based on cultural backgrounds and preferences. Through the FNMEP, Manitoba Hydro understood that in addition to the physical activities described in Table 6-4, a more inclusive list of projects, policies, legislation, and world events contribute to how cumulative effects are experienced by First Nation people and Métis Citizens in the area.

A robust discussion of how residual effects on harvesting and important sites are likely to interact cumulatively with other physical activities occurring in the regional assessment area is included in Section 8.9.8.1.

After considering D83W project's residual effects, and the overlap with existing and future projects, Manitoba Hydro concludes that the D83W project will not result in significant effects to the biophysical or human environment. Manitoba Hydro is committed to continue sharing information with landowners, Indigenous communities, the public and committed to continue working with interested parties through implementation of the Environmental Protection Program.

Manitoba Hydro undertook an approach to First Nation and Métis engagement that was structured to understand concerns related to the D83W project and built upon these understandings for upcoming future projects. Indigenous Coordinators were supported to conduct interviews, assess effects, sit on decision making teams related to routing the project. Manitoba Hydro intends to work with Coordinators in future Manitoba Hydro projects to build upon understandings from the D83W project.



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route
- Project Development Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 08, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Project Development Area

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-1

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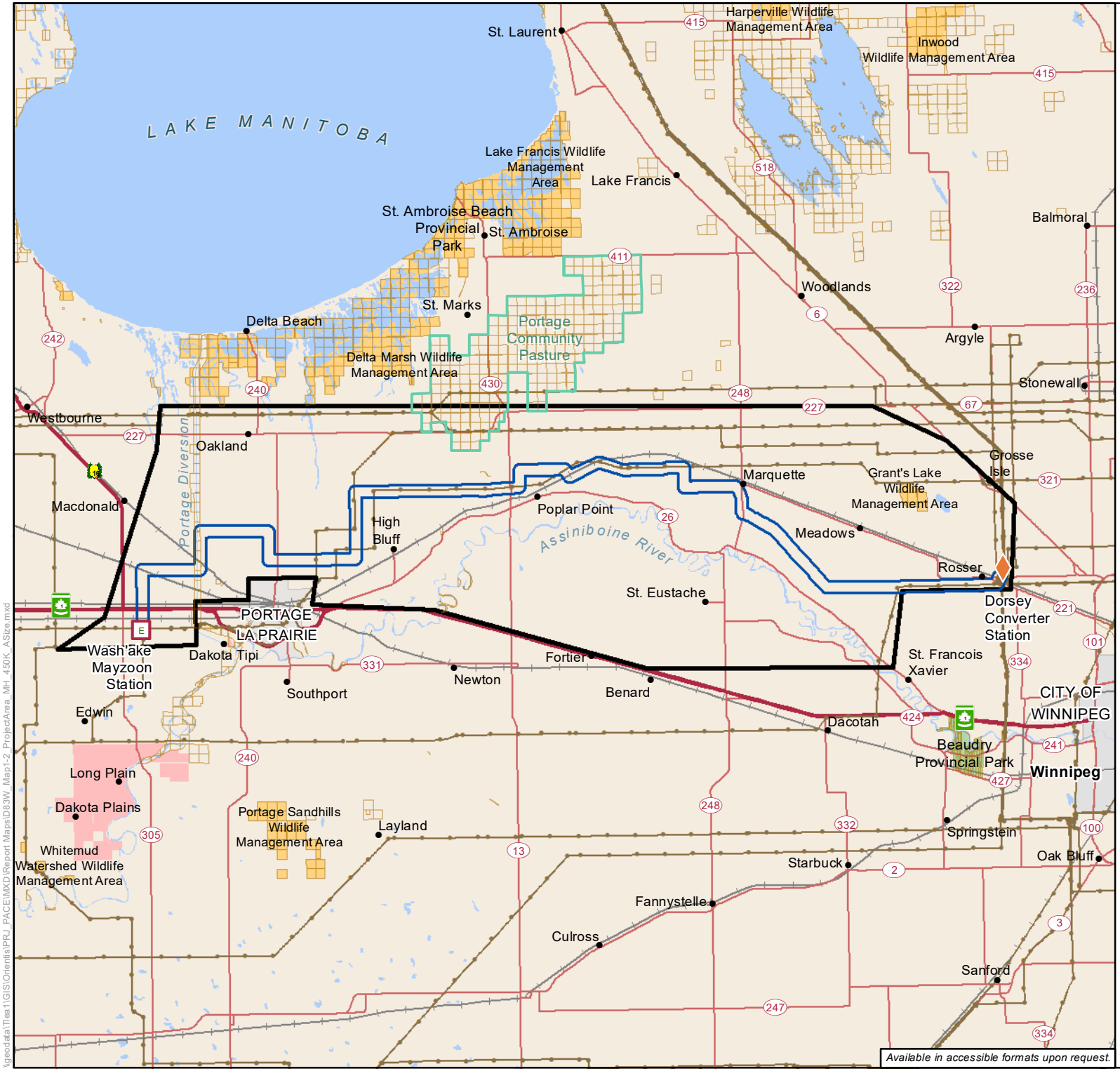

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Assessment Area
- Local Assessment Area (500m)
- Regional Assessment Area

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- Community Pasture
- Crown Land
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: September 02, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles

1:450,000

Socioeconomic LAA and RAA

Map 8-2

Available in accessible formats upon request.

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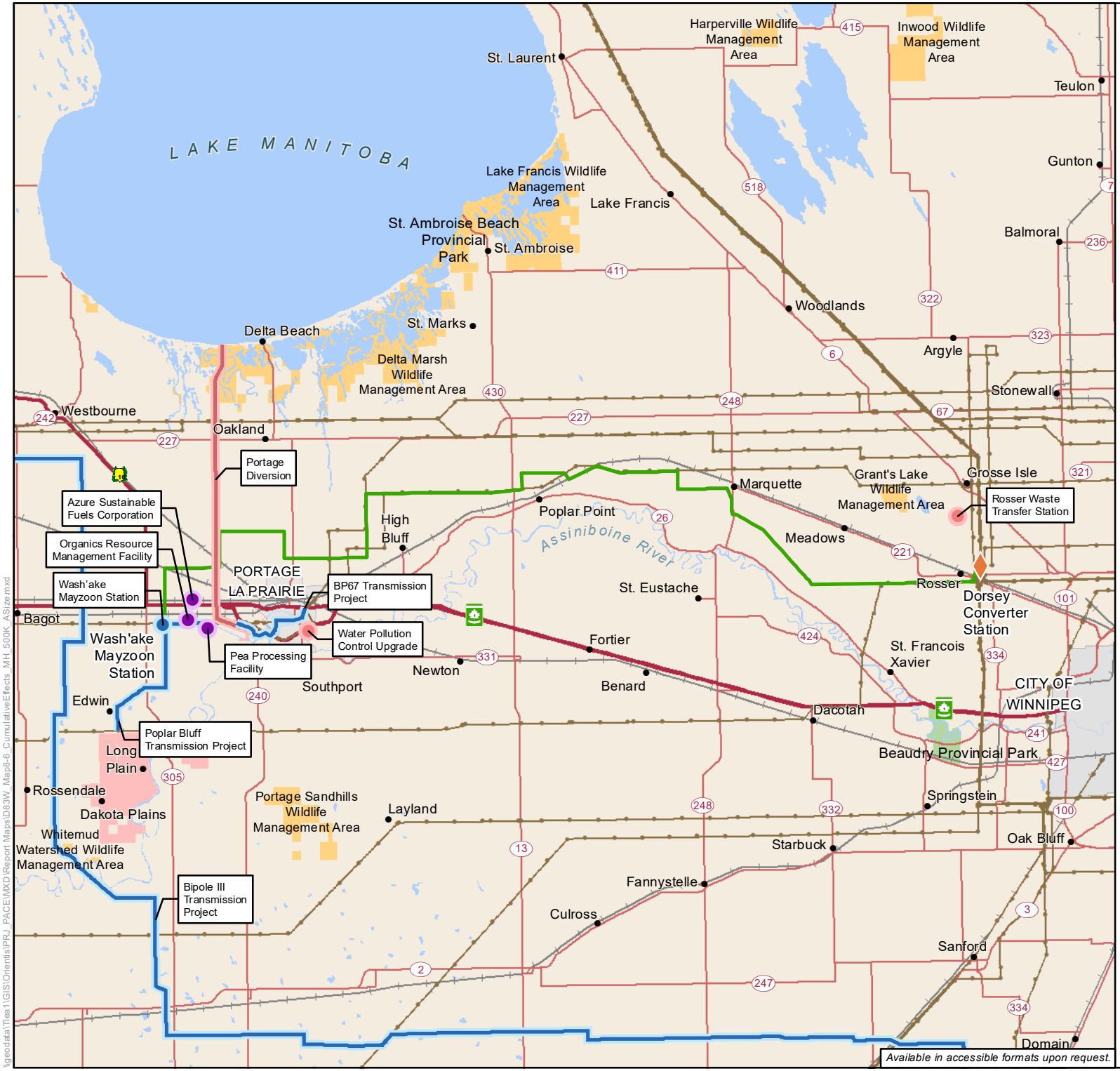

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

Projects in the Cumulative Effects Assessment
- Industrial Project
- Infrastructure Project
- Infrastructure Linear Project
- Transmission Project
- Transmission Linear Project

Infrastructure
- Converter Station (Existing)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 09, 2022

N

0 5 10 Kilometres
0 4 8 Miles

1:475,000

Cumulative Effects Projects

Draft: For Discussion Purposes Only

Map 8-3

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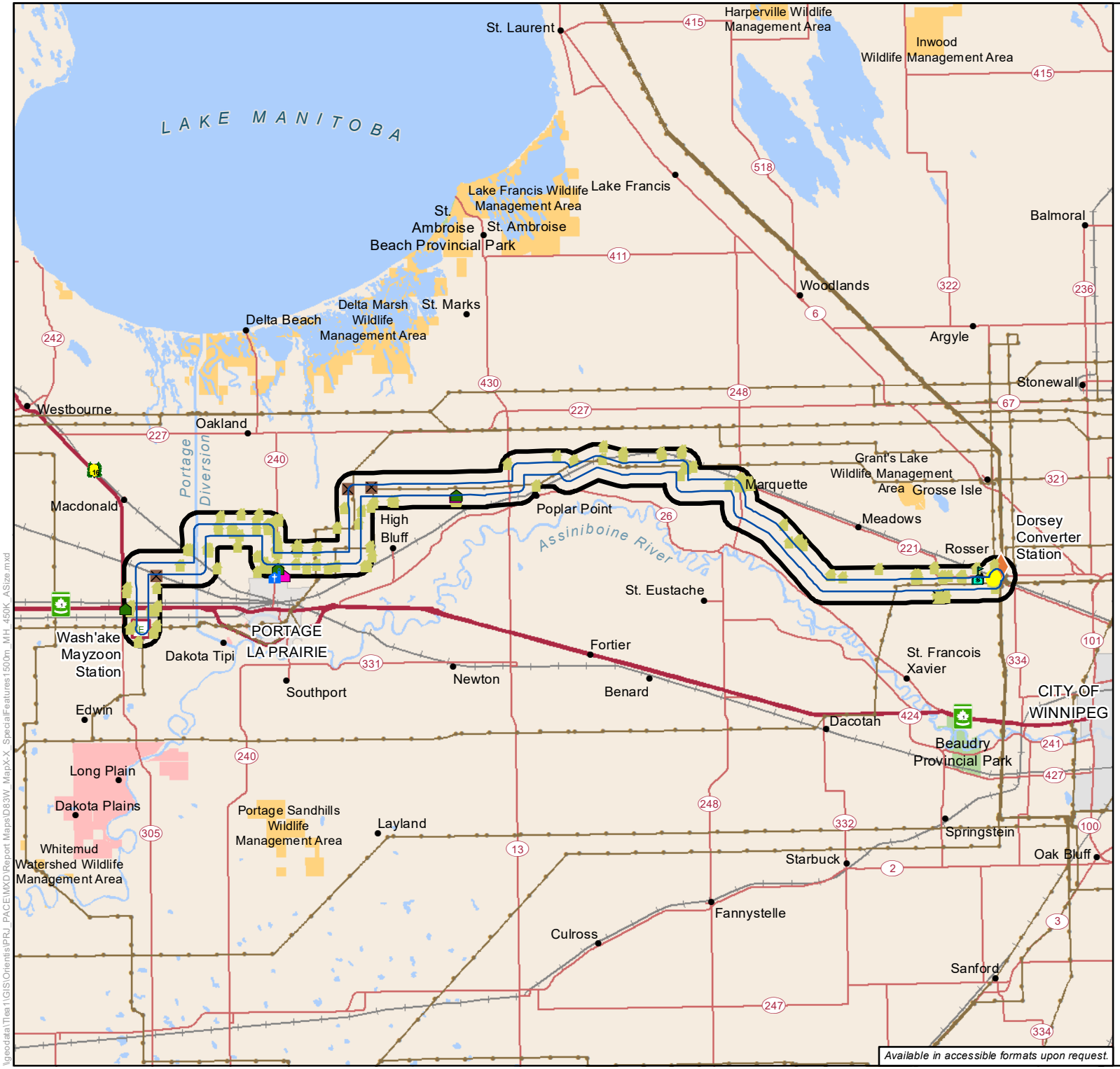

Dorsey to Wash'ake Mayzoon Transmission Line

Special Features

- Occupied House
- Unoccupied House
- Unutilized Bldg
- Commercial Bldg
- Industrial Bldg
- Church/Worship Site
- School Facility
- Town Buildings

Assessment Area

- Foreground View (500m)
- Midground View (1500m)

Infrastructure

- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase

- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: July 13, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Special Features Within 500m and 1500m

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-4

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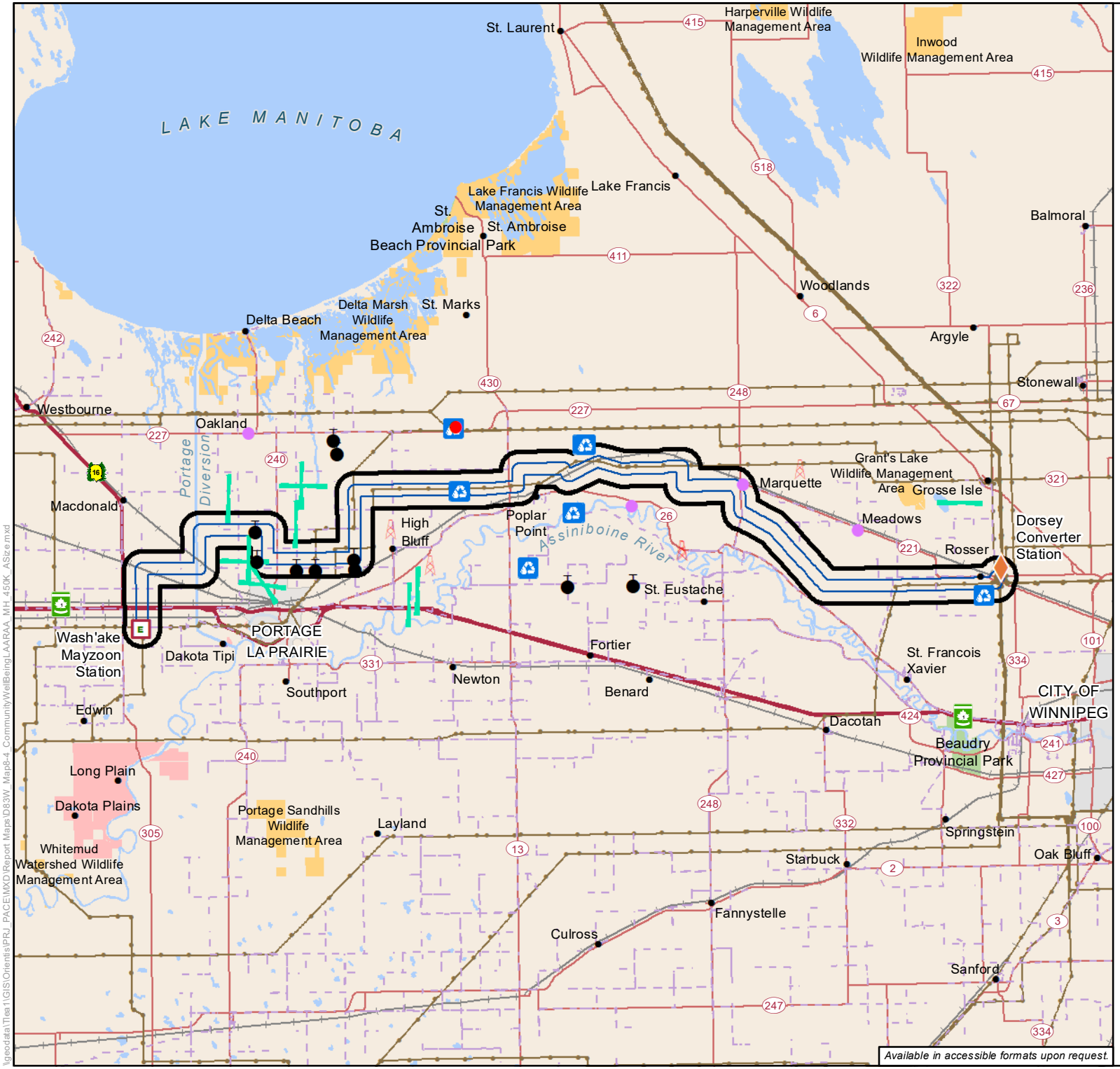

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Regional Infrastructure
- Communication Tower
- Pipeline
- Recreational Bldg/Site
- Waste Disposal Site
- Wastewater Treatment Site
- Rural Water Supply Pipeline
- Runway

Assessment Area
- Foreground View (500m)
- Midground View (1500m)

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 03, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Community well-being LAA

Draft: For Discussion Purposes Only

Map 8-5

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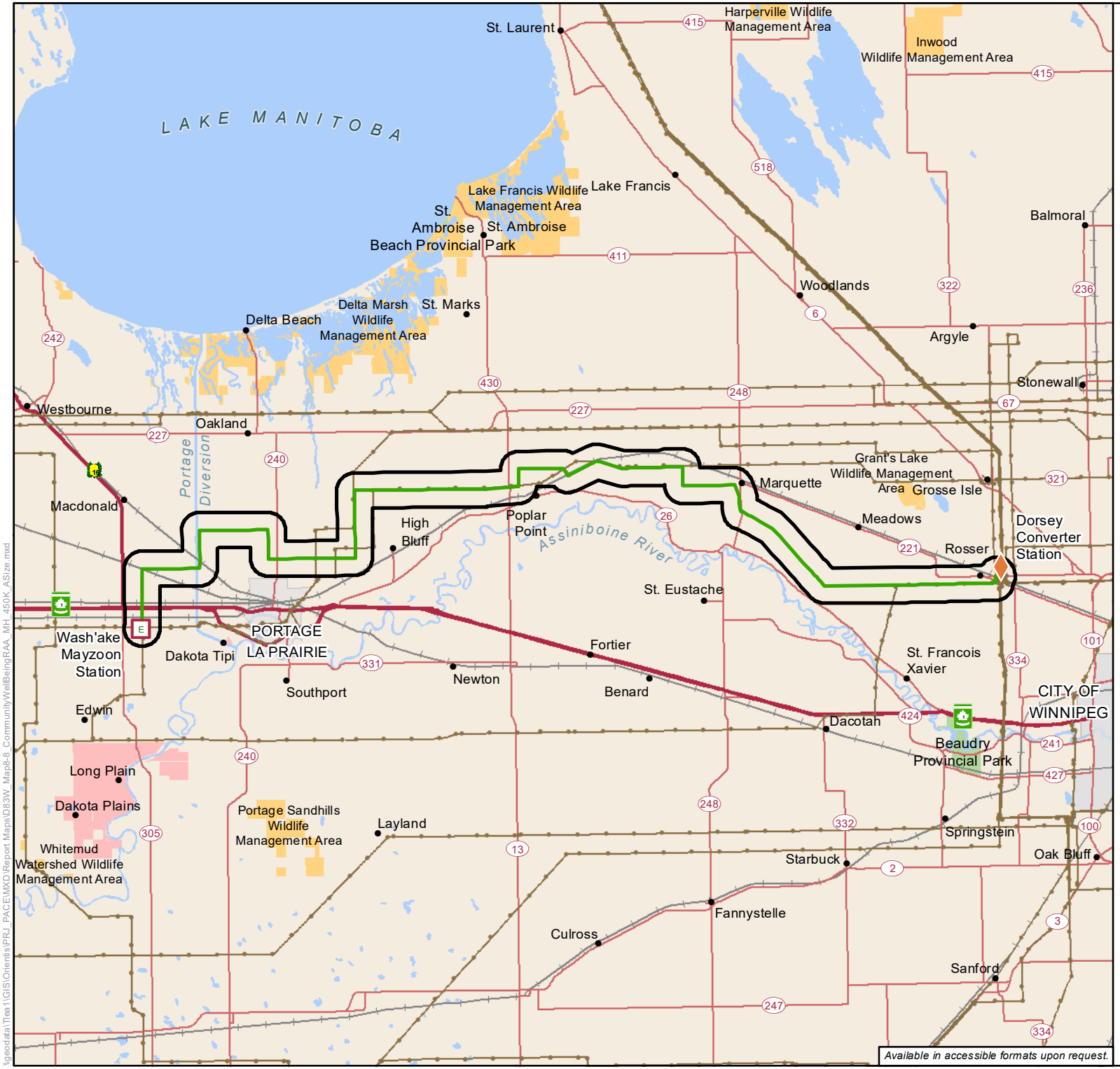

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

Assessment Area
- Community Well-Being RAA (1500m)

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 09, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Community Well-Being RAA

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-6

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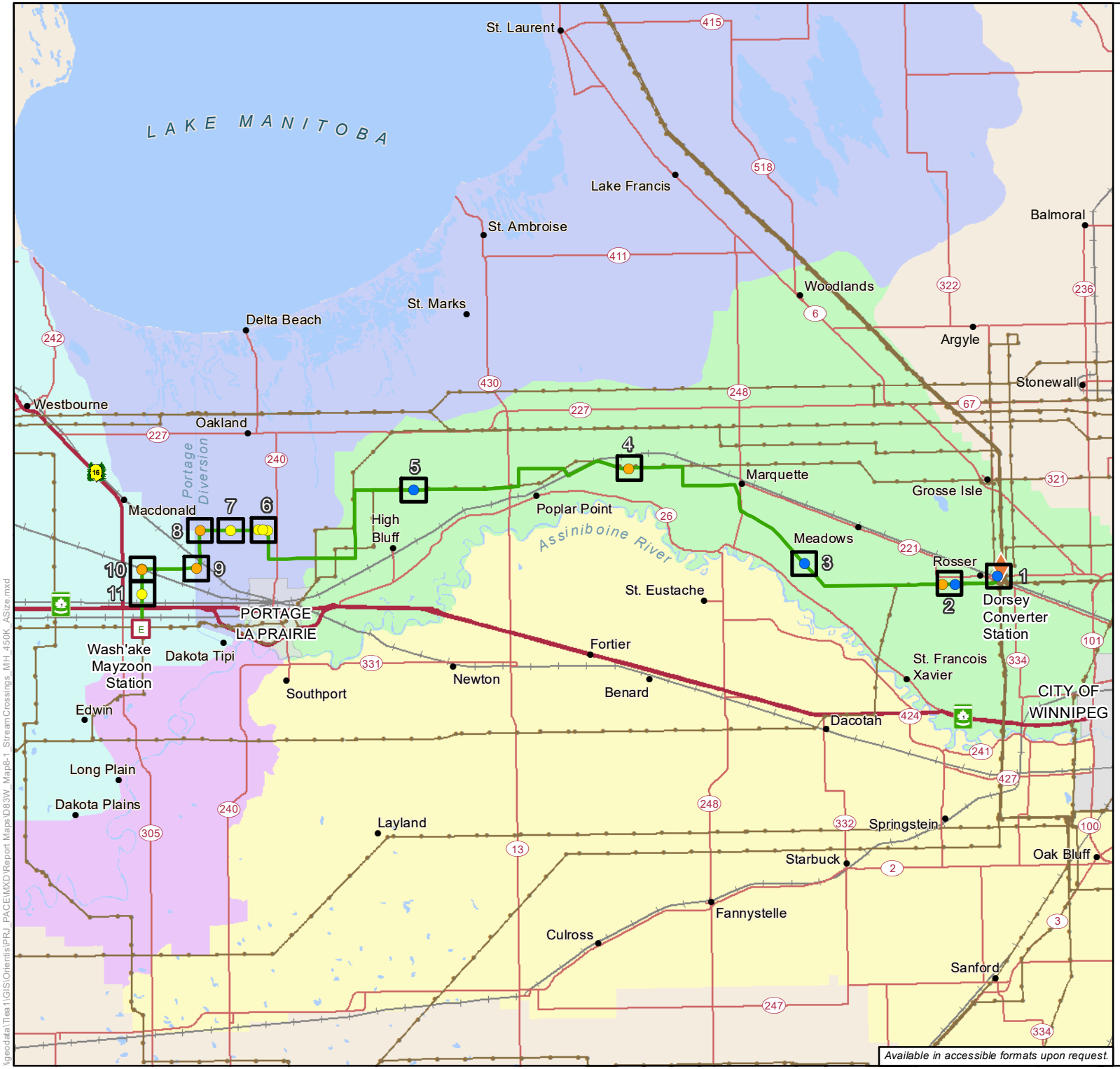

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Gross Sub-Watersheds
- Central Assiniboine
- La Salle River
- Lower Assiniboine
- Shoal Lakes/Delta Marsh
- Whitemud River

Map Tile Index - 1:10,000
- Map Series Tile

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Fish and Fish Habitat
LAA / RAA

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7

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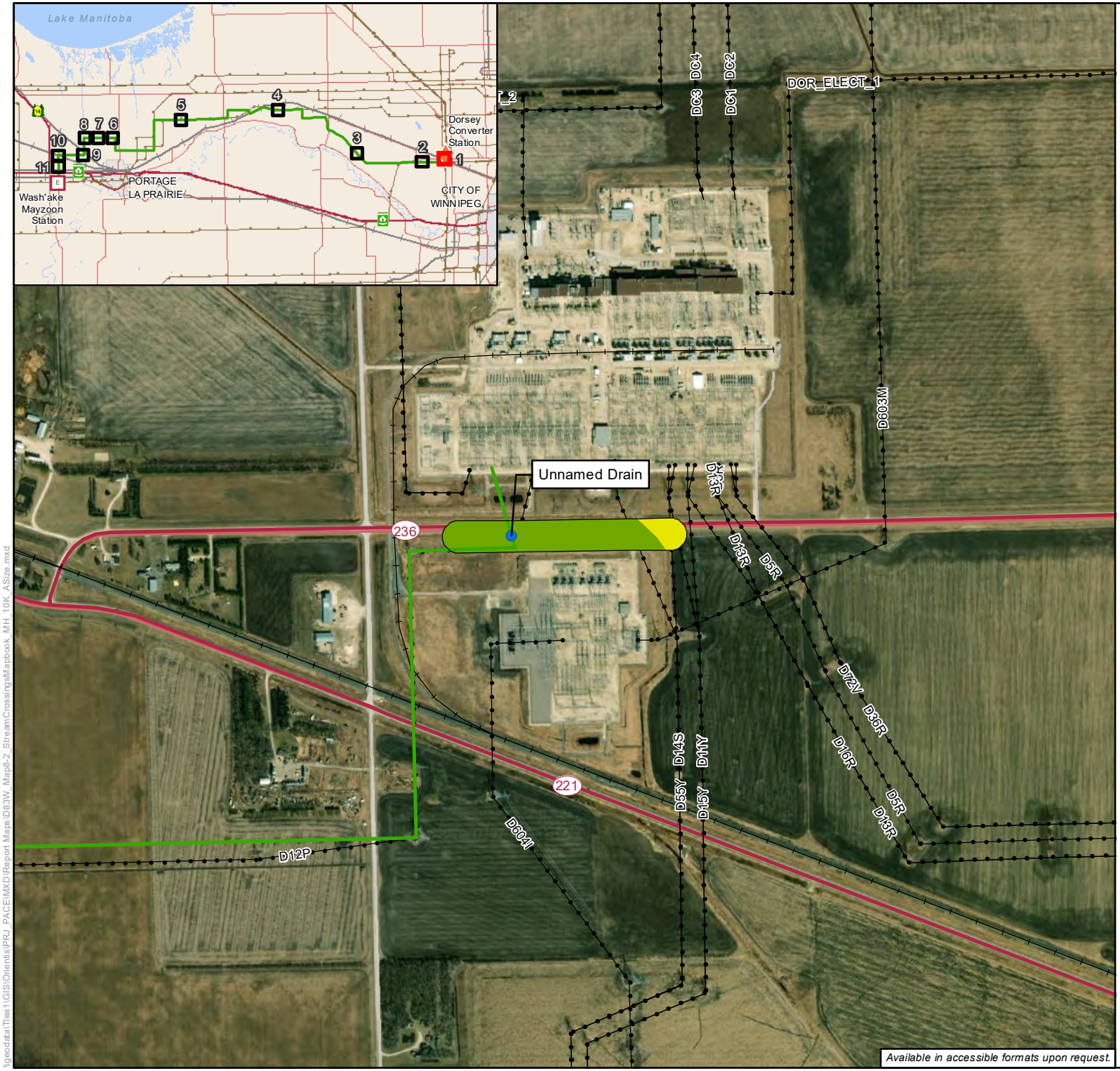

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-1

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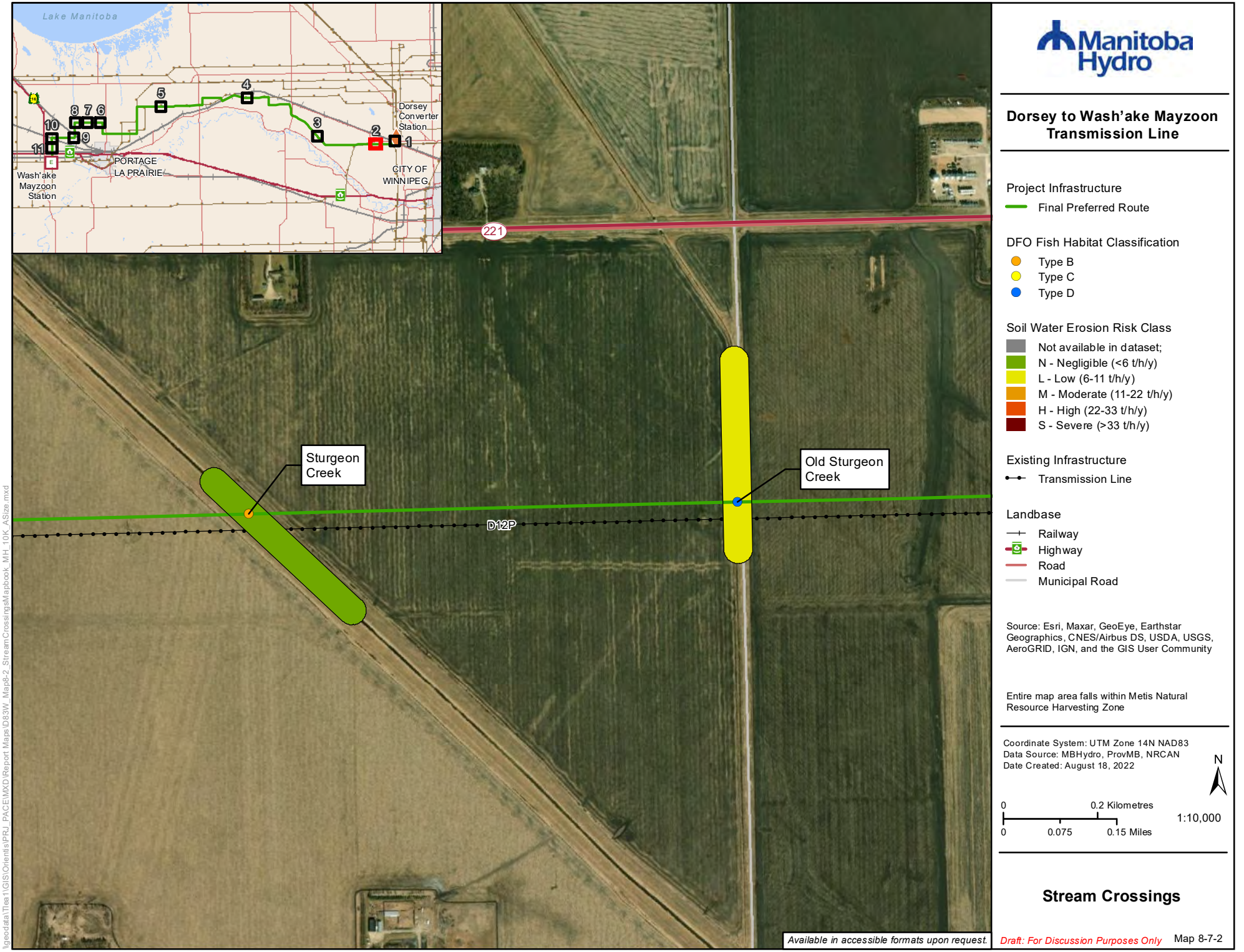

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-2

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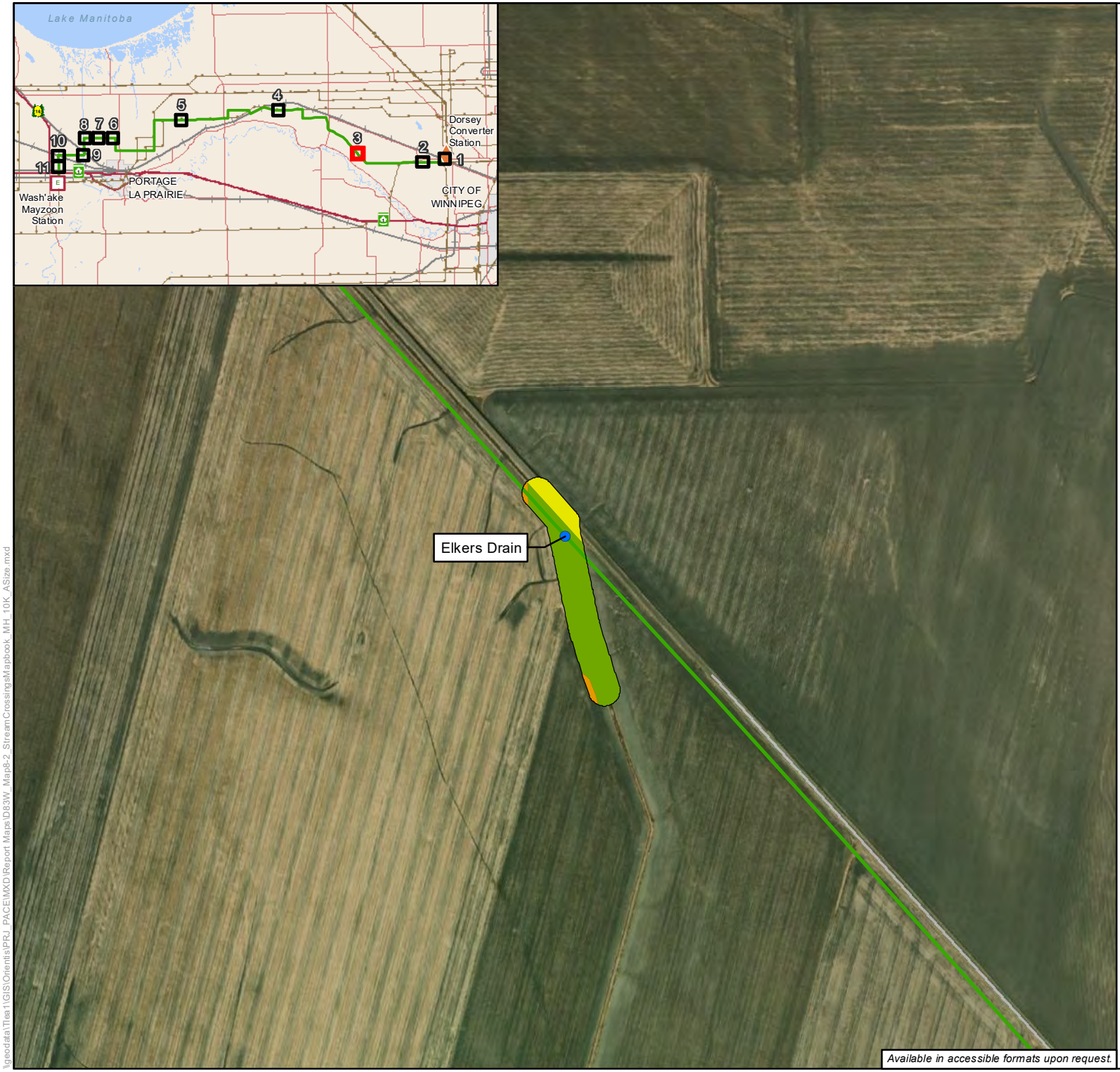

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-3

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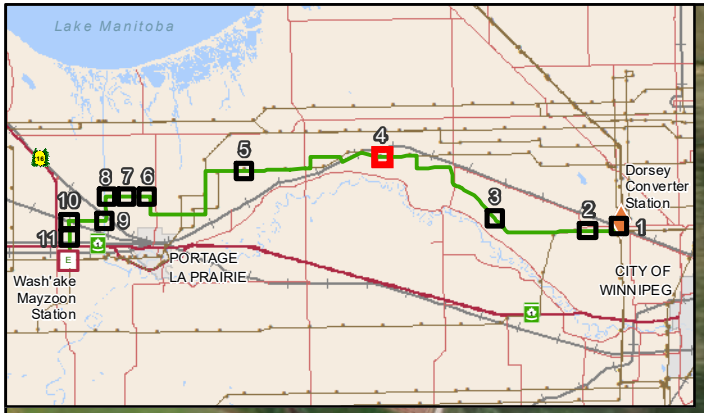

RP16

Long Lake Drain

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles

1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-4

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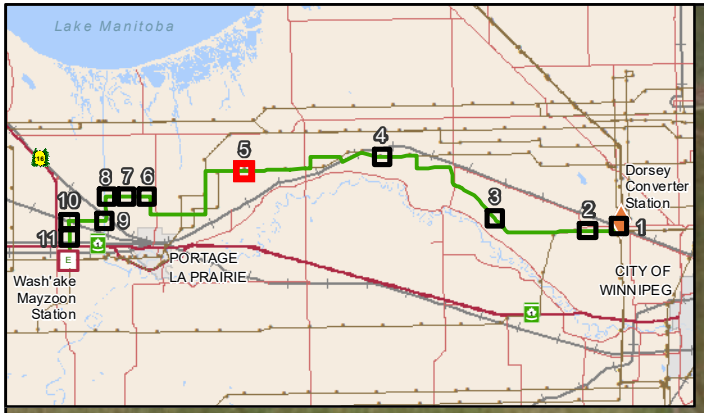

RP 16

72 Road North

Long Lake Drain

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles

1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-5

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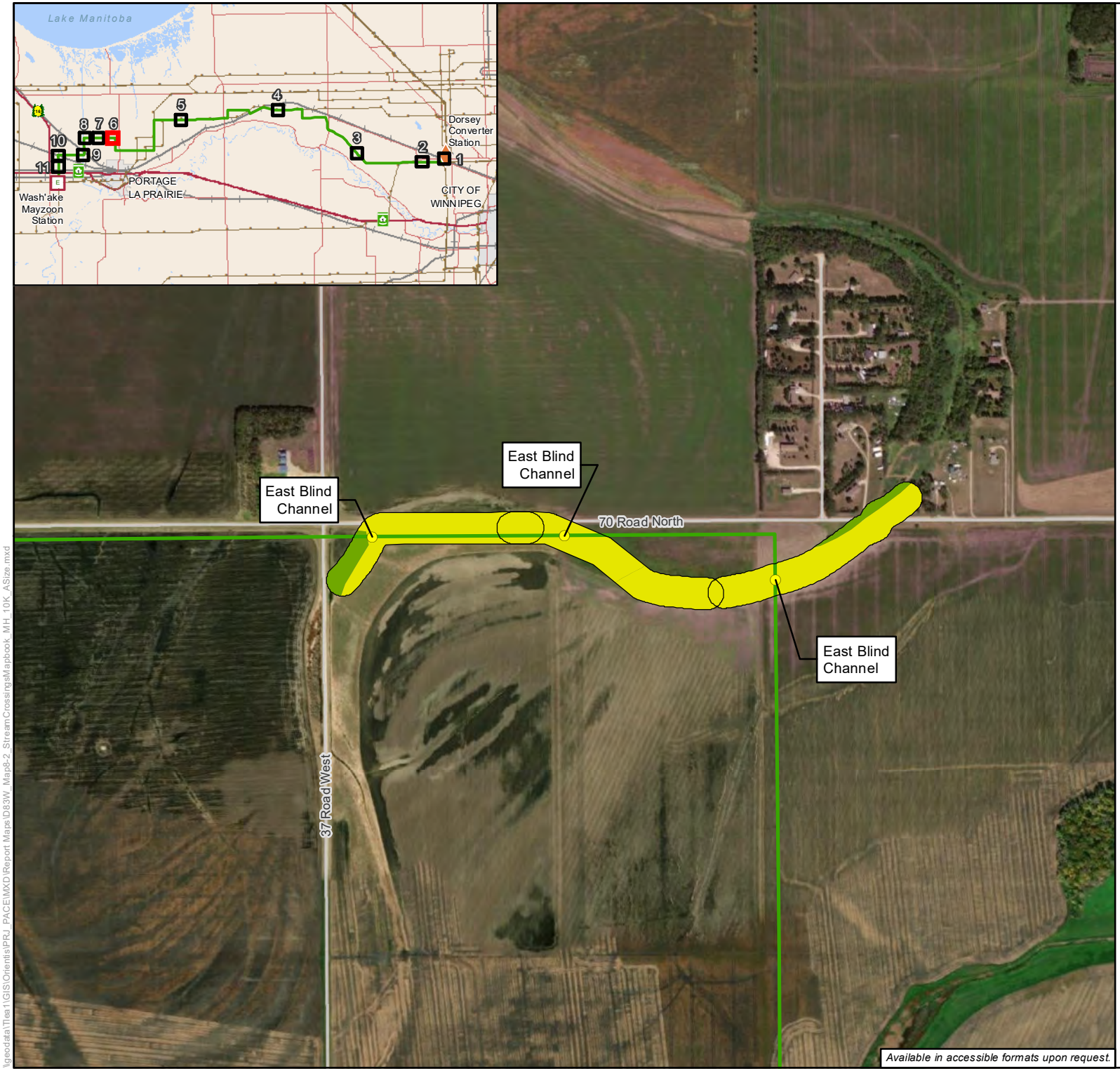

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-6

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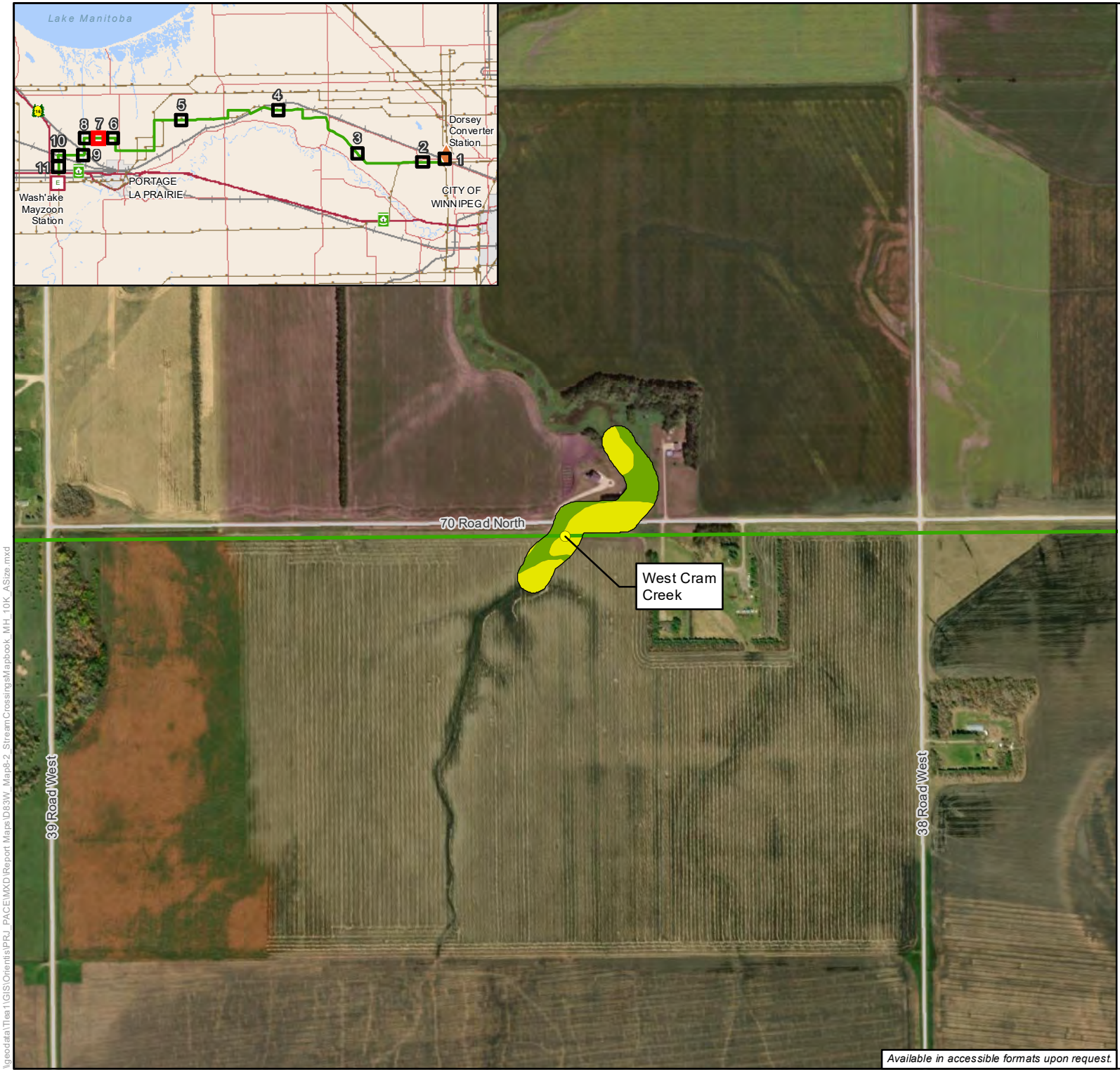

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-7

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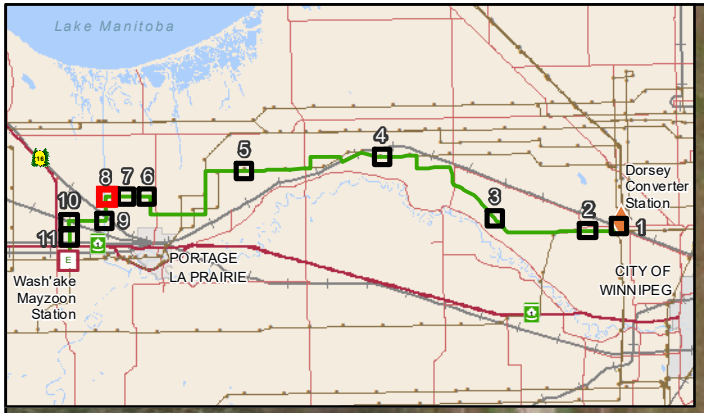

East Outside Drain

40 Road West

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-8

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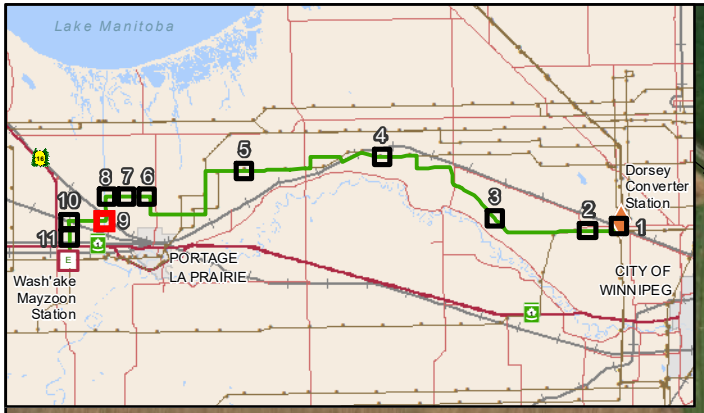

40 Road West

Portage Diversion

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles

1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-9

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Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles

1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-10

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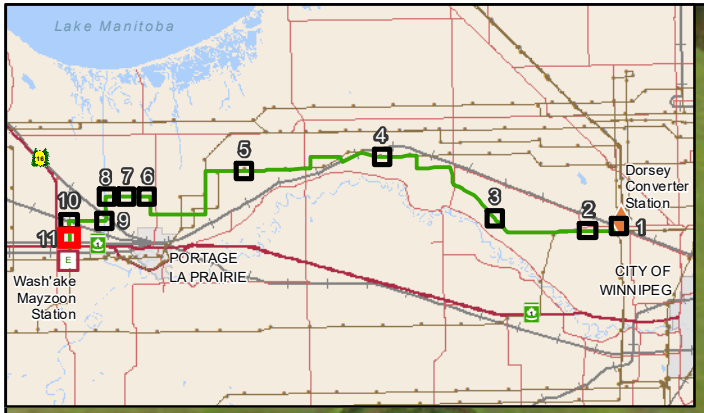

Unnamed Creek

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Project Infrastructure
- Final Preferred Route

DFO Fish Habitat Classification
- Type B
- Type C
- Type D

Soil Water Erosion Risk Class
- Not available in dataset;
- N - Negligible (<6 t/h/y)
- L - Low (6-11 t/h/y)
- M - Moderate (11-22 t/h/y)
- H - High (22-33 t/h/y)
- S - Severe (>33 t/h/y)

Existing Infrastructure
- Transmission Line

Landbase
- Railway
- Highway
- Road
- Municipal Road

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: August 18, 2022

N

0 0.2 Kilometres
0 0.075 0.15 Miles
1:10,000

Stream Crossings

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

Map 8-7-11

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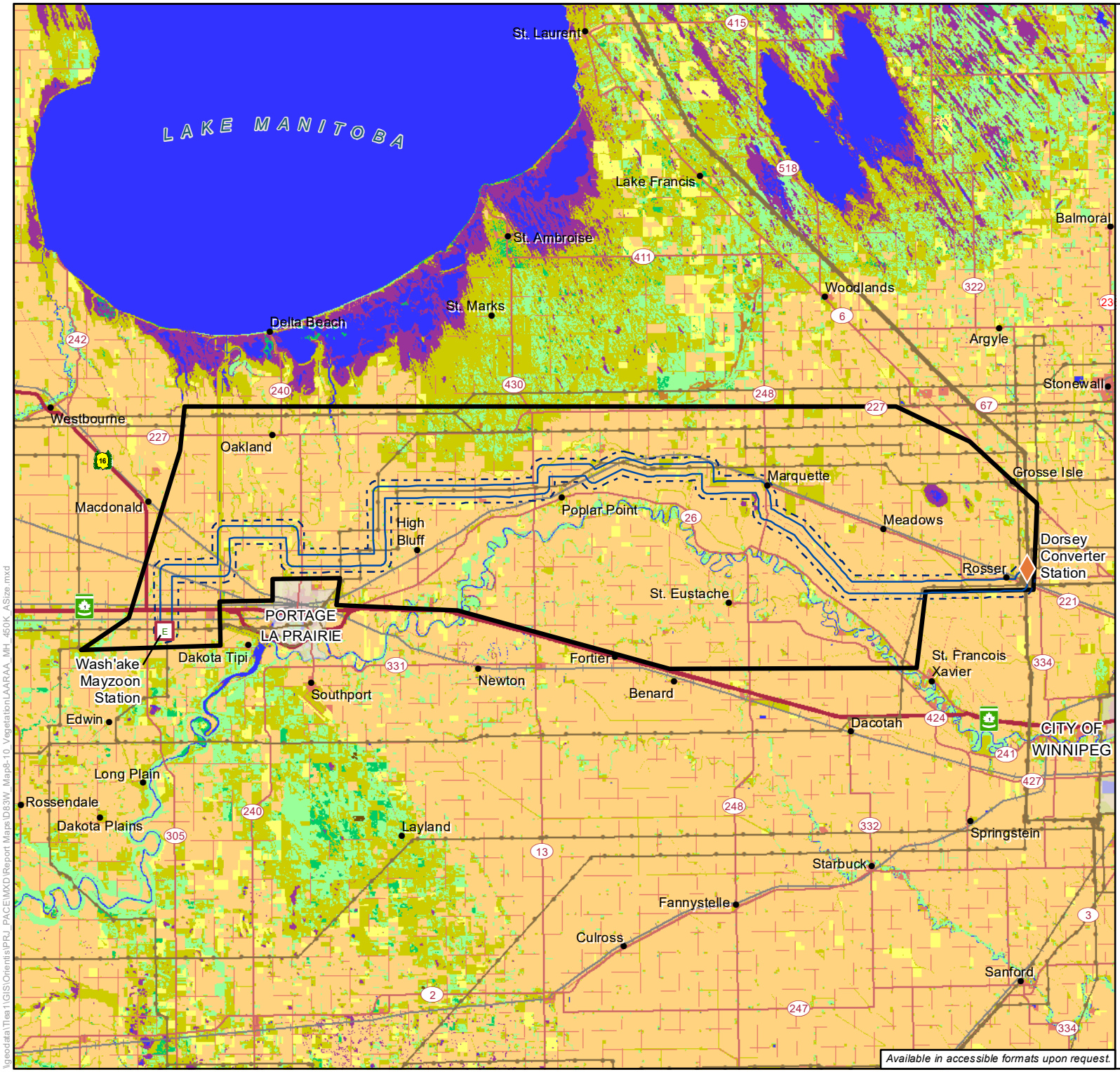


Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Landcover

- Agricultural Cropland
- Bare Rock, Gravel and Sand
- Coniferous Forest
- Cultural Features
- Deciduous Forest
- Forage Crops
- Forest Cutover
- Marsh and Fens
- Mixedwood Forest
- Open Decidious Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Assessment Area

- Vegetation Local Assessment Area
- Vegetation Regional Assessment Area
- Regional Assessment Area

Infrastructure

- Wash'ake Mayzoon Station (Future)
- Converter Station (Existing)
- Transmission Line (>115 kV)

Landbase

- Community
- Trans Canada Highway
- Road
- Railway Line
- City

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 03, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Available in accessible formats upon request.

Vegetation and Wildlife LAA / RAA

Map 8-8

\\geodata\Tlea1\GIS\Orient\s\PRJ_PACE\MXD\Report Maps\D83W_Map8-10_VegetationLAARAA_MH_450K_ASize.mxd

9.0 Greenhouse gases and climate change

The Environment Act Proposal Report Guidelines Information Bulletin (Manitoba Environment, Climate and Parks 2022) requires the discussion of climate change implications including a greenhouse gas inventory that should be calculated according to guidelines developed by Environment Canada (2021) and the United Nations (IPCC 2019). The following sections outline past, present, and future climate conditions and a summary of the greenhouse gas assessment. Further details on climate and greenhouse gases can be found in Appendix G.

9.1 Climate

Climate plays an important role in multiple aspects of the project. For example, design loads are influenced by ice accumulation and wind, construction planning may use seasonal temperature patterns to favour frozen ground conditions, and conductor clearances are influenced by ambient temperature and wind conditions.

Furthermore, the impact of extreme climate events, such as the wet snow event in October 2019 that resulted in damage to the adjacent BP6/BP7 transmission line (Manitoba Hydro 2021), can result in substantial outages and financial consequences.

At a high level, this section characterizes historic climate conditions and presents projections of how climate in the area may change in the future. The information provided will become foundational for subsequent assessments of climate change impacts and resilience for transmission projects in the RAA.

9.1.1 Historic climate

As shown in Map 8-1, the D83W project footprint is in the Prairies Ecozone, Lake Manitoba Plain Ecoregion, and occurs mainly within the Winnipeg and Portage Ecodistricts, in the central portion of the ecoregion. Other ecodistricts that the D83W project overlaps with include Lundar, MacGregor and Gladstone. The project area's climate is generally characterized by short, warm summers and long cold winters (Smith et al. 1998). The mean annual temperature ranges from 2.2 to 2.6°C and the average growing degrees season range from 179 to 183 days. Average growing degrees days vary from 1630 to 1720 and mean annual precipitation ranges from 485 to 515 mm with precipitation amounts highest during the growing season and only a quarter falling as snow. The average yearly moisture deficits range from 170 to 200mm.

There are nine meteorological stations operated by Environment and Climate Change Canada (ECCC) used for the assessment. Seven are in the Portage area and

one at the Richardson International Airport in Winnipeg and one in Brandon are also included.

Some stations have a long temporal coverage (back to 1886) but many have missing and poor-quality data that limit the suitability of these records for long term climate studies.

9.1.2 Climate normals

Monthly Climate Normals (Environment and Climate Change Canada 2021) are illustrated in Figure 9-1 for temperature, precipitation, and wind speed. Also shown are period-of-record extremes at each station, which may extend beyond the 1981-2010 period.

Portage la Prairie is roughly midway between Winnipeg and Brandon and because of their proximity, normal climatic conditions from Winnipeg and Brandon are indicative of general conditions at Portage la Prairie. This is illustrated in Figure 9-1 for precipitation, which shows similar patterns at all three stations. One notable difference in the precipitation plots is the extreme (period-of-record) daily precipitation in which Portage la Prairie CDA's 137mm event (August 16, 1985; (Environment and Climate Change Canada 2021)) exceeds extreme daily records at Winnipeg Richardson Int'l A and Brandon A. This difference shows the highly variable nature of precipitation compared to temperature.

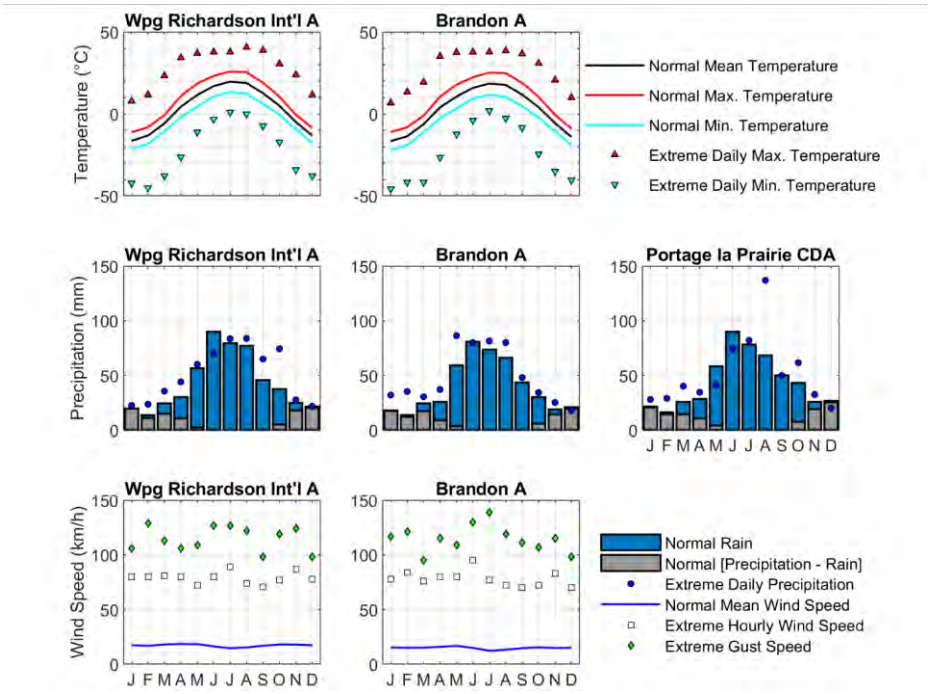


Figure 9-1: 1981-2010 monthly climate normals at Winnipeg, Brandon, and Portage la Prairie[7].

9.1.3 Trends

Adjusted and Homogenized Canadian Climate Data (AHCCD) from ECCC are developed specifically for purposes of trend analysis (Vincent, Hartwell and Wang 2020); (Mekis and Vincent 2011); (Wan, Wang and Swail 2010). AHCCD includes minimum temperature (Tmin), mean temperature (Tmean), maximum temperature (Tmax), rain (total of daily rainfall), snow (total of daily snowfall), precipitation (total of daily precipitation), and wind speed (mean of hourly wind speed). Seasonal and annual time series from AHCCD at select locations in the project area are plotted in Figure 9-2.

[7] Also shown (points) are period-of-record, sub-monthly, extremes for select variables. Data retrieved from ECCC (2021).

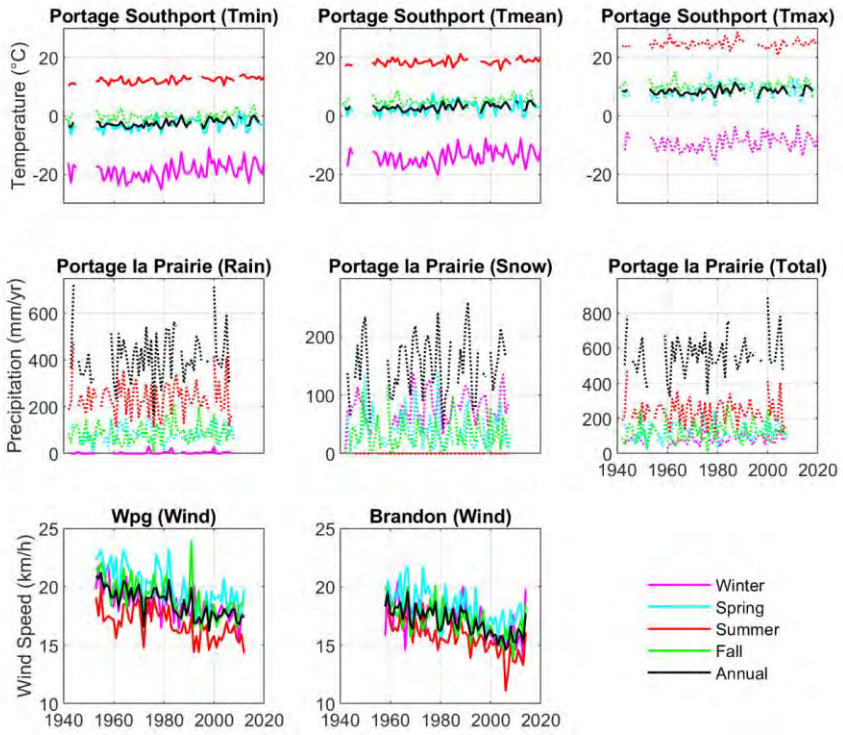


Figure 9-2: Time series of seasonal and annual temperature, precipitation, and wind speed[8]

Statistically significant trends are shown in Figure 9-2 as solid lines (dotted lines are not statistically significant). Trends of note include:

- Annual temperatures increased by o 0.031°C/yr for Tmin
  - o 0.026°C/yr for Tmean
  - o 0.019°C/yr for Tmax
- In winter
  - o minimum temperatures increased by 0.044°C/yr o mean temperatures increased by 0.035°C/yr,
- In spring
  - o minimum temperatures increased by 0.035°C/yr o mean temperatures increased by 0.029°C/yr
- In summer

[8] Solid lines indicate statistically significant trends and dotted lines indicate time series where no statistically significant trend was detected. Data shown are from the entire period available within ECCC's Adjusted and Homogenized Canadian Climate Data (AHCCD) for select stations of interest.

    - minimum temperatures increased by 0.025°C/yr o mean temperatures increased by 0.016°C/yr
- The only significant precipitation trend was for increasing winter rain (0.02mm/yr), which is likely in response to warmer winter temperatures resulting in more precipitation falling as rain instead of snow.
- Annually, wind speeds decreased by 0.055km/h/yr in Winnipeg and 0.056km/h/yr at Brandon. Seasonally, the largest trend occurred in summer at Brandon by 0.057km/h/yr and in spring at Winnipeg 0.071km/h/yr.

It is important to recognize that trend analysis can be sensitive to the start and end dates. For the purposes of this assessment, trends are analyzed for their entire period of record available. Historic trends provide an indication of how the climate has changed in the past but may not be an accurate representation of continued longer-term changes in the climatic system (e.g., through extrapolation of trends).

9.1.4 Future climate

Global climate models driven by future greenhouse gas emission scenarios (van Vuuren, et al. 2011) are used to project how Earth's climate may evolve in the future. Forty simulations from eighteen global climate models and two greenhouse gas emission scenarios provide the basis for this assessment.

The text below characterizes projections specific to the Portage la Prairie area. Based on the design life of the project, projections are presented for the 2050s (2040-2069) and 2080s (2070-2099) future horizons relative to the reference 1981-2010 period. Projected changes (deltas; Δ) indicate how the overall long-term climate may differ from the reference period, so information presented in this section can be complementary to historic climate normal presented in Section 9.1.1

Table 9-1 shows the projected change for the 2050s future horizon (2040-2069) while Table 9-2 shows the projected change for the 2080s future horizon (2070-2099).

Table 9-1: Projected change for the 2050s future horizon (2040-2069)*

	Tmin (°C)	Tmean (°C)	Tmax (°C)	Precipitation (mm)	Evaporation (mm)	Runoff (mm)	Wind Speed (km/h)
Annual	2.97	2.83	2.60	3.00	3.7	-0.12	-0.12
Winter	4.34	3.73	3.18	2.65	1.81	2.36	-0.06
Spring	2.73	2.43	2.31	6.73	5.75	-2.95	-0.14
Summer	2.55	2.67	2.55	-1.11	2.66	0.2	-0.33
Fall	2.66	2.69	2.72	2.67	2.91	0	-0.17

↑ ↓	Strong agreement
↑ ↓	Moderate agreement
↑ ↓	Weak agreement
↑ ↓	Negligible agreement

*Relative to 1981-2010. Cell colours reflect agreement on the direction of change. Dark green / brown indicates strong agreement that an increase / decrease will occur, medium green / brown indicates moderate agreement that an increase / decrease will occur, light green / brown indicates weak agreement that an increase / decrease will occur, and grey denotes projections where the ensemble agreement is less than 60% on the direction of future change.

Table 9-2: Projected change for the 2080s future horizon (2070-2099)*

	Tmin (°C)	Tmean (°C)	Tmax (°C)	Precipitation (mm)	Evaporation (mm)	Runoff (mm)	Wind Speed (km/h)
Annual	4.04	3.83	3.72	4.56	4.76	-0.34	-0.13
Winter	6.11	5.19	4.53	4.11	2.56	3.1	-0.04
Spring	3.85	3.57	3.45	9.72	9.79	-3.92	-0.11
Summer	3.45	3.52	3.69	0.45	4.29	0.2	-0.54
Fall	3.63	3.63	3.59	3.88	4.4	0.07	-0.19

↑ ↓	Strong agreement
↑ ↓	Moderate agreement
↑ ↓	Weak agreement
↑ ↓	Negligible agreement

The model projects average temperatures will increase by 2.83°C in the 2050s and 3.83°C in the 2080s (Table 9-1; Table 9-2). Both future time horizons (Table 9-1; Table

9-2) show strong agreement that temperature will increase into the future in all seasons. Winter is projected to experience the greatest temperature increase.

There is strong agreement that annual and winter precipitation will increase for both future time horizons. Increasing spring and fall precipitation is also projected, although with less agreement. Summer precipitation shows very small changes and is associated with notable uncertainty regarding the direction of change.

As expected, increasing temperature results in increasing evaporation, which may result in dryer summers. Some runoff projections show increasing winter runoff coincident with decreasing spring runoff, which may suggest changes in runoff timing. Increased temperatures result in earlier snowmelt in winter months, leaving less snow to melt in spring. Global climate models suggest that mean wind speed is not expected to drastically change in the future.

9.1.5 Greenhouse gases

The PACE project, which includes the D83W project, underwent a Greenhouse Gas (GHG) Mitigation Assessment ("*GHG Assessment*") as part of a federal government funding application process. This detailed assessment can be found in Appendix G.

The GHG Assessment concluded that the construction of the D83W project will result in the reduction of GHG emissions in Manitoba, Canada, and globally.

GHG emission reductions would result directly from D83W project's addressing multiple transmission issues that have been affecting the reliability of the transmission grid in southwestern Manitoba. Following the construction of D83W project, Manitoba Hydro will be able to rely much less on the operation of natural gas generating units at the Brandon Generating Station, reducing GHG emissions in Manitoba. The D83W project will also improve the overall efficiency of the Manitoba Hydro's Transmission System (resulting in more net Manitoba electricity exports), thereby decreasing GHG emissions outside of the province.

As capacity expansion is required in southwestern Manitoba, the GHG Assessment conservatively considered a shortened 44-month "Effective Assessment Period" based on a maximum plausible delay of the PACE Project. Over the Effective Assessment Period, it was estimated that the D83W project will result in cumulative net GHG emission reductions of 54 to 69 kilotonnes of carbon dioxide equivalent ("CO2e") globally.

Even though net construction GHG emissions from D83W were assumed to be zero (since Capacity Expansion is required in all realistic scenarios), the GHG Assessment incorporated an estimate of gross construction related GHG emissions. At the time of the GHG Assessment, a FPR had not yet been determined for the D83W transmission

line, and the GHG Assessment made use of two routes (B_4 and B_37661) that are shown on Map 9-1 and were deemed representative of an appropriate range of GHG emission estimates for the transmission line. Table 9-3 compares key design elements between the two routes, and the FPR.

Even though net construction GHG emissions from D83W were assumed to be zero (since Capacity Expansion is required in all realistic scenarios), the GHG Assessment incorporated an estimate of gross construction related GHG emissions. At the time of the GHG Assessment there was no FPR; the GHG Assessment considered assumptions for two routes, "B_4" and "B_37661", to present a possible range of GHG emission estimates. Table 9-3 compares key design elements between the B_4, B_37661, and the FPR.

Table 9-3: Key D83W design elements

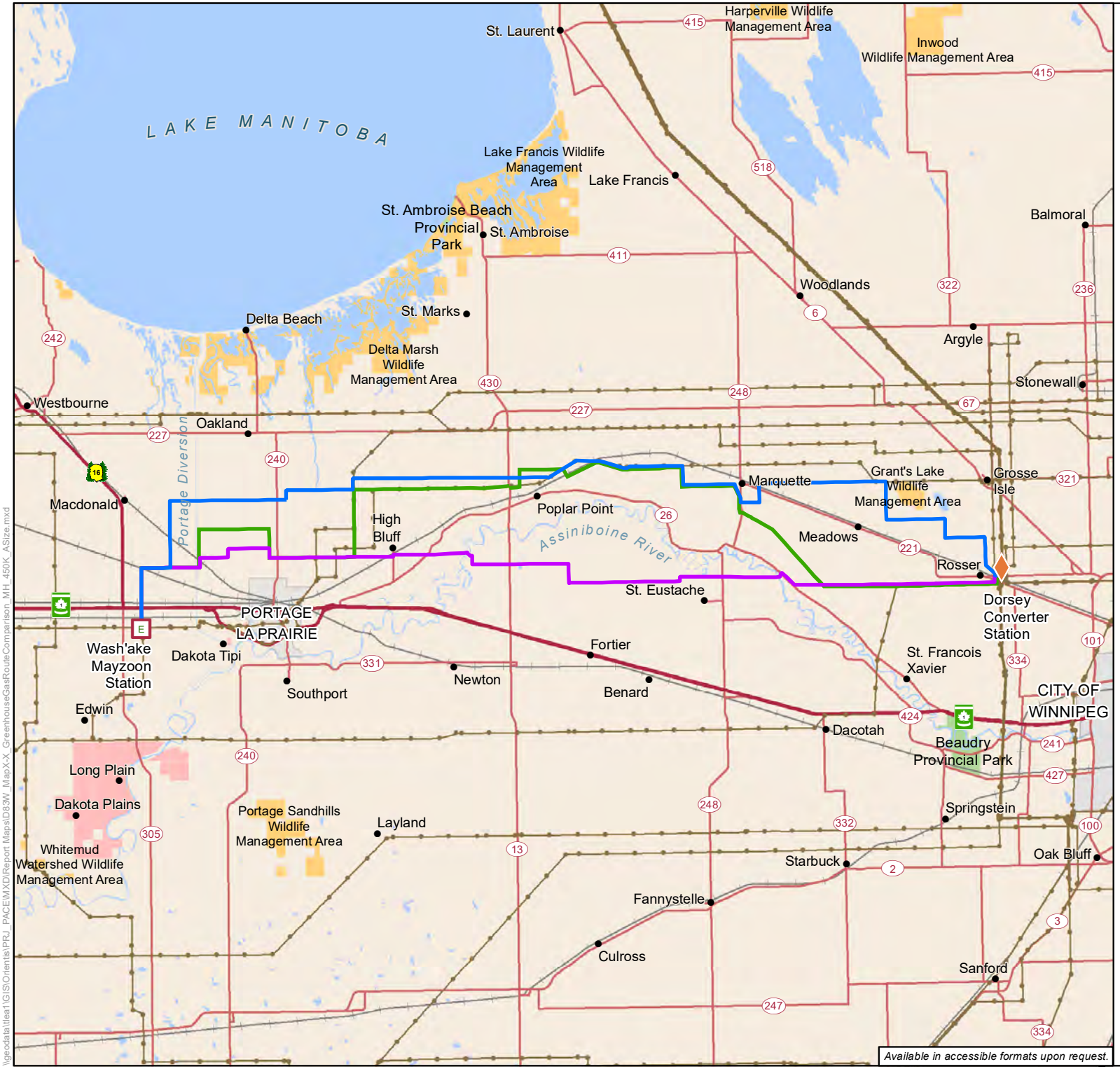
Transmission Line Route	**B_4**	**B_37661**	**FPR**
Length of Transmission Line	85 km	98 km	98.3 km
Average ROW	60 m		
Total # of Towers	215	247	250
# of A-Towers	191	212	219
# of B-Towers	2	4	5
# of D/F-Towers	22	31	26
Assumed Conductor Design	ACSR - Cardinal		
ROW Treed Area (to be cleared)	6.96 ha	1.74 ha	1.97 ha

Once a FPR was determined, construction related GHG emissions were re-calculated using FPR design elements. Table 9-4 shows that gross construction related GHG emissions from the FPR fall within the range presented in the GHG Assessment and are similar to or less than those for B_37661. Most of the construction related GHG emissions relate to the material supply chain while GHG emissions due to land use change (i.e., the permanent alternation of the right-of-way) are relatively small.

Table 9-4: D83W - gross construction related GHG emissions (tonnes of CO_2e)

	B_4	**B_37661**	**FPR**
Material Supply Chain	14,883	17,654	17,364
On-Site Energy & Labour Transport	3,592	4,125	4,137
Operation & Maintenance	1,425	1,425	1,425
Land Use Change	1,071	339	368
All Construction Related GHG Emissions	**21,000**	**23,500**	**23,300**

When allocated over D83W's assumed 75-year life, combined gross construction related GHG emissions from D83W are estimated to average only 0.31 kilotonnes CO2e per year. For comparison, over the Effective Assessment Period cumulative net GHG emissions reductions attributable to the D83W project were estimated to average 15 to 19 kt CO2e per year, significantly outweighing gross construction related GHG emissions. While the GHG Assessment focused on the 44-month Effective Assessment Period, the D83W project is expected to continue to reduce GHG emissions throughout its entire assumed 75-year life.



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line

Route B
- B_4 (Simple Average)
- B_37661 (Built)

Project Infrastructure
- Final Preferred Route

Infrastructure
- Converter Station (Existing)
- Wash'ake Mayzoon Station (Future)
- Transmission Line (>115 kV)

Landbase
- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation
- National/Provincial Park
- Wildlife Management Area

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: October 07, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Greenhouse Gas Route Comparison

Draft: For Discussion Purposes Only

Map 9-1

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10.0 Effects of the environment on the project

10.1 Overview

Effects of the environment on the project refer to the forces of nature that could affect the D83W project physically or hamper the ability to carry out the project's activities in their normal, planned manner. Typically, potential effects of the environment on any project are a function of project or infrastructure design and the risks of natural hazards and influences of nature. These effects may result from physical conditions, landforms and general site characteristics that may act on the project such that project components, schedule and/or costs could be substantively and adversely changed.

While environmental forces (e.g., severe weather, climate change) have the potential to adversely affect a project, good engineering design considers and accounts for such effects and the associated loadings or stresses on the project that may be caused by these environmental forces. The methods used for mitigating potential effects of the environment on the project are inherent in the planning, engineering design, construction, and planned operation of a well-designed project expected to be in service for several decades or longer.

The potential effects of the environment on the D83W project are focused on the following effects:

- Delays in construction and/or operation and maintenance
- Damage to infrastructure
- Reduced visibility impacting public health and safety

10.2 Effects analysis

The assessment of the effects of the environment on the D83W project considers potential changes to the project that may be caused by the environment. There are no environmental factors that are expected to interact substantially with the construction of the D83W project. While some weather-related delays are possible, they are not likely to adversely affect the project's construction, schedule, or cost.

During operation and maintenance, the transmission line of the D83W project or the station components with which it will be associated may be subject to severe weather events. While Manitoba Hydro designs its infrastructure to withstand extreme weather, it is not possible to design for all eventualities.

Severe weather that has negatively affected the Manitoba Hydro system in the past includes tornados, ice storms and floods. There is potential for any of these to occur in the RAA of the D83W project. Mitigation measures include, applying engineering practices and scheduling of activities to account for possible weather disruptions.

Over the next 100 years, Manitoba will likely experience warmer temperatures, a greater frequency of storm events, increasing storm intensity and an increase in annual precipitation. Potential effects of climate change on operation and maintenance of the D83W project would relate to increases in the frequency of severe weather events, changes in temperature and changes in precipitation. It is expected that increases in extreme weather events would affect operation and maintenance of the D83W project by increasing unexpected maintenance due to storm damage. Changes in temperature could affect the freeze/thaw cycle, which will result in decreased foundation stability and potentially increased maintenance.

Mitigation measures include applying engineering practices and scheduling of activities to account for possible weather disruptions. Based on the above, the residual effects of the environment on the D83W project during all phases of the project were deemed minor, with a moderate level of confidence because of the uncertainty in the potential changes to local, regional, and global climate that could occur over the life of the D83W project.

10.3 Assessment conclusions

The most likely effect of the environment on the D83W project is a short-term disruption in service and the economic costs of repair. The D83W project will be designed to meet applicable CSA standards. Design will be subject to two general design standards and the structural design loads will be based on a 150-year return period. Despite these measures, it is likely that extreme weather events could still result in outages and the requirement for repair of transmission lines, conductors or towers. While this can result in socio-economic effects and potential public safety hazards, potential effects on the biophysical environment would be limited and associated mainly with an increased risk of an accidental release of hydrocarbons in the event of a flood or fire.

The D83W project is being designed and will be constructed and operated with regard for health, safety, and environmental protection to minimize potential environmental effects that could result during the normal course of construction, operation, and maintenance as well as those that could result from forces of nature and affect the project physically or hamper the ability for project activities to proceed normally as planned.

The careful planning and design of the D83W project will minimize the potential for damage from extreme weather events. The effects of an individual event could have significant effects on a localized extent. However, the potential for these events to occur, given the measures that will be undertaken to prevent their occurrence, is low.

In the very unlikely and improbable event that damage to the D83W transmission line were to occur, it would be of a short duration, low frequency, or limited geographic extent such that major residual adverse environmental effects will not likely occur.

Overall, given the nature of the D83W project, proposed mitigation, the potential residual environmental effects due to extreme weather events on the valued components during all phases of the project, are assessed as not significant.

11.0Accidents and malfunctions

11.1 Overview

In the context of environmental assessment, a malfunction is a failure of a piece of equipment, a device, or a system to operate as intended and an accident is an unexpected and unintended interaction of a project component or activity with environmental, health-related, social, or economic conditions (Impact Assessment Agency 2021).

Accidents and malfunctions could occur because of abnormal operating conditions, wear and tear, human error, equipment failure, or other possible causes. Many accidents or malfunctions are preventable and can be readily addressed or prevented by good planning, design, equipment selection, hazards' analysis and corrective action, emergency response planning, and mitigation.

In this section, potential accidents and malfunctions associated with the D83W project that could result in appreciable adverse environmental effects are described, discussed, and assessed. The focus is on credible accidents that have a reasonable probability of occurrence, and where the resulting residual environmental effects could be major without careful management.

It is noted that accidents and malfunctions are evaluated individually, in isolation of each other, as the probability of a series of accidental events occurring in combination with each other is deemed unlikely. These possible events, on their own, generally have a very low probability of occurrence and thus their environmental effects are of low likelihood. They have an even lower probability or likelihood of occurring together – thus their combination is not considered credible, nor of any measurable likelihood of occurrence.

Accident and malfunction event scenarios have been conservatively selected that represent higher consequence events that would also address the consequences of less likely or lower consequence scenarios.

The accidents, malfunctions, and unplanned events that have been selected based on experience and professional judgment are as follows:

- Worker accident
- Fire
- Power outages
- Tower or structure collapse (e.g., due to adverse weather, sabotage, or force majeure)

- Spill of hazardous materials
- Collisions
- Discovery of a heritage site or object

Table 6-2 presents the potential interactions between the valued components and potential accidents or malfunctions. Project and cumulative effects of the accident or malfunction event on each valued component with a potential interaction are described, and the significance of the effect is determined using the same thresholds as those for the project environmental effects. Any event that results in human mortality is considered significant. The potential for, and consequence of, accidents and malfunctions were assessed considering historical risk information from Manitoba Hydro's experience and other similar projects.

11.2 Effects assessment

11.2.1 Worker accident

A worker accident has the potential to interact with human health and safety as it may result in harm, injury, or death to workers. All workers will be properly trained in practices to prevent workplace accidents including Workplace Hazardous Materials Information System (WHMIS), first aid, and other applicable training programs. These procedures are designed to prevent serious injury to staff and the public as well as to minimize the occurrence of unplanned events and minimize any potential damage to the environment.

Interactions between a worker accident and communities will be mitigated by compliance with health and safety legislation, safety by design, and implementation of environmental management measures aimed at protecting human health. Safety risks to workers will be reduced by complying with the requirements of various governing standards including the federal *Canada Labor Code*, the federal *Transportation of Dangerous Goods Act*, the *Manitoba Workplace Health and Safety Act* and all associated regulations. Adherence to public safety codes and regulations will help the project to be carried out in a safe manner to protect workers and the public.

With the application of, and compliance with, the above-mentioned acts, regulations, and standards, including the application of safety and security measures that are known to effectively mitigate the potential environmental effects, the potential environmental effects of a worker accident on communities during construction and operation and maintenance of the project are considered not significant.

Table 11-1: Project accident / malfunction interactions with Valued Components

Accident / malfunction	Valued Component								
	Agriculture	Economic opportunities	Human health	Community well being	Property and services	Fish and fish habitat	Vegetation	Wildlife and wildlife habitat	Harvesting and important sites
Work accident			X	X					
Fire	X	X	X	X	X	X	X	X	X
Power outage	X	X	X	X	X				
Tower Collapse (weather, sabotage, or force majeure)	X		X	X	X				
Failure off erosion protection and sediment control measures	X		X	X		X	X	X	
Spill of hazardous materials	X		X	X	X	X	X	X	X
Collisions			X	X				X	
Discovery of a heritage site or object			X	X					X

11.2.2 Fire

Potential effects caused by a fire include:

- Carbon dioxide emissions (contribute to GHG emissions and climate change)
- Safety risks to workers and the public (human health)
- Loss or damage to property or resources (community well-being)
- Direct crop loss (agriculture)
- Soil and shallow groundwater contamination with sediment-laden water used in extinguishing the fire (groundwater (human health), wildlife, agriculture)
- Damage to infrastructure or heritage sites or objects (heritage sites / objects)

A fire may arise from heavy equipment or from natural causes such as a lightning strike.

Manitoba Hydro will ensure that personnel are trained in the use of fire-extinguishing equipment. In the unlikely event of a fire, local emergency response will be able to reduce the severity and extent of damage.

A large fire could create particulate matter levels greater than the ambient air quality standard over distances of several kilometers or damage vegetation or infrastructure in the area, but such situations would be of short duration, infrequent, and are not expected to occur because of planned mitigation and prevention measures. The potential residual environmental effects of a fire are therefore considered not significant.

11.2.3 Power outage

Several factors can cause power outages. These include equipment failure, wildlife or equipment contact with live wires, environmental events such as fires, tornado-like winds, and ice storms, automatic safety equipment deactivating the line, and staff temporarily taking a transmission line out of service either intentionally or accidently.

A power outage can affect infrastructure and services, employment and economy, agriculture, and human health valued components. Effects on infrastructure and services consist of changes to community road traffic and transportation utility due to failure of traffic lights and interference with communication and radio signals with the loss of power to signal sources. Effects on employment and economy would result if the power outage resulted in a loss of productivity for businesses. Effects on agriculture would occur if power was lost by agriculture operations such as hog or dairy operations. Effects to human health involve changes in levels of stress and annoyance and change in capacity of health care services. The lack of power could affect the operation of health care facilities.

With the application of, and compliance with, the various acts, regulations, and standards, including the application of safety and security measures that are known to effectively mitigate the potential environmental effects, the potential environmental effects of a power outage on communities during construction and operation and maintenance of the project are considered not significant.

11.2.4 Tower Collapse

While considered unlikely given the applied design standards, it is possible for a transmission tower or station structure to collapse during construction and operation due to extreme weather, mechanical failure, or intentional or unintentional human interaction.

Tower collapse has the potential to:

- Cause injury or death (human health)
- Cause fires (effects and mitigation discussed above)
- Damage other infrastructure, heritage or cultural sites, crops, either directly due to tower collapse or because of emergency repair activities (agriculture, community well-being, and traditional harvesting and important sites)
- Impede access or movement (traditional harvesting and important sites, wildlife)

The risk of tower failure will be reduced through the application of sound engineering practice in the design of the towers and transmission lines for extreme loadings, the use of qualified construction contractors, and regular maintenance.

Engineering design will adhere to industry standards and reflect Manitoba Hydro's experience with similar projects. Design will follow the Canadian Standards Association (CSA) C22.3 No. 1-10 "Overhead Systems" standard. The reliability-based design method will be used for designing the structural components following the CAN/CSA-C22.3 No. 60826-10 "Design Criteria of Overhead Transmission Lines" standard.

In addition, consequences are managed through mitigation. Line maintenance crews will address damage to personal property, vegetation, or soils. Soil contamination issues will be addressed as part of spill response planning.

The effects of a tower collapse would be localized and short term. The viability of wildlife populations or the capacity of critical habitat for wildlife species of conservation concern would not be jeopardized. Disruption of infrastructure or agriculture is short term and minimal. Given the localized extent of the effects on wildlife habitat, effects on land use activities are not expected to extend beyond the actual collapsed structures. The likelihood of injury to or death of humans or wildlife

is low given the limited area affected by a tower collapse and the rarity of such an occurrence. As a result, while the magnitude of the effect of tower collapse on the affected valued component could be moderate to high, given the low likelihood and array of mitigation measures the effect is assessed as being not significant.

11.2.5 Hazardous materials spill

Hazardous materials could be released into the air, soils, surface water or groundwater because of an accidental spill during construction or operation and maintenance activities.

In general, hazardous materials spills have the potential to:

- Contaminate surface and groundwater (human health, harvesting and important sites, wildlife)
- Contaminate soil (agriculture, harvesting and important sites, wildlife)
- Increase harmful emissions (GHG effect, climate change)

Spills are usually highly localized and easily cleaned up by on-site crews using standard equipment. The oil containment infrastructure for the station will limit potential effects during operation.

Implementation of a detailed spill response plan and a well-designed CEnvPP will result in minimal potential effects through accidental releases. The contractor will be required to provide environmental training, as well as training in spill prevention and response, to construction personnel. Prior to the commencement of construction activities, Manitoba Hydro will ensure that spill response equipment is readily available. All spills will be contained, cleaned, and reported to applicable authorities as follows:

- Contaminated material or potentially hazardous material will be contained
- Proper safety precautions (e.g., protective clothing and footwear) will be implemented
- The contractor will follow their spill response plan and ensure that the province's spill-reporting line is notified for reportable spills
- Contaminated wastes, such as used cleaning cloths, absorbents, and pads, will be stored in proper waste containers
- Waste material will be disposed of at approved disposal facilities

Construction equipment will be cleaned and maintained in good working condition, with visual inspections of equipment performed on a regular basis. Petroleum products such as gasoline, diesel fuel, and oil will be properly labeled in accordance with the appropriate legislation and regulations. Refueling, oiling, and maintenance of equipment, as well as storage of hazardous materials, will be conducted in a

designated and contained area(s). Servicing of equipment (e.g., oil changes and hydraulic repairs) will be completed off-site when possible. Vehicles will be equipped with spill containment and cleanup materials.

Personnel handling fuels and hazardous wastes will have WHMIS training and be qualified to handle these materials in accordance with the manufacturer's instructions and applicable regulations. Hazardous waste and storage area(s) will be clearly marked and secured. Industrial waste will be reused or recycled on a priority basis. Where reuse or recycling opportunities are not available, industrial waste will be collected and disposed of at an approved facility. Garbage receptacles for solid non-hazardous wastes will be available. These wastes will be collected on a regular basis or as they are generated and will be disposed of at approved locations. With these mitigation measures and emergency response procedures implemented, and because of the low likelihood of such events, the potential residual environmental effects of a hazardous material spill on groundwater resources, aquatic environment, and terrestrial environment during construction and operation and maintenance of the project are considered not significant.

11.2.6 Vehicle accidents

A vehicle accident arising from project-related activities could cause injury or death to workers or the public (human health; note that the potential for a fire or hazardous material spill, which could be associated with a vehicle accident or other means has been addressed above).

The potential for a vehicle accident would exist during construction and operation and maintenance phase of the project. Worker traffic and truck traffic to and from the site, and the operation of heavy equipment on-site during construction have the potential to result in a vehicle accident during construction. Project-related vehicles will observe all traffic rules and provincial and federal highway regulations. Trucking activity will observe speed limits and weight restrictions. Because the D83W project will comply with all applicable traffic rules and regulations, the nominal increase in traffic volumes because of the project along with safety precautions, the potential residual environmental effects of a vehicle accident are considered not significant.

11.2.7 Discovery of a heritage site or object

Cultural or heritage sites or objects may be discovered during activities involving ground disturbance such as construction related excavation. It is unlikely that heritage sites or objects will be discovered during operation.

The discovery of a heritage site or object has the potential to affect harvesting and important sites. Heritage potential is determined during the environmental

assessment. If areas of high potential are found, a preconstruction archaeological survey may be conducted.

Mitigation for the protection of heritage sites or objects is outlined in the CHRPP (Appendix H). The CHRPP will provide clear instructions on how to proceed should Manitoba Hydro, its contractors and/or consultants, discover or disturb a cultural or heritage sites or objects and will determine the ongoing protection measures for the resources through processes outlined in this document.

If a heritage site or object is discovered, project work will cease around the discovery and the project archaeologist will be contacted. Work in the area will continue only if approval is received from the archaeologist or the Historic Resources Branch.

With the low probability of encountering heritage sites or objects during the D83W project related activities, and in consideration of the nature of the project and planned mitigation, the potential residual effects are considered not significant.

11.3 Assessment conclusion

The D83W project is being designed and will be constructed and operated with regard for health, safety, and environmental protection to minimize potential environmental effects that could result during the normal course of construction, operation, and maintenance as well as those that could result from accidents and malfunctions.

The careful planning of the D83W project and the implementation of proven and effective mitigation will minimize the potential for accidents and malfunctions. The effects of an individual accident or unplanned event could have significant effects on a localized extent. However, the potential for these events to occur, given the measures that will be undertaken to prevent their occurrence, is low. In the very unlikely and improbable event that an accidents or malfunctions were to occur, it would be of a short duration, low frequency, or limited geographic extent such that major residual adverse environmental effects will not likely occur.

Overall, given the nature of the project, credible accidents and malfunctions considered, proposed mitigation, the potential residual environmental effects of all project-related accidents and malfunctions on all valued components during all phases of the Project, are assessed as not significant.

12.0 Environmental protection program

12.1 Introduction

Manitoba Hydro will implement the mitigation measures, monitoring and other follow-up actions identified during the assessment through an Environmental Protection Program (EPP). The 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 assessment report.

Manitoba Hydro developed the EPP in accordance with its environmental policy.

Manitoba Hydro's Corporate Environmental Management Policy states the corporation is committed to protecting the environment by:

- Ensuring that work performed by its employees and contractors meets environmental, regulatory, contractual, and voluntary commitments
- Recognizing the needs and views of its interested parties and ensuring that relevant information is communicated
- Continuously assessing its environmental risks to ensure they are managed effectively
- Reviewing its environmental objectives regularly, seeking opportunities to improve its environmental performance
- Considering the life cycle impacts of its products and services
- Ensuring that its employees and contractors receive relevant environmental training, and
- Fostering an environment of continual improvement

12.2 Environmental management

Manitoba Hydro is seeking self-verification under the International Organization for Standardization (ISO) 14001 Environmental Management System Standard.

An environmental management system is a framework for developing and applying an organization's 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.

12.3 Adaptive management

Adaptive management is a planned systematic process employed with the goal of continually improving environmental management practices by learning from their outcomes. The environmental protection program for the D83W project has established the principles of adaptive management allowing for flexibility in the mitigation of adverse environmental effects that may result from the project. Manitoba Hydro will use the information gathered during follow up and monitoring activities to verify the accuracy of the environmental assessment effects predictions and the effectiveness of implemented mitigation measures.

Manitoba Hydro designed the EPP to be adaptive and responsive throughout the project lifecycle by evaluating program documents, processes, procedures, and mitigation measures through inspection, monitoring and communication programs and conducting reviews to facilitate updates to the program.

Within the EPP, adaptive management will take place in two primary areas:

- At the management level, involving changes with the program structure itself
- At the implementation level, involving individual mitigation measures as management and implementation teams evaluate the onsite effectiveness of mitigation strategies or the program.

Scheduled update meetings between departments and reviews of the program and its effectiveness will take place to foster the process.

12.4 Experience from previous projects

Manitoba Hydro has extensive experience in the development of environmental 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.

The development of the EPP has allowed the standardization and consistent approach to environmental protection, monitoring and follow-up. The EPP improves through the experiences from past and current projects (e.g., monitoring and inspection results, documentation format changes).

12.5 First Nation and Métis engagement

As a component of the First Nation and Métis engagement process, Manitoba Hydro offered ICACs the opportunity to review harvesting and important sites section of the environmental assessment (Section 8.9). Feedback shared during by First Nations and the MMF during engagement helped inform the environmental assessment report and EPP.

The knowledge that was shared through the FNMEP assisted Manitoba Hydro with:

- Developing a greater understanding of the PDA
- Identifying key concerns in the PDA
- Identifying potential project effects
- Planning and designing the project
- Developing potential mitigation measures

There will be opportunities for additional sensitive sites to be identified in the EPP should any be discovered during construction or operation of the D83W project.

Manitoba Hydro recognizes the unique relationship that First Nation and Métis communities and organizations have with their areas of land use and appreciates sharing of information about their history and culture, and perspectives on the D83W project.

12.6 Environmental protection plan framework

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 and First Nation and Métis engagement process. The EPP:

- Describes how Manitoba Hydro is organized
- Functions to deliver timely, effective, comprehensive solutions and mitigation measures to address potential environmental effects
- Defines roles and responsibilities for Manitoba Hydro employees and contractors
- Outlines management, communication and reporting structures.

The EPP includes the what, where and how aspects of protecting the environment during the pre-construction, construction, operation and decommissioning of the project. Figure 12-1 illustrates the components of the EPP. The following sections describe each component in further detail.

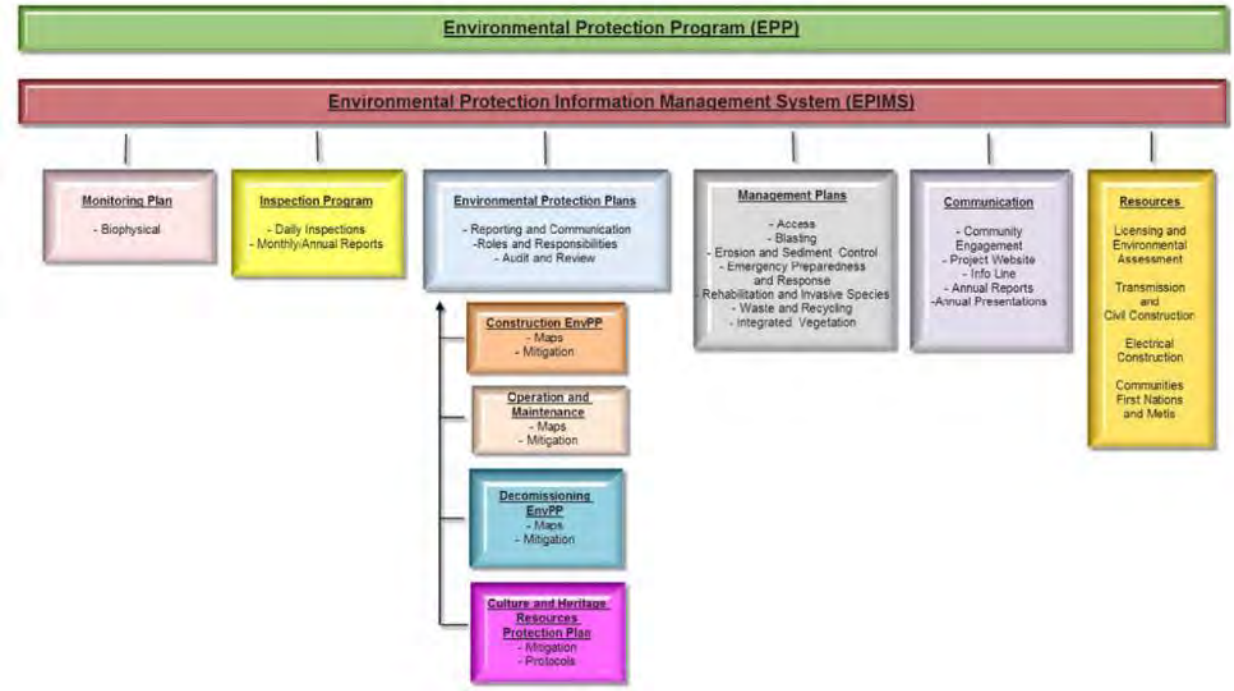

Figure 12-1: Environmental protection plan components

12.7 Organization

The organizational structure of the EPP 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 12-2). Manitoba Hydro senior management is responsible for the overall EPP, including resourcing, management, and performance, and is accountable for regulatory compliance, policy adherence and interested party 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 public and First Nation and Métis engagement activities. Environmental consultants and advisors support the management team.

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 as required.

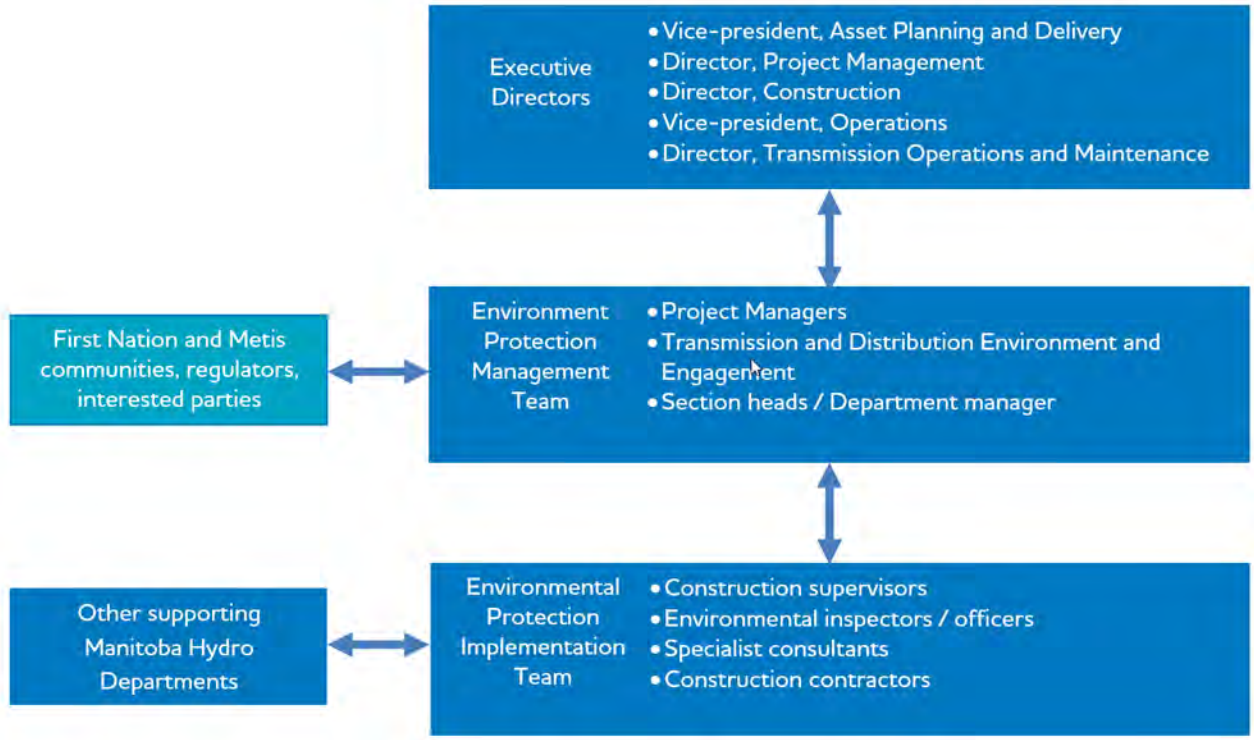

Figure 12-2: Environmental protection plan organizational structure

12.7.1 Resources

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 and routing alternatives. In addition, there are resource allocations for the delivery and implementation of environmental protection measures to meet corporate policy and government regulatory requirements.

Manitoba Hydro is committed to staffing the environmental protection program with environmental inspectors and providing required support, including training, financial resources, and equipment.

12.7.2 Roles and responsibilities

Figure 12-3 illustrates the typical organizational lines of reporting and communications. The roles and responsibilities for delivery of the D83W project and implementation of environmental protection measures are as follows:

- The project engineer has overall responsibility for the implementation of the environmental protection plans and reports to a section head or department manager.

- The Transmission & Distribution Environment and Engagement Department oversees the development of environmental protection documents and associated inspection and monitoring programs, including ongoing public and First Nation and Métis engagement activities.
- The construction contractor is responsible for ensuring work adheres to the environmental protection plans and reports to the construction supervisor.
- Environmental inspectors and officers have the primary responsibility to confirm that environmental protection measures and specifications are implemented per the environmental protection plans as well as provide information and advice to the 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.

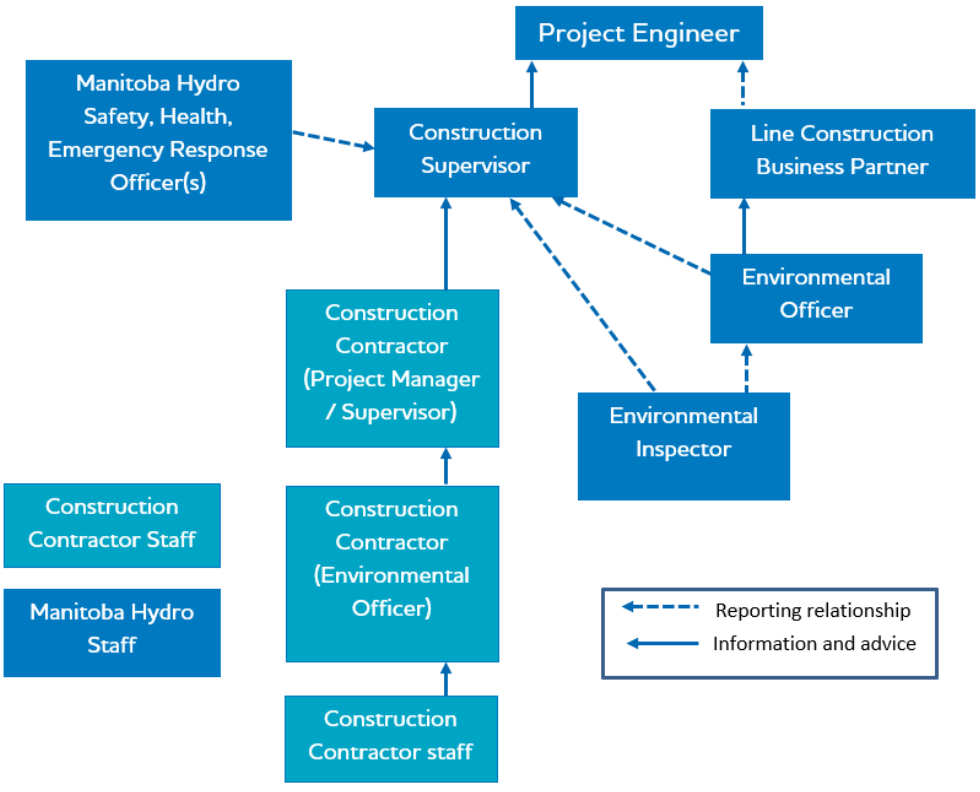

Figure 12-3: Typical organizational lines or reporting and communications

12.7.3 Communication and reporting

Manitoba Hydro personnel will maintain ongoing communications with Manitoba Environment, Climate and Parks, other provincial and federal departments, and First Nation and Métis communities and organizations regarding implementation of the 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 for the regulators, contractors, and Manitoba Hydro staff.

Manitoba Hydro will provide First Nation and Métis communities and organizations, landowners, interested parties and the public with ongoing opportunities to review and comment on the D83W project. Manitoba Hydro developed a dedicated project webpage to facilitate communication with First Nation and Métis communities and organizations, landowners, interested parties and the public. The environmental protection management team will record and review formal enquiries or complaints for response or action.

12.7.4 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 designed the environmental protection plans as user-friendly reference documents that provide project managers, construction supervisors and contractors with detailed lists of environmental protection measures and other requirements implemented in the design, construction, and operation phases of a project.

Manitoba Hydro organized the environmental protection measures by construction component and activity, and environmental component and issue to assist project personnel in implementing measures for work sites and activities.

Manitoba Hydro will develop the environmental protection plans described in the following sections.

12.7.4.1 Construction

The construction environmental protection plan (CEnvPP) will be prepared prior to construction. It is a key element in implementing effective environmental protection and limiting the potential adverse environmental effects identified in the environmental assessment report. It also outlines actions to identify unforeseen

environmental effects and implement adaptive management strategies to address them. An important component of an environmental protection plan is review and updating. This allows environmental protection measures to remain current, continually improving 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 environmental assessment report, including design mitigation, provincial and federal regulatory requirements, beneficial practice guidelines, Manitoba Hydro environmental policies and commitments, and input during public and First Nation and Métis engagement.

The CEnvPP lists the general environmental protection measures for major components and activities associated with the project. Environmental protection measures are provided for environmentally sensitive sites (ESS) identified during public and First Nation and Métis engagement and assessment activities. Environmentally sensitive sites are locations, features, areas, activities or facilities along or immediately adjacent to the transmission line corridor or other project components that are ecologically, socially, economically or culturally important and sensitive to disturbance by the project and, as a result, require site-specific mitigation measures.

The CEnvPP will contain orthophoto map sheets that provide Manitoba Hydro project managers, construction supervisors, employees, contractors, and contract employees with detailed site-specific environmental protection information that can be implemented, managed, evaluated, and reported on in the field.

12.7.4.2 Operation and maintenance

Standard mitigation measures will apply during operations (see Chapter 7 of the MMTP operation and maintenance environmental protection plan; Manitoba Hydro 2020). A specific operation and maintenance environmental protection plan is not planned at this time.

12.7.4.3 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.

12.7.4.4 Cultural and heritage sites / objects

The fact that cultural and heritage sites / objects have intrinsic value to Manitobans is understood by Manitoba Hydro and addressed through a separate protection plan. The culture and heritage resource protection plan (Appendix H) outlines protection measures in the event of the discovery of previously unrecorded cultural and heritage sites / objects during construction and describes the ongoing monitoring of known cultural and heritage sites / objects for disturbance.

Through First Nation and Métis engagement and previous projects, Manitoba Hydro understands and acknowledges the importance of cultural and heritage sites / objects to Indigenous communities. Manitoba Hydro has developed mechanisms such as notification of discovery and involvement in site investigations, which are further explained in the culture and heritage resource protection plan.

Results from the heritage resources monitoring program will be addressed in conjunction with First Nation and Métis engagement on an as required basis during construction, as well as through a heritage resources impact assessment to the Manitoba Historic Resources Branch per the terms of the Heritage Resources Act (1986) and heritage permit(s) issued to Manitoba Hydro.

12.7.5 Management plans

Management involves the 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 environmental assessment report. 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
- Biosecurity
- Blasting
- Erosion protection and sediment control
- Emergency preparedness and response
- Rehabilitation and weed management
- Waste and recycling

Environmental inspectors / officers will conduct regular inspections during construction to ensure adherence to the plans. The following sections describe each plan.

12.7.5.1 Access management plan

Prior to the start of construction, Manitoba Hydro will prepare an access management plan to minimize the need to construct new access roads and trails.

The access management plan will outline:

- The use of existing roads and trails to the extent possible during construction
- Management objectives and principles
- Security requirements, including
  - Terms and conditions for access
  - Restrictions on firearms
  - Hunting and fishing
  - Other resource use activities
- Environmental protection measures including
  - Timing windows
  - Vehicle cleaning and servicing
  - Load restrictions
  - Warning signage
  - Speed limits
  - Sensitive area avoidance
  - Stream crossings
  - Other environmental issues
- Access management issues and mitigation strategies
- Safety of construction workers and the public
- Respect for First Nation and Métis rights and resource users
- Protection of natural, cultural and heritage sites / objects

12.7.5.2 Biosecurity

Prior to the start of construction Manitoba Hydro will prepare a biosecurity management plan for the project to provide guidance to Manitoba Hydro staff and contractors in order to prevent the introduction and spread of weeds and other pests, including invasive species, in agricultural land and livestock operations through project pre-construction and construction activities.

12.7.5.3 Blasting

Prior to the use of explosives, the contractor will prepare blasting plans to manage the storage and use of explosives at construction sites in accordance with environmental protection measures, provincial and federal legislation and guidelines, and corporate policies for explosives.

12.7.5.4 Emergency preparedness and response

Prior to the start of construction, each contractor will prepare an emergency preparedness and response plan to prepare for and respond to emergencies at construction sites in accordance with provincial legislation and guidelines, and corporate policies and procedures for the protection of human health and the environment. The plan will include the following:

- Spills or releases of hazardous substances, including petroleum products
- Accidents involving hazardous substances
- Medical emergencies
- Explosions and fire

12.7.5.5 Erosion protection and sediment control

Prior to the start of construction, Manitoba Hydro will develop an erosion protection and sediment control framework to guide each contractor in preparing an erosion protection and sediment control plan 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.

The plan will prescribe environmental protection measures including:

- Frozen ground conditions
- Establishment of buffer zones
- Avoidance of sensitive areas
- Use of bioengineering techniques

12.7.5.6 Rehabilitation and weed management

Prior to the start of construction, Manitoba Hydro will prepare a rehabilitation and weed management plan in accordance with environmental protection measures and provincial guidelines for rehabilitation.

The plan will prescribe measures for:

- Washing equipment and vehicles prior to entering construction sites
- Controlling vegetation at construction sites

- Restoring and re-vegetating disturbed sites

12.7.5.7 Waste and recycling

Prior to the start of construction, Manitoba Hydro or the contractor will develop a waste and recycling management plan to manage waste at construction locations in accordance with provincial legislation and guidelines, and corporate policies and procedures for the protection of human health and the environment.

The plan will include measures for:

- Waste reduction
- Recycling and reusing initiatives
- Storage of kitchen wastes
- Recycling and disposal of construction wastes
- Disposal of wastes at licenced facilities

12.8 Follow-up and monitoring

Follow-up and monitoring are 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.

12.8.1 First Nation and Métis engagement

Manitoba Hydro will offer Indigenous communities and organizations environmental protection program meetings to review and discuss the findings of the environmental assessment and engagement and how the information shared will inform the EPP.

Manitoba Hydro will also engage Indigenous communities in monitoring of the Project.

12.8.2 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 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 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 / officers 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
- Report all instances of non-compliance to the construction supervisor, contractor and applicable regulatory authority
- Report incidents such as accidents, malfunctions, spills, fires, explosions and environmental damage to the construction supervisor and applicable regulatory authority
- Record all inspection activities in a daily journal and complete daily inspection forms
- Provide daily and monthly inspection reports electronically to the environmental protection information management system for review and viewing by applicable Project staff

Incidents will be dealt with immediately and followed up in subsequent daily inspection reports.

12.8.3 Monitoring program

Due to the minimal natural habitat traversed by the final preferred route and information recently learned from similar projects in southern Manitoba that showed minimal environmental effects in cultivated agricultural lands, an environmental monitoring plan has not been prepared for this project. However, should inspection discover unknown effects, one will be prepared and implemented.

Should it be required, monitoring will be carried out by Manitoba Hydro and may be contracted to environmental consultants that possess the necessary expertise, equipment and analytical facilities. As well, Manitoba Hydro will also engage Indigenous communities in monitoring of the Project.

12.8.4 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.

12.9 Pre-construction activities

Manitoba Hydro will undertake several 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 Indigenous communities and organizations during the finalization of the construction environmental protection plan to discuss, address and mitigate concerns, to the extent possible, with cultural and environmentally sensitive sites.

Manitoba Hydro will obtain licenses, permits, authorizations and other approvals, including property agreements, right-of-way 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 Transmission & Distribution Environment and Engagement 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.

12.10 Work stoppage

The duty to stop work rests with everyone encountering situations where the environment, including biophysical, socio-economic and heritage sites / objects, 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 or environmental inspector / officer immediately. 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 Manitoba Hydro approves the resumption of work. Stop work orders will be documented, reported to regulatory authorities (if applicable) and reviewed at construction meetings.

12.11 Review and updating

12.11.1 Incident reviews

CEnvPP 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.

12.11.2 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. 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.

12.11.3 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.

12.12 Summary

This chapter outlined the environmental protection program where environmental protection commitments, mitigation measures and follow-up actions identified in this environmental assessment report 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. Environmental management and monitoring plans are also identified.

13.0 Conclusion

The environmental assessment for the D83W project examined potential effects on physical, biophysical, and socioeconomic components. The environmental assessment was focused on nine valued components namely agriculture; economic opportunities; human health; community well-being; property and services; fish and fish habitat; vegetation; wildlife and wildlife habitat; and harvesting and important sites.

The primary mechanism to mitigate potential effects attributable to the D83W project involved a routing process that considered the natural built, and engineering perspectives environment, and engagement feedback on potential routing options from the affected landowners, public, First Nation communities, MMF and other interested parties. The preferred route was modified based on engagement input and environmental conditions, resulting in the final preferred route presented in this report.

Mitigation measures were developed to address effects that were not avoided by routing. In terms of the physical environment effects, such as those relating to EMF, air quality, water quality and noise were assessed. The assessment determined that exposures to ELF EMF are expected to be well below ICNRIP guidelines and that accordingly to Health Canada precautions are not required for the levels of exposure that will be generated, therefore effects are negligible. The magnitude in the change in air quality resulting from construction activities (vehicle and heavy machinery) will be negligible and confined to the PDA. During operations and maintenance, a change in air quality from project related activities are expected to be temporary (short-term in duration) and along highways and the transmission line right-of-way.

Anticipated noise levels generated for the D83W project are expected to be limited in duration for all project phases, with noise generated for construction and maintenance during daytime hours only.

There is the potential for groundwater to be affected by possible accidents, malfunctions, and unplanned events. In addition, a reduction in groundwater quality may occur during tower foundation installation and herbicide use during vegetation management. However, the implementation of mitigation measures will minimize potential effects to groundwater quality.

Effects to the natural environment in the project RAA consist mainly of agricultural land, and the reduction of shelterbelts and small treed areas found sporadically along the PDA. There are vegetation species of concern that can be found in the PDA;

however, no species of conservation concern were identified along the proposed final preferred route during field surveys.

There are also several wildlife species of conservation concern that may occur in the RAA including those identified during surveys (birds), but there are few large natural areas near the PDA where they could occur. The minor reduction in the few shelterbelts and small treed areas along the proposed route, which provide potential habitat for wildlife, will not affect regional wildlife populations. No wildlife species of conservation concern were identified within the proposed final preferred route during field surveys. The presence of the transmission line may result in bird-wire collisions, but not at levels that would have measurable effects to regional populations.

The D83W project's PDA has fifteen stream crossings, including the Portage diversion, but, with the implementation of the identified mitigation measures, no effects to fish or fish habitat, including species of conservation concern are expected.

The D83W project is expected to result in positive economic benefits to the region, through the presence of the workforce, but also indirectly, through facilitating development of industry. There will be a slight increase in traffic associated with the workforce, but the volume will be low and outside of traditionally heavy traffic periods.

Known heritage sites were avoided during the routing process, with measures developed to manage previously un-discovered cultural or heritage sites/objects.

There are six residences located from between the edge of the ROW and 100 m from the edge of the right-of-way. There were no residences located within the proposed right-of-way that need to be relocated.

The D83W project runs adjacent to several recreational facilities and there are over 50 within 500 m that would experience some noise and/or visual intrusion.

Manitoba Hydro understands that the severity of residual effects to harvesting, important sites, and cultural landscapes varies between different cultural groups. Overall, the project is anticipated to have low impacts due to its presence within a relatively exurban location.

The proposed final preferred route occurs on or adjacent to agricultural land so there will be effects through loss of agricultural land and the inconvenience, nuisance and increased production costs associated with operating farming equipment and crop production. Manitoba Hydro has developed a compensation policy for landowners that grant an easement for a transmission line right-of-way and for incidental and or physical damages to property during construction.

The environmental assessment includes an evaluation of potential cumulative effects and effects of the environment on the D83W project, as well as an analysis of potential accidents, malfunctions, and unplanned events. It also includes a description of the environmental protection program developed for the D83W project, including the various roles, communication protocols, and commitments to monitor project activities and manage potential effects.

Based on the routing process, and the measures developed to mitigate and manage any potential adverse effects, the conclusion of environmental assessment was that the residual effects were predicted to be considered not significant.

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Available in accessible formats upon request

Appendix A: Transmission line routing

Transmission line routing

Manitoba Hydro

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1.0 Overview

This appendix is intended to be read as supporting material to Chapter 3 of the environmental assessment report for the Dorsey to Wash'ake Mayzoon transmission project. It describes the models used in the transmission line routing process and describes in detail how the models are used.

The routing methods used for this project are based on those developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) overhead electric transmission line siting methodology[1].

The routing process involves the use of GIS-based mapping and models to evaluate the suitability of an area for locating new transmission lines. The models and sequential steps in the process (described in the sections below) provide a structured and transparent way to represent the trade-offs between competing interests and land uses.

1.1 Routing methodology

The EPRI-GTC methodology is a quantitative, computer-based process developed by the Electric Power Research Institute (EPRI) and Georgia Transmission Corporation (GTC) for use as a tool in evaluating the suitability of an area for locating new overhead transmission lines.

The EPRI-GTC methodology is informed by geospatial information (where features and activities occur on the landscape) and, with the help of models at each step through the process, considers three broadly conceived perspectives that apply to land use, plus a fourth perspective that considers the other three equally. The three perspectives (and their project team representatives) are:

Built perspective is concerned with limiting the effect on the socio-economic environment. In routing decision-making, the built perspective is represented by agricultural, socio-economic, resource use and heritage discipline specialists, as well as Manitoba Hydro property and environmental assessment staff.

[1] EPRI-GTC. 2006. EPRI-GTC Overhead Electric Transmission Line Siting Methodology. Tucker, GA: Georgia Transmission Corporation.

Natural perspective is concerned with limiting the effect on the biophysical environment. The natural perspective is represented by wildlife, fish, vegetation, and wetland discipline specialists.

Engineering perspective is concerned with cost, system reliability, constructability, and other technical constraints. The engineering perspective is represented by Manitoba Hydro project management, grid infrastructure planning, design, construction, and maintenance staff.

2.0 Areas of least preference

Areas of least preference (Table 1; Map 1) are features to avoid when routing a transmission line due to physical constraints (e.g., extreme slopes, long water crossings), regulations limiting development (e.g., protected areas), or areas that would require extensive mitigation or compensation (e.g., paralleling rail lines, crossing a runway or glide path).

During the route planning process, attempts are made to avoid these areas, but in some cases, due to other constraints and factors in an area, and in consideration of the specific details of the feature, an area of least preference may be crossed.

Areas of least preference are updated throughout the process as new data is collected and they are used during corridor development as well as during development and analysis of routes and during any potential modifications to the preferred route.

Table 1: Areas of least preference

Aboriginal lands / Indian Reserves / Treaty Land Entitlement selections
Airports/Aircraft landing areas and glide path
Buildings
Cemeteries / burial grounds / Campgrounds & picnic areas
Contaminated sites
Federal/Provincial/Municipal heritage sites / Heritage plaques
Known archaeological sites
Military facilities / past military installations
Mines and quarries (Active)
Non-spannable waterbodies (> 450m)
Recreation / natural provincial park (protected)
Recreation centers (e.g., golf, skiing)
Religious / worship sites
Schools / day cares
Towers and antennae
Waste disposal sites
Wastewater treatment areas
Wildlife Management Areas (protected portions) / Wildlife refuge

3.0 Routing corridors

Corridors map the suitability of an area, within the route planning area, for locating a transmission line. They further narrow the geographic area under consideration for route development. Four corridors (built, natural, engineering, and simple average) are created. Creating the corridors requires:

- The corridor model
- Geospatial data
- Geospatial data layers
- Suitability surfaces
- Least cost path analysis

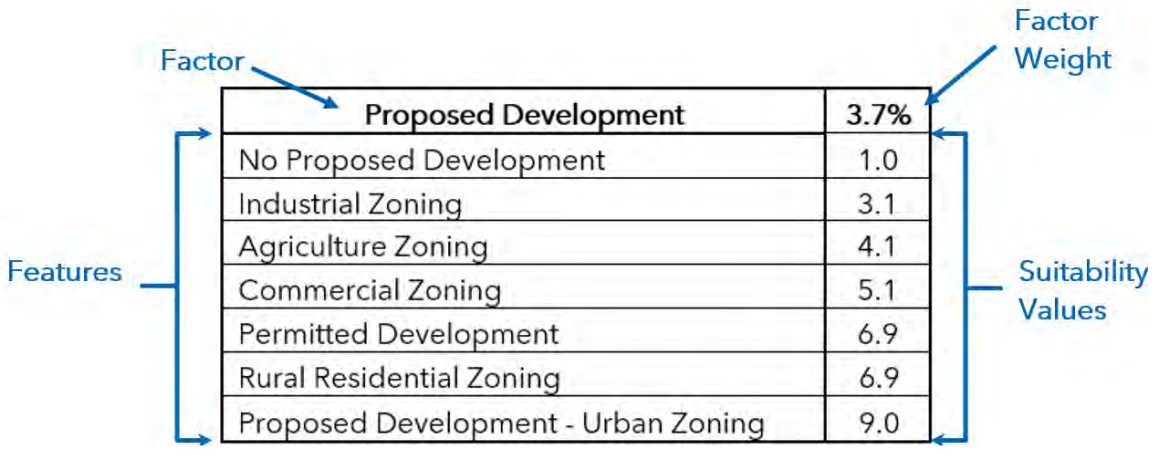
The creation of routing corridors is discussed below.

3.1 Corridor model

The corridor model (Table 2), used to create routing corridors, was developed using input from external parties representing the three perspectives described above.

A model based on this input was developed to represent the suitability of features on the landscape in southern Manitoba for transmission line routing. The resulting model includes (Figure 1):

- Factors
- Factor weights
- Features
- Suitability values



Proposed Development	3.7%
No Proposed Development	1.0
Industrial Zoning	3.1
Agriculture Zoning	4.1
Commercial Zoning	5.1
Permitted Development	6.9
Rural Residential Zoning	6.9
Proposed Development - Urban Zoning	9.0

Figure 1: Corridor model factor layer

3.1.1 Factors

Factors are groups of similar features on the landscape considered in transmission line routing. Each factor will be represented by a geospatial data layer (Figure 2).

3.1.2 Factor weight

Factors are weighted relative to each other, within each perspective. The weights of all factors within each perspective sum to 100%.

3.1.3 Features

Features (e.g., agricultural zoning) comprise the subcomponents of the factor and must capture all potential elements of the factor.

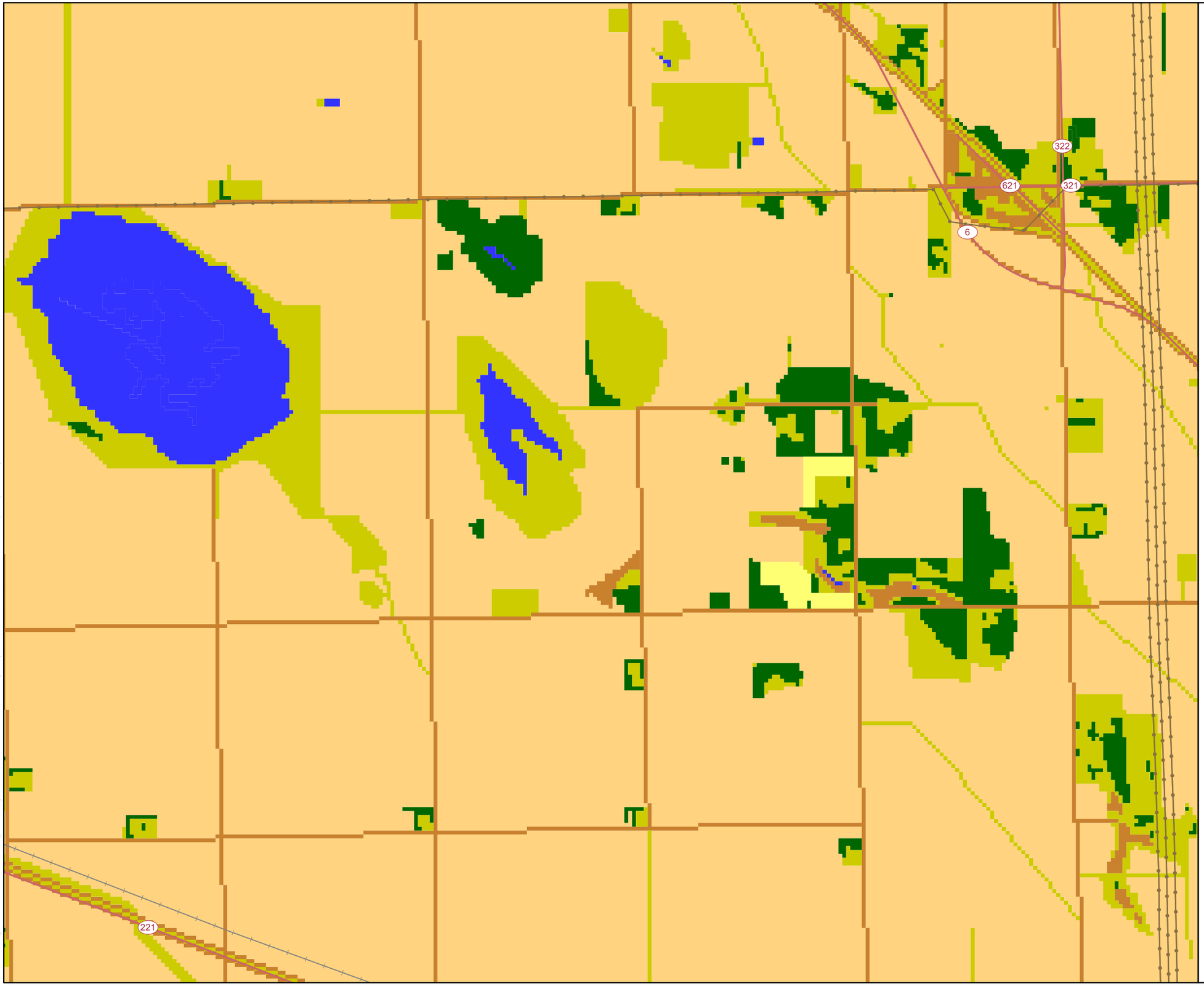
3.1.4 Suitability Values

Suitability values for each feature are scored on a common scale. Numbers between one and nine are used to represent degrees of suitability for routing a transmission line across (or in proximity to) this feature, with one being most suitable and nine being least suitable.

Each factor requires a 1 and 9, the remaining features are given values based on suitability relative to each other.

These values are described in the EPRI-GTC methodology (2006) as follows:

- High Suitability for an Overhead Electric Transmission Line (1, 2, 3) – these areas do not contain known sensitive resources or physical constraints, and therefore should be considered as suitable areas for the development of corridors
- Moderate Suitability for an Overhead Electric Transmission Line (4, 5, 6) – these areas contain resources or land uses that are moderately sensitive to disturbance or that present a moderate physical constraint to overhead electric transmission line construction and operation. Resource conflicts or physical constraints in these areas can be reduced or avoided using standard mitigation measures.
- Low Suitability for an Overhead Electric Transmission Line (7, 8, 9) – these areas contain resources or land uses that present a potential for significant effects that may not be readily mitigated. Locating a transmission line in these areas would require careful routing or special design measures. While these areas can be crossed, it is not desirable to do so if other, more suitable alternatives are available.



Manitoba Hydro

D83W Transmission Project

Land Cover

- Exposed/Urbanized/Open Land - Suitability Value 1
- Agricultural (Forage) - Suitability Value 2.5
- Agricultural (Crops) - Suitability Value 2.8
- Grassland - Suitability Value 5
- Forest - Suitability Value 5.7
- Native Grassland/Water/Wetlands - Suitability Value 9

Existing Infrastructure

- Transmission Line (>115 kV)

Landbase

- Road
- Railway Line

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: March 2, 2022

N

0 0.5 1 Kilometres
0 0.25 0.5 Miles

1:28,312

Figure 2: Example portion of the land cover geospatial data layer

Draft/Confidential: For Discussion Purposes Only

File Location: \\mpodata\Tier1\GIS\Oriental\PBJ_PACE\Analysis\20220218 Natural Land Cover Example Map DBlock\20220218 Natural Land Cover Example Map DBlock.aprx

Table 2: Corridor Model

Engineering	
Linear Infrastructure	**39.9%**
Parallel Roads ROW	1
Municipal Road Allowances	3.1
Parallel Provincial Highways ROW	3.4
Parallel Existing Transmission Lines	3.8
No Linear Infrastructure	4.4
Parallel Oil / Gas Transmission Pipeline	5.6
Parallel Railway ROW	5.6
Within Road, Railroad, or Utility ROW	9
Spannable Waterbodies	**11.6%**
No Waterbody	1
Non-navigable / spannable waterbody	2.8
Navigable / spannable waterbody	4.3
Non navigable spannable waterbody (specialty structures – 300-450m)	9
Geotechnical Considerations	**33.8%**
No Special Geotechnical Considerations	1
Floodplain	6.6
Wetland / Peatlands	9
Mining Operations / Quarries	**14.7%**
No Mining Operation	1
Abandoned / Inactive Mines	9

Natural	
Aquatics	**10.0%**
No Aquatic Feature	1
Ephemeral Streams (Non-Fish Bearing)	4.9
Spannable Waterbodies (Lakes & Ponds)	6.1
Ephemeral streams (Fish Bearing)	6.3
Permanent Stream	7.5
Bogs	7.7
Marsh	8.2
Permanent Stream (CRA Fish Bearing)	9
Special Features	**42.4%**
No Special Land	1
Managed Woodlots	5.4
Crown Land With Special Code	7
Conservation Easement	8.0
Proposed Protected Areas	8.6
Conservation Lands	9
Land Cover	**10.2%**
Exposed / Urbanized / Open Land	1
Agricultural (Forage)	2.5
Agricultural (Crops)	2.8
Grassland	5
Forest	5.7
Native Grassland	9
Wildlife Habitat	**37.4%**
Other	1
Waterfowl Habitat	6.3
Grouse Lek Area	7.7
Rare Species Habitat	8.0
Critical Habitat	9

Built	
Proximity to Buildings	**11.9%**
> 800 m	1
400 - 800 m	2.7
100 - 400 m	6.5
ROW - 100 m	9
Building Density	**17.7%**
< 1 Building / Acre (Rural Agricultural)	1
1 Building per 1-5 acres	3.3
1-3 Buildings/Acre (Rural/Residential)	4.5
3-10 Buildings / Acre (Suburban)	7.2
>10 Buildings / acre	9
Soil Capability / Agricultural Use	**14.1%**
Other	1
Class 6 & 7 (Low Productivity)	3.3
Organic Soils / Peat Bogs / Sod Production	3.9
Class 4 & 5 (Forages, Transitional)	5.9
Class 1- 3 (Prime Ag./Cultivated Land)	9
Land Use	**19.1%**
Other	1
Open Land (Sand & Gravel)	1.7
Agricultural (Forage)	4.9
Listed Trails (Existing & Planned)	5.9
WMA (unprotected)	5.8
Agricultural (Crops)	6.6
Intense Development & Use	6.6
Intensive Livestock	9
Proximity to Heritage Sites	**14.2%**
> 300 m	1
200 - 300 m	9
Landscape Character	**9.3%**
Other	1
Recreational Trails	4.1
Resort Lodges/ Campgrounds	8.6
Residential	8.9
Designated Historic Sites	9
Edge of Field	**13.7%**
Road Allowances	1
Quarter Section / Half-Mile Lines	1.9
Parallel/Adjacent To Road Allowances	2.9
Other (None of the Above)	9

3.1.5 Geospatial data

Geospatial data, that represents each factor in the corridor model, is required to create corridors. Sources of data include aerial photography, geographic information system databases, publicly available data sets, internally developed data, and other sources.

3.1.6 Geospatial data layers

Each factor in the corridor model must be represented by a geospatial data layer (Figure 2). This layer divides the route planning area into grid cells (e.g., 5 m x 5 m). Each cell is assigned a suitability value (between 1 and 9) based on the corridor model.

3.1.7 Create suitability surfaces

A suitability surface is created by combining the individual geospatial data layers (factors and areas of least preference) into one layer (Figure 3).

Suitability surfaces are created for each of the three perspectives: engineering, natural, and built, as well as one for the simple average. Each suitability surface represents a weighted combination of the three perspectives. Four scenarios were created by distributing the weight of each environment as follows:

Engineering suitability surface: The data layers from the engineering environment perspective are given five times (72%) the emphasis of the built environment (14%) and natural environment (14%) perspectives.

Natural suitability surface: The data layers from the natural environment perspective are given five times (72%) the emphasis of the built environment (14%) and engineering environment (14%) perspectives.

Built suitability surface: The data layers from the built environment perspective are given five times (72%) the emphasis of the natural environment (14%) and engineering environment (14%) perspectives.

Simple average suitability surface: The data layers for the simple average suitability surface are given equal emphasis (33.3% applied to all three perspectives).

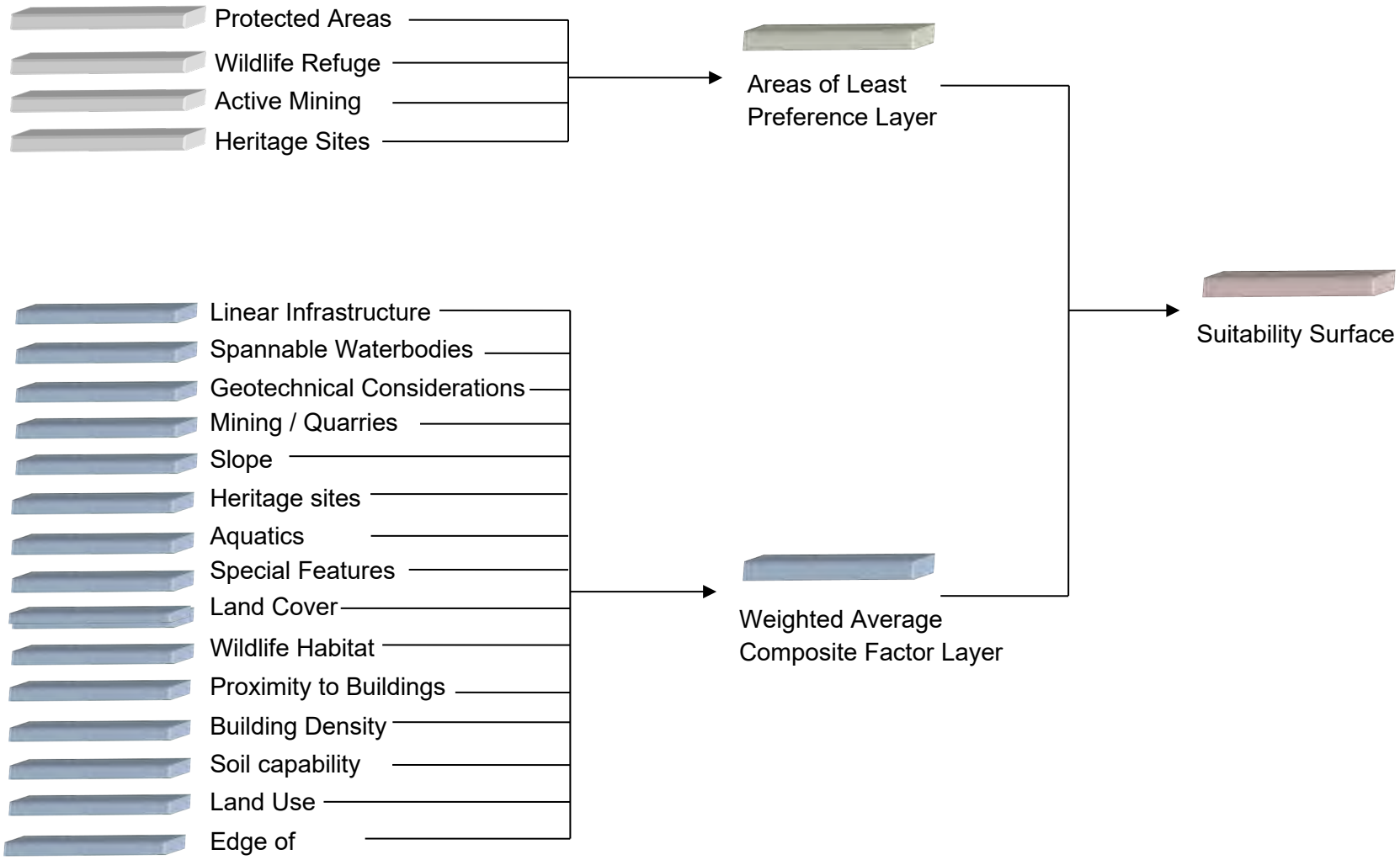


Figure 3: Creating a suitability surface

3.1.7.1 Least cost path

The corridors developed from the model represent the top 3%[2] (the most suitable 3%) of "optimal paths" within the route planning area. For the development of the corridors, a start (Dorsey Station) and end point (Wash'ake Mayzoon Station) were used. Least cost path analysis was run from the Dorsey Station to Wash'ake Mayzoon Station.

The least-cost path, in a geographic information system (GIS), is guaranteed to be the "optimal" path relative to the "suitability values" defined by the "suitability surface" (ESRI 2013).

An algorithm is used to find the "cost" of every possible path between the two end points. The "cost" in this case is the sum of values of each grid cells, and not monetary in nature. A path is any continuous string of grid cells connecting the start and end points input into the system.

Lower summed values indicate relatively suitable paths, whereas higher summed values indicate relatively less suitable paths.

Corridors were generated for each of the three perspectives (built environment, natural environment, and engineering environment) as well as the simple average (an average of the three perspectives).

3.1.8 Composite corridors

The combination of the four corridors results in the composite corridor. The composite corridor depicts the most suitable areas, based on the criteria used in the model, in which to plan potential routes for the transmission line.

[2] When the EPRI-GTC siting methodology was first created, it was validated against recent electric transmission line siting projects. It was discovered that the routes selected for these projects typically fell within corridors created at 3% of all potential routes. For this reason, 3% has become widely used by utilities implementing this methodology to create corridors.

4.0 Route evaluation

4.1 Route evaluation model

The route evaluation model (Table 3) was developed by Manitoba Hydro team members. The team determined the criteria in the model as well as the relative weights of each criterion.

The criteria are informed by feedback received during previous projects and engagement. The criteria are grouped into engineering, natural, and built perspectives and each criterion is given a weight. Weights within each perspective sum to 100%.

Definitions for each of the model criteria are provided in Table 4.

Table 3: Route evaluation model

Criteria	Weight
Built	
Relocated Residences	30%
Potential Relocated Residences	18%
Proposed Developments	16%
Diagonal Crossings of Agriculture Crop Land	11%
Proximity to Residences	6%
Special Features	5%
Historic / Cultural Resources	5%
Current Agricultural Land Use	4%
Proximity to Buildings and structures	3%
Land Capability for Agriculture	2%
Natural	
Critical habitat	40%
Native grassland	20%
Crown Land (natural)	18%
Wetlands	16%
Natural Forests	3%
Stream/River Crossings	3%
Engineering	

Table 3: Route evaluation model

Criteria	Weight
Construction/Design Costs	40%
Seasonal Construction + Maintenance Restrictions	17%
Accessibility	17%
Transmission reliability	17%
Proximity to infrastructure	9%

4.1.1 Route statistics

Statistics (Table 5) are created to allow comparison of route segments or complete routes. The statistics are normalized (distributed along a scale from zero to one; Table 6) to allow comparison between each of the features as they comprise different data types (e.g., counts, acreages, lengths, monetary values). Normalizing the values allows the comparison of whole route statistics. Adding the normalized statistics together allows routes to be compared with one value and allows routes to be ranked.

Table 4: REM criteria definitions

Criteria	Measurement	Criteria Description
Built		
Relocated residences	Count	Occupied residence categorized in buildings layer and windshield surveys that are within the right-of-way
Potential relocated residences	Count	Occupied residence categorized in buildings layer and windshield surveys that are within 100 meters of the edge of the right-of-way
Proposed Developments	Count	Quarter section of land within which there is an approved residential subdivision
Diagonal crossing of Agriculture Crop Land (Acres)	Acres	Diagonal crossings of land identified to be in agricultural capability classes 1-3
Proximity to Residences	Count	Occupied residence categorized in buildings layer and windshield surveys that are 100-400 meters from the edge of the right-of-way
Special Features	Count	Schools, Churches, Park Parcels, Recreational Trails, Campgrounds, Resorts and Lodges, Woodlots
Historic/Cultural Resources	Count	Designated and known heritage sites within 250 m of the edge of the ROW
Current Agricultural Land Use (Acres)	Acres	Annual crop (x 2.7) and hayland (x1) land cover classes
Proximity to Buildings and Structures	Count	All buildings and structures from buildings layer not including occupied and unoccupied residences, churches, schools, daycare, unobservable or unused buildings
Land Capability for Agriculture (Acres)	Acres	Soil classes 1-3 (x2) and 4-5 (x1).
Natural		
Critical Habitat	Acres	Critical habitat regulated under the *Species at Risk Act*
Native Grassland	Acres	Grassland polygons from a land cover classification dataset overlaid with Crown lands.
Crown land (natural)	Acres	Crown Land Operational Land Use Code system including Wildlife, Forest Management, Significant Riparian Area or Shoreland, Unique Rare Site, and Natural Lands.
Wetland Areas (Acres) – ROW	Acres	All wetland classes from Forest Resource Inventory data
Natural Forests (Acres) – ROW	Acres	All forested (*i.e.*, productive, and non-productive) cover classes from Forest Resource Inventory data
Stream/River Crossings – Centreline	Count	Natural stream/river crossings based on Fisheries and Oceans Canada data. Types A, B, C, and D
Engineering		
Design / Construction Costs	Cost	Estimated costs including construction material costs, estimates of tower type based on terrain, additional costs for angle structures, clearing, some specialty land uses (irrigated land)
Seasonal Construction and Maintenance Restrictions	Value	A value determined by the presence of wetland, forest, and agricultural land use/land cover patterns within the ROW
Accessibility	Value	A value determined by the ROW's proximity to the nearest public roadway (improving accessibility), and any wetland locations within the ROW (reducing accessibility)
Transmission reliability	Value	A value determined by the ROW's proximity to existing transmission lines
Index of Proximity to road and rail	Value	A value determined by the ROW's proximity to existing pipelines and rail lines

Table 5: Route statistics for the top four routes

Features	Weight	Min	Max	ROUTE ID			
				A	B	C	D
Built							
Relocated Residences (count)	30%	0	1	1	0	0	0
Potential Relocated Residences (count)	18%	0	16	7	8	8	8
Proximity to Residences (count)	6%	11	72	63	36	35	36
Proposed Developments (count)	16%	10	34	19	19	18	20
Current Agricultural Land Use (value, lower better)	4%	667	908	734	789	823	784
Land Capability for Agriculture (value, lower better)	2%	794	972	854	936	939	937
Diagonal crossing of Agriculture Crop Land (acres)	11%	0.00	187.86	153	86	86	86
Proximity to Buildings and Structures (count)	3%	0	21	9	6	6	8
Special Features (count)	5%	4	6	4	5	5	5
Historic/Cultural Resources (count)	5%	1	15	7	4	6	4
Natural							
Critical Habitat (acres)	40%	0.00	0.00	0.00	0.00	0.00	0.00
Native Grassland (acres)	20%	0.00	0.00	0.00	0.00	0.00	0.00
Crown Land Natural (acres)	18%	0.00	0.00	0.00	0.00	0.00	0.00
Wetlands (acres)	16%	0.08	3.42	3.42	1.06	1.21	1.21
Natural Forests (acres)	3%	1.48	34.21	25.46	3.47	3.47	3.47
Stream / River Crossings (count)	3%	4	27	20	8	10	11
Engineering							
Length (km)		84.461	101.352	88.5	96.8	96.8	96.7
Construction/Design Costs ($)	40%	$43M	$54M	$45M	$48M	$49M	$48M
Seasonal Construction + Maintenance Restrictions (value, lower better)	17%	243	316	262	280	292	278
Accessibility (value, lower better)	17%	10,714,243	27,569,005	14,071,505	18,433,646	17,388,474	17,714,801
Transmission Reliability (value, higher better)	17%	99,309,835	290,565,919	272,510,731	117,727,557	131,121,276	126,641,691
Proximity to Gas and Rail (value, higher better)	9%	96,562,698	252,011,621	206,335,387	133,094,070	135,299,867	135,240,461

Table 6: Example of normalized values and weighted scoring

Features	Weight	Min	Max	ROUTE ID				
				2216	2992	2254	134	4
Built								
Relocated Residences (count)	30%	0	1	0	0	0	1	1
Normalized[1]				0	0	0	1	1
Weighted Score				0	0	0	0.3	0.3
Potential Relocated Residences (count)	18%	0	16	4	3	4	11	3
Normalized				0.25	0.19	0.25	0.69	0.19
Weighted Score				0.05	0.03	0.05	0.12	0.03
Proximity to Residences (count)	6%	11	72	12	11	12	58	52
Normalized				0.016	0.000	0.016	0.770	0.672
Weighted Score				0.001	0.000	0.001	0.046	0.040
Proposed Developments (count)	16%	10	34	18	13	18	17	19
Normalized				0.33	0.13	0.33	0.29	0.38
Weighted Score				0.05	0.02	0.05	0.05	0.06
Current Agricultural Land Use (value, lower better)	4%	667	908	749	796	762	709	756
Normalized				0.34	0.53	0.39	0.17	0.37
Weighted Score				0.01	0.02	0.02	0.01	0.01
Land Capability for Agriculture (value, lower better)	2%	794	972	896	902	896	827	813
Normalized				0.57	0.61	0.57	0.19	0.11
Weighted Score				0.01	0.01	0.01	0.00	0.00
Diagonal crossing of Agriculture Crop Land (acres)	11%	0.00	187.86	85.72	85.72	85.72	170.73	133.63
Normalized				0.46	0.46	0.46	0.91	0.71
Weighted Score				0.05	0.05	0.05	0.10	0.08
Proximity to Buildings and Structures (count)	3%	0	21	3	3	3	10	7
Normalized				0.14	0.14	0.14	0.48	0.33
Weighted Score				0.00	0.00	0.00	0.01	0.01
Special Features (count)	5%	4	6	5	5	5	4	5
Normalized				0.5	0.5	0.5	0	0.5
Weighted Score				0.025	0.025	0.025	0	0.025
Historic/Cultural Resources (count)	5%	1	15	6	3	6	3	9
Normalized				0.36	0.14	0.36	0.14	0.57
Weighted Score				0.02	0.01	0.02	0.01	0.03
TOTAL				**0.22**	**0.17**	**0.22**	**0.65**	**0.59**

[1]Normalized values = (value – min) / (max – min) = a value between 0 and 1

[2] Weighted score = normalized value x weight. Total score is the sum of all weighted scores.

4.2 Route evaluation workshop

The routes were evaluated at a workshop. Participants in the workshop included members of the project team representing the various perspectives (built, engineering, natural) as well as the community team, representing public and Indigenous input.

Team members responsible for engineering, technical design, construction, and maintenance represented the engineering perspective. Team members responsible for the public and Indigenous engagement processes represented feedback received from participants. Socio-economic discipline specialists represented the built perspective. Discipline specialists responsible for assessing the potential effect on the biophysical environment represented the natural environment.

In the workshop, the goal was to use the route statistics as well as expert judgement to reduce the number of routes to a set of finalists.

The finalists are carried forward for further evaluation at the preference determination workshop (Section 4.3 below).

Using the route statistics and GIS software, the top five routes from each perspective were reviewed. Based on the review, four routes were chosen to move forward to the preference determination step. Table 7 provides details on the rationale for the selection of each route.

Table 7 : Rationale for the top four preference determination routes

Route A	Route A was one of the top engineering routes. It is short and would have lower costs than routes that use the northern segments.
Route B	Routes B, C and D use the northern segments which were preferred by the built and natural teams as well as those from the community perspective. These routes differ from each other in their use of the Portage Diversion. Different options were selected to allow several options in the preference determination workshop.
Route C	
Route D	

4.3 Preference determination

4.3.1 Preference determination model

Prior to the development and evaluation of route segments, the transmission senior management team developed a list of key considerations and assigned each a weight based on relative importance for this project. This formed the basis of the preference determination model. Weights were based on technical experience, familiarity with the key issues in the project area related to its geographic and sociological makeup and input from engagement. The team determined the criteria in the model as well as the relative weights of each criterion (Table 8).

Table 8: Preference determination model

Criteria	Percent	Description
Cost	40%	Cost was based on high-level cost estimates for construction, materials, mitigation, used for relative comparison
Community	30%	Input received from public and First Nation and Metis engagement
Schedule risks	7.5%	Includes consideration of the need for additional approvals, seasonality of construction, overall level of complication expected that could result in delays.
Environment (Natural)	7.5%	Consideration of the natural environment route statistics with interpretation by the project team and additional information not captured by the criteria that can inform the relative potential effect on the natural environment of different route alternatives.
Environment (Built)	7.5%	Consideration of the built environment route statistics with interpretation by the project team and additional information not captured by the criteria that can inform the relative potential effect on the built environment of different route alternatives.
System Reliability	7.5%	Consideration of external factors (e.g. weather events) that could affect the reliability of the transmission line during operation.

4.3.2 Preference determination workshop

In the preference determination step, the preference determination model (Table 8) is used to select the preferred route from the route finalists identified from the route evaluation process described above.

In the preference determination step, the "finalists" from the route evaluation are considered in a comparative fashion by the project team. This step incorporates feedback received during public (Chapter 4) and Indigenous engagement (Chapter 5) together with route statistics, and additional research and analysis by discipline specialists, to provide input into the selection of a preferred route.

Each route received a value between 1 and 3, for each of the criteria in the model, with lower values indicating higher suitability for routing a transmission line. Discussions are guided by the experts responsible for each criterion. In some cases, meetings are held prior to the workshop to discuss the route and determine scores.

The cost and system reliability criteria scoring were determined by the engineering team. The community criterion scores were developed by the engagement teams. The environment (natural) criteria scoring was determined by the natural team. The environment (built) criteria scoring was determined by the built team.

Finally, the schedule risks criterion scoring was developed through consideration by the entire project team as elements of each consideration (built, natural, engineering) can contribute to schedule risks.

The scores given to each route were entered into the preference determination model. Table 9 provides the rationale for each score. When the weights for each criterion were considered, a rank order of the remaining routes was established.

Table 9: Rationale for preference determination scoring

Criteria	Route	Scores[1]	Rationale
Cost	A	1	A scaling factor was used to calculate the scores based on estimates for the total project costs.
	B	1.72	
	C	1.83	
	D	1.71	
System Reliability	A	1	Route A is preferred, based on distance to existing 230+115 kV lines. Although it is preferred to be further from 115 kV lines, this is not as concerning as the distance to 230 kV lines. Another consideration for reliability, outside of paralleling, is the potential for damage from agricultural operations. As Route A has more cross-country sections, it would have a higher risk of damage. A is still preferred, but a lower spread due to agricultural risk.
	B	1.5	
	C	1.5	
	D	1.5	
Risk to Schedule	A	3	Route A has higher biosecurity and access concerns and more forested acres that would need to be cleared and has two Assiniboine River crossings, all leading to the highest risk. Route B may have delays if the potential development near Portage La Prairie does go forward.
	B	1.5	
	C	1	
	D	1	
Environment (natural)	A	3	Route A is least preferred as it crosses the most forest, wetland and streams. The other routes differ primarily in the amount of paralleling of the Assiniboine River Diversion. This is a concern due to the increased potential for bird/wire collisions. However, the line is far from the water (>250 m) and can be mitigated with bird diverters, so the scores reflect this. Based on this, Route C is preferred, least paralleling of the Assiniboine River Diversion, followed by Route D, then Route B.
	B	1.5	
	C	1	
	D	1.25	
Environment (built)	A	3	Route A is least preferred. It has the most diagonal crossing of agriculture land and homes in proximity. The other routes differ in the amount of paralleling of the Assiniboine River Diversion. This avoids routing on private agricultural land. There is a proposed development along the rail (Route B). Based on this, Route D is preferred (uses the diversion but avoids the development). Routes B+C are equal in most respects.
	B	1.5	
	C	1.5	
	D	1	
Community	A	3	Scores came from collaboration between RM and Indigenous community representatives. The 'least-worst' route was D. It avoids rivers and most traditional sites but there are some very important cultural sites. Route A considered the worst due to impacts to biodiversity, heritage sites, old Metis settlement areas and burial grounds. The scores were mathematically determined based on average scores given by each representative group, then scaled between 1 and 3.
	B	1.43	
	C	2.78	
	D	1	

[1] Scores are between 1 (preferred) and 3 (least preferred)

Appendix B: Engagement process

Appendix B
Engagement materials

TABLE OF CONTENTS

Summary of issues and concerns from Round 1 public virtual information sessions

Topic	Concern	Summary of Manitoba Hydro response
Aesthetics	Removal of trees	If trees had to be removed for the preferred route, then this would become part of the compensation discussion with the landowner.
	Visual impacts of transmission line outside homes	Visual impacts are being considered under the valued component of Community Well-being in the environmental assessment.
Heritage	Municipal heritage site of concern along the routes – St. Paul's Anglican Church	The final preferred route is not located near St. Paul's Anglican Church. Manitoba Hydro will be undertaking a heritage resource impact assessment to determine any potential impacts to heritage resources. The heritage resource impact assessment will likely take place following the licensing decision for the project, but this timing is subject to change. A cultural and heritage resources protection plan will be implemented that outlines the protection measures and protocols that Manitoba Hydro, its contractors and/or consultants will undertake in the event of the discovery of previously unrecorded cultural and heritage resources.
Agriculture	Impacts to pivot irrigation in agricultural fields	The placement of towers in agricultural fields would take existing irrigation pivots into consideration.
	Impacts to tile drainage	The placement of towers in agricultural fields would take tile drainage into consideration
	Impacts to runways and flight paths used for aerial spraying	Manitoba Hydro collected an inventory of known runways in the area. The preferred route avoids known runways.
	Biosecurity concerns, including clubroot and invasive species, on agricultural fields during construction and maintenance	Manitoba Hydro has biosecurity policies that will be followed any time crews need to access properties for construction or maintenance activities and individual considerations with landowners can be

		discussed once a preferred route is selected.
	Impacts of the transmission line on GPS used in precision agriculture	Radio noise from an AC transmission line would not be expected to directly affect GPS receivers used for farming or other operations from receiving GPS signals or the satellite- or antenna-based correction signal
	Economic impacts and economic loss of high productivity agriculture	Manitoba Hydro will compensate landowners for the easement, at 150% of fair market value, as well as tower payments for towers placed on land classified as agricultural land. The land underneath the lines can still be farmed and used for agriculture.
Engagement	Some participants shared issues with contacting Manitoba Hydro via email/1-800 number and accessing the feedback portal	Manitoba Hydro offered to set up a meeting to walk through the use of the feedback mapping portal and to set up individual meetings with participants who wanted to provide additional feedback.
	Participants asked what avenues were available to submit comments and concerns	Participants were encouraged to submit feedback through the online feedback mapping portal, complete the online survey, participate in virtual information sessions, or reach out to Manitoba Hydro via phone, email, or letter.
	Some participants were concerned by the lack of direct, individual communication by Manitoba Hydro about the project	A landowner mailing list was not available for Round 1 given the large number of alternative route segments. Manitoba Hydro used broad notification methods in Round 1, including postcards, social media advertisements and IVR calls. When a preferred route was selected, Round 2 engagement included direct mail to potentially affected landowners.
	Participants asked how public feedback influences the routing process	Feedback received during engagement informed the determination of the final preferred route and the environmental assessment, project design (i.e., tower placement), and mitigation measures.

	Participants asked about project timelines and next steps	Round 2 engagement took place in winter 2022, when there was one preferred route presented for feedback. The environmental assessment will be filed in the fall of 2022, the project will undergo regulatory review in 2023 and construction would start in 2025, pending project approval.
Economics	Concern that those most affected by the Project do not equal most in need of this power	Manitoba Hydro acknowledged that the recipients of the power from D83W would be largely in the Portage la Prairie area, noting that the power for western Manitoba is generated in other parts of the province and travels along transmission lines to be used in homes.
	Request for an economic impact study	Economic impacts will be considered as a valued component in the environmental assessment.
	The overall need for the project and whether the 2019 storm is being used as justification for the project	After the October 2019 storm, options were being explored for increasing electrical capacity to the area, but this proposal had not yet been developed. This project is to serve the growing demand for power in the Portage la Prairie area. Manitoba Hydro determined that the existing infrastructure could not meet the anticipated future power needs in the area and that a new line is required to bring additional capacity.
EMF	Interference from towers with GPS and livestock	Since GPS signals are of far higher frequency than the radio noise from an AC transmission line, it is very unlikely that an AC transmission line will interfere with GPS functioning.
	Human health impacts, concerns about increased risk of miscarriage, leukemia, other diseases	Manitoba Hydro shared a brochure from Health Canada on electromagnetic fields with participants who requested more information following the virtual information sessions.
Health & Safety	Interference with livestock	There is no evidence to suggest livestock are negatively impacted by proximity to transmission lines.

	Health risks with proximity of the line to homes	Manitoba Hydro shared a brochure from Health Canada with participants following the virtual information session.
Property values	Potential loss of use of land because of hydro towers, with several proposed routes cutting through the middle of fields	Participants are still able to use the land underneath the transmission line. There are certain restrictions with new developments directly underneath the transmission line, but the land can still be used for agricultural purposes.
	Several route segments cross high value river properties	Manitoba Hydro noted that many participants expressed a desire to avoid routing over the Assiniboine River and adjacent properties and this feedback would be incorporated into the routing process.
	When do easement and compensation discussions take place and what does it entail?	Once there is a final preferred route, Manitoba Hydro property agents will reach out to affected landowners to set up discussions about easements and compensation. There are four categories of compensation: • Land compensation to landowners granting an easement for the transmission line right-of-way; • Construction damage compensation; • Structure impact compensation to landowners for each tower located on agriculturally zoned lands; and • Ancillary damage compensation where Manitoba Hydro's use of the right-of-way impacts the use of the property. Landowners are still able to farm the land underneath the lines.
	Can people be expropriated when the preferred route is selected and what does that process look like?	Manitoba Hydro seeks to sign easements with landowners. Expropriation is the worst-case scenario. Manitoba Hydro would need permission to move forward with expropriation; it is not a given process.
Proximity to Homes	Potential effects on internet service	Wireless internet operates at a frequency of 2,400 MHz. Radio noise from an AC transmission line does not overlap with

		wireless internet signals therefore, does not affect wireless internet function near an AC transmission line.
	Route options in proximity to the towns of St. Eustache and Marquette	Many different route options are considered during Round 1 engagement. Proximity to homes and communities is considered in the routing process.
Routing	Why can't existing rights-of-way be twinned for this new line?	The preference is to parallel existing infrastructure. This project has been challenging to route because there are many homes, fields, and runways in the area. There are reliability concerns with having too much of the line twinned with other Manitoba Hydro infrastructure, particularly additional 230-kV lines, in the event of a storm or weather event.
	The need for the Project and whether Bipole III could be used instead to bring power to Portage la Prairie	Bipole III is a 500kV DC line, whereas D83W is a proposed 230-kV line. Since converter stations are very costly, using Bipole III was not the preferred option since the power from Bipole III needs to be converted to a lower voltage before it can be distributed to customers.
	Whether the power can come from Brandon instead of Dorsey to service Portage la Prairie	There is not sufficient energy in the Brandon area to service the needs of the Portage la Prairie area.
	Participants expressed preference for northern routes and PR227 since these areas are less agriculturally productive	Manitoba Hydro noted this feedback and considered it in the routing process.
	Requests to route along PR 227 and the Portage Diversion	There are two main reasons that a route along PR 227 is not feasible: there are many homes immediately adjacent to both sides of the road as well as along the quarter section; the route would be longer and parallel existing infrastructure, which would be more costly and less reliable
	Previous flooding on properties along the	Manitoba Hydro noted this feedback and considered it in the routing process.

	river and how routing would be affected by this	
	What factors will be considered when choosing the preferred route?	Many factors are considered in routing decisions, including feedback provided through engagement. Other factors include cost, impacts to the natural and built environments, and system reliability.
	Preference to route further south, along the Trans-Canada highway and closer to Elie	Manitoba Hydro noted this feedback and considered it in the routing process.
	Some participants expressed a preference to follow existing rights-of-way and road allowances as much as possible	Manitoba Hydro noted this feedback and considered it in the routing process.
	A participant expressed a preference to use Crown land to route the Project	Manitoba Hydro noted this feedback and considered it in the routing process.
	Concerns about private runways in the area that Manitoba Hydro might not be aware of	Airstrips and runways are difficult to mitigate. Information about private runways in the area is helpful to know when making routing decisions.
Trees & Vegetation	Routing within conservation agreement lands and whether special consideration would be given to these areas	Manitoba Hydro was not aware of any routing that had taken place in conservation agreement lands and would follow up on this question with the participant.
	Impacts to trees and shelterbelts	If trees had to be removed for the preferred route, then this would become part of the compensation discussion with the landowner.
Wildlife	Rivers and creeks in the area have high concentrations of birds and wildlife, and are popular spots for hunting and fishing	Manitoba Hydro noted these concerns about route segments that crossed or were near the Assiniboine River.

	Proximity to Grant's Lake Wildlife Management Area	Manitoba Hydro noted that the Department of Conservation had been engaged on the project and had also shared this concern.
	Impacts to geese, eagles, chickens, and migratory birds	There are criteria for installing bird diverters on transmission lines to make them more visible for birds to avoid wire collisions.

Summary of Round 1 survey feedback

Topic	Concern	Summary of Manitoba Hydro response
Aesthetics	Concerns that several alternative route segments pass by homes and properties	Visual impacts are being considered under the valued component of Community Well-being in the environmental assessment.
Agriculture	Concerns about impacts to agricultural productivity, pivot irrigation and aerial spraying	The placement of towers in agricultural fields would take existing irrigation pivots into consideration. Compensation for affected landowners includes consideration of the agricultural productivity of the land.
	Concerns about transmission line construction and operations having biosecurity implications on agricultural fields	Manitoba Hydro has biosecurity policies that will be followed any time crews need to access properties for construction or maintenance activities and individual considerations with landowners can be discussed once a preferred route is selected.
Aircraft	Concern about impacts to aircraft runways that are traversed by route segments	Manitoba Hydro will look to avoid all known runways in the study area during routing as a mitigation measure. Participants are encouraged to share runway location information with Manitoba Hydro to be used in the routing process.
Cost	Encouragement from participants to consider the overall cost and to choose a cost-effective route for D83W.	Cost is considered in the routing model when determining a preferred route for the transmission line, alongside community perspectives, impacts to the natural and built environments, and other factors.

Economic benefits	Requests from participants to route away from highly agricultural productive fields to minimize economic impacts to farmers and agricultural producers.	Cost of the project, including compensation amounts, is considered in the routing model when determining a preferred route for the transmission line. Landowners who are along the preferred route will receive compensation for the presence of the transmission line, and any towers, on their property.
Engagement	Concerns about the notification methods for Round 1 engagement (use of postcards, IVR phone calls).	A landowner mailing list was not available for Round 1 given the large number of alternative route segments. Manitoba Hydro used broad notification methods in Round 1, including postcards, social media advertisements and IVR calls. When a preferred route was selected, Round 2 engagement included direct mail to potentially affected landowners.
Health and safety	Concerns about human health risks (EMF, cancer) from presence of transmission line	There is no scientific evidence that shows a correlation between exposure to EMF and negative health effects to humans, animals, or vegetation.
	Concerns about noise levels from project construction and operations.	Noise levels and nuisance are considered in the environmental assessment. Landowners would be informed about upcoming construction activities and crews will work to minimize noise to specific hours of the day.
	Safety concerns with operating farm equipment in proximity to transmission line infrastructure.	Once a preferred route has been identified, Manitoba Hydro will work with affected landowners to determine the placement of the transmission towers to mitigate impacts on agricultural operations and subsequent safety concerns.
Heritage	Concerns about impacts to Métis hunting rights	The presence of the transmission line does not impact the ability of Métis citizens to practice harvesting activities in areas that were previously used.
	Concerns about proximity of alternative route segment to St. Paul's Anglican Church	The preferred route avoids St. Paul's Anglican Church.
Proximity to homes	Concerns about the proximity of the	Many different route options are considered during Round 1 engagement.

	transmission line to houses, homesteads and associated impacts to property values, health impacts.	Proximity to homes and communities is considered in the routing process. Studies undertaken by Manitoba Hydro have shown that there is no long-term impact of the presence of transmission lines on property values.
Routing	Preference by participants to route further north along PR227 to avoid the highly productive soils along the Assiniboine River	Manitoba Hydro explored routing along PR227 and determined it was not feasible for several reasons, including the need for separation between 230kV lines for enhanced reliability, the inability to route along portions of the Portage Diversion, the need to acquire new easements, and greater additional line length and higher total costs.
	Preference by participants to consider routes further south along the Trans Canada Highway.	Southern route options were initially considered but would be considerably longer than the current alternative route segments, adding significant additional cost to the project.
	Questions about the overall need for D83W and whether the power can come from other existing sources.	The purpose of the D83W project is to increase the available power supply in the Portage la Prairie area to address increased demand. Other options were explored, such as receiving energy from the Brandon area, but there is insufficient supply to address the increased demand in the Portage la Prairie area.
Trees and vegetation	Concerns that trees and vegetation would need to be removed to accommodate the transmission line.	Manitoba Hydro considers the presence of trees and forested areas during the routing process. If trees had to be removed for the preferred route, then this would become part of the compensation discussion with the landowner.
Wildlife	Concerns about impacts to migratory birds, Grant's Lake Wildlife Management Area	The preferred route avoids Grant's Lake Wildlife Management Area. There are criteria for installing bird diverters on transmission lines to make them more visible for birds to avoid wire collisions. Impacts to migratory birds are considered as part of the environmental assessment.

Round 1 alternative route segment feedback

Route segment #	Comment
3	Goes through a participant's land
	This segment comes close to St. Eustache. Having large transmission towers in the area will be detrimental to future development due to the aesthetics. There are many new houses and potential future development in the area.
4	Runs along the side of a participant's home and farm
	Close in proximity to Grant's Lake Wildlife Management Area
5	Runs along the side of participants' homes and farms
7	Runs across river lots, disruptive for spraying
	A participant noted they are planning to put irrigation in a field along this segment
	Vegetable crops are typically grown here, requiring a high frequency or airplanes and the use of GPS in this area for irrigation.
	Segment runs along the La Salle River, which is a popular area for hunting, fishing, canoeing and other use of the river
	Concerns that the segment crosses multiple waterbodies
	This segment comes close to St. Eustache. Having large transmission towers in the area will be detrimental to future development due to the aesthetics. There are many new houses and potential future development in the area.
	Crosses the Assiniboine River, narrow river lots with high value land
	Migratory birds and waterfowl inhabit the area, and eagles are known to nest in the area
	Land in the area irrigable and requires a high frequency of airplane use and GPS.
11	Runs along two sides of a participant's property and across hay land
	Crosses a participant's property, route segment potentially intersects with treeline
	Participant wants to designate land as a nature conservancy along this segment
12	Crosses a participant's property, route potentially intersects with treeline
13	Running right across river lots is very disruptive for spraying
	In an area previously impacted by flooding along the river
	Pivot points in fields under route segment
	Crosses a participant's property, potential intersection with treeline
14	Heritage site along Highway 26 (St. Paul's Anglican Church)
	Potential impact with trees along the route segment

15	Passes right through the farmstead; concerned about potential long-term health risks.
	Runs through the middle of farmland
	Crosses through the middle of the farm section and does not follow any roads. This route will hinder pivot irrigation and aerial spraying.
16	Passes right through a participant's farmstead and they are concerned about potential long-term health risks
18	Goes across a potato field
	Running right across river lots is very disruptive for spraying
19	Route segment crosses several river lots, disruptive for aerial spraying
	Goes through 5 miles of pivot irrigated land
20	Pivot points in fields under route segment
22	Runs along a participant's homestead (within 140 ft of home), and they have major health concerns that the family would be close to a 230-kV line
	Proximity to heritage homes and heritage farm quarters
23	Crosses the diversion and underground irrigation infrastructure
	Very highly productive agricultural land that should not be wasted on hydroelectric towers.
24	Least potential to intersect with runways for aviation, no known runways that would be in conflict

Summary of issues and concerns from Round 2 public virtual information sessions

Topic	Concern	Summary of Manitoba Hydro response
Aesthetics	A participant shared concerns about loss of their shelterbelt	Based on the height and proximity of the participant's trees, Manitoba Hydro is investigating engineering solutions to maintain this shelterbelt, which requires design changes. If there are no solutions, the plan would be to replant, rehabilitate and remediate. Manitoba Hydro would work with the landowner with the shelterbelt to get the specific information about the trees to figure out what engineering solutions would be feasible.
Agriculture	Aerial spraying impacts	The preferred route avoids known runways in the area to reduce the impacts of the project on aerial spraying.

	Use of the land underneath the lines for agricultural purposes	Landowners can continue to farm and cultivate the land underneath the transmission line. Manitoba Hydro has a biosecurity policy (developed in consultation with government and industry) that outlines the requirements of employees and contractors who carry out work on cultivated agricultural lands.
Construction & maintenance	Compensation for damages during construction	Manitoba Hydro will work with agricultural producers to schedule work outside of crop windows, but if this is not possible, agricultural producers will be paid crop damage compensation and compensation for any un-rehabilitated damage done to the land during construction. If any damages are incurred during operations and maintenance, Manitoba Hydro will pay compensation to fix any damages caused by accessing the line.
	Disruptions to daily life from construction	Due to the length and nature of the project, there will not be a large concentration of workforce all in one place. Construction will be done in stages, starting with the tower foundations, followed by tower assembly and stringing crews for the wires and conductors. The largest noticeable impact to the community will be during the implode process to fuse two ends of the conductors together. Approximately every 3 miles, there will be an implode sleeve to weld the two ends of the conductors. It causes a large bang sound, but this process will be done at scheduled times with a substantial notification process to landowners, the RCMP and other local law enforcement.

	Maintenance protocols	Manitoba Hydro will patrol the infrastructure once a year by air and ground. Ground patrol generally takes place in the winter so as not to impact agricultural operations. Over the life of the line, portions of the line or tower may need to be replaced but this work would be minimal. Every 5-10 years there is vegetation management that takes place under the line in areas where trees and shrubs grow back, to prevent safety hazards.
Engagement	Clarity of maps	Detailed maps are available on the Manitoba Hydro webpage and hard copy maps were made available upon request. Manitoba Hydro will provide more detailed maps to each landowner once the project is licenced.
	Concerns with notification process	Manitoba Hydro used several different notification methods to inform landowners and interested parties in the study area, including postcards, automated phone calls, targeted Facebook ads and direct mail letters in Round 2 to affected landowners.
	Benefits to affected landowners and RMs	The D83W transmission line will increase system capacity to meet the area's increasing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding areas. Manitoba Hydro is trying to build a grid that serves all of Manitoba, which involves transporting power from the northern generating stations, through the Bipoles down to Dorsey and Riel stations to be redistributed to the rest of the province.
	Notification of access for repair and maintenance	Following signing of a voluntary easement agreement, Manitoba Hydro will have access to the right-of-way. Access for construction and maintenance will generally occur along the right-of-way using existing public access roads wherever possible.

		Permission will be requested from landowners for use of roads or trails on private property.
Health & safety	Concerns about EMF levels	There is no scientific evidence that shows a correlation between exposure to EMF and negative health effects to humans, animals, or vegetation.
	Whether Manitoba Hydro could loan EMF measurement kits to affected landowners	Manitoba Hydro used to have staff visit landowner's homes with an EMF meter to measures EMF levels, they did not have measurement kits for loan.
Licensing	Questions about the Environment Act and the licensing process for the Project	The Project is subject to a Class 2 license under the *Environment Act*. When the environmental assessment is filed with the province, it will be made available on the provincial website.
Noise	Noise from transmission line construction, operation	Line noise is typically perceived close to the towers. Manitoba Hydro seeks to avoid development close to residences and abides by all guidelines set forth by the province related to noise.
Property values	Compensation process, amounts and negotiations	Manitoba Hydro offers a comprehensive compensation package to landowners affected by the transmission line on their property. There are four categories of compensation: • Land compensation to landowners granting an easement for the transmission line right-of-way; • Construction damage compensation; • Structure impact compensation to landowners for each tower located on agriculturally zoned lands; and • Ancillary damage compensation where Manitoba Hydro's use of the right-of-way impacts the use of the property. Landowners are

		still able to farm the land underneath the lines. Compensation specifics, including payment structure and amounts, will be negotiated with landowners on an individual basis with a property agent.
	Taxation on land held by MH infrastructure	The land is not purchased by Manitoba Hydro, an easement is acquired that grants Manitoba Hydro certain rights to the land. The land stays in the landowner's name and tax roll, and they can continue to farm the land. The easement gives Manitoba Hydro consent to have the line there and to access it. The 150% market value payment for the easement area is to recognize the need to pay taxes on the land under the towers.
	A participant asked how much acreage a tower would take up and shared concerns about loss of farmland due to towers	Manitoba Hydro provided an estimate that with a tower footprint of 32 ft x 32 ft, it would take up about 0.02 of an acre. Some farmers will farm right up to the base of the tower and others will leave additional space. The compensation is based on more than just the project footprint and includes where in the field the tower is placed, how far from the field edge and whether it is adjacent to other Manitoba Hydro infrastructure, as well as the crop type and cropping schedule.
Routing	Project specifications (distance between towers, tower design, right-of-way)	Information about Project specifications, including tower design, tower distance was provided during the virtual information sessions and one-on-one landowner meetings.

	Preference for northern routes along PR227, southern routes	Manitoba Hydro explored routing along PR227 and determined it was not feasible for several reasons, including the need for separation between 230kV lines for enhanced reliability, the inability to route along portions of the Portage Diversion, the need to acquire new easements, and greater additional line length and higher total costs. Manitoba Hydro is still investigating the feasibility of routing the transmission line along rail lines.
	Requests to change preferred route (closer to rail line)	Manitoba Hydro advised that a proposed option along the railroad has been shared with the routing team and Manitoba Hydro will have to look into it, particularly into the issues of induction along the railroad.
	Concerns about jogging around proposed runway	Manitoba Hydro advised that the proposed runway was not the only reason for the jog, that existing homes right along the road were also a reason the jog was put in place.
	Acceptable/minimum distances between lines	The distance depends on the length of parallel and the type of lines. There are North American reliability standards that apply to 230kV transmission lines. The distance calculation requires significant engineering input, but the longer 230kV lines parallel, the greater the risk to system reliability.
	Undergrounding	Undergrounding lines is considerably more expensive and does not offer the same technical advantages as an overhead transmission line.
Trees & vegetation	Loss of shelterbelts along the preferred route	Manitoba Hydro is continuing to work with landowners with shelterbelts on their property to determine whether minor adjustments can be made to the preferred route to minimize impact to shelterbelt trees.

Summary of Round 2 survey feedback

Topic	Concern	Summary of Manitoba Hydro response
Aesthetics	Concerns with increasing number of powerlines on the viewscape	Aesthetic impacts are being considered under the valued component Community Well-being in the environmental assessment for the project.
Agriculture	Organic farms along the preferred route, associated concerns with weed control and pesticide application for vegetation management	Manitoba Hydro will work with landowners of organic farms to discuss vegetation management practices.
	Soil compaction during construction	During construction, soil compaction and rutting can result from the movement of vehicles and equipment, storage of materials, and assembly and installation of towers. Effects of soil compaction and rutting can be mitigated by managing equipment traffic routes and activities for clearing the transmission right-of-way, and installation of transmission towers to minimize the impact. Soil compaction will work with the landowners to resolve concerns.
	Impacts to tile drainage fields	The preferred route aims to avoid impacts to tile drained fields. Tower placement can also minimize potential conflicts. If tile drainage is affected by the final preferred route, Manitoba Hydro will work with the landowners to resolve concerns.
	Routing in the middle of highly productive agricultural land as opposed to following road allowances or twinning existing infrastructure	Routing along road allowances is ideal but not possible in all cases, such as when homes are along roads. Paralleling existing Manitoba Hydro infrastructure is also beneficial to reduce the number of new right of ways, but paralleling must also be balanced with overall system reliability.

Topic	Concern	Summary of Manitoba Hydro response
Health & safety	Requests for EMF readings to understand baseline EMF levels prior to the construction of the transmission line. The participant has concerns about the proximity of new 230kV line to existing 115kV and local feeder lines	Manitoba Hydro looked into options for measuring baseline (pre-Project) EMF levels at one landowner's property per a request received during Round 2 engagement. Upon further discussion with the participant, it was determined that the preferred route was a sufficient distance from the house that an EMF reading was not required.
	Concerns about EMF on honeybees and the production of honey	There is no scientific evidence that shows a correlation between exposure to EMF and negative health effects to humans, animals, or vegetation.
Heritage	Question about the protocols to be followed if cultural artefacts are found	Manitoba Hydro will implement a Cultural and Heritage Resources Protection Plan that will outline protection measures and protocols that Manitoba Hydro, its contractors, and consultants will undertake in the event of the discovery of previously unrecorded cultural or heritage resources during construction, maintenance, or operation of the transmission line.
Property	Concerns about the compensation payment structure (e.g., one-time payments as opposed to annual payments)	The structure payment is based on the long-term impact.
	The requirement for landowners to pay taxes on land taken up by towers which becomes unusable for farming	Manitoba Hydro responded that the land is not purchased by Manitoba Hydro, an easement is acquired that grants Manitoba Hydro certain rights to the land. The land stays in the landowner's name and tax roll, and they can continue to farm the land. The easement gives Manitoba Hydro consent to have the line there and to access it. The 150% market value payment for the easement area is to recognize the need to pay taxes on the land under the towers.

Topic	Concern	Summary of Manitoba Hydro response
	Cost of jogging around proposed airstrip versus not avoiding mature shelterbelt	There are features other than the proposed airstrip that are being avoided in that area, including homes, a subdivision, and pivot irrigation.
	Concerns about whether transmission lines can run along land registered with the Nature Conservancy	Lands that are registered with a conservation easement (i.e. Nature Conservancy, Ducks Unlimited, Manitoba Habitat Heritage Corporation) are protected from transmission line development. Manitoba Hydro considers current and future land use throughout the routing process and the compatibility of various land uses with transmission line development.
Trees & vegetation	Loss of shelterbelt along the preferred route (2 miles of shelterbelt at risk of being removed), providing many benefits including carbon sequestration, water table retention, animal habitat	Manitoba Hydro is continuing to work with landowners with shelterbelts on their properties to determine whether minor adjustments can be made to the preferred route to minimize impact to shelterbelt trees. The routing process considers three perspectives, including the natural environment. The goal is to minimize overall potential effects.
Wetlands	Impacts to wetlands along the preferred route during construction and operation	Impacts to wetlands will be considered as part of the vegetation valued component for the environmental assessment. Mitigation will be applied to minimize potential effects.
Wildlife	Impacts of transmission line on migratory birds	Manitoba Hydro will propose mitigation measures to reduce potential effects on birds that may include: • timing of construction activities to avoid sensitive breeding periods; • retention of vegetated buffers around wetlands and riparian areas where possible; • bird diverters on the transmission line to increase visibility and reduce bird collisions at high-risk locations.

Topic	Concern	Summary of Manitoba Hydro response
	Concerns on how the preferred route will affect terrestrial wildlife, in reference to the fact that crossing the Assiniboine was avoided due to impacts on aquatic wildlife.	Wildlife is a valued component in the environmental assessment for the project.
	Impacts to migratory birds, geese, and ducks in the area. Fields and wetlands used as nesting areas	Application of proven and effective mitigation measures will be implemented as part of the project to avoid or minimize the environmental effects on wildlife and wildlife habitat.

Interested party[1] feedback

Interested party meetings and dates

Round	Date of meeting	Interested party
1	October 13, 2021, November 9, 2021	RM of Portage la Prairie
	November 5, 2021	RM of Rosser
	November 24, 2021	KF Aero Inc.
	November 25, 2021	RM of Cartier
	November 30, 2021	RM of St. François Xavier
2	February 18, 2022	Snoman Inc.
	March 3, 2022	RM of Woodlands
	March 28, 2022	RM of St. François Xavier

Round 1 public meetings

RM of Portage la Prairie

During the October 13, 2021 meeting with the RM of Portage la Prairie, the RM asked about improving other services and project specifications.

[1] An interested party is someone or a group that would potentially have feedback to provide, may be affected by the decisions made regarding route selection, have a specific interest or mandate in the area, data to share, ability to disseminate information to membership or a general interest in the Project's route selection area.

The RM asked whether Manitoba Hydro could partner with Bell MTS to use the towers for D83W for better service in the area.

- Communities, Telecom and Internet Service providers are welcome to contact Manitoba Hydro External Services (formerly Manitoba Hydro Telecom) to discuss connectivity options.

The RM asked for more information on the transmission line including, tower design, tower span and ROW width.

- Manitoba Hydro confirmed that tower design has not been finalized. Tower span lengths have tentatively been identified as 385 m. The ROW width is estimated to be 60 m on center line and 42 m when it runs along a road.

During the meeting on November 9, 2021, the RM of Portage la Prairie asked why there was no alternative route segment being considered along PR 227.

- Manitoba Hydro clarified that there is no route segment along PR 227 for two main reasons: there are many homes immediately adjacent to both sides of the road as well as along the quarter section, and the route would be approximately 20 km longer which would be more costly and less reliable.

The RM asked if there is better stability for a long line than corner cuts like that proposed in some of the options.

- Manitoba Hydro clarified that longer lines have lower stability given the size. Having the lines run as straight and short as possible is optimal from a cost and reliability perspective, but this is balanced with other factors from the natural and built environment and from input from the engagement process.

The RM asked if the two airports north and east of Portage la Prairie had been accounted for in the options.

- Manitoba Hydro confirmed that airstrips and airports in the area were being considered and accounted for in the routing options.

The RM asked what the compensation rate is for property owners.

- Compensation amounts have not been determined, but the rate is typically 150% of fair market value.

The RM asked if all individual property owners had been notified.

- Manitoba Hydro clarified that broad notification methods are used in Round 1 engagement. Once a preferred route is identified, Manitoba Hydro will reach out to affected property owners.

RM of Rosser

Manitoba Hydro met with the RM of Rosser to discuss the D83W project. The RM of Rosser indicated there were no concerns or follow-up questions related to the project.

KF Aero

Participants during the meeting with KF Aero provided comments related to routing, aircraft, and airstrips.

A participant asked where Bipole comes through the area and mentioned that they suppose a converter station would be required in order to use that.

- Manitoba Hydro confirmed that a converter station would be required, and Bipole goes to Riel.

A participant asked is there is a preference by Manitoba Hydro for routing.

- Manitoba Hydro responded that public engagement is being conducted to gather information and come up with a final preferred route.

A participant mentioned that Eastern area is mostly farmland.
Burying lines was suggested by a participant.
Manitoba Hydro mentioned that underground infrastructure is very cost prohibitive.

RM of Cartier

Participants shared that the targeted mailout of postcards and other communication was not ideal, noting some people did not receive communication from Manitoba Hydro about the D83W project.

- For Round 1, Manitoba Hydro used a broad notification process to try to reach more people in the area. For Round 2, once there is a preferred route, they will send letters to affected landowners.

A participant asked if there were options to upgrade existing infrastructure for today and future.

- Manitoba Hydro indicated that following the same infrastructure over long distances has greater risk to reliable system operation due to the greater potential for both lines being affected by the same weather event, like the storm of October 2019.

Participants noted concerns with the alternative routes seeming to jog to avoid homes but still affecting many homes and properties. Participants asked the cost of a corner structure compared to running in a straight line.

- A corner tower is approximately $120,000 more than a tangent tower. Once a final preferred route is selected, a property agent would work with the landowner to secure an easement. Tower payments are provided on agricultural land and payments are determined based on different factors and not necessarily $10,000 per tower.

Participants shared concerns about routing so close to St. Eustache as it will have a large impact on the people and land. Future economic development will be impacted along with potential for new buildings. The RM of Cartier has strategic plans for growth and development, and the transmission line would impede these plans.
Participants mentioned concerns about potential impacts to irrigation and organic farming related to biosecurity. Farm equipment would need to work around towers and become less efficient.
Many participants suggested Manitoba Hydro route the transmission line along PR 227 and down the Portage Diversion

- An alternative route option along PR 227 is being investigated by the Manitoba Hydro routing team including collection of additional constraint information such as homes, buildings etc. to determine feasibility. Manitoba Hydro is aware there are many homes located along portions on PR 227.

Participants shared concerns about the area in the RM of Cartier being a flood plain with low topography.
A participant commented that Manitoba Hydro talked about looking at comparative analysis, but participants had to pick from the worst of the worst in terms of routing.
A participant asked if it the option of going through Elie was considered.

- Manitoba Hydro responded that a southern route was considered initially but would be considerably longer than the current alternative route segments.

Participants noted concerns with high value agricultural land and potential depreciation with the presence of the transmission line. Several participants shared that crossing the Assiniboine River is not ideal due to the good farmland along the river. Participants shared that the province said that they cannot take land out of agricultural use, so it seems counterintuitive that some of the proposed routes would limit production.
A participant asked when the station would be constructed.

- Manitoba Hydro responded that the station is scheduled to be constructed in 2023 if they receive an Environment Act licence.

RM of St. François Xavier

Participants asked about the cost of the D83W Project and whether Bipole III could be used for power in this area instead.

- Manitoba Hydro responded that a converter station would be required if Bipole III were to be used, which would cost about $1 billion. The cost of D83W is below $200 million, with each kilometer of transmission line costing approximately $750,000, depending on location and structure design.

Participants shared concerns about impacts to irrigation and drainage systems, as well as impacts to agricultural operations during transmission line construction. Participants also expressed concerns about potential impacts to organic farms if pesticides had to be used to vegetation management along the transmission line.
A participant asked if Manitoba Hydro has a preferred route.

- Manitoba Hydro responded there is no preferred route until comparative analysis is completed after the first round of public engagement. Large amounts of data and feedback are brought together into a routing workshop to determine a preferred route.

Participants shared preferences to route the transmission line along PR 227.
Participants shared concerns that the power was being used to meet industrial growth in the Portage la Prairie area but was not benefitting the RM of St. François Xavier.
Participants shared concerns about potential impacts to trees and heritage sites along several of the alternative route segments.

Participants asked questions about the compensation and easement process.
Participants asked whether the transmission line could parallel the railroad track.

- Manitoba Hydro responded that induction over a long distance of a steel object for that length of time interrupts signals for the railway. Manitoba Hydro noted they would undertake studies to determine the feasibility of paralleling the railway.

A participant added that as you parallel a transmission line and railway line, the induction from the electromagnetic fields can interfere with communications and cathodic protection. Over long distances, it has a greater risk of interference with signaling systems/corrosion. Participant explained signaling that runs through rail lines. Explained that electrical storms are a much bigger concern.

Round 2 public meetings

Snoman Inc.

Snoman Inc. noted the preferred route crosses 3 Snoman Inc. snowmobile trails and wanted a sense of the timeline for the project overall.

- Manitoba Hydro noted that this is the current preferred route. Currently the project is undergoing Round 2 engagement to gather feedback on whether minor adjustments need to be made to the line at an individual property scale. Following Round 2 engagement, an environmental assessment will be submitted to the province, which will likely be in the late summer / early fall. The province's review typically takes about 1 year, and construction is anticipated to start in 2025.

To-date, Snoman Inc. noted they had not heard any feedback from the snowmobile clubs about the project or Manitoba Hydro's engagement process.
Snoman Inc. noted there are three trails in the area:

- Out of Portage la Prairie, in between Portage diversion and PR240, a trail goes straight north in this area
- East of Portage la Prairie, northeast of Highway 26, to the west side of Road 30W, there is a trail that goes north to PR 227
- Trail near St Eustache, going north of Elie, right along Marquette Road

Snoman Inc. noted there are no future trails planned in this area.

RM of Woodlands

Manitoba Hydro met with the RM of Woodlands to discuss the preferred route for the D83W project. The RM of Woodlands indicated there were no concerns or follow-up questions related to the project.

RM of St. François Xavier

The RM of St. François Xavier expressed concerns that the transmission line will run along many river lots which will impact a larger number of landowners than if the

transmission line followed agricultural sections. The RM of St. François Xavier noted that river lots have important traditions and cultures since Métis people used the river as a transportation route and settled in this area. The RM of St. François Xavier heard concerns about a potential conservation land area that the line will run through that is currently farmed organically. The RM of St. François Xavier mentioned that if cost was the only consideration, the further south route would have been chosen since it was the shortest.
The RM of St. François Xavier expressed their dissatisfaction that the land goes through their RM and noted that although it would be better for the RM of St. François Xavier to route on the north side of two-mile road, it would then create impacts for the RM of Woodlands.

- Manitoba Hydro shared that one of the considerations during the routing process was to provide greater distance from homes located on the north side on two-mile road.

A participant asked if Manitoba Hydro has done an assessment on how much agriculture land will be taken out of production in terms of irrigation, and if aerial spraying was considered.
The RM of St. François Xavier noted they understand the need for power in the Portage la Prairie area due to industrial growth, but also recognize that nobody wants a transmission line in their backyard. The RM of St. François Xavier mentioned that aerial spraying should be considered when finalizing the preferred route.

- Manitoba Hydro shared that agriculture is included as part of the environmental assessment and once the report is filed, there will be a public review period. Information was provided during Round 1 engagement about pivot irrigation and runway locations that helped inform route selection.

The RM of St. François Xavier asked to be kept informed as Manitoba Hydro met with landowners so they can continue to help advocate for their constituents. The RM of St. François Xavier acknowledged that the transmission line generally is along the edges of agricultural fields which makes it more manageable for farming practices.
The RM of St. François Xavier acknowledged the improvements made during the engagement process and would like to be kept in the loop and informed as the Project progresses.

- Manitoba Hydro agreed with the statement made and shared that landowner liaisons will be assigned to landowners to have a direct and consistent Manitoba Hydro contact during the project.

The MLA shared the importance of farm safety and disease prevention. The RM of St. François Xavier also wants to be equipped with the right information to be able to inform and educate constituents. St. François Xavier is a small RM that is rich in cultural significance; both because of the Indigenous and Métis communities, and valuable agricultural land.

Round 1 engagement materials

Information sheet

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)

Round 1: Identify & evaluate alternative route segments

Manitoba Hydro has been working hard in Portage la Prairie and nearby areas over the past couple years. After the October 2019 storm that ripped through the area, several projects were initiated to make necessary repairs and restore proper function to parts of the electrical system that were severely damaged.

Now, through its Portage Area Capacity Enhancement (PACE) project, Manitoba Hydro is looking to the future and planning expansion of its transmission system to better serve customers in the area and meet their growing electricity needs for years to come.

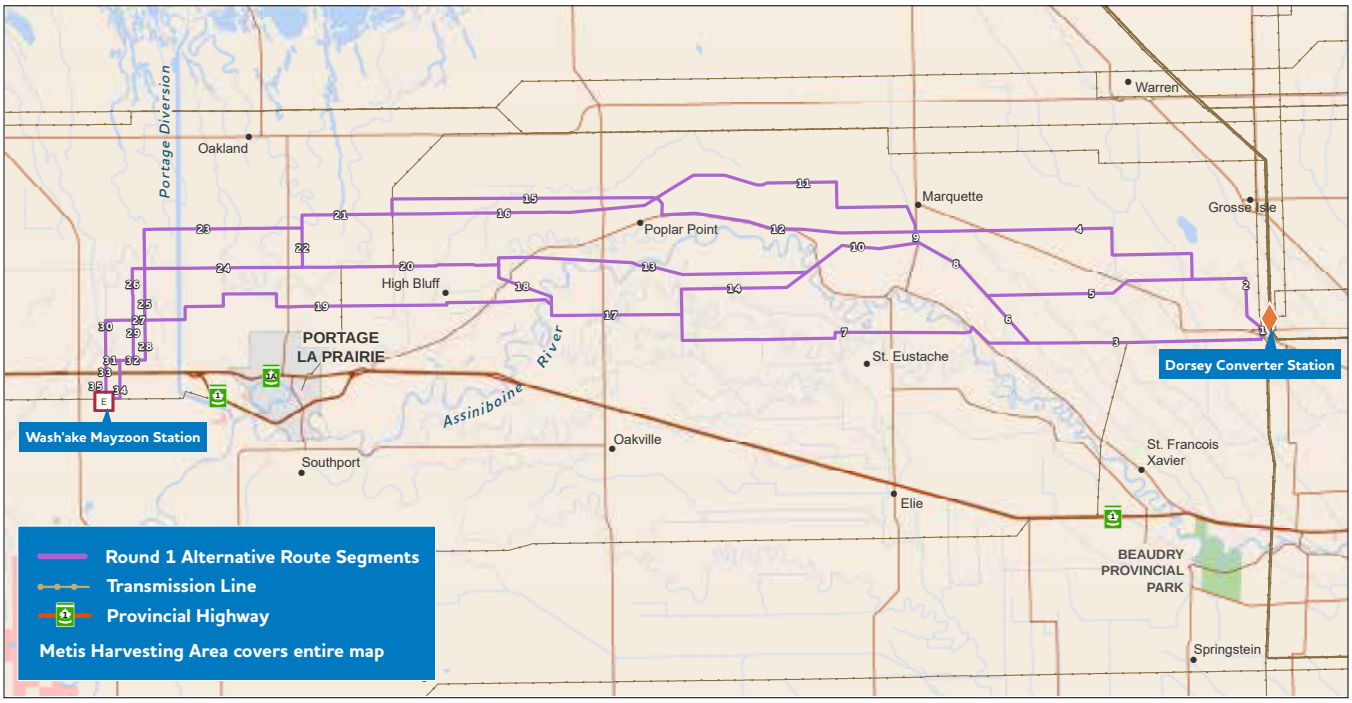
What is happening?

Manitoba Hydro is planning to build a new 230-kV transmission line starting at Dorsey Converter Station and ending at the proposed Wash'ake Mayzoon Station. As part of the utility's PACE project, this new electrical station and transmission line will increase system capacity to meet the area's increasing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding areas.

Where is it?

The new transmission line will start at Dorsey Converter Station (northwest of Winnipeg) and end at the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie).

The following map shows the alternative route segments (in purple) currently under review. Feedback received through engagement will help determine the preferred route.



Map of alternative route segments for the new Dorsey to Wash'ake Mayzoon 230-kV transmission line.

Manitoba Hydro

Why is it necessary?

Growth in the Brandon and Portage la Prairie region, including the addition of new industrial customers, is increasing electricity demand. To meet these needs and continue to deliver reliable power, Manitoba Hydro requires a new transmission line to bring electricity to the area.

Are regulatory approvals required?

Yes. This new transmission project requires approval as a Class 2 development under The Environment Act.
An environmental assessment for the new transmission line route will be conducted and a report will be submitted to Manitoba Conservation and Climate for approval.
A similar approval has been sought for the new Wash'ake Mayzoon Station.

How will the new route be decided?

Routing is a key part of the environmental assessment process. Data gathering, on the ground fieldwork, technical and environmental considerations, as well as input from landowners, Indigenous communities, interested parties, and the public, will help inform the selection of a preferred route for the new transmission line.

What is the schedule?

The tentative schedule (subject to change) is:

- October 2021 – Round 1 (Identify & evaluate alternative route segments)
- Winter 2022 – Round 2 (Select preferred route)
- Fall 2022 – File environmental assessment report for regulatory review
- Fall 2023 – Licensing decision
- Summer 2025 – Transmission line construction, if licence approved.

We want to hear from you

There are a number of opportunities for you to learn more about this work. We welcome you to provide feedback, ask questions, and voice your concerns to help inform our routing and plans.

Online survey

Go to www.hydro.mb.ca/pace to tell us what you think about the proposed alternative route segments.
Survey closes on December 1, 2021.

Virtual information sessions

Join us for a virtual information session on:

- November 2 at 7:00 pm
- November 3 at 12:00 pm
- November 4 at 4:00 pm
- November 9 at 7:00 pm
- November 10 at 12:00 pm
- November 16 at 7:00 pm
- November 17 at 12:00 pm

To register, e-mail **LEAprojects@hydro.mb.ca** or call 1-877-343-1631.

Online feedback portal

Take part in our online feedback portal as an interactive way to comment on the alternative route segments, share suggestions, and identify points of interest in the area. Go to www.hydro.mb.ca/pace to get started.

For more information:

Visit **www.hydro.mb.ca/pace** to learn more and sign-up for updates. Send your questions to LEAprojects@hydro.mb.ca or call 1-877-343-1631.

Available in accessible formats upon request. (November 2021)

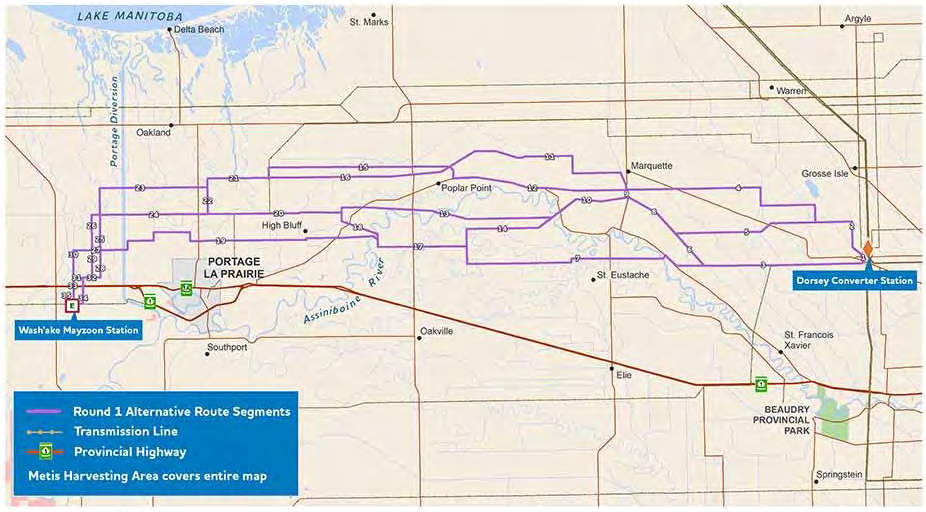
eCampaign text

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)
Round 1: Identify & evaluate alternative route segments

We are planning to build a new 230-kV transmission line starting at Dorsey Converter Station and ending at the proposed Wash'ake Mayzoon Station. As part of our Portage Area Capacity Enhancement Project (PACE), this new electrical station and transmission line will increase system capacity to meet the area's growing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding areas.

The new transmission line will start at Dorsey Converter Station (northwest of Winnipeg) and end at the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie).

The following map shows the alternative route segments (in purple) currently under review. Feedback received through engagement will help determine the preferred route.



View larger image in your browser.

We want to hear from you

We are seeking input from landowners, Indigenous communities, interested parties, and the public to help inform our routing and plans. Check out our current engagement opportunities:

Feedback portal

- Take part in our online feedback portal by November 15 as an interactive way to comment on the alternative route segments, provide suggestions, identify points of interest in the area, and see what others are saying.

Online survey

- Complete our online survey by November 15, 2021 to tell us what you think about the alternative route segments.

Join us for a virtual information session

- November 2 at 7:00 p.m.
- November 3 at 12:00 p.m.
- November 4 at 4:00 p.m.

- November 9 at 7:00 p.m.
- November 10 at 12:00 p.m.
- To register, email LEAProjects@hydro.mb.ca or call 1-877-343-1631.

Contact us

- Email LEA Projects.
- Phone 204-360-7888 or toll-free 1-877-343-1631.
- Visit our project website.

Postcard

Plans underway for new Dorsey to Wash'ake Mayzoon transmission line (D83W)

Opportunity for feedback on alternative route segments

Manitoba Hydro is planning to build a new 230-kV transmission line from Dorsey Converter Station (northwest of Winnipeg) to the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie).

This project will increase system capacity to meet the area's growing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding communities.

We are seeking input from landowners, Indigenous communities, interested parties, and the public to help inform our routing and plans.

Online survey & feedback portal

Fill out our survey or comment on the alternative route segments in our interactive feedback portal at **www.hydro.mb.ca/pace**.

Join us for a virtual information session:

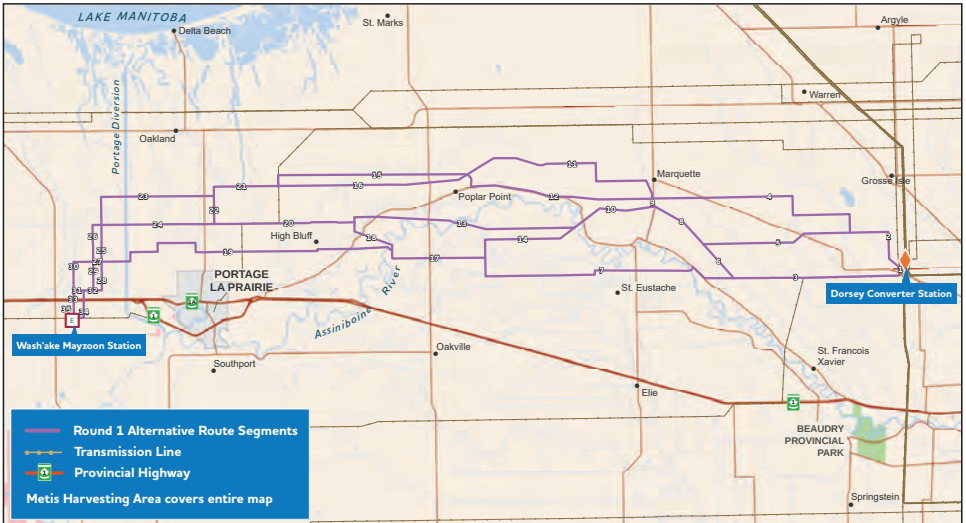
- November 2 at 7:00 pm
- November 3 at 12:00 pm
- November 4 at 4:00 pm
- November 9 at 7:00 pm
- November 10 at 12:00 pm

Email LEAprojects@hydro.mb.ca or call 1-877-343-1631 to register.

Stay connected

Learn more and sign-up for updates at **www.hydro.mb.ca/pace** or connect with us: **LEAprojects@hydro.mb.ca** or **1-877-343-1631**

Manitoba Hydro



Map of alternative route segments (in purple) for the new Dorsey to Wash'ake Mayzoon 230-kV transmission line. Feedback received through engagement will help determine the preferred route.

Available in accessible formats upon request.

Virtual information session presentation

Dorsey to Wash’ake Mayzoon transmission line

D83W

Manitoba Hydro

Project description

- New 230-kV transmission line from Dorsey converter station to proposed, Wash'ake Mayzoon station

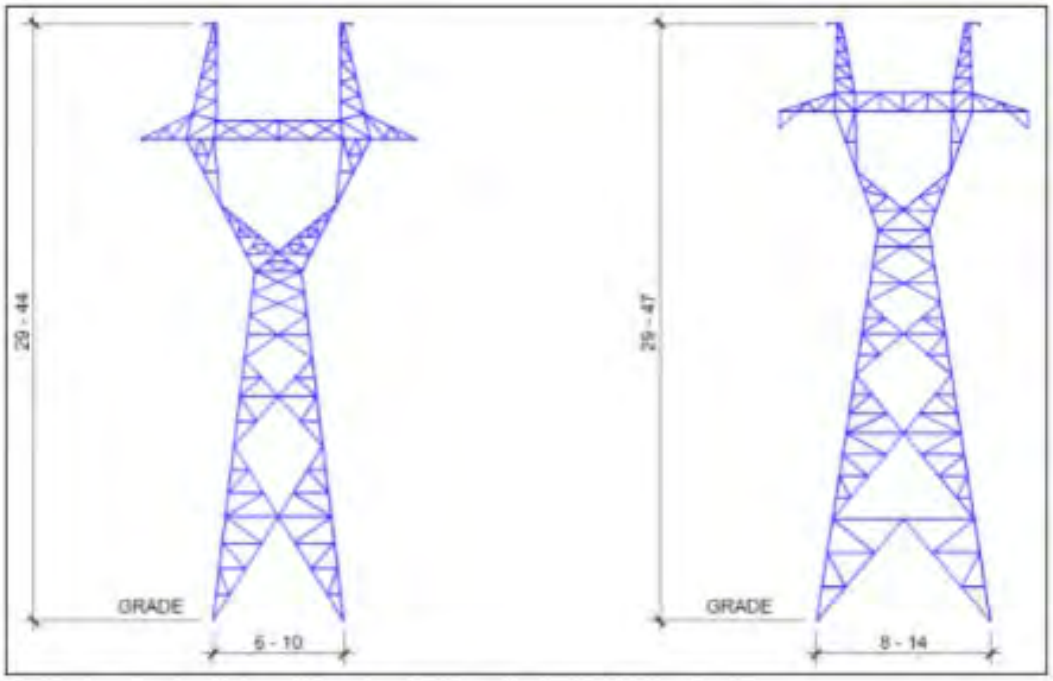


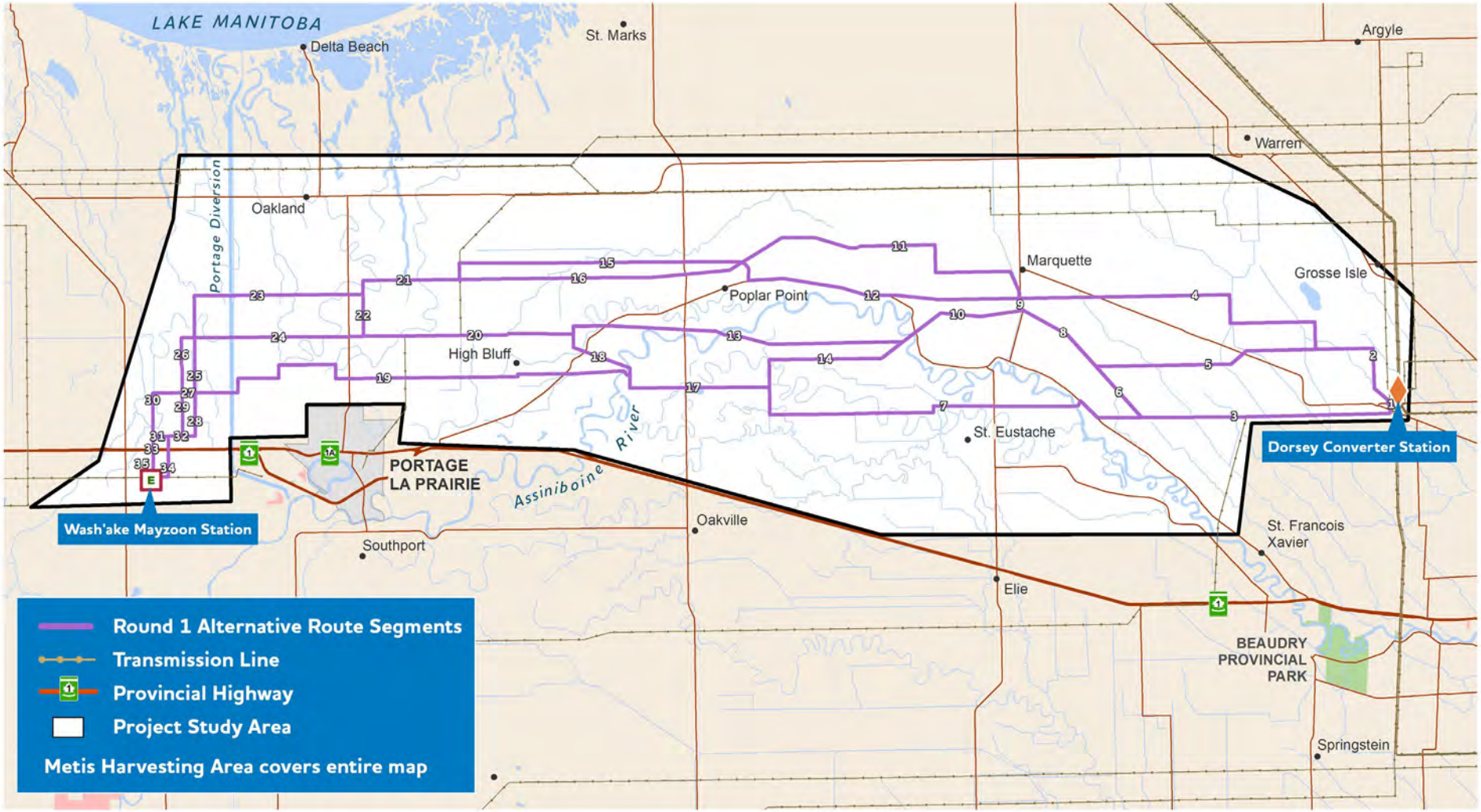
Figure 2-1: Typical self-supporting steel lattice suspension tower

Why is this project needed?

Project will increase system capacity to meet growing electricity needs

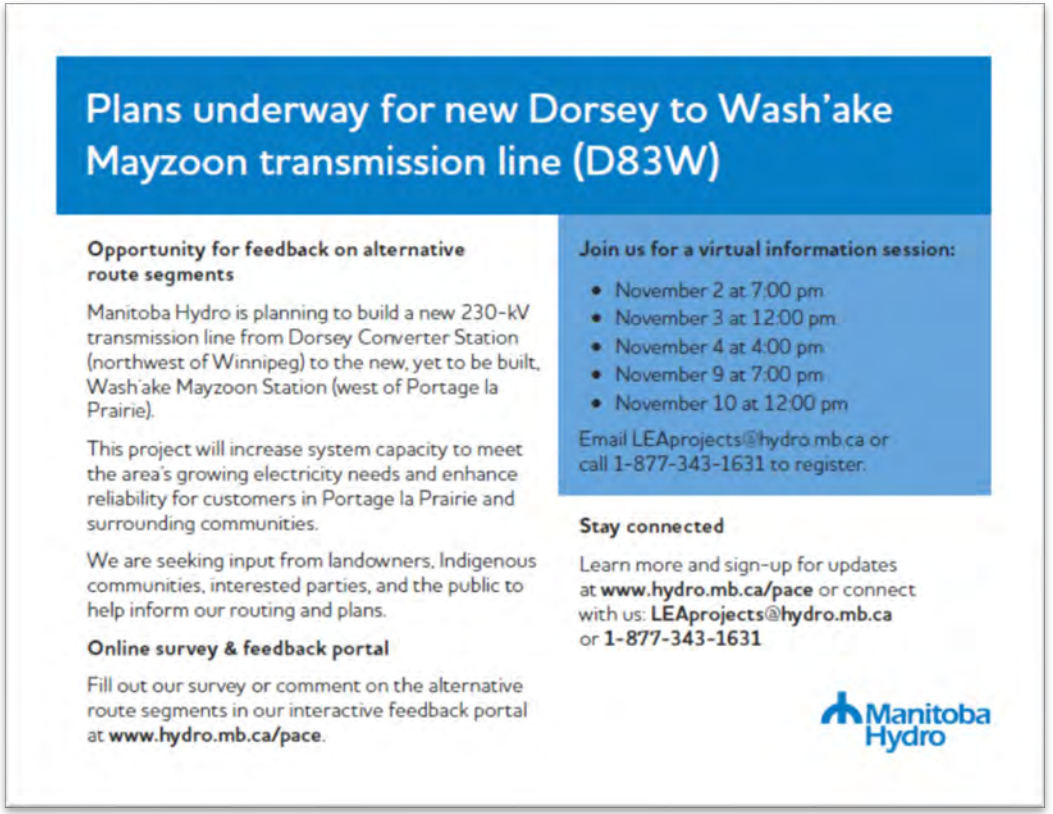
Enhance reliability for customers in Portage la Prairie and surrounding areas

Manitoba Hydro


LAKE MANITOBA
Delta Beach
St. Marks
Argyle
Warren
Oakland
Portage Diversion
Marquette
Grosse Isle
Poplar Point
High Bluff
St. Eustache
Dorsey Converter Station
Wash'ake Mayzoon Station
PORTAGE LA PRAIRIE
Assiniboine River
Oakville
Southport
St. Francois Xavier
Elie
BEAUDRY PROVINCIAL PARK
Springstein
Round 1 Alternative Route Segments
Transmission Line
Provincial Highway
Project Study Area
Metis Harvesting Area covers entire map

How we're sharing information

- Project webpage
- Postcards
- Printed materials
- eCampaign
- Emails
- Social media



Plans underway for new Dorsey to Wash'ake Mayzoon transmission line (D83W)

Opportunity for feedback on alternative route segments

Manitoba Hydro is planning to build a new 230-kV transmission line from Dorsey Converter Station (northwest of Winnipeg) to the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie).

This project will increase system capacity to meet the area's growing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding communities.

We are seeking input from landowners, Indigenous communities, interested parties, and the public to help inform our routing and plans.

Online survey & feedback portal

Fill out our survey or comment on the alternative route segments in our interactive feedback portal at **www.hydro.mb.ca/pace**.

Join us for a virtual information session:

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- November 3 at 12:00 pm
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Email LEAprojects@hydro.mb.ca or call 1-877-343-1631 to register.

Stay connected

Learn more and sign-up for updates at **www.hydro.mb.ca/pace** or connect with us: **LEAprojects@hydro.mb.ca** or **1-877-343-1631**

Manitoba Hydro

Manitoba Hydro

How we're engaging

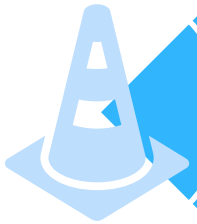
- Virtual information sessions
- Interested parties' meetings
- Online survey
- Feedback portal
- Email and telephone communication

Feedback portal

How does information inform decisions?

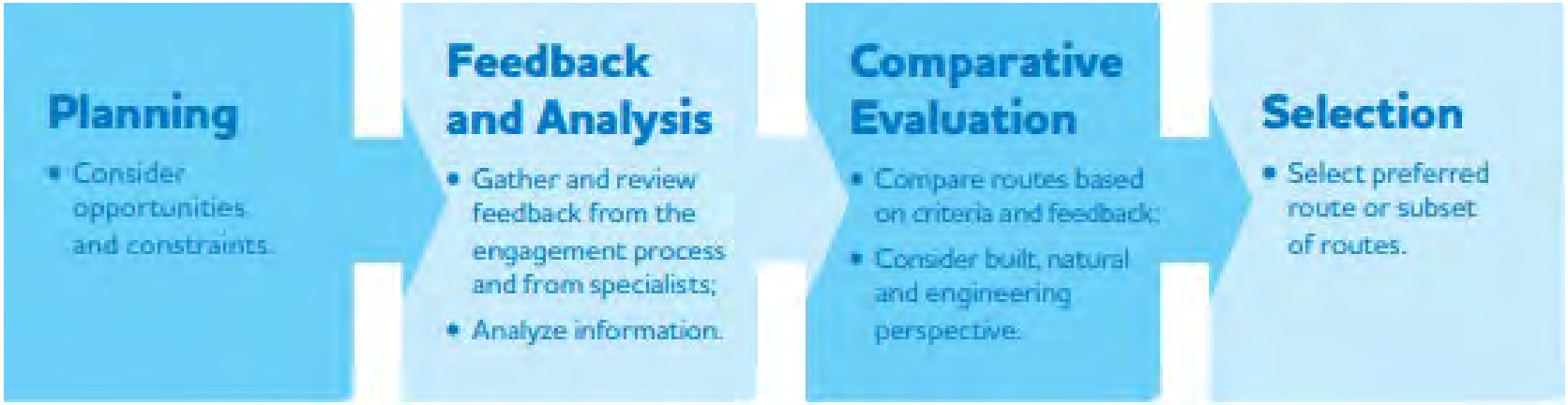
Design

Location

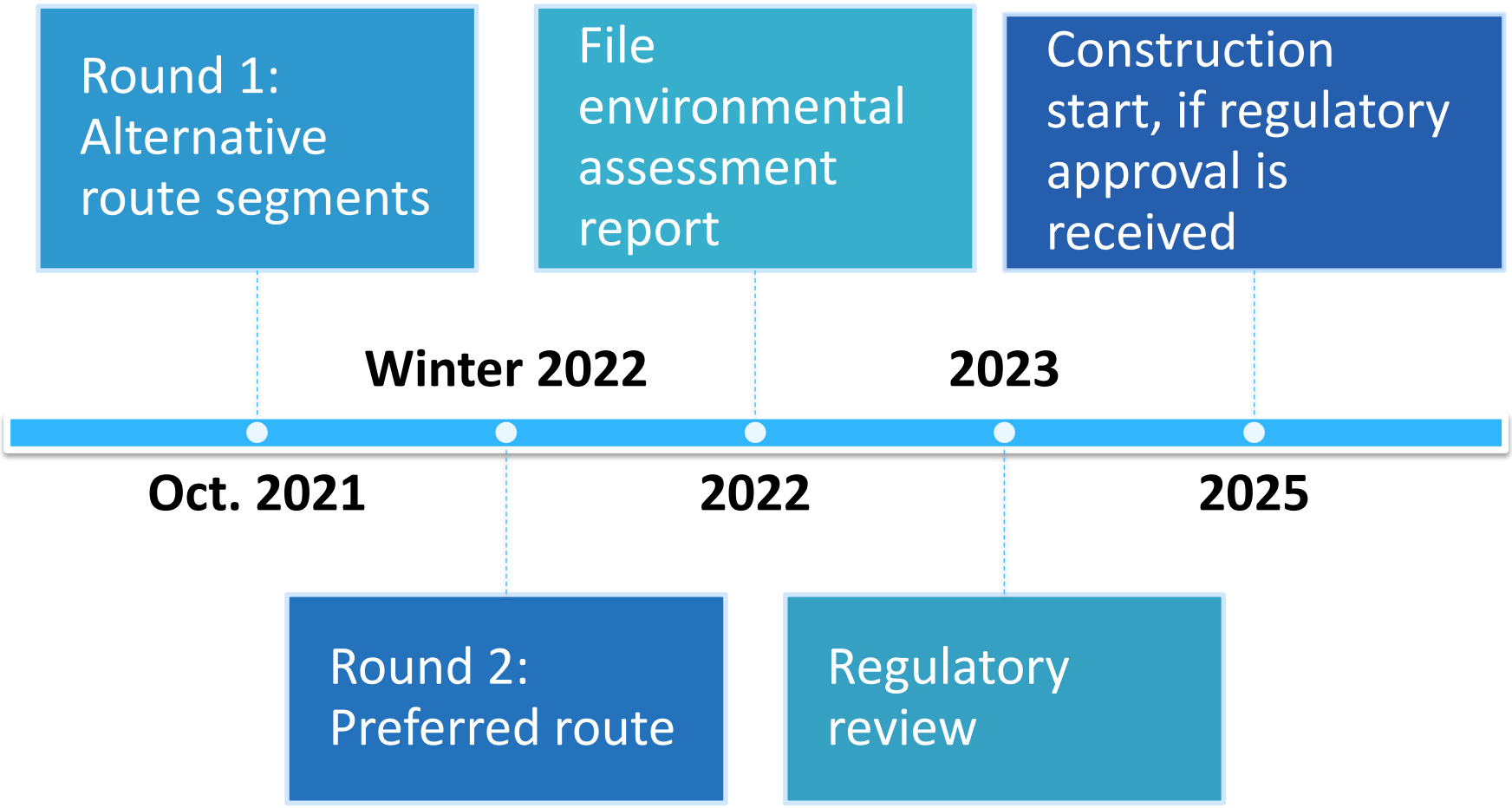


Mitigation

How do we move between routing stages?



Schedule


Round 1: Alternative route segments
File environmental assessment report
Construction start, if regulatory approval is received
Winter 2022
2023
Oct. 2021
2022
2025
Round 2: Preferred route
Regulatory review

We want to hear from you

Online survey and feedback portal

Tell us what you think about the proposed alternative route segments. The survey closes on December 1.

www.hydro.mb.ca/pace

Feedback portal

Thank you

The project team wants to hear from you.

For more information about Dorsey to Wash'ake Mayzoon transmission line and to sign up for email notices, please visit http://www.hydro.mb.ca/pace

Available in accessible formats upon request.

Virtual information session meeting notes

PACE – D83W meeting notes

D83W virtual information session		
Location: Microsoft Teams	Date: November 2, 2021	Time started: 7:00 pm
# of participants	11	

Action items		
Action item	Responsibility	Status
Manitoba Hydro to provide the participant with a list of similar/comparable structures nearby. Manitoba Hydro sent a follow up email to the participant on November 5, 2021.	Manitoba Hydro	Completed
Manitoba Hydro to investigate other options for towers, particularly ones that have smaller foundations.	Manitoba Hydro	Completed
Manitoba Hydro to double-check runway location data.	Manitoba Hydro	In progress
Manitoba Hydro to discuss with the route planning team potential options near PR 227 and the diversion.	Manitoba Hydro	Completed
Manitoba Hydro to share the reason for pursuing a new route instead of the using existing ROW.	Manitoba Hydro	Completed
Manitoba Hydro to share biosecurity concerns with maintenance to determine if the same policies are followed.	Manitoba Hydro	In progress
Manitoba Hydro to determine if banks/lenders are made aware of land status such as in the event of an easement.	Manitoba Hydro	Complete
Manitoba Hydro to determine the road number where segment #11 goes north.	Manitoba Hydro	Completed

Discussions – category specific	
Category	Discussion
Aesthetics	A participant asked what towers are comparable in Manitoba to this project as they want to get a sense of the towers and see the tower size. - Manitoba Hydro will follow up with comparable structures. Manitoba Hydro sent a follow up email to the participant on November 5, 2021. In response to the question about where you can see a similar tower to the preliminary design for Dorsey to Wash'ake Mayzoon transmission line (D83W), the best place to see a similar tower would be off the south perimeter highway just east of the Highway 59 intersection.
Routing	A participant asked why Manitoba Hydro needs to run a line all the way west of Winnipeg as there is Bipole III already. - Manitoba Hydro explained that Bipole III is a direct current line so a converter station would be needed, also that D83W is a 230kV line while Bipole III is 500kV.
Aesthetics	A participant asked if there are other tower options. - Manitoba Hydro answered they have used tubular steel structures in some places in the past. For this project, the current tower design is self-supporting steel lattice but they will investigate other options. - After the session, Manitoba Hydro asked and determined that steel lattice towers allow for longer span lengths reducing the number of towers that landowners would need to avoid when operating agricultural equipment. Tubular steel is also more expensive because more towers are needed due to the shorter span.
Proximity to homes	A participant asked what the setback distance is for runways in the area. - Manitoba Hydro responded that there are two runways that were considered during the routing process (Jonair and Portage North). The alternative route segments are more than 2km away from both runways A participant explained that there are four licensed runways north of Portage la Prairie so Manitoba Hydro will need to look into those. - Manitoba Hydro responded that runways are a layer in their database and they will double-check.

	Another participant mentioned they have a private runway on their property and asked for the number of towers per mile. - Manitoba Hydro explained the span for structures is 385 meters with the tower height currently being looked at; however, this would change if the tower design is changed.
Proximity to homes	A participant asked what distance the line would be from a roadway (i.e. in a field). - Manitoba Hydro said it is anticipated to be 60 meters on the centerline when in a field and 42 meters from the edge of the road allowance.
Property	A participant explained there are two line operations going north of St. Eustache so their field will be directly affected. If the line crosses their land, pivot irrigation point will be affected and they will lose the ability to irrigate that field all together. If they do not have access to irrigation, they will lose their contract. - Manitoba Hydro shared that if that route was selected, a property agent would reach out to talk about mitigation options; and explained that the concerns shared are what would be discussed with the Manitoba Hydro property representatives.
Property Value	A participant explained they cannot believe Manitoba Hydro is suggesting something like this considering all of the river property. They shared that it does not make sense as it is prime property and it is high value property. They have read through the information explaining that land values won't go down; however, they would be skeptical on buying property with towers on it. - Manitoba Hydro explained they do look at many options so they can learn about the area; part of the process is through feedback from landowners and other interested parties in the area. A participant stated that the shortest route isn't always the best and can see that nobody wants it in their backyard.
Agriculture	A participant stated concerns with agricultural lands in general with river soil. They feel there is an opportunity cost just beyond the expropriated land, also additional utility (i.e. lose access to aerial capacity to spray and irrigate when a transmission line is on the land). They shared that at any adjacent land to the river crossing that people would lose ability to grow vegetables if there were towers and lines running

	through. They shared that additional costs beyond the lost cost of the soil, ultimately impacts fair market value and limits options to the same field (i.e. if one acre of land is lost, then there is potential loss of value for future prospects). - Manitoba Hydro thanked the participant for sharing and stated that when property reaches out, they will offer 150% of fair market value for the easement. Tower payments will also be offered for land classified as agricultural land.
Property	A participant explained his dad's field is being cut in half width-wise on one field, which is worse than cutting it lengthwise. They shared that the segment is not following road allowance. Another participant mentioned the southern transmission routes run through the greatest potential soils; however, it is also a floodplain. They cautioned the capacity of Portage diversion has been reached so if Manitoba Hydro cannot protect this area their towers will be standing in water. The participant questioned why Manitoba Hydro is not looking at PR 227, where they also have property, and is by the Portage diversion. - Manitoba Hydro stated they will take this back and look at this with route planners to see if they can come up with route options. A participant asked how Manitoba Hydro came up with this this instead of north of 227 where they have easements and areas that seems less intrusive. - Manitoba Hydro said they will look into this with the route planners. - After the virtual information session, Manitoba Hydro followed up on why there is not an alternative route segment along road 227. There are two main reasons: o there are many homes immediately adjacent to both sides of the road as well as along the quarter section o the route would be longer, which would be more costly and less reliable
Routing	A participant asked what the preference is for Manitoba Hydro to make a new route vs. twinning an existing ROW. - Manitoba Hydro explained they do like to try to parallel existing linear infrastructure but also need to look at many options to balance concerns.
Routing	A participant explained the flood issues along the river. They shared that route #13 would be in this area previously impacted

	by flood. In terms of irrigation, with the interactive website the participant put in pivot points throughout #13 and #20. Some go through where they have permanent water points so they feel those lands would be useless without water access. They are along five of these routing segments and one would be right in their front window. They shared that if it is along an existing easement or roadway, they may have to live with it. The participant just purchased land in October that a route option goes through. - Manitoba Hydro thanked the participant for adding in all their points to the portal as it will help with informing the routing process.
Agriculture and routing	A participant explained the southern-most routes affect the most valuable farmland and the most people so the more northern routes are better. A participant shared that they own an organic farm that is planning to put up more irrigation pivots. A participant shared that the southern routes are not good as they would have to cross the river at least twice. They noticed that river crossings have the most wildlife that they have seen so they prefer that Manitoba Hydro go on the more northern routes.
Health and Safety	Manitoba Hydro presented the topics: How does info inform our decisions? How do we move between routing stages? Schedule. A participant asked what policies Manitoba Hydro has in place to prevent spread of invasive species when they go on our land? - Manitoba Hydro explained there are biosecurity procedures that are followed if workers need to go on your land/access; Manitoba Hydro takes this very seriously. A participant said the potato industry has national guidelines and they are learning more about this subject so want to make sure Manitoba Hydro considers this. Another participant stated most of Manitoba Hydro personnel are aware during construction; however, they have experienced that it is the maintenance crews that they are not sure are aware. - Manitoba Hydro will note this concern and pass on the consideration.

Property Value	A participant asked for any of the lands affected, if there is a lender or financial institution involved, would they be informed of the change on the land say if an easement is put in place? - Manitoba Hydro will ask the property department and get more information regarding this request. Manitoba Hydro followed up and found that lenders or financial institutions are not notified by Manitoba Hydro or by The Property Registry (land titles) upon registration of the easement. The landowner remains owner of the land, with Manitoba Hydro having rights within the easement area. This does not affect the financial institutions security.
Routing	A participant asked when Manitoba Hydro goes for their easements. - Manitoba Hydro answered once they have a final preferred route, they will go for easements.
Routing	A participant explained they are along route #7 (3 miles west of St. Eustache) and asked how the powerline would go through if they have development on both sides. There is yard site that the line appears to cross on the north side, would the line go over top? Would Manitoba Hydro go around yard sites? Seems less intrusive going on the northern routes than southern. - Manitoba Hydro answered they would work directly with the landowner to address the issue with the transmission line in the yard site if that is the preferred route chosen.
Routing	A participant asked to zoom to route #11 – west of Marquette. They asked at what point is Manitoba Hydro heading north – what route number is that - road 15? - Manitoba Hydro answered they can follow up with the participant on segment #11 where it heads north. Where segment 11 heads north is Road 15W.
Routing	A participant asked if Manitoba Hydro can share the process for what happens once a preferred route is selected (i.e. is Manitoba Hydro asking for permission? Is it on existing easements? Is land expropriated?) If end up in preferred route can landowners still share concerns? - Manitoba Hydro explained they would come out with a preferred route and have specific sessions on that route. They would reach out to individual landowners and have

	one-on-one meetings to work with landowners to secure an easement vs. expropriation. These discussions involve our property agents. They would still need to file their environmental assessment and get permission to build the line. A participant asked if they don't want this to happen through their land, can they still get expropriated? - Manitoba Hydro said that is the worst-case scenario. Manitoba Hydro would try to exhaust all options before landing in that situation. Manitoba Hydro also needs to get permission to expropriate. A participant asked if individual landowners can work together or work individually. - Manitoba Hydro said they have worked with groups in the past and that has worked well, so they would be happy to do this if there is interest.
Engagement	A participant asked a question regarding earlier meetings that Manitoba Hydro had before this one. A couple people attended and were wondering why no farmers or others were there. - Manitoba Hydro explained it may have been a meeting with the RM of Cartier. Manitoba Hydro is open to having additional meetings and talking to people separately if there is interest.
Closing comments	A participant shared that they look forward to Manitoba Hydro's responses and thanked Manitoba Hydro for the meeting. They stated there may be more questions later as this is a lot of information to be taking in at once.

PACE – D83W meeting notes

D83W virtual information session		
Location: Virtual meeting via Microsoft Teams	Date: November 3, 2021	Time started: 12:00 pm Time ended: 12:45 pm
# of participants	7	

Action Items		
Action Item	Responsibility	Status
Action item 1	Manitoba Hydro to send routing brochure discussing evaluation criteria and weighting to participant. Manitoba Hydro emailed a copy of the brochure on November 5.	Complete
Action item 2	Manitoba Hydro to send brochure regarding the effect of EMF on GPS signaling to a participant. Manitoba Hydro emailed a copy of the brochure on November 4.	Complete
Action item 3	Manitoba Hydro to send a participant a map with the route segments shown with the municipal boundaries	Complete
Action item 4	Manitoba Hydro to check whether there are backlogged messages stored on the toll-free number voicemail. Manitoba Hydro responded to the voicemail messages.	Complete
Action item 5	Manitoba Hydro to follow up with participant to determine if the issues accessing the portal remain and potentially schedule a meeting.	In progress
Action item 6	Manitoba Hydro to send session notes around for review	In progress

Discussions – category specific	
Category	Discussion
Agriculture	A participant raised concern that all the proposed routes go through their farmed land; one of the routes would go through 5 miles of irrigated (pivot) land (#19); many routes proposed would go right down the middle rather than along road allowances. The participants main concerns include: effects on agricultural operations (obstructing machinery, etc.); placement of towers potentially effecting tile drainage. They shared that input on placement of towers would be of interest as well as hearing about irrigation related mitigation measures

PACE – D83W meeting notes

EMF	A participant raised concern about whether EMF will affect GPS signaling depended on in precision agricultural operations.
Engagement	A participant inquired whether individual landowners along each segment have been contacted by Hydro. - Manitoba Hydro explained that postcards have been sent out, but at this stage of the process letters haven't been sent out to specific landowners because the landowner mapping is not complete given that the preferred route has not been established. - The MH presenter provided a demonstration of the engagement portal and participants were advised that concerns can be provided via the feedback portal or documented today as verbal comments. It was confirmed that when logging into ArcGIS to access the portal, participants can log-in as a 'guest' (i.e. do not need to create an ID). A participant advised that issues were encountered in attempting to access the portal as a guest and that emails and voicemails to the 1-800 number requesting a physical map had not been returned. They shared that other participants had been experiencing similar issues. - Manitoba Hydro advised that a meeting could be set up to walk through the entry of points in the portal. There is the option to have a separate meeting with Council.
	A participant asked if Manitoba Hydro is looking for a lot of input from the local people to influence the project plan? - Manitoba Hydro shared that they are able to learn a lot from local people who know the area well. The input the public provides greatly informs the routing process.
Routing	A participant asked how Manitoba Hydro came up with all the different routes and how the final route will ultimately be decided? (E.g. why through the middle of a section rather than along the edge). Advised it would be beneficial to have more information about how and why the options were established as is. - Manitoba Hydro advised that many different issues are contemplated in the development of the segments.

	A participant asked how much modification to the proposed segments is possible? - Manitoba Hydro advised that there is some opportunity for the placement of the segments to be modified in response to certain concerns if feasible mitigations can be identified.
	A participant asked what happens if there is a shelterbelt on the half mile? - Manitoba Hydro advised that routing and tower placement in response to identified concerns will be location specific. It is helpful if specific shelterbelts of concern on the half-mile can be identified early in the routing process.
	A participant asked about the width of the right-of-way. - Manitoba Hydro advised the anticipated right-of-way/easement is 60m along the ROW and 42 along the road allowance. The ROW width could change if tower design changes.
	A participant inquired about the straight-line distance between stations and the distance between towers. - Manitoba Hydro advised that the straight-line distance of the project is approximately 75 km and that towers will likely be placed about 385 meters apart.
Property value	A participant inquired whether compensation is provided only for the footprint of the tower or the entire line? - Manitoba Hydro discussed the process for ultimately securing land easements. Land agents work with the participant to sign an easement for the entire width of the right-of-way and to discuss tower placement and other mitigation measures. Within the right-of-way, the property owner maintains ownership and is provided 150% of the appraised market value of the area of the easement. The easement provides Manitoba Hydro with rights of access to construct, operate, and maintain the transmission line. There are some restrictions with

	what the property owner is able to do on the area of the easement (e.g. development restricted). There is also a tower placement payment on land that is agricultural. Discussions regarding compensation do not take place until the final preferred route is established (estimate: fall 2022)

Route segments	
Route Segment #	Comments
19	Segment would go through 5 miles of one producer's irrigated (pivot) farmland
11	RM of Woodlands inquired whether Segment 11 which transverses the RM of Woodlands is proposed to go along a road ROW

Recap:

- Specific concerns about properties affected from an agricultural perspective (tile drainage, irrigation, farm implements between towers)
- Questions about compensation and when negotiations may start
- Issues accessing the portal and with responsiveness of the toll-free voicemail

PACE – D83W meeting notes

D83W virtual information session		
Location: Virtual meeting via Microsoft Teams	Date: November 4, 2021	Time started: 4:00 pm Time ended: 5:00 pm
# of participants	5	

Action items		
Action item	Responsibility	Status
Action item 1	Manitoba Hydro to provide more formal response regarding challenges with routing north of 227	Complete
Action item 2	Manitoba Hydro to follow up on the feasibility of placing underground segments to accommodate airstrips	Complete
Action item 3	Manitoba Hydro to ask why segments did not parallel D54N	Complete
Action item 4	Manitoba Hydro to look into issue a participant reported with 18 cottonwood stumps being left behind in 2019 and see if there is anything that can be done.	In progress
Action item 5	Manitoba Hydro to confirm whether segments 20/24 runs across the ditch of the municipal road and advise the participant.	Complete

Discussions – category specific	
Category	Discussion
Agriculture	Key concerns to this group of participants were the potential effects on agricultural production, especially as it related to airstrips. There was significant focus in the discussion on the locations of existing airstrips.
	A participant inquired as to whether putting the line underground where airstrips are located is an option? They discussed a line running by the community of Oak Bank (~20 years ago) in which the line was run under an unauthorized airstrip after a lengthy negotiation. A participant brought up concerns with cutting through the middle of parcels of land, affecting irrigation. The participant inquired what happens if tower was supposed to go right on top of irrigation system? - Manitoba Hydro advised that the location of irrigation systems would need to be considered in determining tower placement.
	A participant brought up concern with increased cost of spraying crops if applicators have to start working around more hydro infrastructure - Manitoba Hydro advised that it would be considered as part of the tower payment on agriculture land.
	Participants inquired about whether guy wires would be used. - Manitoba Hydro advised that for this project free-standing towers will be used.

PACE – D83W meeting notes

Engagement	A group of participants advised that they had not received any postcards or notifications about this project or engagement process and had only heard of the sessions through word of mouth and checking the Manitoba Hydro website. Another participant was made aware of the session from the Manitoba Aerial applicator's association and not any of their clients they reached out to north of Portage had received notification yet. - Manitoba Hydro shared that they are trying to find other ways to reach people. A landowner mailing list is not available until a preferred route is selected so Manitoba Hydro typically uses broad methods of engagement for the first round of engagement
	A participant asked if an individual can't figure out how to record things on the website/portal and don't have any interesting landmarks to add to the map (irrigation, airstrips) if they would get the route run over their land because they don't have enough dots on the map? - Manitoba Hydro shared that many factors are considered in routing decisions (i.e. not only the number of dots) and advised that a meeting can be set up to walk through the portal if assistance is required.
	A participant inquired as to why this was not thought of immediately after the 2019 storm, stating that this proposal felt like a blindside due to a lack of notification and that it is hard to believe that this has come up since the 2019 weather event was being dealt with. - Manitoba Hydro advised that after the 2019 weather event that options were being explored for increasing electrical capacity to the area, but the proposal had not yet been developed.
	A group of participants inquired if the Rural Municipality of Portage la Prairie is aware of the site of the station and all the proposed route segments - Manitoba Hydro advised that they have met with the Rural Municipality of Portage la Prairie Council to discuss the project.

Economic benefit	A participant inquired about why there is a need for this new line given the addition of power from the south to Roquette (P81C). The participant asked if the Roquette station was being shut down? A participant asked why capacity wouldn't just be increased at an existing station? - Manitoba Hydro advised that it was determined that the existing infrastructure could not meet the anticipated future power needs in the area and that a new line is required to bring additional capacity.
	A group of participants raised concern that the 2019 storm was being blamed for damage on poles that were ready for replacement. - Manitoba Hydro acknowledged that there is a lot of old infrastructure in the area.
	A group of participants asked who is going to be using this new capacity in the area? Who is the new capacity for? We all already have power. - Manitoba Hydro advised the line is intended to meet the need of area residents as well as future industrial development interests in the area that cannot be met by the current system.
Routing	A participant inquired why all of these line segments were developed without proposing alternate sites for the station? Is it etched in stone where the lines are going to end at the end station? Another participant asked what would happen if approval was not received for the new substation? - Manitoba Hydro advised that selection of the proposed site for the station was done first. An environmental assessment report for the station site has been submitted to the province, but feedback has not yet been received. If approved, the proposed station site will move forward. Manitoba Hydro is working with the landowner to secure the property. If the province does not approve the station location, the reason for

	disproval would shape the new plan, but regardless there is a need to increase capacity in the area. A participant suggested that the route runs along the mile roads rather than across fields. - Manitoba Hydro advised that the issue with mile roads tends to be that homes are built along them adding to routing challenges. A group of participants discussed Marquette/Meadow Leak corner and right across 227, where there would be no one to disrupt (~230 yards between the bottom of the diversion and the municipal road). Asked how much it could cost to push a route 6-8 miles? - Manitoba Hydro advised that the challenges in that area included the added length (substantial cost), but also increased storm damage concerns further north closer to the lake. A participant advised that north of High Bluff an airport is identified on the map (Airport Colony), but it no longer exists. A participant advised that their airstrip is east of 240 on 5-13-6 and that Hydro has already marked the runway with poles and markers. - Manitoba Hydro advised that airstrips are more difficult to mitigate around so it is very helpful to know them in advance. If any more sites/airstrips are added to the portal or locations provided they can be mapped and considered. A participant asked where possible less turns are better (straight line) to avoid as many corner towers and wires as possible; would prefer it go on Crown land along the diversion. A participant asked how far the line must be from a town? It is close to High Bluff. - Manitoba Hydro advised there are no specific restrictions regarding towns, advising that a recent line runs through Sage Creek in Winnipeg.

	A participant inquired if there was any possibility running the line south of the Trans Canada by Elie? - Manitoba Hydro advised that the concern was it would be substantially longer. A participant asked how many posts per mile? - Manitoba Hydro advised there will be approximately 385 meters between towers.
Health & Safety	A participant advised that the Southport Military Helicopter Training Program has an agreement to use a number of airstrips/land in the area to reduce noise near homes.
Property value	A participant North of Portage la Prairie is some of the most productive agricultural land in the RM and most high value and it will not be received well while north of 227 is not as productive (mostly alfalfa). The participant asked if it has been thought to go north of 227 rather than cutting across high assessment properties and through the middle of sections? - Manitoba Hydro advised that they can provide a more formal response regarding why the area north of 227 was not included in the potential routing segments. - After the virtual information session, Manitoba Hydro followed up on why there is not an alternative route segment along road 227. There are two main reasons: o there are many homes immediately adjacent to both sides of the road as well as along the quarter section the route would be longer, which would be more costly and less reliable A participant stated that the cost of compensation in this area will be high, inquiring if the extra length cost it would take to go north of 227 would be more than to compensation cost in the proposed area. A participant estimated it would cost about $1.4 million in easements per mile plus tower payments. The participant indicated that it is surprising the cost to run the line further north would still be higher. The participant asked if the tower payment is one-time or ongoing? - Manitoba Hydro advised that the tower payment is a one-time payment. Once a preferred route is established, property agents reach out to the relevant landowners. It is understood that it is the high cost of

	the towers that drives up the costs significantly with increased length of a line. A participant asked if property agents work one-on-one with landowners; concerned if neighbors may get a better compensation deal through negotiation. - Manitoba Hydro advised that the appraised value of the land is relied upon, but that participants can also talk with their neighbors about discussions with property agents.
Trees/vegetation	A participant indicated frustrations with Manitoba Hydro stemming from a 2019 issue with the tree clearing crew not completing work, advising there are still 18 stumps remaining on property that Manitoba Hydro did not take out. A backhoe was left to deal with the stumps, but the operator said they would destroy the bush. Manitoba Hydro met with the landowner after the meeting to discuss the concerns.

Route segments	
Route Segment #	Comments
19	Concern going across a bunch of river lots
18	Goes across a potato field
23	Segment 23 crosses the diversion and underground irrigation system.
19	Question about why Segment 19 jogs to the north and whether an airstrip influenced the jog
20	Question about if Segments 20/24 runs across the ditch of the municipal road? The right of way would be adjacent to the edge of the road allowance.
24	Participants did not believe there were any runways that Segment 24 would affect.
13	Running right across river lots is very disruptive for spraying
18	Running right across river lots is very disruptive for spraying
19	Running right across river lots is very disruptive for spraying
7	Running right across river lots is very disruptive for spraying

PACE – D83W meeting notes

Recap:

- Main concerns:
    - Impacts on airstrips, specialty crops, potatoes, irrigation
    - Running across highly productive ag land

PACE – D83W meeting notes

D83W virtual information session		
Location: Virtual meeting (Teams)	Date: November 9, 2021	Time started: 7:00 pm Time ended: 8:30 pm
# of participants	10	

Action Items		
Action item	Responsibility	Status
Action item 1	Manitoba Hydro to follow up about the technical feasibility of running along 227 and provide a response to participants	Complete
Action item 2	Manitoba Hydro to provide an interested participant with mail/email address so input can be provided through an avenue other than the portal	Complete
Action item 3	Manitoba Hydro to provide Health Canada brochure regarding EMF to interested participants	Complete
Action item 4	Manitoba Hydro to provide brochure regarding AC towers and electronic devices to interested participants	Complete
Action item 5	Manitoba Hydro to confirm whether there is a way to submit to the portal without an email address	Complete
Action item 6	Manitoba Hydro to follow up to see why communications have not been received or advertisements seen on social media by participants north of Portage la Prairie	In progress
Action item 7	Manitoba Hydro to follow up with System Planning to inquire why the line originated from Dorsey rather than from Brandon	Complete
Action item 8	Manitoba Hydro to confirm if PDFs be uploaded to portal and advise participant	Complete

Discussions – category specific	
Category	Discussion
Routing	A participant mentioned concerns about the total permanent ongoing damage associated with the alteration to highly productive farmland. It was asked why the line cannot follow the existing Bipole I/II right-of-way up to Warren and then run along 227, stating that would be the route of least damage between the beginning and end since there is no irrigation potential. The participant estimated that running a line through productive land in the project area may reduce value from $7,000/acre to $4,000. The participant acknowledged that regardless of the location, someone will feel the impacts and that those affected individuals need to be reasonably compensated. Many participants supported the preference to move the route north along 227. Participants in the virtual information session shared that they feel that the southern route over Cartier is the route with the most impacts, while a more northerly route would be less impactful and create less pushback if there is a high enough compensation package. Participants wanted to understand why a more northerly option has not been suggested. - Manitoba Hydro advised they can follow up about the technical feasibility of running along 227. It is understood that increased length and the fact that people tend to develop along roads are influencing factors. Paralleling existing lines tends to increase concerns about system resiliency with the increased risk to all lines in extreme weather events (storms, tornados). - After the virtual information session, Manitoba Hydro followed up on why there is not an alternative route segment along road 227. There are two main reasons: o there are many homes immediately adjacent to both sides of the road as well as along the quarter section o the route would be longer, which would be more costly and less reliable A participant stated that greater tornado/storm risk seems less than the risk in destroying farm land

	A participant stated that longer route length didn't seem to be an issue with Bipole III. A participant asked why more power cannot come off the Bipole III line? - Manitoba Hydro advised that a new converter station (prohibitively expensive) would be required to tap off of Bipole III (DC). A participant asked if the towers take a lot of side torque without cables so that they could handle some jogs to help with mitigation? It may minimize harm to use more corner towers. The participant also feels the same weight is being given to all types of land (i.e. 'an acre is an acre'), where affecting Class 5/6 land north of 227 would result in far less damage. - Manitoba Hydro advised that they do not consider 'an acre to be an acre' but that there are many different concerns and perspectives to balance. A participant asked why existing rights-of-ways are not being used (e.g. Dorsey to Portage south) or used more efficiently and why an entirely new station must be built. - Manitoba Hydro advised that some segments do follow existing ROWs while others do not. It is extremely challenging to route in the area, one factor being a high level of development (mostly homes) to be considered. Costs do increase with length (biggest predictor) but also more corners increase costs. Participants inquired as to why there are no options related to the substation? Why couldn't the participants had input on the station location yet? - Manitoba Hydro clarified that the Wash'ake Mayzoon station location has not yet received approval from the province. The preferred location was identified by Manitoba Hydro so that P81C could be tapped off of. The station location could potentially change is the province disproves, but there will still be sufficient energy need to require a new station in the area. A participant asked: Why is the route originating from Dorsey and not east from Brandon?

	- Manitoba Hydro to follow up. Manitoba Hydro followed up and determined that there is not sufficient energy in the Brandon area to service the needs of the Portage area.
Agriculture	Participants shared a concern with proposed segments running through the best farmland in Manitoba. The participant feels that the project will ruin profitability, efficiency, and take away ability to aerial applicate (their other business) for selves and neighbours, who they feel will be equally as devastated. They shared that they feel aerial application would be much less feasible. A participant mentioned that irrigation is a huge concern. They shared that they had to totally destroy an entire lane and rebuild the lane in order for the pivot to get around. The participant explained that massive irrigation systems and pivots cannot easily be moved and that they can run into things. Is there a tool that would take away liability from those with pivot irrigation systems if they do run into infrastructure? Participants asked if any consideration is given to tile drainage? - Manitoba Hydro advised that should tile drainage be encountered by the final preferred route, it would be considered in determining tower placement, working with the landowner. Participants raised concerns with significant impacts to aerial application, which is highly used with fungicide in this Grade A farmland. Airspace impacts would affect residents as well as business (aerial application) and military helicopter personnel that use area for training. - Manitoba Hydro advised that airstrips are very difficult to mitigate and that mapping has been updated as new locations are identified, but any new input on the presence of airstrips is helpful in assessing the route segments.
Proximity to homes	Participants shared major health concerns that family home would be within close proximity to 230 kv line A participant shared concerns with visual effects and perceived health risks with proposed routes within 400m of the town of St

	Eustache and they feel that it would stagnate any growth in the area and create quality of life impacts. Participants asked if there would there be potential effects on different forms of internet service? - Manitoba Hydro understands that there should be no effect and can provide their brochure regarding AC towers and electronic devices.
Wildlife	A participant is concerned with effects on chickens and other birds (up to 1500 ft - the closer you get, the worse the effect)
Economic benefit	A participant raised the concern that they feel those most affected by the proposed routes are not the ones in need of more power, and that the specialty factories in Portage area that require the increased energy capacity rely on the specialty crops that the producers that may be severely impacted in this area are producing. A participant inquired whether landowners will receive an economic and environmental impact study? The participant wants to make sure the Minister of Agriculture knows the true costs and that he is involved. - Manitoba Hydro advised that the project will require an Environment Act Licence and that economic and environmental impacts are both typically considered as valued components included in the Environment Act proposal. This will not be prepared until 2022, and will be made available for public comment on the province's Public Registry. Participant indicated that that the types of crops in the project area can have 6,7,8:1 economic multipliers as opposed to the more mundane crops and that this should be captured in an economic assessment. Crops with the high multipliers are the reason for those companies in Portage. - Manitoba Hydro advised that it is helpful to receive feedback on what information stakeholders would want to see in the economic part of the assessment.
Property value	A participant inquired how compensation works. - Manitoba Hydro advised that once the final preferred route is established that land agents reach out to discuss compensation. 150% appraised fair market value is paid

	for the easement plus a tower payment on agricultural land. A participant stated that it is not about what you use (i.e. the area of land used to determine compensation), it's about what it does long-term ('what happens to the chunk of dirt affected') noting that they feel that irrigation rig function will be severely impacted - Manitoba Hydro advised that the understanding is that should the route end up going through irrigated land that the property agent would factor in irrigation systems and work with the landowner to mitigate based on tower placement. A participant expressed that some of the words used in Manitoba Hydro responses (e.g. try to, mitigate) are not concrete enough and is concerned that Manitoba Hydro is trying to obtain trust, but does not think the negotiation process will have much validity once a route is determined. A participant shared concern that they feel that compensation doesn't work if you have reduced the value of the land because it has been made less efficient (people do not want to rent or farm land).
Engagement	A participant inquired if alternate route segments can be suggested on the online portal and if there are alternate avenues to submit information. - Manitoba Hydro advised alternate suggestions can be added to the portal and that help with the portal can be provided. Information can also be received by mail/email. A participant asked if you have to have email to participate in the online mapping portal? A lot of people affected do not have email so it should not be required or preclude participation from submitting feedback to the portal; off-putting for people not as fluent with technology - Manitoba Hydro also has the 1-800 number and packages can be sent out. Ideally in-person meetings would occur, but approach had to be adjusted due to

	Covid; Manitoba Hydro committed to following up about whether there is a way to submit to the portal without an email address. After the session, Manitoba Hydro determined that an active email address is not required; participants can type "no email". They will still be able to make a submission without an email address. A participant mentioned they are disappointed with lack of communication and not being provided a heads-up until a crew started staging next to their property recently, which tipped them off. It does not appear that any neighbours were aware either. Other participants north of Portage agreed that they had not received any communications about the project. - Manitoba Hydro advised that the crew staging would be working on rebuilding CN9 north or Portage. CN9 was storm-damaged so that is not related to this project. Manitoba Hydro committed to following up as to why the postcards and social media advertisements have not been received. It was asked whether the military base, who uses the area for helicopter training, has been notified? Manitoba Hydro confirmed that Southport and Jonair have both been contacted. A participant inquired whether Manitoba Hydro would consider extending deadline for collecting information into the New Year? Also, asked if PDFs can be uploaded to the portal. - Manitoba Hydro would consider extending timeframes. It is often a balance because people also want to know where the preferred route will be located efficiently so they do not have to wait to find out where it will be located. It will be confirmed whether PDFs can be uploaded. Participants were advised that if there is a lag in the feedback appearing it is just waiting to be approved (everything has been approved so far). Manitoba Hydro determined that pdfs can also be uploaded.
Health & Safety	A participant is very concerned about the health effects of EMF. Based on their own research, they found that EMF may increase risk of miscarriage, leukemia, and other diseases. Findings were frightening for the participant and they feel they would not be able to live in house if it is 140 ft from the line. Manitoba Hydro

	followed up with the participant to share more detailed maps regarding the proximity to their home.

Route segments	
Route Segment #	Comments
22	Segment 22 basically goes along homestead, is within 140 ft of home, and goes along 5 quarters of land. There are major health concerns that family would be within close proximity to 230 kV line; advised that they would want Manitoba Hydro to buy their home because they could not live there. Segment 22 would also go past heritage homes and heritage farm quarters that have been there for a century.
7	Segment 7 passes through land where their home and farm is located.
15	Participant identified they would be affected by 7, 13, 12, 11, 15 & 16. 15 & 16 pass right through the farmstead; concerned about potential long-term health risks.
16	Participant identified they would be affected by 7, 13, 12, 11, 15 & 16. 15 & 16 pass right through the farmstead; concerned about potential long- term health risks.

Key concerns:

- Routing through high value, high productive farmland – irrigation (particularly pivot), visual effects, effects on aerial application, concerns about effects on profitability of land/rental, etc.
- Concerns about a lack of communication, requiring an email address – Manitoba Hydro to follow up about why people did not receive postcards
- Strong preference for a more northerly route along 227
- EMF health effects

PACE – D83W meeting notes

D83W virtual information session		
Location: Virtual meeting (Teams)	Date: November 10, 2021	Time started: 12:00 pm Time ended: 12:30 pm
# of participants	3	

Action Items		
Action Item	Responsibility	Status
Action item 1	Manitoba Hydro to send a zoomed in map (screenshot) to participant so concerns can be identified in more detail.	Complete
Action item 2	Manitoba Hydro to send a screenshot of the area west of Marquette to participant	Complete
Action item 3	Manitoba Hydro to provide participant with a link to more detailed maps	Complete

Discussions – category specific	
Category	Discussion
Routing	A participant asked if the proposed lines are above ground? - Manitoba Hydro confirmed route segments are proposed above ground. Manitoba Hydro demonstrated the feedback portal. A participant asked how the final route will be decided? - Manitoba Hydro explained that after the engagement process, a variety of criteria are considered and evaluated (includes proximity to homes, river crossings, costs, input received through public and Indigenous engagement). A participant asked if there is a preference to stay along roads? - Manitoba Hydro shared that attempts are made where possible to parallel existing infrastructure. It is challenging to route in the area due to many constraints including homes, etc. A participant asked if Segment 7 crosses the river and what the thought process is with going past St Eustache rather than more north? The participant stated that passing through river lots

	will be difficult, but acknowledged that the line has to go somewhere to support progress. - Manitoba Hydro advised that a lot of concerns have been heard about Segment 7. The approach is to first engage the public for feedback on many different route options. It would be more costly to go more north, but it has been a common recommendation through the public engagement process so far. Manitoba Hydro confirmed it is just one of the routes under consideration; they will have more information in the winter as the route is refined. If anyone needs help with the portal or has additional questions after the meeting, feel free to reach out for one-on-one assistance A participant inquired if there is an existing line that runs 4 miles north of Marquette? - Manitoba Hydro confirmed that there is an existing line running north of Marquette. A participant is interested in seeing more detailed maps.

Route segments	
Route Segment #	Comments
7	Inquiry about whether Segment 7 crosses the river
11	Segment 11 running 3 miles west and then one north would run along two sides of a participant's property and then across hay land (the hay land being a lesser concern)
4	Segments 4 & 5 would go would run either side of home/farm
5	Segments 4 & 5 would go would run either side of home/farm
3	Segment 3 would go through participants land

PACE – D83W Meeting Notes

D83W virtual information session		
Location: MS Teams	Date: November 16, 2021	Time started: 7:00 p.m. Time ended: 7:35 p.m.
# of participants	7	

Action Items		
Action Item	Responsibility	Status
Action item 1	Manitoba Hydro to schedule follow-up meeting with Southport Airport	In progress

Discussions – category specific	
Category	Discussion
Routing	A participant asked how flexible the project is with routing. The study area is 15-20 miles north to south and the participant noted there is a lot of helicopter training in the southern section of the study area close to Portage la Prairie. The preference is for the transmission line to be placed further to the north of the study area. - Manitoba Hydro asked if this request was regarding a new potential route segment. The participant clarified that this comment is regarding a preference for the existing northern segments. - Manitoba Hydro responded that previous concerns have been voiced about route #19 related to interference with flight paths and preference for the more northern segments A participant noted that for aviation purposes, route #24 is preferred since it has the least potential to intersect with runways. The participant also noted it is helpful for the transmission line to run as straight as possible, so it is easier for low-level pilots to track the transmission line while flying. - Manitoba Hydro responded that it is helpful to know where runways are in the study area. The participant noted that there is a specific runway that might intersect with route #22 and route #24 near Highway 240 and Road 70 North. One mile east and half a mile north of this area, there are grain bins on left side of road. There is a runway to be put in south of this area. - Manitoba Hydro responded that a participant in a previous information session had provided an image of this area to the team.

	A participant asked how likely the southern routes are to be chosen. The participant asked what the rationale is behind route #7. - Manitoba Hydro responded that the southern routes are the shortest distance, which is why they are being considered, but would bring back their concerns about the southern segments, particularly route #7.
Engagement	A participant asked if there were any more formal feedback opportunities related to planning the routing. - Manitoba Hydro asked if this participant was from Southport and noted that they would be happy to set up a meeting to meet with Southport representatives. - The participant noted they would follow up with contact information via email to set up a meeting.
Agriculture	A participant noted that route #7 is of concern because the land in this area is irrigatable and requires a high frequency of airplane use and GPS. - Manitoba Hydro responded that there have been many concerns raised about route #7 A participant noted that their farm, located along route #7, is organic and is concerned that if the route goes through their fields, construction and maintenance activities may cause cross contamination from other crops and fields that have GMOs or other contaminants. - Manitoba Hydro responded that there have been previous concerns raised about route #7.
Wildlife	A participant noted that the area of the La Salle River near route #7 is a popular area for hunting and fishing. A participant noted that route #7 runs through an area with a high concentration of wildlife and birds. - Manitoba Hydro responded that wildlife will be considered as a valued component as part of the environmental assessment.
Aesthetics	A participant noted concerns about route #3 and route #7 due to their proximity to St. Eustache. The participant noted that there are new houses and potential future development near these route segments and the aesthetics would be compromised by a transmission line through this area.

PACE – D83W Meeting Notes

Route segments	
Route Segment #	Comments
7	This segment intersects personal farmland property of a participant. A participant noted they are planning to put up irrigation in the field, which would be tough to implement if route #7 is selected.
24	Least potential to intersect with runways for aviation.
7	The land around route #7 is irrigatable, with vegetable crops typically being grown here. There is and will continue to be a high frequency or airplanes and the use of GPS in this area for irrigation.
7	This segment runs along the La Salle River, which is a popular area for hunting, fishing, canoeing and other use of the river. These activities would be harmed if the route #7 is selected.
7	This segment crosses the Assiniboine River twice and crosses multiple waterbodies
3	This segment comes close to St. Eustache. Having large transmission towers in the area will be detrimental to future development due to the aesthetics. There are many new houses and potential future development in the area, and this route segment would be detrimental to the aesthetics.
7	This segment comes close to St. Eustache. Having large transmission towers in the area will be detrimental to future development due to the aesthetics. There are many new houses and potential future development in the area, and this route segment would be detrimental to the aesthetics.
7	A participant shared concerns with high value land and crossing the river on route segment 7.

PACE – D83W Meeting Notes

D83W virtual information session		
Location: MS Teams	Date: November 17, 2021	Time started: 12:00 p.m. Time ended: 12:50 p.m.
# of participants	4	

Action Items		
Action Item	Responsibility	Deadline
Action item 1	Manitoba Hydro to send participants a link to the interactive feedback portal (with orthoimagery) and the detailed maps for D83W	Complete
Action item 2	Manitoba Hydro to send a participant a copy of the Health Canada pamphlet on EMF	Complete

Discussions – category specific	
Category	Discussion
Agriculture	A participant noted that route #10 and where it splits into route #13 and route #14 is through their farmland. The area south of the Assiniboine River is highly productive agricultural land and there are special high input crops such as vegetables and potatoes. There are considerations for future irrigation pivots and aerial application concerns. - Manitoba Hydro responded that the concern about aerial application has also been voiced by other participants A participant noted that pivot irrigation cannot be run on fields that have transmission line towers in them. It is already difficult to farm beside existing hydroelectric lines. - Manitoba Hydro asked the participant if there is a particular route segment of concern. The participant noted that route #19 runs directly through their property and other adjacent farmland. The participant noted that there will likely be many growers that will not be affected from an ownership standpoint or compensated with a cheque but would deal with the impacts of the tower. - Manitoba Hydro responded that route #19 also has concerns related to the runways in the area. A participant noted that the presentation mentioned land use is considered in routing, but the lines in the area north of Portage la Prairie cross some of the best farmland in the country.

Health & Safety	A participant raised concerns about biosecurity, noting that clubroot is a soil-borne disease of concern. It is currently manageable in Manitoba but could affect vegetable crops. - Biosecurity is a big issue for Manitoba Hydro and is taken very seriously. Manitoba Hydro has measures related to biosecurity that are implemented during construction. Biosecurity has been a concern on other recent projects in agricultural areas as well.
Routing	A participant noted that high water levels on the Assiniboine River in previous years due to flooding may create problems if the transmission line towers are placed in proximity to the river. If the water becomes saturated, there is a possibility the towers may shift. A participant asked if it was possible to group hydroelectric infrastructure or use the roadways or the floodway to put towers. - Manitoba Hydro responded that the preference is to place infrastructure parallel where possible. People tend to build houses close to roadways, which poses challenges. To increase reliability, there is a desire not to place too much infrastructure in close proximity. Placing lines near railways creates potential issues with induction, which the engineers are looking at. A participant asked if the Wash'ake Mayzoon Station location was confirmed. - Manitoba Hydro responded that the station does not yet have an environmental license and the project is still under regulatory review, meaning construction has not started. The station will likely be in that area since that area has the biggest electricity need and would be close to P81C. A participant asked what the right-of-way width would be, and who would be responsible for upkeep of the towers. - Manitoba Hydro responded that based on the current tower design, the right-of-way infield is 60 m, and the right-of-way adjacent to a road allowance is 42 m. - For tower upkeep, Manitoba Hydro noted that a property agent would reach out to landowners and offer an easement at 150% of the appraised land value. For agricultural land, there would also be a tower payment to cover tower upkeep, taking crops out of production and other associated costs. A participant noted that the lines all appear to be within a couple of miles to one another, which could be a concern in future ice storms.

	- Manitoba Hydro responded that it is an ongoing challenge to balance the risk with tornadoes and ice storms with too much infrastructure in close proximity. A participant noted that there is a runway that would be directly in the way of one of the route segments. - Manitoba Hydro asked which segments were of concern. The participant responded one runway is northwest of routes #7, #12 and #34. There is another runway east of Highway 240. - Manitoba Hydro responded they are trying to map runways in the area since it would be challenging to mitigate impacts to runways. A participant noted the route would be better to be north, out of the highly productive land along the floodway and then come straight down to town. A participant asked why the route cannot be placed south of the town of Portage la Prairie. - Manitoba Hydro responded that because of where the Wash'ake Mayzoon Station is, it would make the route significantly longer to go south. The participant asked why the station is not closer to the diversion. - Manitoba Hydro responded that the location was selected to it can tap off existing lines in the area. A participant noted that they did not want the route to be placed through their highly productive agricultural land with lots of planes flying above. A participant noted that if the routes are north of Portage la Prairie why they could not go further north to the diversion since it is an existing corridor but noted that there could potentially be wildlife concerns near the floodway. The route could also go south of town since there are heavier and less productive soils. - Manitoba Hydro responded that wildlife would be a consideration in the northern routes. For routing on the floodway, the province could have concerns with lines in the area impacting their ability to operate their infrastructure. The participant responded that there is enough land around the diversion to have the necessary right-of-way width but these options will cross lots of high productivity ground. A participant asked why Manitoba Hydro could not have multiple sets of wires on the same poles. - Manitoba Hydro responded that this does happen on projects like BP 6/BP7 and in Sage Creek in Winnipeg. This can result in very big towers and can cause reliability issues if a storm takes down infrastructure.

	The participant responded that the project covers expansive land and would restrict what could be done with the land in the future.
EMF	A participant raised concerns about the high-power transmission line and potential human health impacts. - Manitoba Hydro responded that human health is a concern that other participants have also voiced. There is a Health Canada brochure on electromagnetic fields that could be shared following the virtual information session.
Wildlife	A participant noted that there is a lot of wildlife along the rivers and creeks in the area.
Engagement	A participant noted that they only found out about the virtual information session and the project by a neighbour mentioning it off-handedly. A participant asked why farmers were not listed in things being taken into consideration. Farmers should be first on the list for consideration since they will be affected by the decision. - Manitoba Hydro clarified that the project is looking at land use and capability and that the process benefits by agricultural producers participating in the engagement process. Once a preferred route is selected there will be direct mail sent out to reach affected landowners. The participant asked why this mail couldn't be sent before the route was decided. - Manitoba Hydro responded that meters could be used to pull a landowner list but not everyone has a meter on their property. For the amount of people potentially affected during early notification, the outreach is broad. In the coming days Manitoba Hydro will start automated phone calls to reach people in the study area that may have been missed. A participant noted that they would share the link to the interactive portal with their neighbours who may not be aware of the project.

Route segments	
Route Segment #	Comments
23	Very highly productive agricultural land that should not be wasted on hydroelectric towers.

PACE – D83W Meeting Notes

D83W virtual information session		
Location: MS Teams	Date: November 23, 2021	Time started: 7:00pm Time ended: 8:30pm
# of participants	18	

Action Items		
Action Item #	Item	Status
Action item 1	Follow-up phone call with participants to review detailed maps	Complete
Action item 2	Send participants copies/links to the more detailed maps of the route segments	Complete
Action item 3	Send participant EMF brochure	Complete
Action item 4	Follow-up with participant on conservation agreement lands and consideration in routing process	Complete
Action item 5	Send participant a link to the online mapping feedback portal	Complete

Discussions – category specific	
Category	Discussion
Engagement	A participant noted they did not receive a postcard in the mail, and noted they found out about the information session from the automated phone call. The participant noted there was a long pause at the start of the call and wished the talking had started sooner after answering the phone. - Manitoba Hydro thanked the participant for sharing and responded that the automated phone call is something new that are trying and they will share the feedback. For round 2 engagement when there is a preferred route identified, a land title pull would be done to collect the names and contact information of the landowners that the preferred route traverses so that Manitoba Hydro can send a letter. A participant asked why the RM of Saint François Xavier did not know about the project. - Manitoba Hydro responded that they reached out to all the Rural Municipalities in the study area but will reach out to confirm they have the correct contact information. The participant noted that they saw a random Facebook post about the information session. A participant asked why Manitoba Hydro would wait to mail landowners until round 2 when a preferred route is identified.

	- Manitoba Hydro responded that they do not have all the addresses for landowners at this stage so that's why there is a broader notification process. When a preferred route is selected there will be more feedback opportunities. The participant responded that before the route is chosen, it would be nice for more people to have input at this time. The participant noted they received the automated call and saw the Facebook post. A participant noted they are a Councillor with the RM of St. François Xavier and that as far as they were concerned, they had no previous knowledge of this project. The participant noted they hoped that everyone in the RM could work with Manitoba Hydro to come up with a route that people can coexist with. A participant noted they found out about the project via the robocall. The participant asked how they can ensure they are informed about upcoming meetings and information sessions. - Manitoba Hydro responded that the participant could sign up for the eCampaign service on the website. Manitoba Hydro also noted that now they have participant's names and email addresses that they can continue to share project updates. A participant noted they would like to have a community meeting in St. François Xavier - Manitoba Hydro noted there was an upcoming meeting in the RM of Cartier coming up this week. A participant from the RM of St. François Xavier asked if the office could be emailed with project information moving forward and it could be shared on the RM website. A participant asked what the timeline is for the project. - Manitoba Hydro responded that based on the current timelines, round 2 engagement would take place in winter 2022, when there is one preferred route that would be presented for feedback. The environmental assessment would be filed in the fall of 2022, the project would undergo regulatory review in 2023 and construction would start in 2025, pending project approval.
Agriculture	A participant asked why Manitoba Hydro would consider going through the middle of prime farmland when there are road allowances that could be followed. The participant does not have a concern with the transmission line if it follows the existing road allowance. - Manitoba Hydro asked if there a segment that this comment was about. The participant noted the segments north of High Bluff are of concern, where the proposed route runs through the middle of farmland. The participant noted the concern was route 15 and asked why it did not go further north to the road where there is already an H-line along the road allowance.

	- Manitoba Hydro responded that this was likely because it would otherwise go through homes but would be willing to set up a call to discuss further.
Wildlife	A participant noted they did not want to the see the route go near Grant's Lake Wildlife Management Area (WMA), which is located about 5 miles northwest of Dorsey Station. - Manitoba Hydro responded they have heard concerns about bird migration paths and many stands of trees in this area as well. The participant noted they farm the lure crop at Grant's Lake WMA and are familiar with the area. The participant noted that Grant's Lake WMA is a heritage marsh and bird game refuge with hunting posts in the surrounding area. The northern proposed route (segment 4) comes within half a mile of the refuge and the participant is surprised that this proposed route was even under consideration. Route 5 is less of a concern but is still close to a game bird refuge. The participant mentioned that they are a volunteer at Grant's Lake WMA and noted that there would likely be opposition from the Department of Conservation, hunters and landowners in the area. - Manitoba Hydro thanked the participant for sharing. The participant noted they understood that Manitoba Hydro was presenting many route options, but this is a no-brainer not to be selected since Grant's Lake Wildlife Management Area is a bird game refuge. A participant noted that the area is a major flyway for geese, not only for migrating but also for staging and feeding. The participant noted they are also a Métis harvester and harvest waterfowl and other animals in this area.
Property value	A participant asked about type of compensation landowners would receive if a tower is placed on their land. The participant noted they have a lot of tree line on their property, which is near route 11. The participant also asked how much land would be required for the transmission line to go through and what allowance for right-of-way would be needed. - Manitoba Hydro responded that when there is a final preferred final route, a land agent reaches out to each landowner. Compensation is 150% of the assessed land value for the easement and the landowner will maintain ownership of the property. On agricultural land, there will also be a one-time tower payment. For the right-of-way width, it is 60 m in field and 42 m along a road allowance. Towers can be moved further in field (if feasible) when working with each individual landowner. A participant asked if there would be any reimbursement if trees had to be removed. - Manitoba Hydro responded that this would be part of the compensation discussion.

	A participant noted that they had farmland in a different municipality that had towers installed 2 years ago and noted that it is now difficult to move around the field with farm equipment. The participant asked if an individual did not want to participate in the compensation process, if the land would be expropriated. - Manitoba Hydro responded that this is the worst-case scenario and they want to reach agreements with landowners. Manitoba Hydro also noted that they need permission to move forward with expropriation and it is not a given process.
Agriculture	A participant asked about tile drainage and how tower placement would be affected. - Manitoba Hydro responded that the property agent would work with the landowner to identify the best tower placement to avoid damage to tile drainage. A participant noted that potato and other vegetable crops are important agricultural products in the region. These towers could impact the ability to use center pivots and safe food practices.
Routing	A participant noted that their property is along a proposed route. The participant has 24 acres of land so a 60 m right of way would create a large problem. The participant noted their property is just south of Marquette, between Meadows Road and Highway 248. The participant asked whether the route runs on the north or south side of the road. - Manitoba Hydro clarified that the route in this area runs on the south side of the road. The participant noted that their property is on the north side and although it would not be on their property, having power lines right outside their property would be overwhelming. A participant asked what factors are taken into consideration when picking a final preferred route. - Manitoba Hydro responded that information provided by participants helps influence the design, location, and mitigation measures for the transmission line. Manitoba Hydro will map homes and drive all route options to begin evaluating the study area, followed by feedback and analysis of the routing options. Feedback from public and Indigenous engagement are considered in the analysis, and Manitoba Hydro undertakes a comparative evaluation based on the criteria and feedback provided. The preferred route will then be shared with the public for more engagement and comment. A participant asked how concerns about factors such as Grant's Lake WMA, wildlife, farm operations, cattle, and other factors are considered in the routing process. The participant asked what the most important factors are influencing the routing decision.

	- Manitoba Hydro offered to hold a routing presentation with the RM of St. François Xavier to explain this process better. A participant noted that even along road allowances, the tower size means that the towers will still be placed in fields and onto landowner properties. - Manitoba Hydro confirmed that towers could be placed in field and that they are willing to work with landowners to move towers more in-field if that gives more room to move agricultural equipment. A participant noted that the farmland lots along the Assiniboine River are quite narrow and that even one tower can have a large impact on a field. The participant asked for more details on the area each tower would require and what the maintenance regime would be. The participant noted they care about trees and natural forests and does not want to see a single tree have to be cut down for this project. - Manitoba Hydro responded that based on preliminary designs, tangent towers would be 8 – 14 m in both directions for a footprint, with a height of 29 – 47 m. Corner towers would have a larger footprint. Manitoba Hydro noted that river lots are challenging to route through. A participant asked why this transmission line could not be added to an existing line and why this option was not considered. - Manitoba Hydro responded that this was considered and that part of route #11 parallels an existing line. Manitoba Hydro noted that paralleling lines creates too much of a storm risk, particularly for east-west lines and lines near the lake. A participant asked why more land on existing rights-of-way could not be taken up and made bigger. - Manitoba Hydro responded that it still poses a tornado risk having multiple lines in the same corridor. It also makes the line longer, which is less reliable and more expensive. A participant expressed that Manitoba Hydro would do what they wanted anyways and that this project would interfere with and inconvenience a lot of people so Portage la Prairie could attract more business. The participant asked why the energy needs to come from Dorsey Converter Station and why it could not come from somewhere else. - Manitoba Hydro responded that other people have asked why energy could not come from Brandon. The rationale is that there is energy available in Winnipeg, which is why the line comes from Dorsey. A participant asked about the new big line that came in west of Portage la Prairie and whether that could be used. - Manitoba Hydro responded that this is Bipole III, which is a 500kV DC line. D83W is a proposed 230-kV AC line. Since converter stations are very costly this was not the preferred

	option since the power from Bipole III needs to be converted before it can be distributed to customers. A participant asked if they could see a detailed copy of the map and were specifically interested in the route leaving Dorsey Station near Grant's Lake WMA. The participant also asked if the Department of Conservation had been involved or notified. - Manitoba Hydro confirmed they would share this map and noted that the Department of Conservation has been engaged on the project and have shared concerns about this area as well. A participant noted there is a line south of the Town of Rosser and asked why the line could not be twinned or piggybacked off that line. - Manitoba Hydro noted that alternative route segment #3 parallels that line. The participant asked why it was not twinned. - Manitoba Hydro responded that they go out with lots of options to consider and get feedback. A participant asked how far apart the towers are. - Manitoba Hydro responded that there is about 385 m between towers. A participant noted that their preference is to stick with an existing right-of-way and roadway allowances as much as possible, avoiding areas that go along rivers and streams. - Manitoba Hydro responded that the preference is to parallel existing infrastructure. Manitoba Hydro noted this project has been challenging to route because there are many homes, fields and runways in the area to consider.
EMF	A participant asked about if there is interference from towers with GPS mechanisms and livestock. - Manitoba Hydro responded that it is not a significant issue but they would share a brochure with the participant that covers the topic in-depth.
Heritage	A participant noted that there is a municipal heritage site on the highway. The participant wanted assurance that this site would not be affected by the towers. - Manitoba Hydro asked if this site was a church. The participant confirmed it was the St. Paul's Anglican Church, which is over 100 years old and recently had restoration work completed. - Manitoba Hydro responded that the team undertakes extensive heritage work and that the project would require a heritage resource impact assessment.
Trees/vegetation	A participant asked what happens if there are conservation agreement lands and whether they would have special consideration made for them.

	- Manitoba Hydro noted they would follow up on this question and provide the participant with more information.

Route segments	
Route Segment #	Comments
4	Concern raised that segment 4 is in proximity to Grant's Lake Wildlife Management Area
11	Crosses a participant's property, potential intersection with tree line
12	Crosses a participant's property, potential intersection with tree line
13	Crosses a participant's property, potential intersection with tree line
15	The proposed route runs through the middle of farmland.

PACE – D83W Meeting Notes

D83W virtual information session		
Location: MS Teams	Date: November 24, 2021	Time started: 12:00 pm Time ended: 12:35 pm
# of participants	7	

Action Items		
Action Item	Item	Status
Action item 1	Send participant brochure on EMF	Completed

Discussions – category specific	
Category	Discussion
Agriculture	A participant noted their property is along route #7 on the Assiniboine River. Just north of the highway, there is a drain that goes through the field and moves east. Having towers in this area will affect the cropland between the highway and the drain. The small fields will be impacted by the 8 – 14 m^2 of space required for a tower. - Manitoba Hydro zoomed in to this portion of route #7 and took a screenshot for consideration in routing.
EMF	A participant noted that they did not know much about potential EMF and their effects but that their property (along route #7) is where they grow and harvest their food. The participant noted their farm is their investment and retirement plan so degradation to property values would not be appreciated. The participant also noted they keep bees and want to avoid any effects on that activity. The participant added that they do not want to see the removal of any trees to potentially increase wind erosion along the river. - Manitoba Hydro responded that there have been many concerns raised about route #7.
Wildlife	A participant noted that route #7 is highly populated and there is also migration of geese and other waterfowl in the area. The participant noted they were unsure how geese interact with powerlines, especially during foggy and snowy conditions. - Manitoba Hydro responded that there are criteria for when to install bird diverters along transmission lines to make them more visible. The participant noted that along route #7, there are also eagles nesting in that area.
Engagement	A participant noted they are the Chief Administrative Officer (CAO) of the RM St. François Xavier and are hoping to learn

	more about the project to be able to address resident concerns at the meeting next week. - Manitoba Hydro thanked the participant for attending and for helping to organize the meeting. A participant asked when the community meeting in St. François Xavier would be held. - The CAO responded that it would be on November 30 at the St. François Xavier community club at 5:30pm Another participant asked if an email would be sent out with information about the meeting. - The CAO responded that the email will be sent out in the next day. A participant asked if the Manitoba Métis Federation had been involved. - Manitoba Hydro confirmed that the Home Office of the Manitoba Métis Federation has been engaged with as part of the Indigenous engagement for the project.
Routing	A participant asked to zoom in on route #15 and #16, north of High Bluff. The participant asked why route #15 goes through the middle of the section. - Manitoba Hydro responded that it was likely to avoid the homes further north. The participant noted route #16 makes more sense than #15 since it is alongside the road. Route #15 would hinder pivots and aerial spraying. - Manitoba Hydro responded that impacts to agricultural lands, including pivot irrigation, is one of the top concerns they have heard so far. A participant asked whether route #4 was along the north side or south side of the road. - Manitoba Hydro confirmed the route is on the north side of the road. A participant asked to see route #5 where it intersects with route #8, noting their property is on the south side of the 2-mile road and the route would cut through their field. A participant asked that based on the consultation to-date, if any routes were currently being prioritized. - Manitoba Hydro responded that all routes are still being considered. Public engagement will prioritize certain routes, and engineers and wildlife biologists will have other issues that will have to be considered. A participant asked if certain routes are ruled out, if the route can cut between segments to meet. - Manitoba Hydro responded that during the routing process, if people identify other segments to consider

	and if there are new factors to consider, there is a possibility to have connector routes between segments if necessary. A participant asked if cost was a factor in routing. - Manitoba Hydro responded that cost is a very high consideration. Built and natural environments are considered, and community engagement is also a highly ranked criterion. Risk to reliability and schedule delay are also considered.
Health & Safety	A participant noted concerns about crews entering fields to do tower maintenance possibly bringing in clubroot disease and spreading it onto fields. - Manitoba Hydro responded that biosecurity is something they take very seriously and is top of mind for this project.

Route segments	
Route Segment #	Comments
7	Crosses the Assiniboine River, narrow river lots
15	The route crosses through the middle of the farm section and does not follow any roads. This route will hinder pivot irrigation and aerial spraying.

Round 1 survey results

DETAILED SURVEY RESULTS – ROUND 1

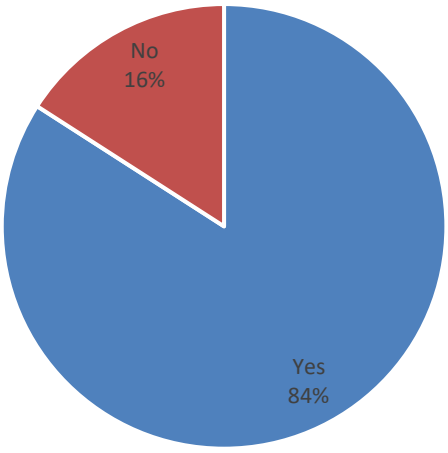
There were 88 survey responses. None of the surveys were excluded. Due to the number of responses, not all direct quotes were included, but all themes were.

For each question the number of responses has been represented as n.

Q1. I LIVE IN THE PROJECT AREA.

- Over four in five (84%) of the survey respondents live in the project area.

Figure 1. Project area respondents.



n=88

Q1.1. Please specify the name of the area/town you live in.

- The survey was made up of respondents from 16 unique locations. The largest portion of respondents, making up one in four (23%) of the respondents live in St. Eustache.

Table 1. Location of survey respondents.

Town or Closest Town	Number of Respondents
St. Eustache	17
St. Francois Xavier	10
Portage la Prairie	7

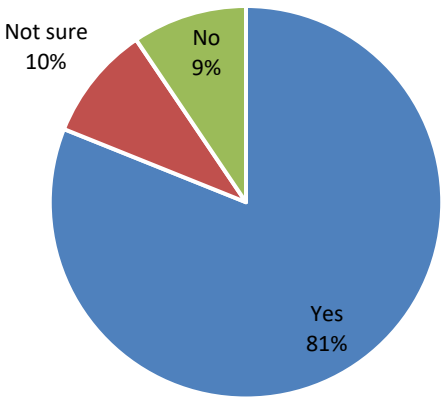
High Bluff	7
Marquette	7
Poplar Point	6
Meadows	6
Rosser	3
Reaburn	2
Oakville	2
Cartier	2
Burnside	1
Gross Isle	1
Edwin	1
MacDonald	1
Oakland	1

n=74

Q1.2. Do you live within one (1) mile of any of the alternative route segments identified in the map?

- Eighty per cent of the survey respondents identified that they live within one mile of the alternative route segments on the map presented.

Figure 1.2. Live near the alternative route segments.

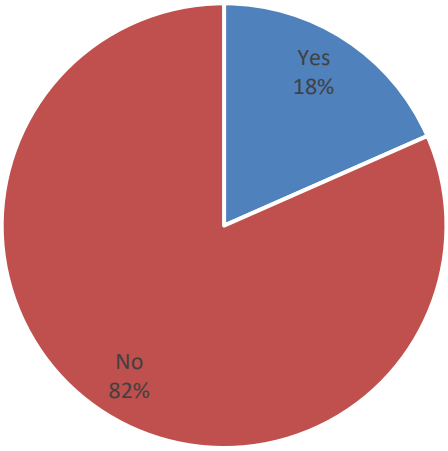


n=74

Q2. I AM INDIGENOUS.

- Nearly a fifth (18%) of the survey respondents identified as Indigenous.

Figure 2. Identify as Indigenous.



n=87

Q2.1. If you wish to do so, please share the name of your Indigenous community.

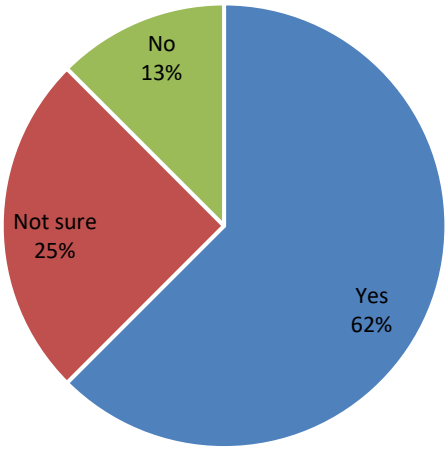
- The Indigenous communities of the survey respondents include:
    - Metis.
    - Metis – St Eustache local (Southwest Regional Local).
    - Mispawistik Cree.

n=7

Q2.1.1. Do members of your community use the area for traditional pursuits?

- Nearly a third (62%) of respondents identified that they use the area for traditional pursuits.

Figure 2.1.1. Traditional pursuits in the community.

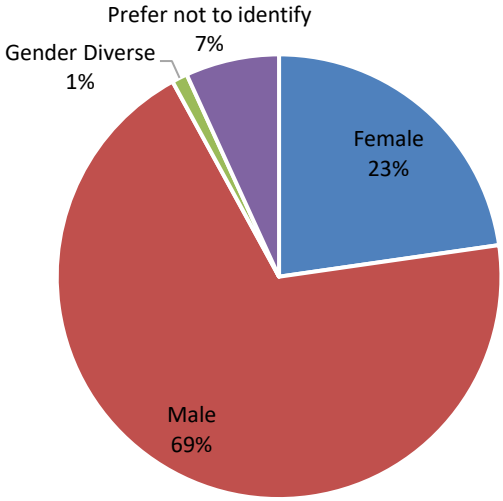


n=16

Q3. I IDENTIFY AS: - SELECTED CHOICE.

- Over two thirds (69%) of the survey respondents identified as male. Seven per cent of the respondents chose to not identify their gender.

Figure 3. Gender.

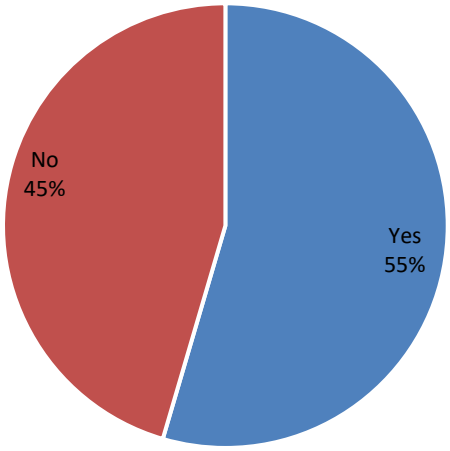


n=88

Q4. I OWN A BUSINESS IN THE PROJECT AREA.

- Over half (55%) of the survey respondents own a business in the project area.

Figure 4. Own a business in project area.

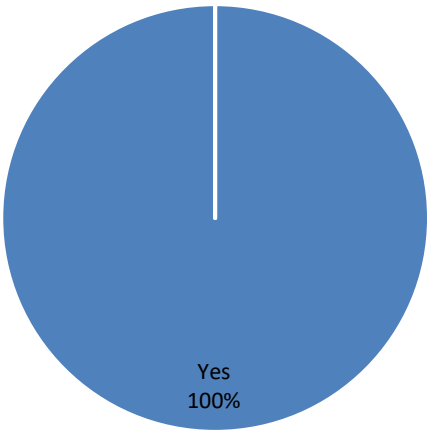


n=88

Q5. I PASS THROUGH THE PROJECT AREA ON A REGULARL BASIS.

- All of the survey respondents identified that they pass through the project area on a regular basis.

Figure 5. Pass through project area.

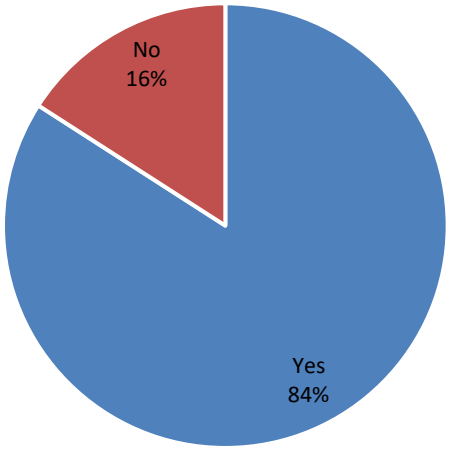


n=88

Q6. I OWN A PROPERTY IN THE PROJECT AREA.

- Most (84%) of the survey respondents own a property in the project area.

Figure 6. Own property in project area.

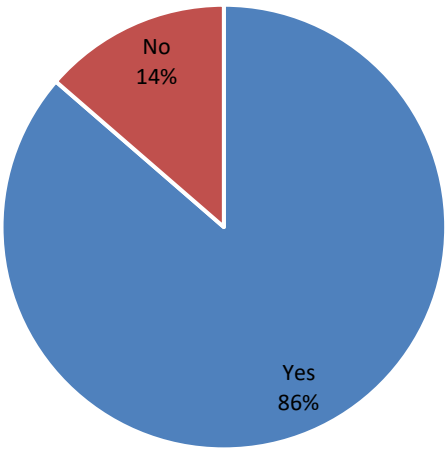


n=88

Q7. I VISIT OR WORK IN THE PROJECT AREA.

- Eighty-six per cent of survey respondents identified that they visit or work in the project area.

Figure 7. Work or visit project area.



n=88

Q8. WHICH OF THE ALTERNATIVE ROUTE SEGMENTS DO YOU PREFER (IDENTIFY ROUTE NUMBER LISTED IN MAP).

Table 2 below captures common themes and quotes from survey respondents. Figure 10 presents a heat map showing the frequency of question 8 responses for each route number segment. Figure 11 presents a heat map of where respondents identified they do not want a route.

Table 8. Alternative route segments preferred.

Common Comments	Quotes
• Don't want the route to pass through personal property (home, land, farming operations or business)	*"None of the above as they cut through our residential, commercial and prime agricultural land.* *This would be Devastating to our family!"*
• Route should be far from populated areas.	*"Furthest away from higher populated areas. But prefer along road allowances rather than through section centers"*
• Routes through Traditional lands.	*"Because it is away from my traditional lands"*
• Routes through farmlands and towns/villages.	*"As a Farmer in the St.Eustache area I would rather see this line in a area where less high quality crops are grown. We have to use Irrigation and Spray planes on our crops and this will be not possible with a powerline in our area. North of the Assiniboine where the land is less in Quality it would be not as big a factor.* *If the Route would be north of HWY 26 it would be a less populated area and less trees and Waterways to go around."*
• Routes with least number of environmental impacts (not crossing rivers, impacts on wildlife etc)	*"I prefer route #11 because it does not cross the Assiniboine river, which is better for wildlife (river is full of wildlife and migration paths), future potential flooding issues along hydro line, it crosses poorer farm land with less trees (D-F land instead of A and B land), would not be crossing organic land and vegetable production land with irrigation pivots and the area is less populated than the St Eustache route (#7)."*
• Already many powerlines.	*"3,7,17,19,27,30 further north we already have main power lines every 2 or 3 miles."*
• Alternative routes as many aren't happy with the suggested segments. • Highway 227 in the	*"None of the proposed routes noted above are acceptable. I propose a route along Highway 227 from Warren west to the floodway which would be more sustainable route for the following reasons: (1) this route would be built on a*

floodway. • More Northern routes.	*ridge that should never flood; (2) this route would not cross the Mill Creek and the Assiniboine River and their distributaries multiple times causing environmental damage with each crossing; (3) this route would not take away acres of some of the most valuable and productive farm land in Manitoba. The proposed routes would cause irreparable damage to both the environment with the crossing of the rivers multiple times. These proposed routes would also take away valuable acreage and productivity of fertile land along the river. The proposed Route 7 is only mere meters away from the Town of St. Eustache. This would impact the growth of the town together with property values as no one wants to live near hydro lines due to health concerns. It would also ruin the visual view from the properties. The impact of our health must also be taken into consideration."*
• Use areas with pre-existing infrastructure.	*"Other transmission lines are in that area and it is the shortest and most likely least expensive route. It is not near my residence or most likely the least amount of residential yards are on that route. I own property and my home is near the proposed #5 line. There is also no documentation stating that it is completely safe for you to live near power lines so I would not be in favor of this route."*
• Most Direct and also cheapest, would be an efficient use of resources. • A clear well-defined map.	*"It is difficult to make an informed decision if actual river lot/ section numbers etc. are not provided. The straight line route would probably be most cost effective/easiest to build? I need to know the exact lands that would be impacted on any of the proposed routes before I can make an informed decision. The route map is not specific enough."*

n=83

Figure 8.1. Alternative Route Segment Preference.

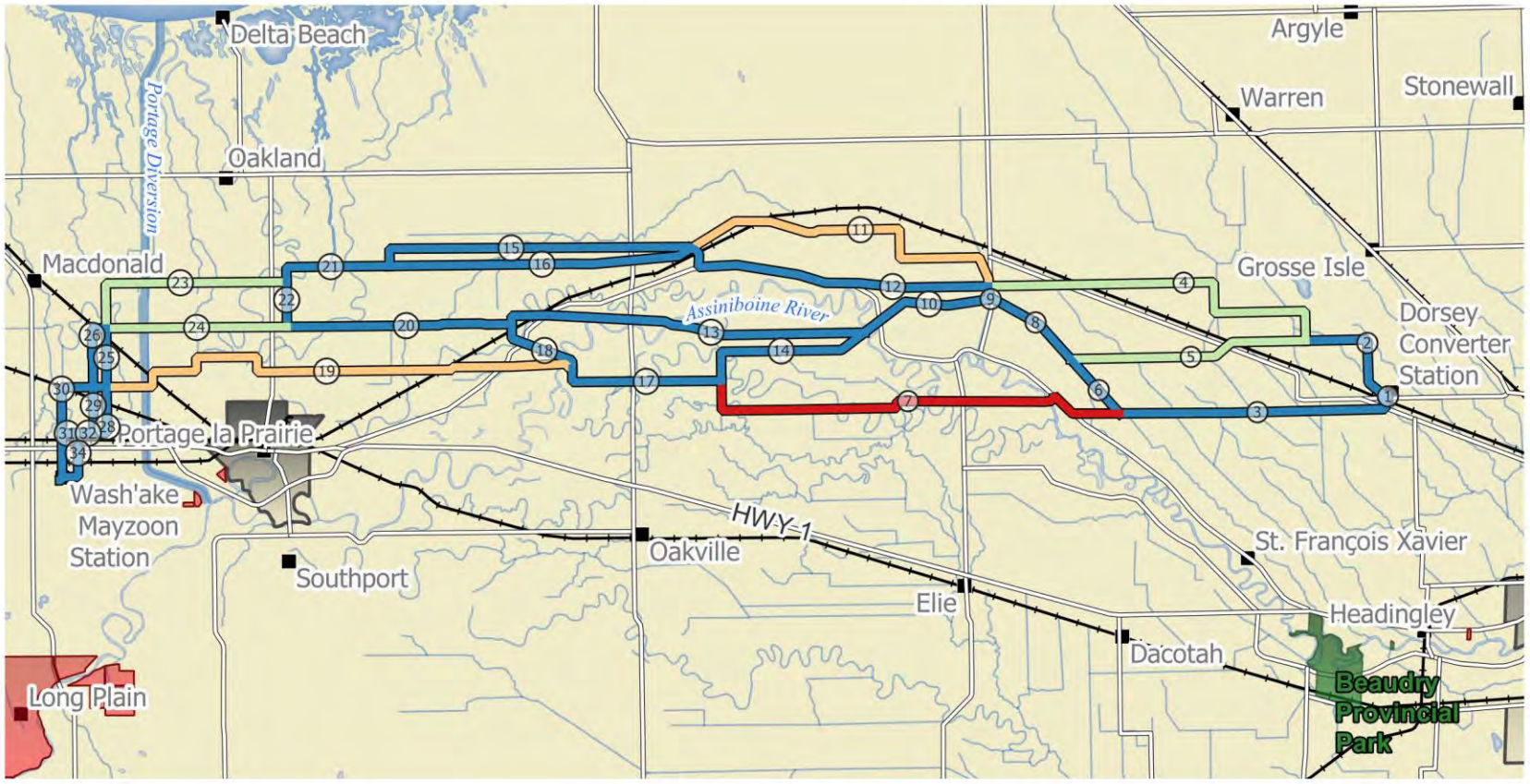
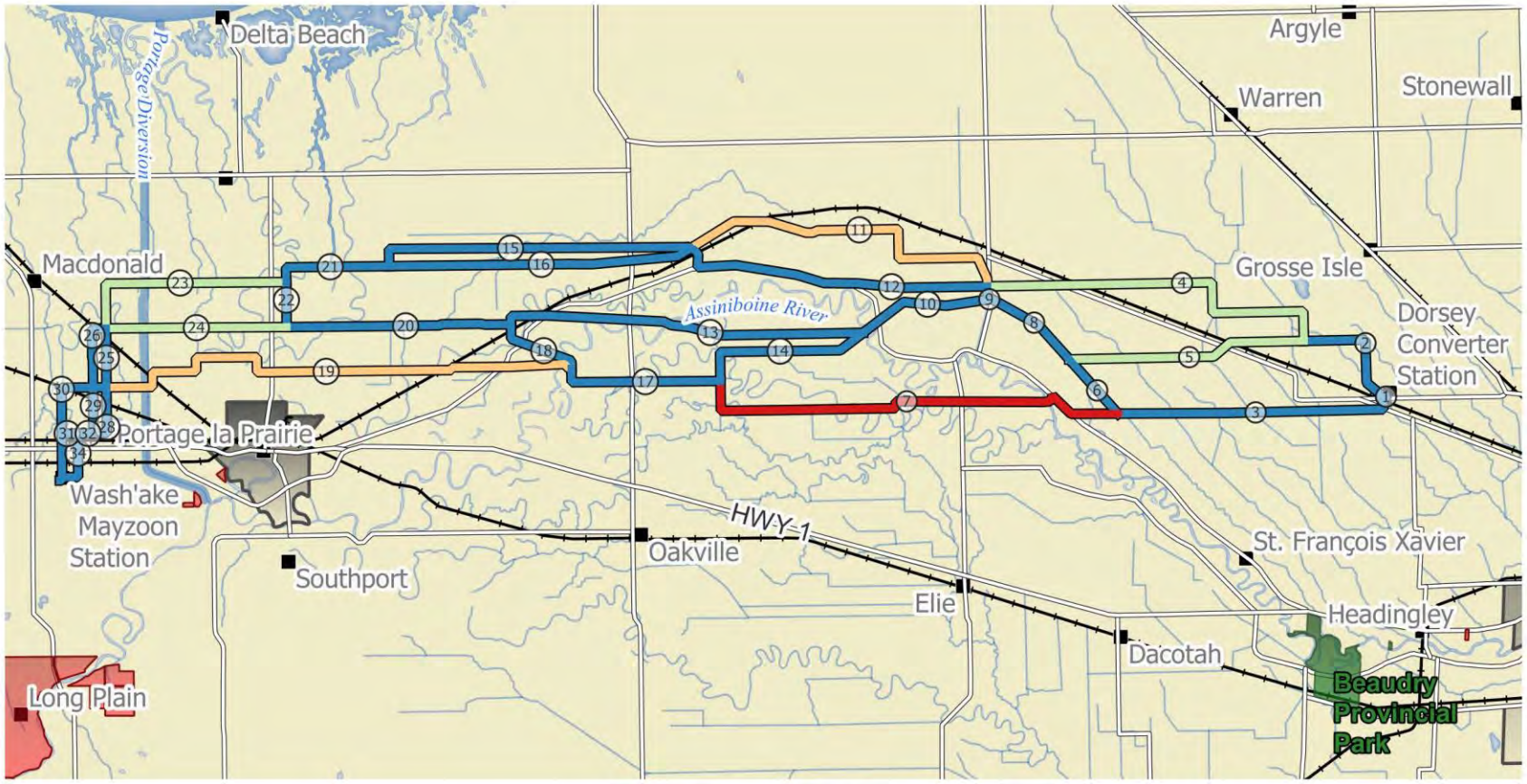


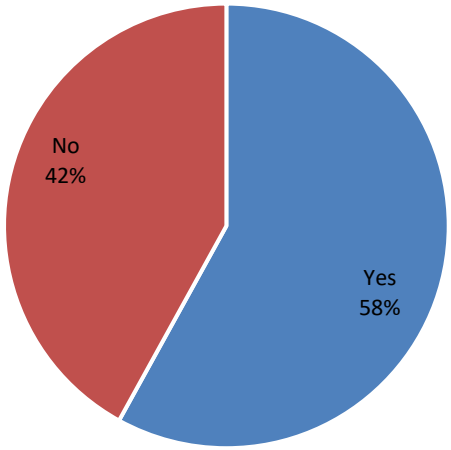
Figure 8.2. Alternative Route Segment Not Preferred.



Q9. IS THERE ANYTHING RELATED TO AESTHETICS / VISUALS YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE.

- Over half (58%) of the respondents identified various aesthetics and visuals for Manitoba Hydro to consider.

Figure 9. Aesthetics or visual for Manitoba Hydro to consider.



n=81

Q9.1. Is there anything related to aesthetics / visuals you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- Appearance of the towers.
- Devastation to the lands in the area.
- Established family dwellings.
- Property value.
- Does not need to happen.
- Inconvenient.
- Health impact from the towers.

Common Preferences:

- Build the towers near already paved or major gravel roads to not leave scar on the land.

- Minimizing the degradation and impact on the natural landscapes.
- Utilize least travelled routes.
- Have the poles be straight.

Table 9. Aesthetic and visual aspects to consider.

Route segment	Concerns or Recommendations	Quotes
3	• One of the most direct routes. • Route impacts the least number of people. • Would want a turn through the route.	*"Route 3 is more direct"* *"...seems best for the initial part from that consideration"*
4	• Concerns for the impact on the area. • Worried about property value and ability for resale. • Identified that the route passes through the Grants Lake Bird Refuge. • Route runs through homes, yards and the school. • Runs through the shelter belt and grain buns. • Potential negative impacts on people who use the area for recreational purposes.	*"...will pass very close to grants lake bird refuge which could affect ducks and geese. North of meadows has more than its fair share of transmission lines already so please choose south of meadows."* *"...would impact the area around our home and those people who come to the area for recreational purpose (ie. hunting)."*
7	• Respondents were concerned about the high negative environmental impact. • Concerns about the segment being a highly populated area. • With a future housing expansion, St Eustache would be negatively impacted by this route. • Concerns about the aesthetics. • This segment impacts 7 farms, could ruin productive high value crops. • One respondent shared that this would be a better route as it does not affect as many people.	*"7 is open prairie and there is no hiding those ugly towers."* *"Future housing expansion in St Eustache will be negatively affected by the construction of route 7."* *"I don't want to see steel structures, they're not pleasant to look at"* *"Route 7 will ruin some of the most productive high value crops, irrigated crops in Manitoba"*
11	• There is an organic farm on this route.	*"we have an organic farm along the two mile road route*

		11 (SW 10 13 4 W). *We have miles of tree lines on the south side of the 2-mile road.* *We already have an H-Line going down the north side of the road and a supply line going down the South side!* *The proposed line will expose us to a large amount of cumulative EMR."*
12	• There is a church on this route that went through restorations in 2021, respondent does not want the tower near the church.	*"We absolutely do not want a tower near the church."*
13	• Concerns about the segment being close to property and where children play outside.	*"13 runs along my property within 200-300 feet of my front door and where my son plays. I don't want to have to worry about him being around any of the towers. His safety is more important to me. One of the reasons we purchased the property was the lack of radio/cell/transmission towers."*
17, 18 and 19	• Concerns about a high negative environmental impact.	*"These routes would definitely have the highest environmental impact especially on wildlife as the Assiniboine River is crossed twice. Also, it is the most beautiful landscape with the most amount of treed areas and also the most amount of residents are impacted. You would destroy the aesthetics of this beautiful are."*
19	• There are buried irrigation lines on this route segment. • Property faces this direction.	*"On route 19, I have buried irrigation lines and pivot points direct on the route"*

20	• There are pivots in this section.	*"...just below 20 there are 4 pivots in that section"*

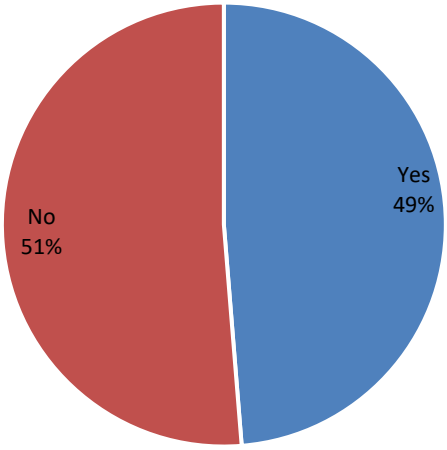
n=45

Note: Two respondents who said they have comments did not provide comments.

Q10. IS THERE ANYTHING RELATED TO ECONOMIC BENEFITS FROM THE PROJECT TO THE AREA YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE.

- Nearly half (49%) of the survey respondents identified that there were things related to the economic benefits from the project to the area that they want Manitoba Hydro to consider.

Figure 10. Economic benefits in the project area.



n=78

Q10.1. Is there anything related to economic benefits from the project to the area you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- Irrigation and agricultural land.
- Concerns about the land and the high return of the crops.

- Aviation businesses.
- Aerial spraying business.
- Loss of ability to hunt.
- Water in the area.
- Not through houses and farmland.
- Will hydro be cheaper and more reliable?
- Some respondents do not prefer any of the routes.

Common Preferences:

- Route that is the shortest distance and most financially feasible.
- Route should be north where the land has little to no purpose or value.
- Corers need to be looked at and with the permission of landowners.
- Underground lines.
- Profit sharing for near Metis communities.

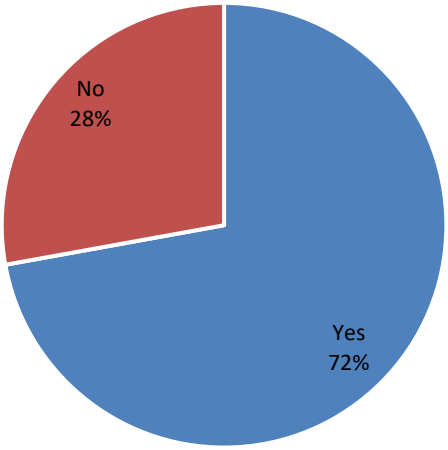
n=37

Note: One respondent who said they had comments did not leave a comment.

Q11. IS THERE ANYTHING RELATED TO HEALTH AND SAFETY YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE.

- Nearly three-quarters (72%) of the survey respondents identified that there were things related to the health and safety from the project to the area that they want Manitoba Hydro to consider.

Figure 11. Health and safety to consider.



n=79

Q11.1. Is there anything related to health and safety you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- Health impact of various health concerns to cancer.
- Property and land value decreasing.
- The safety concerns of the risk for farmers due to farm equipment.
- Aircrafts and spraying not able to occur near the lines.
- The environmental impact impacting wildlife and migratory paths.
- Environmental consideration of the biosecurity and food safety standards.
- Soil born diseases.
- Visual and sound pollutions.

Common Preferences:

- A better map to see the specific route.
- Avoid the bird sanctuaries.
- Construct high visibility markers on areas that helicopters and agricultural equipment utilize.

Table 11. Health and safety of routes to consider.

Route segment	Concerns/constraints	Quotes
4	• Homeowners feel impacted having route so close to home with children. • Healthcare concerns. • Development of the towers through the shelterbelt. • Grants Lake Bird Refuge.	*"This is a major concern as I am in the area of route 4 on many occasions and I have family members that would be dramatically affected as your proposed route would be within 300 meters of their home with young children."*
7	• Concerned about wires falling on house. Don't want towers so close to their homes. • High frequency concerns for human health. • Agricultural concerns for the impact of power lines on cattle. • The towers go through the natural Metis hunting territory which could be damaging to the wildlife migration patterns.	*"Along route 7, there are many family homes and farms growing vegetables and organic production. Having this high of voltage towers nearby is bad for human health (high frequency) as well as plant health for high value crops and natural rich trees (oaks, cottonwoods etc). There is also lots of irrigation on many of the fields it would cross which would be a hazard for hitting the hydro poles. Also many of the fields are smaller (river lots) which makes it more dangerous and difficult to farm around hydro poles. For our organic land, Manitoba Hydro would be required to clean and sanitize all equipment before servicing or building anything on the land."*
11 and 12	• Close to the community, Little Creek Colony, and concern about their older population.	*"The proximity of route 11 and 12 to our community (Little creek colony) is very concerning. Will there be any health ramifications to our older community members from the transmission line?"*

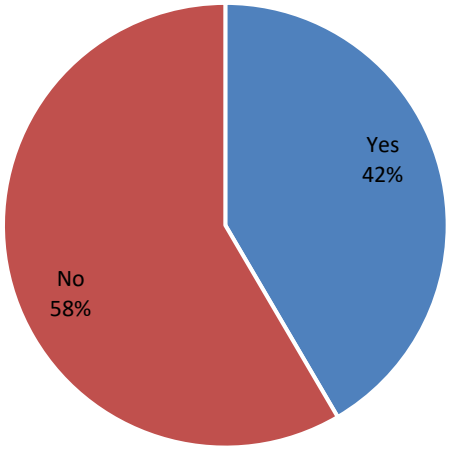
13, 14,17 and 18	• Concerned about health risk of being close to the towers.	*"Both my husband and I are essential workers and having to worry about the health risks to being so close to Route 13 and 14 not only having to worry about if there is another storm like the one in 2019 and how it would affect us and if those towers would be knocked down and what it would do to our tree line."*
19	• Health impact. • Dangerous to have the route on fields.	*"very dangerous having a transmission line in my field route 19"*
22	• Impacts on the family home, business and health risks.	*"Yes specifically 22 as it passes right through our family home and businesses affecting us and our three children. We are Terrified of the health risks associated within close proximity to transmission lines.* *20,21,22,23,24 pose a safety risk to our Aviation business as it creates dangerous hazards for flight in and around the runway."*

n=56

Q12. IS THERE ANYTHING RELATED TO HERITAGE AND CULTURE YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE.

- Over two in five (42%) of the survey respondents identified that there were things related to the heritage and culture from the project to the area that they want Manitoba Hydro to consider.

Figure 12. Heritage and culture to consider.



n=7

Q12.1. Is there anything related to heritage and culture you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- Routes being close to farm and agricultural pursuits.
- There being cultural sites around St. Francis Xavier including a former one room schoolhouse.
- Routes being close to populated areas.
- Co-owners of the land are Metis and it is Metis area.
- There are established wildlife hunting grounds.
- Old trees.
- Unhappy with the provided routes and the project.

Common Preferences:

- Utilize routes that do not disrupt people's lives.

Table 12. Heritage and culture to consider.

Route segment	Concerns/constraints	Quotes
2 and 5	• There is a Native American burial site near this route. (Only 2) • Current landowners aren't allowed to build anything, unhappy that others can come in and build.	*"In the RM of Rosser, they always say that you can't take farmland out of production. I understand that hydro is important, but they won't allow us to build anything on the land we own, so why do they allow big businesses to do what they want?"*
7	• Worried about the decrease of value for the farmland. • Cuts through the Metis heritage community, that has heritage hunting and trapping on it. (Community members still find wheels from when it was a migration trail for the Metis).	*"-St Eustache is a Metis township with a long history and heritage. St Eustache territory contains traditional Metis hunting grounds. Future growth will be impacted if expansion is limited by using town limits territory.* *-Any disruption to the local farmland will decrease assessment value which will in turn decrease property taxes and values to the RM of Cartier and in turn the St Eustache Community."*
11	• Should have a conservation easement on this route. • Don't want to disrupt peaceful lifestyle.	*"Some of the proposed land on route 11 is has a proposed conservation easement on it."* *"we are a secluded people living a peaceful community life, route 11 would be very disruptive to our lifestyle."*
11 and 12	• Route would interfere with hutterite heritage and culture.	*"With route 11 and 12 your limiting expansion which interferes with hutterite heritage and culture"*
Routes along Highway 26	• This is a designated municipal heritage site, which undertook extensive restoration in 2021.	*"As mentioned above, St. Paul's Anglican Church is a designated municipal heritage site, recently having undergone extensive*

	• Cyclists use this highway frequently. • Towers would alter the look and feel of route. • Route has a fair amount of traffic already.	*restoration work in 2021. It is located on the north side of Hwy 26. Hydro towers have no place near this site.* *Long-distance cyclists use Hwy 26 not only for recreational purpose from Winnipeg to Portage, but as a safer and more aesthetic route when travelling across Canada. Hydro towers would permanently alter the feel of this route."*

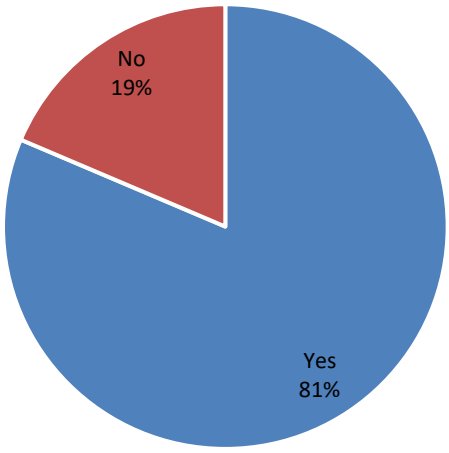
N=56

Note: One respondent who said they had a comment did not leave a comment.

Q13. IS THERE ANYTHING RELATED TO POTENTIAL IMPACT ON AGRICULTURAL ACTIVITIES YOU WANT MANITOBA HYDRO TO CONSIDER? – SELECTED CHOICE.

- Over four in five (81%) of the survey respondents identified that they want Manitoba Hydro to consider aspects of the potential impact on agricultural activities.

Figure 2. Potential impact on agricultural activities to consider.



n=86

Q13.1. Is there anything related to potential impact on agricultural activities you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) – Text

Common Concerns:

- All the chosen routes will affect agricultural land.
- Potentially not being able to have aerial spraying of the crops. Creates hazards for the aviation business in the area.
- Areas chosen are prime agricultural land.
- Transmission lines are dangerous for farming equipment,
- Farmers lose land and GPS won't work as well.
- Organic farmers are worried about the chemical weed controls.
- The unknown effects on people.
- Concerns about the lines being near the Assiniboine River.

Common Preferences:

- Routes should stay along the RM roads.

Table 13. Agricultural activities to consider.

Route segment	Concerns/constraints	Quotes
2 and 5	• There is hay along this route, which is very valuable to cattle.	*"It runs right where we have hay which is extremely valuable to cattle farmers (route 2 and 5)"*
4	• Impact on farms, this route would reduce the grazing land for livestock.	*"Impact on numerous farm lands route 4."*
7, 10, 11, 12, 13, 14 and 17	• This area has high value farmland. Towers create high frequency which is bad for the plant health of high performing plants. • There would be impacts to farmers ability to irrigate. • GPS use impacted for farming. • Concerns about the impact of towers on the produce. • Towers would make it challenging to	*"-Reduction of farmland value in terms of production capacity, lack of ability to irrigate despite some of the marked fields being of high productive value, inability to grow vegetables on river soil.* *-Irrigation lines cannot be used within proximity of the hydro lines, the St Eustache route contains river soil which*

	have aerial spraying. • The river land would be impacted.	*is used in attribute to the production of vegetables which requires irrigation.* *-Limited use of aerial spraying (Route 7)"* *"Routes 7,13,14 ,17 pass through some of the most productive farmland in the province. If any of these routes are used the value of this land will be severely reduced. Not to mention the fact that these routes involve crossing the Assiniboine river twice which could also lead to further environmental issues"*
17, 18, 19	• Negative health impacts. • Environmental impact of having the towers cross the river twice.	*"...have the most negative health impact of high voltage power cause you are crossing river twice and impact negatively on the most productive farmland in the area. Also, the transmission line impacts our organic farmland negatively both threw magnetic field disturbance as well as impact on GPS systems we use to inter-row cultivate our organic farm.* *Not to mention the negative practical impact the towers would have on our operation"*
23	• Airstrip on this route that is used for a variety of different sectors: agriculture, business, pleasure aircrafts, military helicopters.	*"Segment 23 goes right on top of this airstrip.* *also, our farm uses a agricultural aircraft for pesticide application. This segment would stop any future application by aircraft. Irrigation pivots would also be*

		negatively affected."

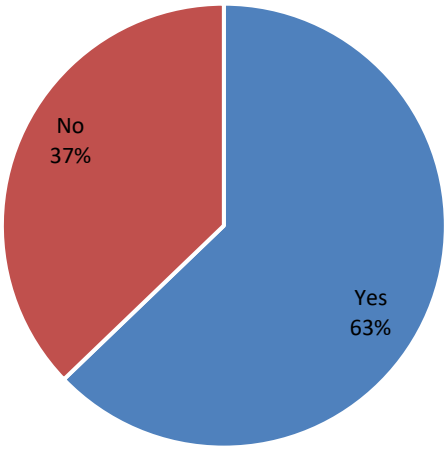
n=68

Note: Two respondents who said they have comments did not leave comments.

Q14. IS THERE ANYTHING RELATED TO POTENTIAL IMPACT ON WILDLIFE INCLUDING BIRDS YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE

- Nearly two thirds (63%) of the survey respondents identified that they want Manitoba Hydro to consider aspects of the potential impact on wildlife.

Figure 3. Impact on wildlife to consider.



n=78

Q14.1. Is there anything related to potential impact on wildlife including birds you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- There would be a high environmental impact.
    - Assiniboine River has a large amount of wildlife.
    - Disruption of wildlife migration patterns. In Millcreek, Geese nest.
    - The diversified wildlife population would be affected.
- The Metis community would have their hunting rights disrupted.

Common Preferences:

- Use northern routes.
- Avoid wetlands and bird sanctuaries.
- Ensure wildlife and ecological impact be minimized.

Table 14. Impact on wildlife to consider.

Route segment	Concerns/constraints	Quotes
2	• Large number of woodland birds and animals.	*"My property along route 2 is approximately half wooded in an area where due to high alkaline growing trees is difficult, so it attracts large varieties of woodland birds and animals."*
4	• Grants Lake Game reserve area is a protected area and powerlines should not encroach close to it.	*"Route 4 runs through grants lake a provincial bird refuge and marsh area. We are concerned about the negative impact on the ecosystem and birds that live there."*
7	• Disruption of the critical wildlife habitats (birds and deer).	*"Our land is used by the Metis people to harvest food and lumber for our lively hood and culture. The install of the hydro line would disrupt critical habitat for birds and deer. On the route 7 path, the line cuts*

		through creeks and tree parcels that will negatively impact the landscape and wildlife."
11, 12, 15, 19 and 23	• Migratory patterns of geese and deer will likely be affected.	*"We get a lot of flocks of migrating geese and ducks settle in our fields along route 11 and 12, due to the proximity of the Assiniboine River. Whether route 11 and 12 would affect other forms of wildlife like deer I'll let you decide....(of which there are considerable numbers of north of the Assiniboine river)."*

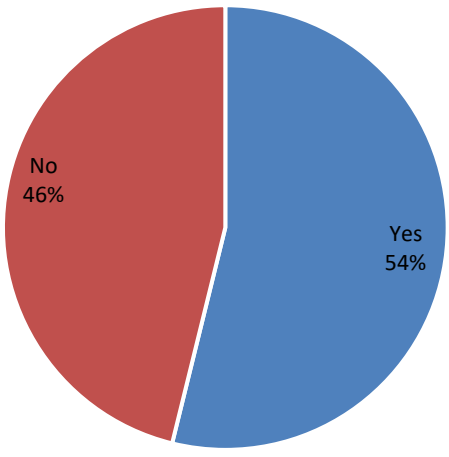
n=45

Note: Four respondents who said they had comments did not leave a comment.

Q15. IS THERE ANYTHING RELATED TO POTENTIAL IMPACTS ON TREES AND VEGETATION YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE.

- Over half (54%) of the survey respondents identified that they want Manitoba Hydro to consider aspects of the potential impact on trees and vegetation.

Figure 4. Impact on trees and vegetation to consider.



n=78

Q15.1. Is there anything related to potential impacts on trees and vegetation you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- Trees and agricultural land, respondents did not want damage to trees or for them to be removed.
- Damage to the shelterbelt.
- Flood plain damage with damage to bushland, trees and vegetation.
- Removing trees from rivers causing erosion in an area prone to flooding.
- Weeds from building and maintaining the towers. The biosecurity in surrounding areas.

Common Preferences:

- Provide proper restoration.
- Consider placing lines alongside existing infrastructure to minimize impacts.
- Use routes with less trees and vegetation.

Table 15. Impacts on trees and vegetation to consider.

Route segment	Concerns/constraints	Quotes
2	• Personal property with diverse trees, bush, and wildlife. •	*"My property along route 2 is approximately half wooded with oak. There's also 2 large thick bushes of blue spruce on my property, all of which is home to a large variety of unique creatures."*
2 and 5	• Runs through creeks and lakes.	*"Running across the sturgeon creek and or through grants lake (route 2 and 5)"*
4	• Grants Lake Reserve. • Concerns about the removal of the shelterbelt as it is relied upon as a barrier and to shade animals.	*"Route 4 will take out our south shelter belt in our yard which provides wind protection for our home and livestock."*
7	• Safety of working around towers on property.	*"Trees, hundreds of years old will no doubt be destroyed*

	• Trees and vegetation would be negatively impacted.	*because of the multiple river and creek crossings on route 7. Noxious weeds will be harder to control where these towers sit."*
11	• Some respondents feel this is a better option as there is no tress and less wildlife. • Others are concerned about the shelterbelt tree lines.	*"We have shelterbelt tree lines, in a east to west pattern, that are in direct line of the proposed Route line 11."*
12	• Route is close to river, trees, and vegetation.	*"Route 12 runs very close and parallel to the Assiniboine River….lots of trees and vegetation there…. our members like to go to the river to hang out."*
13	• Mature trees along this line.	*"We have 4 acres of treed property and I'm concerned that you will remove a large portion of mature trees on our property as you will consider it less of a hassle than placing the transmission lines/towers in the agriculture land on the other side. This is along route 13."*
19	• Route goes through personal field, which would not allow for irrigation or aerial spraying.	*"yes, route 19 runs right though my field and cannot irrigate and cannot have products applied by ground sprayer or aerial application. Opportunity for weeds and grass to contaminate field. AND opportunity for tractor, etc to hit transmission line route 19"*
23	• Destruction of trees and vegetation.	*"Hydro towers and lines would destroy trees and vegetation along route segment 23."*

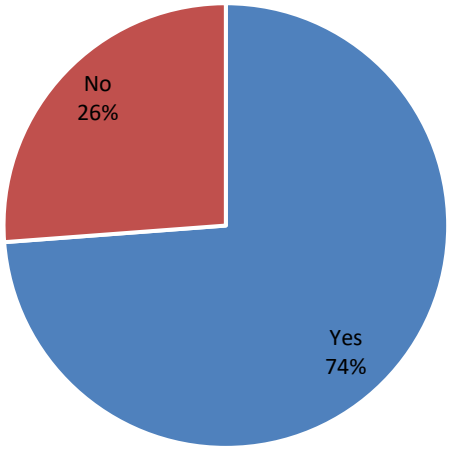
n=40

Note: Two respondents who said they had comments did not leave a comment.

Q16. IS THERE ANYTHING RELATED TO THE PROPOSED TRANSMISSION LINE'S PROXIMITY TO HOMES YOU WANT MANITOBA HYDRO TO CONSIDER? - SELECTED CHOICE.

- Approximately three quarters (74%) of the survey respondents identified that they want Manitoba Hydro to consider aspects of the proposed transmission lines proximity to homes.

Figure 5. Proximity to home to consider.



n=84

Q16.1. Is there anything related to the proposed transmission line's proximity to homes you want Manitoba Hydro to consider? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text.

Common Concerns:

- Health concerns of families and children.
- A lot of homes on the current proposed line's,
- Decrease of property value (both homes and farmlands).
- Some homes were built due to there not being transmission lines.
- The expense if Hydro buys the homes close to the lines.
- Sound pollution and aesthetically ugly.

Common Preferences:

- Provide a better map for community engagement.
- For the lines to be built far from homes, schools, towns, and villages.
- Use northern routes as to avoid southern routes with lots of homes.
- Fairly compensate landowners who are impacted or live in close proximity to the lines.

Table16. Proximity to homes to consider.

Route segment	Concerns/constraints	Quotes
4	• Close to homes.	*"As I have stated earlier this proposed (#4) route would be very close to our home. We have lived here since 1992, raised our family, keep horses and thoroughly enjoy the 'natural' surroundings we are blessed with. After working for many years my wife and I are now retired and are enjoying our home more than ever with our free time. We do not oppose 'progress' and have lived with our neighbour, the Dorsey Converter Station, for many years without incident. As you consider the various routes at your disposal we would ask that you consider our request. As I have outlined the effect on our home and our lifestyle would be quite direct and profound. If another option could be pursued we would be grateful."*
7	• Near the Metis heritage land.	*"The proximity of route 7 near st eustache will have a detrimental impact on future housing development in the town. The town has seen significant investment in the school, Metis daycare, arena to attrack people to call this town there home. Being 20 minutes from Winnipeg, st eustache is an ideal location to build a home and start a family. Route segment 7 will infringe on Metis land and heritage and future housing will not be considered as a*

		result"
11	• There are already towers in the area. • Route is close to a hutterite community.	*"11 will be very close to our home, about 100 meters, and would add to the EMR we experience already."* *"route 11 would take the transmission line right alongside a hutterian community. this would disrupt their peaceful secluded lifestyle and hinder any expansion they have planned for the future."*

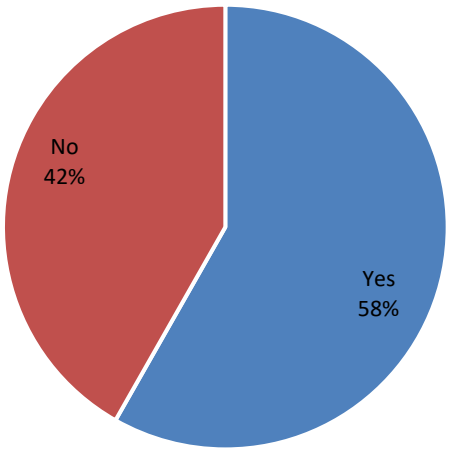
n=59

Note: Three respondents who said they wanted to leave a comment did not leave a comment.

Q17. ARE THERE ANY OTHER FACTORS THAT YOU WANT MANITOBA HYDRO TO CONSIDER IN THIS PROJECT? - SELECTED CHOICE.

- Three in five (58%) of the survey respondents identified that they had other items they want Manitoba Hydro to consider.

Figure 6. Additional factors to consider.



n=79

Q17.1. Are there any other factors that you want Manitoba Hydro to consider in this project? – Yes (If yes, please explain and specify along which route segment(s), if applicable) - Text

Common Concerns:

- Agricultural and wildlife damage. This is high quality farmland.
- Impacts to human health, and the generations to come.
- Worries about homes and livelihoods.
- Need a better communication and engagement strategy. Poor follow through. Many people impacted have not heard about it
- Map is not clear.

Common Preferences:

- Use a less intrusive route that doesn't cross rivers, isn't close to communities and doesn't cross farming land.
- Consider a new route.
    - Highway 227 was suggested as it wouldn't affect prime farmland, not flood prone and would be cheaper.
- Use crown land.
- Northern route would not impact as many people.
- Utilize existing infrastructure.
    - Use Bipole 3.
- Compensate communities fairly and equitably, not a one size fits all. Pay annual rent.
- Route should be chosen based on the most cost-effective route.

Table 17. Other factors to consider.

Route segment	Concerns/constraints	Quotes
1 and 2	• Do not want route to go by homes, concerned about impact on health.	*"Routes 1 and 2 do not go by any homes. Reducing health."*
4	• Unhappy with this route.	*"As I have outlined above, we have our concerns. I want to thank you for the opportunity to share these concerns."*
5	• Cost for homes on this route.	*"Additional cost and residential homes on route #5."*

7	• Agricultural impact for high productive soils and organic farms. • Impact of land values and negatively impact the ability for future expansion of the town.	*"I have an organic farm on route #7 and many of the towers would be on this land. All equipment would need to be sanitized and cleaned anytime a Manitoba Hydro vehicle would want to enter this land. Also we would like to irrigate and do more intensive crop production which would create many jobs. However if this project goes through route #7 this will not be possible."*
11	• Little Creek Colony is concerned about their proximity to this route.	*"All members of Little Creek Colony are very concerned that the proximity of route 11 and 12 to our Colony, will prevent or hinder us from future planned expansion projects. These projects are required to finance the constant population growth in our community.* *Why does Manitoba hydro not consider running the transmission line further north where they already own the land and right of way?"*
13, 14 and 15	• Would want the route changed along the river. • Does not want the line near productive soils.	*"Irrigation and aerial spraying. If it goes along route 13, would like them to change angle along river route."*

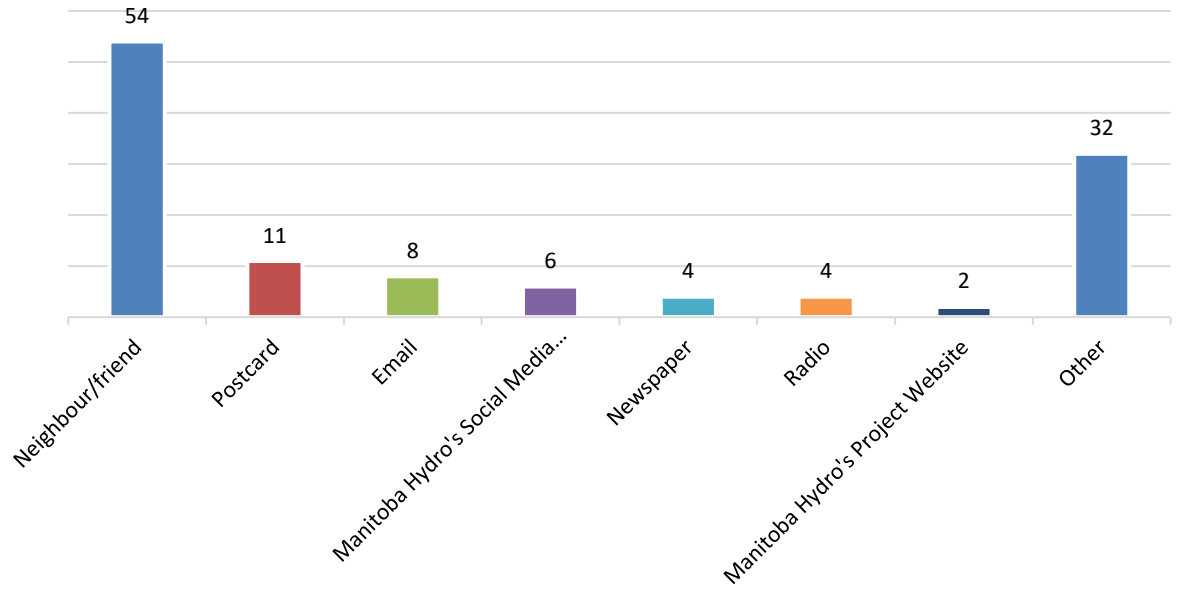
n=43

Note: Three respondents who said they had comments did not leave a comment.

Q18. HOW DID RESPONDENTS HEAR ABOUT THE PUBLIC ENGAGEMENT OF THE PROJECT?

- The largest portion (61%) of the survey respondents learned about the public engagement for this project through a neighbor or friend. Other common ways respondents learned about the engagement was from a postcard (12%) and email (9%).

Figure 18. Hear about this public engagement.



n=88

Note: Respondents were able to provide more than one answer.

Q18.1. How did you hear about the public engagement for this project? (Select all that apply) - Other

Public Engagement Through:

- Facebook.
- Neighbor.
- Through community members.
- Phone call.
- RM or community leadership.

Feedack:

- Did not geel that the postcard was accessible, small print and not easily understood.
- Disappointed in the outrech, received a robocall.

  "*For your information, the postcard provided was very inadequate. The print was very small and it could not be understood. Was there a reason for such a poor communication to the public?*"

- Many felt there was not adequate outreach.

"*We had to find out on our own, Hydro did not put out adequate notice and this is commonplace amoung my fellow farmers.*

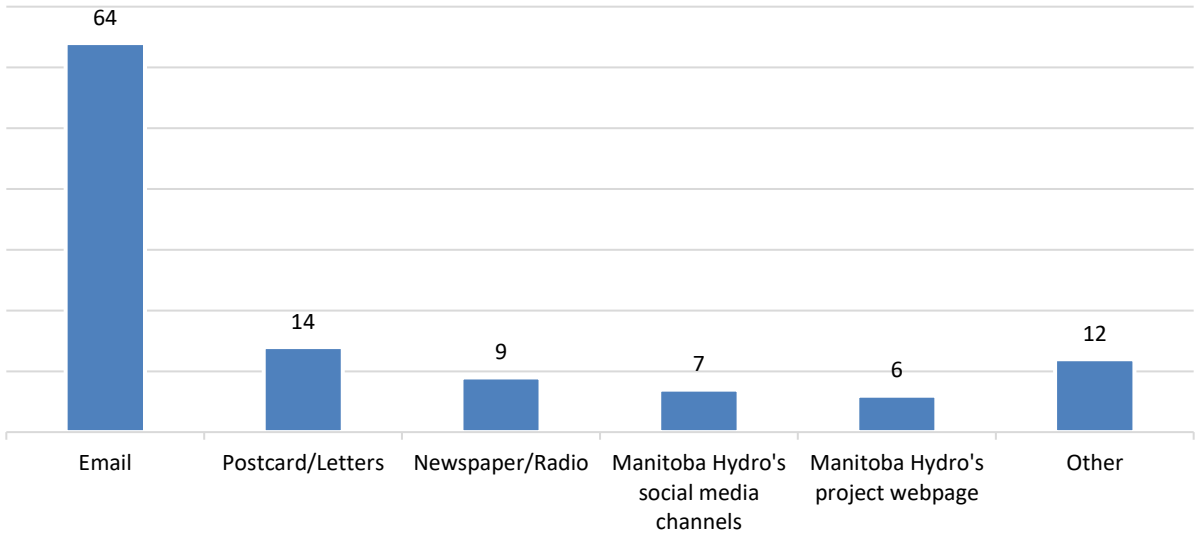
This information was inadequately communicated with us as we had to obtain this information from a third-party source."

n=31

Q19. WHAT IS YOUR PREFERRED METHOD FOR RECEIVING INFORMATION ABOUT THE PUBLIC ENGAGEMENT ACTIVITIES FOR THIS PROJECT?

- Many respondents (77%) would like to hear about public engagement activities for this project through email.

Figure 19. Preferred method to receive information about public engagement activities.



n=83

Note: Respondents were able to provide more than one answer.

Q19.1. What is your preferred method for receiving information about the public engagement activities for this project? (select all that apply) - Email (Please provide your email address) - Text.

- There were 63 emails provided for public engagement opportunities.

Q19.2. What is your preferred method for receiving information about the public engagement activities for this project? (select all that apply) - Other (please specify): - Text.

Table 19. Preferred method to receive information.

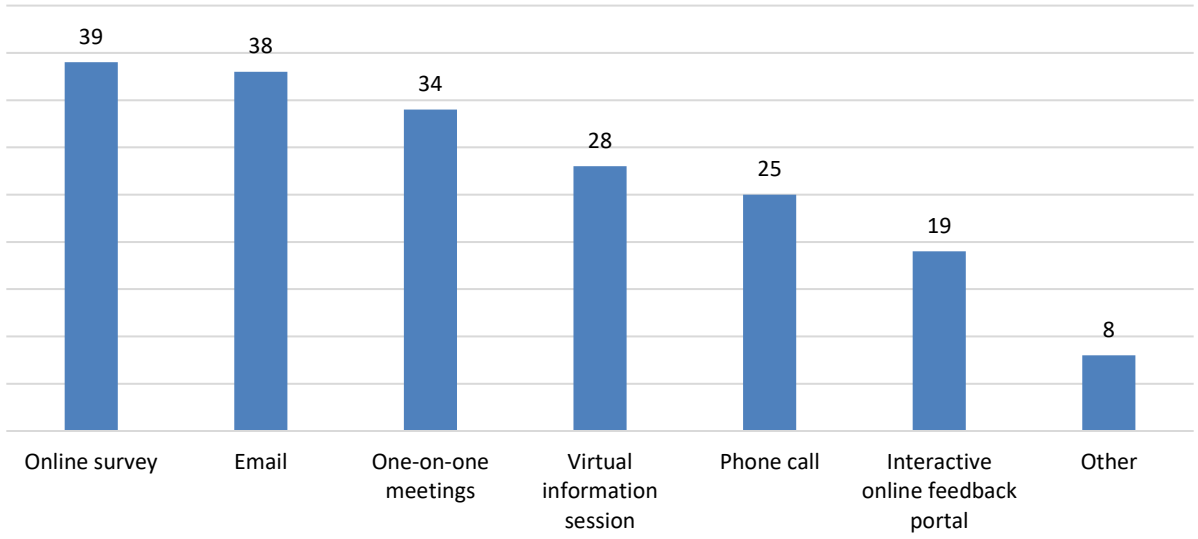
Preferred Method
Well explained letter to the communities (not postcard format).
Phone Calls.
Information Sessions in Conjunction with RM of St. Francois Xavier, MMF, etc.
Through the RM.

n=10

Q20. WHAT IS YOUR PREFERRED METHOD FOR PROVIDING INPUT AND FEEDBACK ON THIS PROJECT? (SELECT ALL THAT APPLY) - SELECTED CHOICE.

- Respondents varied greatly on how they would like to provide input and feedback for this project. Most commonly, Online survey, Email, One on one meetings, and virtual information sessions were preferred.

Figure 20. Preferred method to provide input and feedback.



n=83

Note: Respondents were able to provide more than one answer.

Q20.1. What is your preferred method for providing input and feedback on this project? (select all that apply) - Other (please specify): - Text.

Table 20. Preferred method to provide feedback.

Preferred Method
A letter with a contact number for questions.
Phone Calls.
Information Sessions in Conjunction with RM of St. Francois Xavier, MMF, etc.
Meetings (Public, townhall, one on one).
Information Sessions with the RM, MMF, etc.

n=8

Q21. DO YOU HAVE ANY OTHER FINAL COMMENTS, CONCERNS OR SUGGESTIONS RELATED TO THE PROJECT YOU WOULD LIKE TO SHARE WITH MANITOBA HYDRO?

Table 21. Final comments or suggestions.

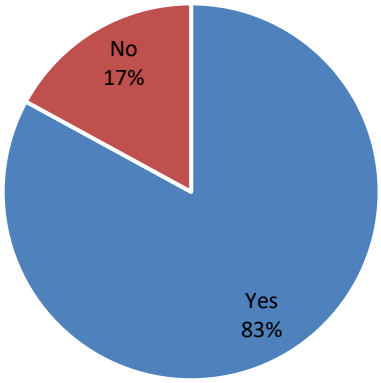
Final Comments
Respondents shared the need for a clear, detailed and comprehensive map so they can identify roads and lands that will be impacted by the project.
More Information to the Community, numerous respondents did not feel they have been provided with appropriate or adequate information.
Route to be as North as Possible to avoid houses and communities, less intrusive and disruptive to residents in the area. Impact on communities in the south.
Impact of the aesthetic and impact on the environment (People, animals, and farming economy).
Participants feel that they were not involved at the beginning of the process. Lack of public awareness.
More consultations and public engagement are needed.

n=37

Q22. DO YOU AGREE TO BE CONTACTED BY MANITOBA HYDRO AT A LATER DATE IF WE WISH TO FOLLOW-UP WITH YOU ON ANY OF THE RESPONSES YOU PROVIDED IN THIS SURVEY? (SELECT ONE).

- Most of the respondents (83%) identified that they agree to being contacted for a follow up on their responses.

Figure 7. Agree to participate in follow up.



n=88

Engagement summary

Dorsey to Wash'ake Mayzoon transmission line (D83W) project

Round 1 engagement summary

Growth in the Brandon and Portage la Prairie region, including the addition of new industrial customers, is increasing electricity demand. Manitoba Hydro is planning to build a new 230-kilovolt transmission line starting at Dorsey Converter Station (northwest of Winnipeg) and ending at the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie) to meet the area's increasing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding areas. To learn more, visit www.hydro.mb.ca/pace

This fall, landowners, Indigenous communities, local residents and interested parties were invited to participate in Round 1 engagement for the new D83W transmission line project. This feedback, along with input from other studies, will help inform final routing and design, which we expect to share more details on in the coming months. The following are some key insights from our Round 1 engagement.

Public engagement activities

- Online survey & mapping feedback portal
- 9 virtual information sessions
- 5 meetings with interested parties
- Attended in person sessions organized by the RM of Cartier and RM of St. François Xavier

First Nation and Métis engagement activities

- Sought feedback from eight First Nations, the Manitoba Métis Federation and the Portage Urban Indigenous Peoples Coalition through sharing information and holding virtual meetings.
- A series of heritage-focused workshops with interested First Nation communities and the MMF to further discuss key concerns that focused on heritage, cultural and archeological sites.
- Community-specific engagement initiatives undertaken by Community Coordinators from the Manitoba Métis Federation, Long Plain First Nation and Dakota Tipi First Nation providing valuable feedback to Manitoba Hydro on how to mitigate effects and support community interests.

Key engagement themes

Proximity to homes

Participants shared concerns about impacts to their homes and properties, such as the loss of use of land, and asked questions about easements and compensation. Some participants noted it would be overwhelming to have transmission lines located outside their homes and in their communities.

Routing

Participants shared perspectives on the alternative route segments presented. Some participants expressed a preference to route further north or south outside the study area, and other participants provided alternative segments for consideration through the mapping feedback portal. These suggestions were considered and evaluated when determining the final preferred route.

Agriculture

Participants shared concerns about impacts to agricultural activities, including pivot irrigation, aerial spraying, tile drainage, runways, biosecurity and associated economic impacts. Participants noted that there is a large amount of highly productive agricultural land in the project area.

Culture and heritage

Participants shared knowledge about the likelihood of finding cultural and heritage artifacts close to rivers, at old oxbow lakes and in areas north of Portage la Prairie. Participants shared it will be important to have a culturally specific approach to understanding project impacts and heritage resources.

Land and wildlife

Participants shared concerns about impacts to land and wildlife, including the potential removal of trees for the project, and shared that the rivers and creeks in the project area have high concentrations of birds and other wildlife. Participants also shared that the project area is a Métis harvesting area and that Crown land in the project area is used for practicing rights-based activities.

Health and safety

Participants shared concerns about the potential effects of electric and magnetic fields on human and animal health, as well as biosecurity concerns with the construction and maintenance of the transmission line on agricultural fields.

Manitoba Hydro

Key survey findings

79% of survey respondents noted they wanted Manitoba Hydro to consider impacts to agricultural activities

70% of survey respondents noted they wanted Manitoba Hydro to consider impacts related to the proximity of the transmission line to homes

65% of survey respondents noted they wanted Manitoba Hydro to consider impacts related to health and safety

Environmental assessment underway

An environmental assessment report, including the final preferred route for D83W, will be submitted to Manitoba Environment, Climate, and Parks for approval before construction work can begin.

For more information:

LEAprojects@hydro.mb.ca
1-877-343-1631
Hydro.mb.ca/pace

Available in accessible formats upon request.

Manitoba Hydro

Online feedback portal Round 1 maps

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Project

Project Infrastructure

Route Segments

Public Feedback Submissions

Point of Interest

Feature: Irrigation Center Pivot Point
Category:
Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Irrigation & Arial Spraying
Category: Important
Details: Prevents
irrigation expansion plans/ prevents Arial spraying
Votes:

Feature: Irrigation
Category: Important
Details: Prevents
Irrigation expansion plans
Votes:

Feature: Prevents future building plans
Category: Important
Details: Prevents future
home building plans on existing established yard site
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Irrigation
Category: Important
Details: Irrigation Plans
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Health Concerns
Category: Important
Details: Health
Concerns line close to Homestead
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Temporary Irrigation Center Pivot Point (Future Permanent site)
Category: Important
Details: Temporary Irrigation Center Pivot Point (Future Permanent site)
Votes:

Feature: Past Land Use
Category: Important
Details: 2011 Flood
Response Staging area.
Votes:

Feature: Temporary Irrigation Center Pivot Point (Future Permanent site)
Category: Important
Details: Temporary Irrigation Center Pivot Point (Future Permanent site)
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Irrigation Pivot Center Point
Category: Important
Details: Irrigation
pivot center point for past 25 years
Votes:

Feature: Temporary Irrigation Center Pivot Point (Future Permanent site)
Category:
Important
Details: Temporary Irrigation Center Pivot Point (Future Permanent site)
Votes:

Feature: pivot
Category:
Important
Details: pivot
Votes:

Feature: Irrigation Pivot Point
Category: Important
Details: Irrigation pivot
center point for past 25 years
Votes:

Feature: Pivot
Category:
Important
Details: pivot
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: irrigation
pivot point
Category: Important
Details: irrigation pivot point
Votes:

Feature: Irrigation Center Pivot Point
Category: Important
Details: Irrigation Center Pivot Point
Votes:

Feature: pivot
Category:
Important
Details: pivot
Votes:

Feature: pivot
Category:
Important
Details: pivot
Votes:

Feature: Pivot point
Category: Important
Details: pivot point
Votes: 1

Feature: Temporary Irrigation Center Pivot Point (Future Permanent site)
Category:
Important
Details: Temporary Irrigation Center Pivot Point (Future Permanent site)
Votes:

Feature: Buried irrigation line -centre pivot point permanent site
Category: Important
Details: Buried irrigation line- centre pivot point permanent site
Votes:

Feature: Runway
Category: Important
Details: Aircraft runway
open year round since 1978
Votes:

Feature: Irrigation Center Pivot Point
Category:
Important
Details: Irrigation Center Pivot Point
Votes:

Feature: Rainbow Bridge
Category: Sensitive
Details: 100-year old concrete arch bridge that is
being preserved by the RM of Portage la Prairie in 2021
Votes:

Poplar Point

High Bluff

Metis Harvesting Area covers entire map

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: December 14, 2021

0 1 2 Kilometres

0 0.25 0.5 1 Miles

1:60,000

D83W Feedback Portal Comments

Draft: For Discussion Purposes Only

Feature: Irrigation Pivot
Category: Important
Details: Underground
Irrigation line
Votes:

Feature: Irrigation Pivot Point
Category: Important
Details: Underground Irrigation Line
Votes:

Feature: Irrigation Pivot Point
Category: Important
Details: Underground
Irrigation Line
Votes:

Feature: Irrigation Pivot Point
Category: Important
Details: Underground
Irrigation line
Votes:

Feature: Home
Category:
Important
Details: Home
Votes:

Feature: Irrigation Pivot
Category: Important
Details: Underground
Irrigation Line
Votes:

Feature: Irrigation Pivot
Category: Important
Details: Underground Irrigation line
Votes:

Feature: Irrigation Pivot
Category: Important
Details: Underground
Irrigation Line
Votes:

Feature: Irrigation Pivot
Category: Important
Details: Underground Irrigation Line
Votes:

Feature: River Crossing
Category: Sensitive
Details: Transmission Line
crosses Assiniboine River
Votes:

Feature: Irrigation Pivot
Category: Important
Details: Underground
Irrigation Line
Votes:

Feature: AG Land
Category: Important
Details: land use and
value will be lower with large towers
Votes:

Feature: residence
Category: Important
Details: house value compromised
Votes:

Feature: irrigation and perennial crop
production
Category: Important
Details: forage production impacted
Votes:

Feature:
Irrigation land
Category: Important
Details: 6500$/ acre
Votes:

Feature: AG land
Category: Important
Details: As a renter of this Land
i will face difficulties in the future to Farm it.
Votes:

Feature: Our house and farm yard
Category:
Important
Details: We live in this location
Votes:

Feature: manure spreading
Category: Important
Details: spreading
compromised
Votes:

Feature: housing potential eliminated
Category: Important
Details:
scenic view of river frontage
Votes:

Feature: River Crossing
Category: Sensitive
Details: Transmission line
crosses Assiniboine River
Votes: 2

Province of Manitoba, Esri Canada, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, USDA, NRCan, Parks Canada, Esri, NASA, NGA, USGS, FEMA

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Project

Project Infrastructure

Route Segments

Public Feedback Submissions

Point of Interest

Metis Harvesting Area covers entire map

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: December 14, 2021

N

0 2 4
0 1 2

1:52,512

D83W Feedback Portal Comments

Draft: For Discussion Purposes Only

Feature: Center Pivot
Category: Important
Details: Irrigated field with centre pivot point
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with center pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with center pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with center pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with centre pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with centre pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with centre pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with centre pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with centre pivot
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with rolling irrigation and/or sprinkler system
Votes:

Feature: Existing Runways
Category: Important
Details: Existing Runways
Votes:

Feature: Irrigation
Category: Important
Details: Irrigated field with centre pivot irrigation
Votes:

72 Rd N
71st Rd N
70th Rd N
69th Rd N
68th Rd N
McIntyre Rd
Richardson Blvd
Trenton Ave
7th Ave NW
6th Ave NW
5th Ave NW
6th Ave NE
18th St NW
Tupper St N
3rd St NE
41 Rd W
40 Rd W
39 Rd W
38 Rd W
29 Rd W
292 m
282 m
289 m
240
1A
1
Portage la

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Project

Project Infrastructure

Route Segments

Public Feedback Submissions

Point of Interest

Metis Harvesting Area covers entire map

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: December 14, 2021

0 1 2 Kilometres
0 0.25 0.5 1 Miles

N

1:39,085

D83W Feedback Portal Comments

Draft: For Discussion Purposes Only

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Project

Project Infrastructure

Route Segments

Public Feedback Submissions

Area of Interest

Metis Harvesting Area covers entire map

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: December 14, 2021

N

0 2 4 6 8 10 Kilometres
0 1 2 4 Miles

1:181,387

D83W Feedback Portal Comments

Draft: For Discussion Purposes Only

St Ambroise
Woodlands
St Marks
301 m
Delta Beach
Flee Island
Meadow Lea
Scotts Drain
Reaburn
Poplar Point
St Francois Xavier
Assiniboine Trl
High Bluff
316 m
St Eustache
Portage la Prairie
388 m
Mellenville
Dakota Tipi
Hoop and Holler Bend
Curtis
Newton
Oakville
Fortier
Elie
Dacota

Feature: Archeological Site
Category: Important
Details:
Archeological Site
Votes:

Feature: Archeological Site
Category: Important
Details:
Archeological Site
Votes:

Feature: Shelterbelt
Category: Sensitive
Details: One mile long shelterbelt
Votes:

Feature: Tile drainage
Category: Important
Details: Tile drained area
Votes:

Feature: Tile drainage
Category: Important
Details: Tile drained area
Votes:

Feature: Shelterbelt
Category: Sensitive
Details: One mile long shelterbelt
Votes:

Feature: Bald Eagle Nesting Area
Category: Sensitive
Details: Nesting pair of Bald Eagles in this area.
Votes:

Feature: Limited space between highway and field drain
Category: Important
Details: hydro transmission line between highway and field drain would severely impact field equipment and therefore productivity on this crop land.
Votes:

Feature: most cost effective route
Category: Important
Details: most effective route
Votes:

Feature: Proposed route section
Category: Important
Details: Avoids routing through narrow piece of farmland just north of the colony. Routing through this narrow piece of farmland would make it very difficult to work within.
Votes:

Feature: Route 11 is best less destructive route
Category: Important
Details: Route 11 is best less destructive route
Votes:

Feature: Irrigation Pivot
Category: Important
Details: This will interrupt irrigation expansion plans for Itzke River Farm Ltd.
Votes: 1

Feature: Alternate route
Category: Important
Details: Alternative routing with less impact to intensive agriculture. No current or likely irrigation pivots. Higher topography and access during wet conditions.
Votes: 1

Twin Lakes Beach
Shoal Lake
Lake Francis
Woodroyd
St Ambroise
Woodlands
Oswald
St Marks
Argyle
Delta Beach
House Creek
Warren
Meadow Lea
Scotts Drain
Reaburn
Grosse Isle
Poplar Point
St François Xavier
MacDonald
High Bluff
Portage la Prairie
Mellenville
Hoop and Holler Bend
Curtis
Newton
Oakville
Fortier
Elie
Dacotah
Cabot
Lido Plage
South Headingley
Diamond
Calrin
Springstein
Layland
Wingham
Starbuck
Rossmere
St Eustache
Province of Manitoba, Esri Canada, Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, USDA, NRCan, Parks Canada, Esri, NASA, NGA, USGS

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Project

Project Infrastructure
- Route Segments

Public Feedback Submissions
- Route Suggestion

Metis Harvesting Area covers entire map

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: December 14, 2021

N

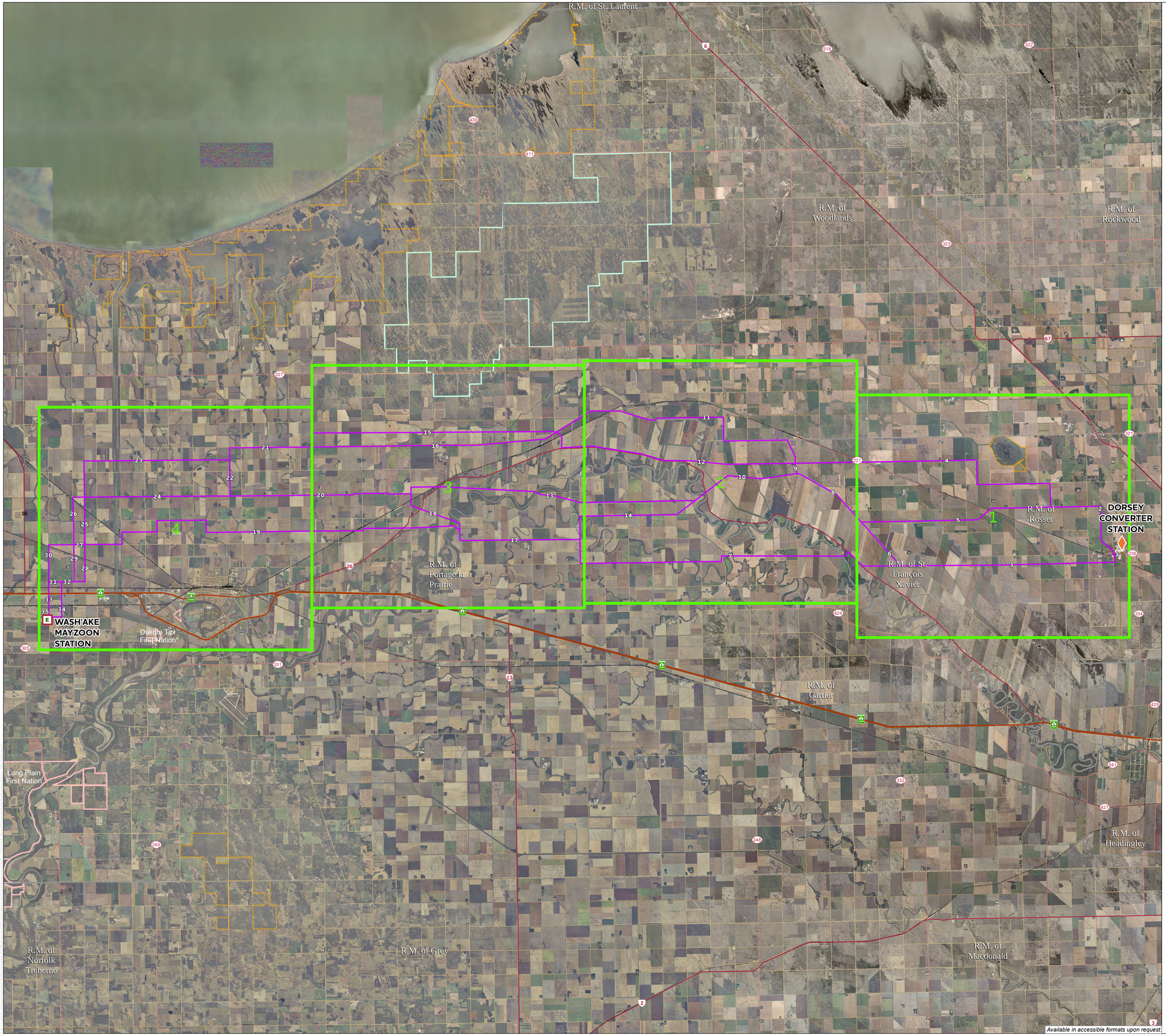
0 2 4 6 8 10 Kilometres
0 1 2 4 Miles

1:247,200

D83W Feedback Portal Comments

Draft: For Discussion Purposes Only

Alternative route segment maps



Manitoba Hydro

Portage Area Capacity Enhancement (PACE)

Legend

- Map Book Index

Project Infrastructure

- Wash'ake Mayzoon Station
- Alternative Route Segment

Infrastructure

- Converter Station (Existing)
- Transmission Line

Landbase

- Community
- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, October 6, 2021

0 3.5 7 Kilometres
0 1.5 3 Miles

N

1:85,000

Round 1 Alternative Route Segments

Index Map

Available in accessible formats upon request.

Manitoba Hydro

Portage Area Capacity Enhancement (PACE)

Project Infrastructure

- Wash'ake Mayzoon Station
- Alternative Route Segment

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Community
- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, October 6, 2021

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Round 1 Alternative Route Segments

Map 1

Available in accessible formats upon request.

Manitoba Hydro

Portage Area Capacity Enhancement (PACE)

Project Infrastructure

- Wash'ake Mayzoon Station
- Alternative Route Segment

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Community
- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

R.M. of Woodlands
R.M. of Cartier
R.M. of St. François Xavier
R.M. of Rosser
R.M. of Portage la Prairie

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, October 6, 2021

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Round 1 Alternative Route Segments

Map 2

Available in accessible formats upon request.

Manitoba Hydro

Portage Area Capacity Enhancement (PACE)

Project Infrastructure

- Wash'ake Mayzoon Station
- Alternative Route Segment

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Community
- Provincial Trunk Highway
- Provincial Road
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- First Nation
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Entire map area falls within Métis Natural Resource Harvesting Zone.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, October 6, 2021

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Round 1 Alternative Route Segments

Map 3

Available in accessible formats upon request.

Manitoba Hydro

Portage Area Capacity Enhancement (PACE)

Project Infrastructure

- Wash'ake Mayzoon Station
- Alternative Route Segment

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Community
- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, October 6, 2021

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Round 1 Alternative Route Segments

Map 4

Available in accessible formats upon request.

Round 2 engagement materials

Information sheet

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)
Round 2: Preferred route

Through its Portage Area Capacity Enhancement (PACE) project, Manitoba Hydro is looking to the future and planning expansion of its transmission system to better serve customers in Portage la Prairie and nearby areas and meet their growing electricity needs for years to come.

What is happening and why?

Growth in the Brandon and Portage la Prairie region, including the addition of new industrial customers, is increasing electricity demand.

As part of its PACE project, Manitoba Hydro is planning to build a new 230-kilovolt transmission line starting at Dorsey Converter Station (northwest of Winnipeg) and ending at the new, to-be-built, Wash'ake Mayzoon Station (west of Portage la Prairie). This new electrical station and transmission line will increase system capacity to meet the area's increasing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding areas.

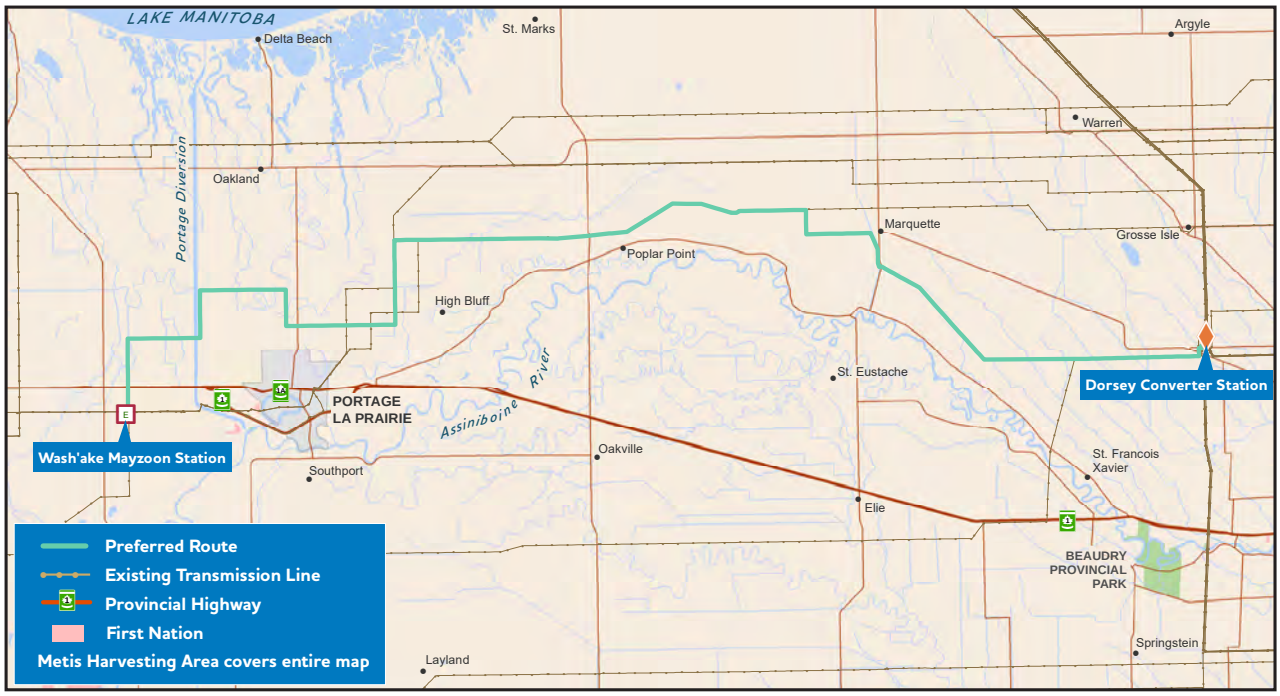
Preferred route for D83W

Round 1 of Manitoba Hydro's engagement on this project kicked off in fall 2021, where 35 alternative route segments for D83W were presented for feedback.

Data gathering, on the ground fieldwork, technical, cost, and environmental considerations, as well as input from landowners, Indigenous communities, interested parties, and the public, helped inform the evaluation of each alternative route and selection of a preferred route.

The preferred route aims to balance different interests and local concerns and limit the overall effects of the transmission line.

Read our **What we heard summary** at www.hydro.mb.ca/pace for a summary of the feedback received in Round 1 of our engagement.



Map of preferred route for the D83W transmission line (solid green line).

Manitoba Hydro

Have your say on the preferred route

Round 2 of engagement is now underway. We welcome you to ask questions, voice your concerns, and provide feedback on the preferred route to help inform our final route and plans.

Virtual information sessions

Join us for a virtual information session:

- February 22 at 7:00 pm
- February 23 at 12:00 pm
- February 28 at 7:00 pm
- March 1 at 12:00 pm
- March 2 at 7:00 pm

To register, e-mail LEAprojects@hydro.mb.ca or call 1-877-343-1631.

Online survey

Tell us what you think about the preferred route in our survey at www.hydro.mb.ca/pace. Survey closes on March 25, 2022.

Online feedback portal

Comment on the preferred route and see what others are saying in our interactive feedback portal at www.hydro.mb.ca/pace.

What is next?

Round 2 of engagement will conclude in March 2022, and any final refinements necessary will be made to the preferred route. The final preferred route for the D83W transmission line will be presented in an environmental assessment report submitted to Manitoba Environment, Climate, and Parks for review and approval before construction begins. Part of this process includes a public review period for local residents, Indigenous communities, interested parties, and the public to share their concerns and ask questions about the report. Manitoba Hydro will continue to share information as these processes progress.

When will the work happen?

The tentative schedule (subject to change) is:

- **Round 1** – Identify & evaluate alternative route segments: October-December 2021 (completed)
- **Round 2** – Select preferred route: winter 2022
- **File environmental assessment report for regulatory review:** fall 2022
- **Anticipated licensing decision:** fall 2023
- **Transmission line construction start, if licence approved:** summer 2025

Stay connected

Visit www.hydro.mb.ca/pace to learn more and sign-up for updates. Send your questions to LEAprojects@hydro.mb.ca or call 1-877-343-1631.

Available in accessible formats upon request. (Feb. 2022)

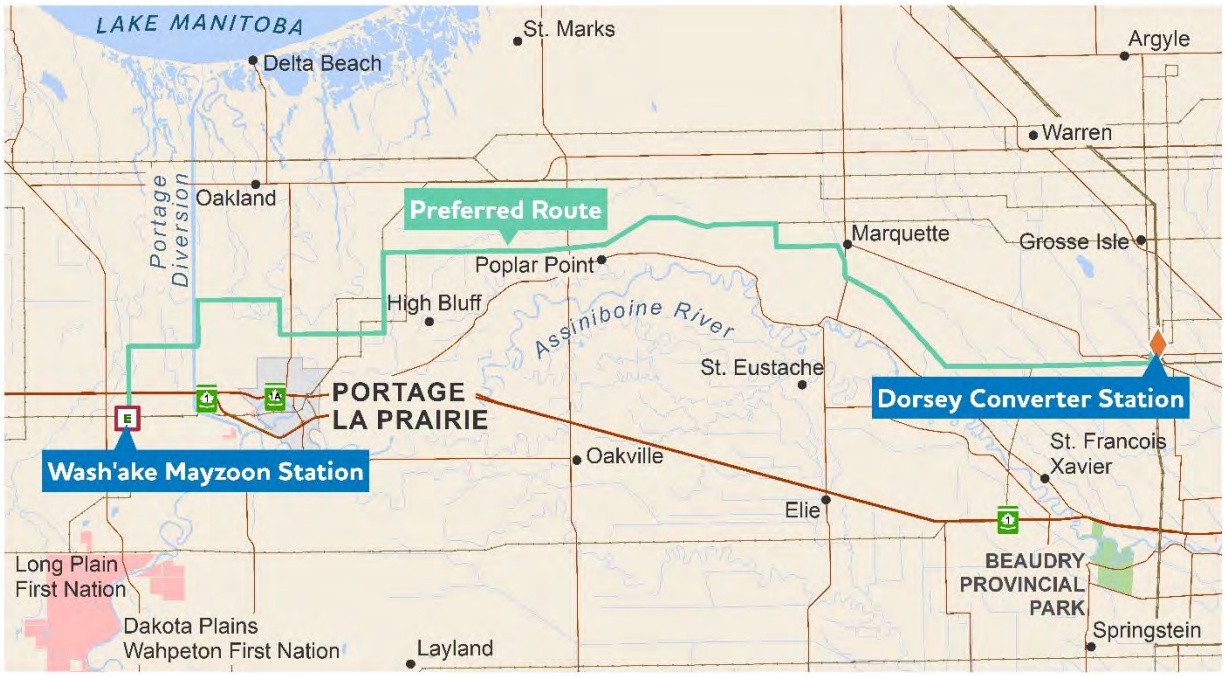
eCampaign text

eCampaign text

Title: D83W Transmission Line: Preferred Route Selected

Thank you to everyone who participated in our first round of engagement for the Dorsey to Wash'ake Mayzoon transmission line (D83W). A preferred route has been determined that aims to balance local concerns and limit overall effects.

The map below shows the preferred route (solid green line).



Opportunities to get involved

A second round of engagement is now underway. We want to hear your thoughts or concerns about the preferred route to help inform our final route and plans.

Online survey:

- Learn more about the environmental assessment and tell us what you think about the preferred route in our online survey. Closes on March 25, 2022.

Virtual information **sessions:**

- February 22 at 7:00 pm
- February 23 at 12:00 pm
- February 28 at 7:00 pm
- March 1 at 12:00 pm
- March 2 at 7:00 pm
- Please click the link of the day you would like to register, or email LEAProjects@hydro.mb.ca or call 1-877-343-1631.

Online feedback portal:

- Comment on the preferred route and see what others are saying in our online feedback portal.

Contact Us

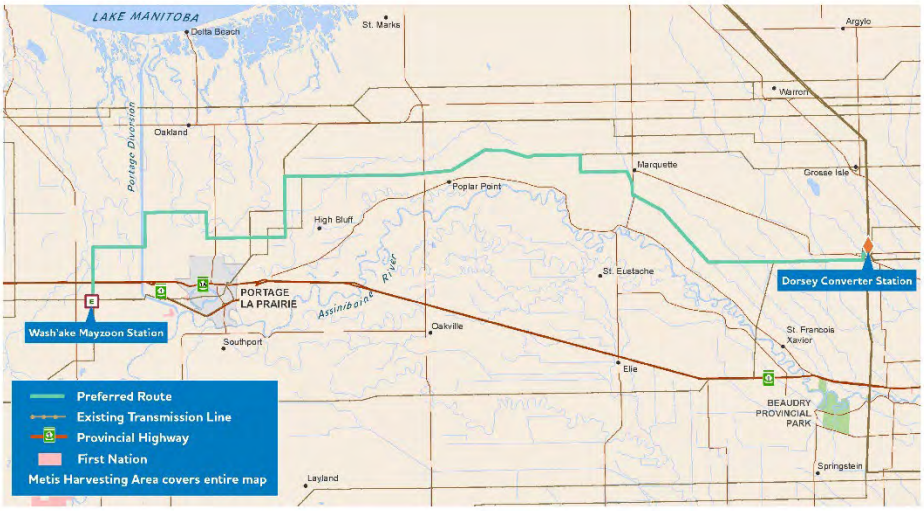
- Learn more and sign-up for updates at hydro.mb.ca/pace
- Email LEA Projects.
- Phone 204-360-7888 or toll-free 1-877-343-1631.

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)

Round 2: online survey available

Thank you to everyone for continuing to participate in our second round of engagement for the Dorsey to Wash'ake Mayzoon Transmission Line (D83W). The D83W round 2 survey is now live on the Manitoba Hydro webpage and the date to provide feedback has been extended until April 6, 2022. We are interested to hear your thoughts or concerns about the preferred route to help inform our final route and plans.

The map below shows the preferred route (solid green line).



View larger image in your browser.

Online feedback portal

The Dorsey to Wash'ake Mayzoon feedback portal is still available for you to provide any further information, comment on the preferred route and see what others are saying.

Contact us

Learn more and sign-up for updates on our project webpage.

Email Projects

Phone 204-360-7888 or toll-free 1-877-343-1631

Postcard

Preferred route selected for new Dorsey to Wash'ake Mayzoon transmission line (D83W)

Engagement underway for D83W preferred route

Thank you to everyone who participated in our first round of engagement for the new D83W transmission line project. A preferred route has been identified that aims to balance local concerns and limit overall effects.

A second round of engagement is now underway. Share your thoughts or concerns on the preferred route to help inform our final route and plans.

We want to hear from you

Join us for a virtual information session:

- February 22 at 7:00 pm
- February 23 at 12:00 pm
- February 28 at 7:00 pm
- March 1 at 12:00 pm
- March 2 at 7:00 pm

E-mail LEAprojects@hydro.mb.ca or call 1-877-343-1631 to register.

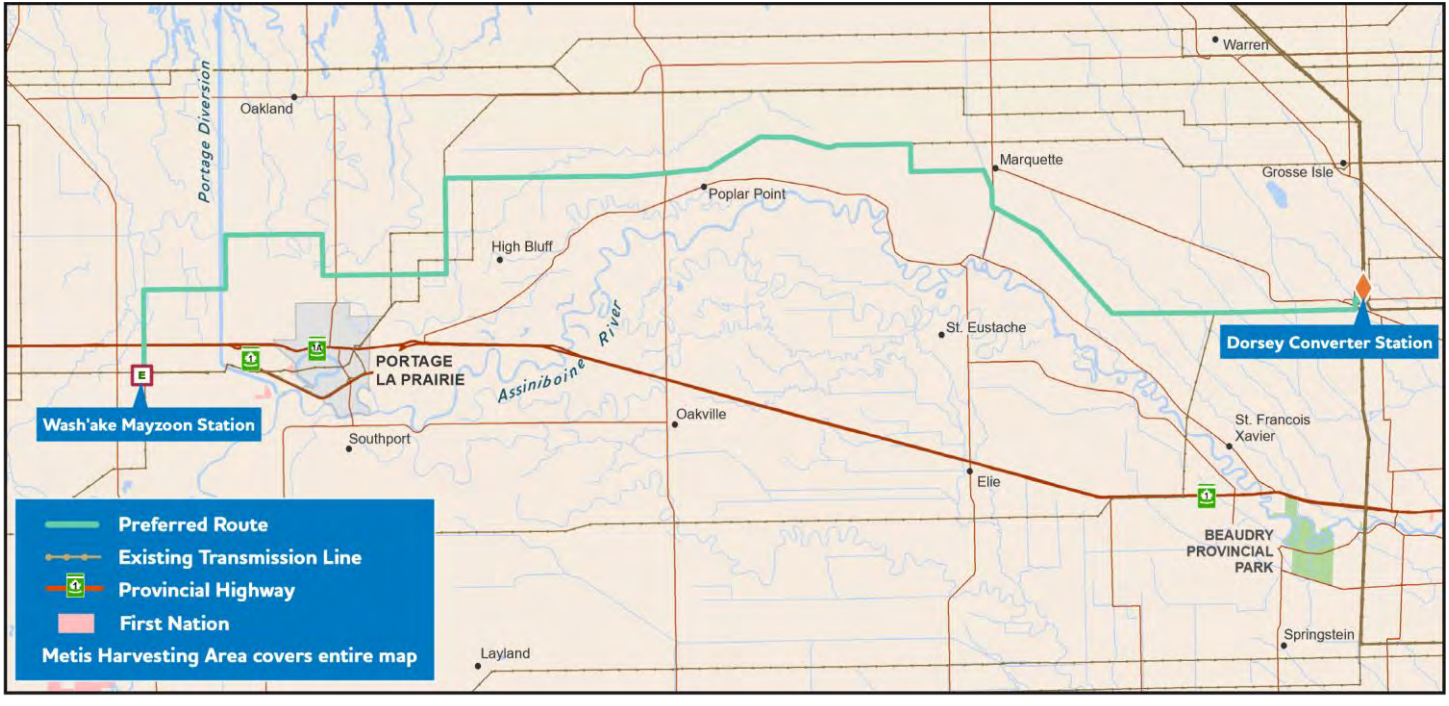
Stay connected

Learn more and sign-up for updates

Manitoba Hydro

Fill out our online survey or comment on the preferred route in our interactive feedback portal at: **www.hydro.mb.ca/pace**.

at www.hydro.mb.ca/pace or connect with us: LEAprojects@hydro.mb.ca or 1-877-343-1631



Map of preferred route for the D83W transmission line (solid green line).

Manitoba Hydro

Available in accessible formats upon request.

Round 2 virtual information session presentation

Round two – preferred route

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)

Manitoba Hydro

Land acknowledgement

I acknowledge that we are within Treaty 1 territory and that the land on which this project is being planned is the traditional territory of Anishinaabe, Cree, Oji-Cree and Dakota Peoples, and the traditional Homeland of the Red River Métis, and within the Recognized Métis Harvesting Area. I also want to acknowledge that others may be joining us from different lands and territories.

Manitoba Hydro

Purpose of the session

Share project information

Answer questions

Listen to feedback

Goals of session

Have a better understanding of the project

Feel that you've had opportunity to share feedback and concerns

Understand how feedback will influence decision making.

Manitoba Hydro

Session outline

Project description

Round one engagement

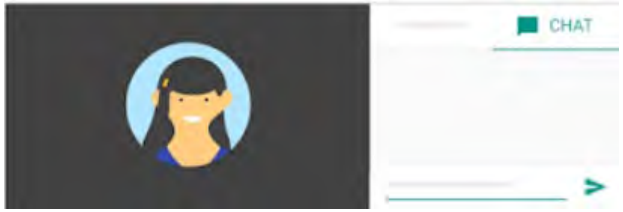
How we consider routing feedback

Preferred route

Next steps

During the meeting

- Please mute your microphone if not speaking
- We encourage you to use the raise hand function or the chat box to ask your questions
- We will make time throughout the presentation and at the end for questions



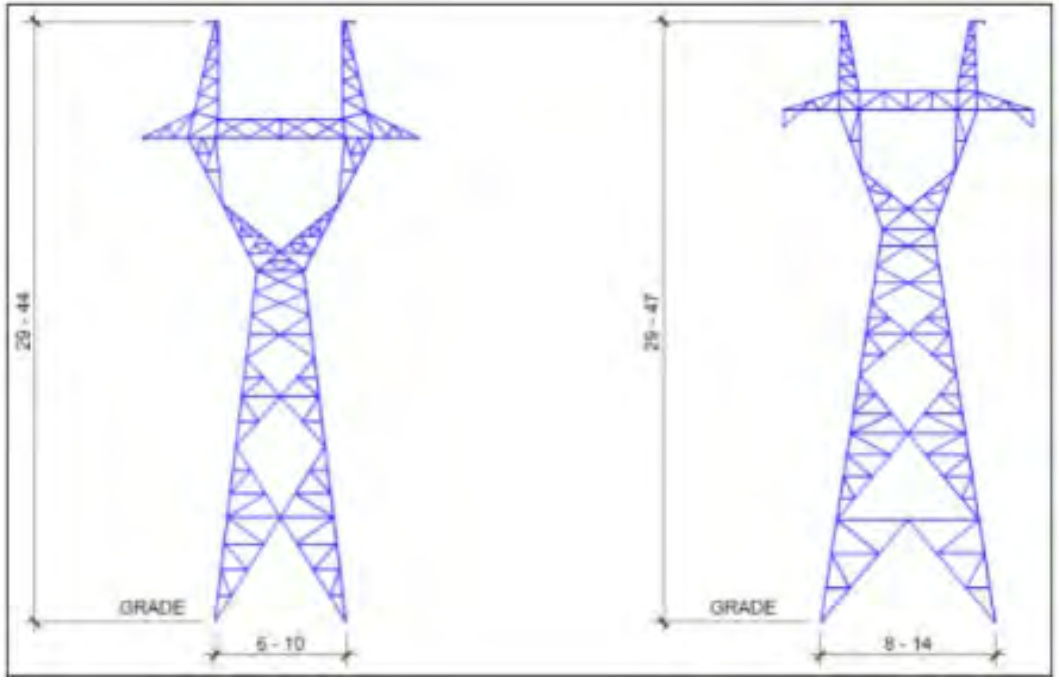
Manitoba Hydro

Project description

- New 230-kV transmission line from Dorsey converter station to Wash'ake Mayzoon station
- 230-kV transmission lines are vitally important to the Manitoba electricity grid

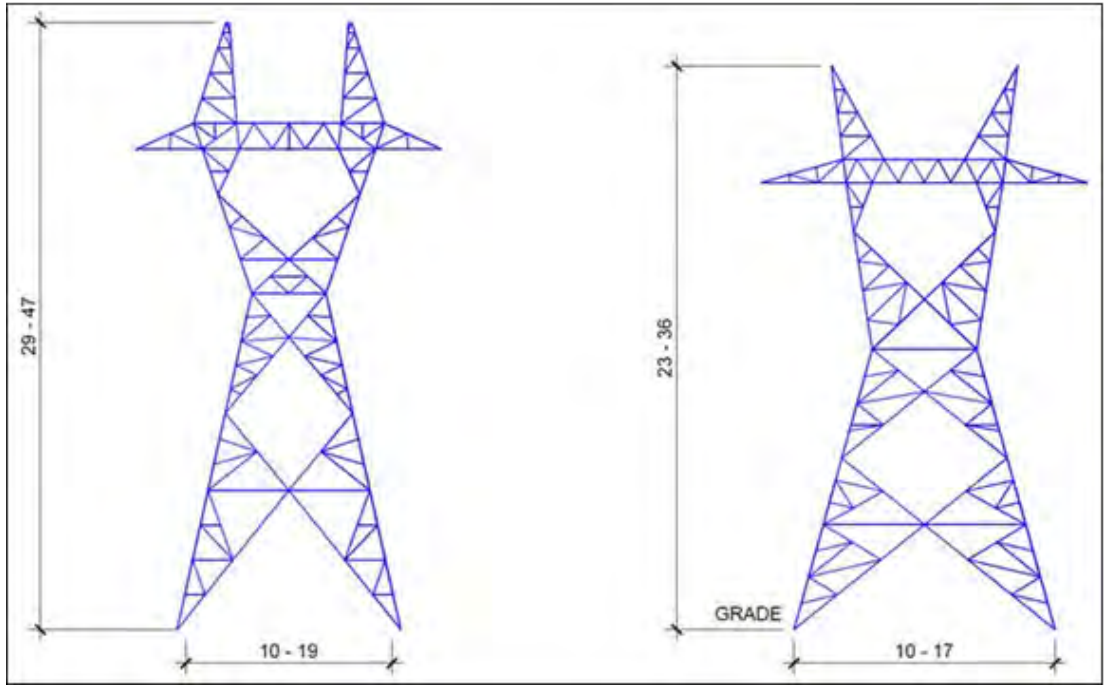
Manitoba Hydro

Tower design



Manitoba Hydro

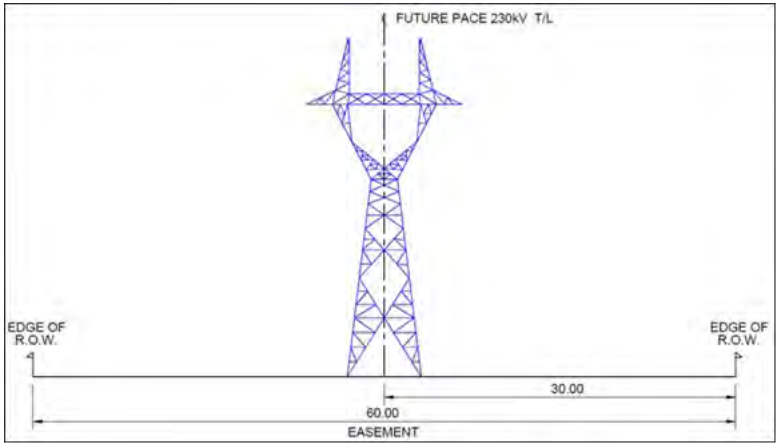
Angle tower



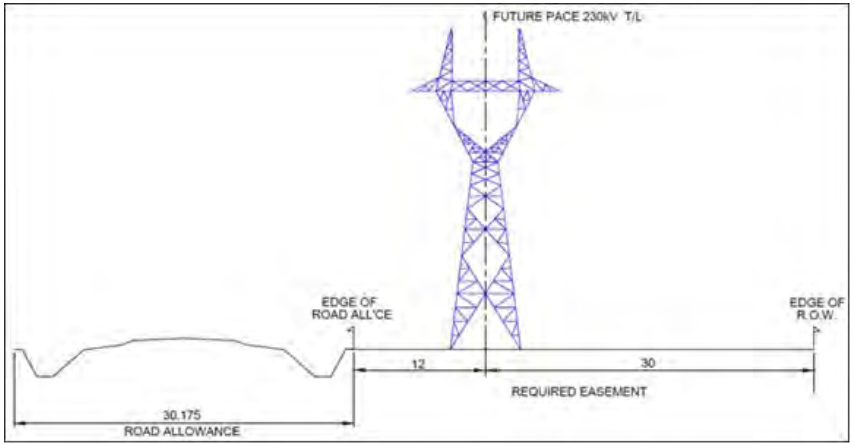
Typical steel lattice angle / dead-end towers

ROW width

Typical right-of-way requirements (60m)



Typical right-of-way requirements along road allowance (42 m)



Manitoba Hydro

Why is this project needed?

Increase system capacity to meet growing electricity needs

Enhance reliability for customers in Portage la Prairie and surrounding areas

Manitoba Hydro

Round one public engagement

Online survey and mapping feedback portal

9 virtual information sessions

5 meetings with interested parties

Attended in person sessions organized by the RM of Cartier and RM of St. François Xavier

Manitoba Hydro

What we heard

Agriculture
Routing
Proximity to homes
Health and safety
Culture and heritage
Land and wildlife

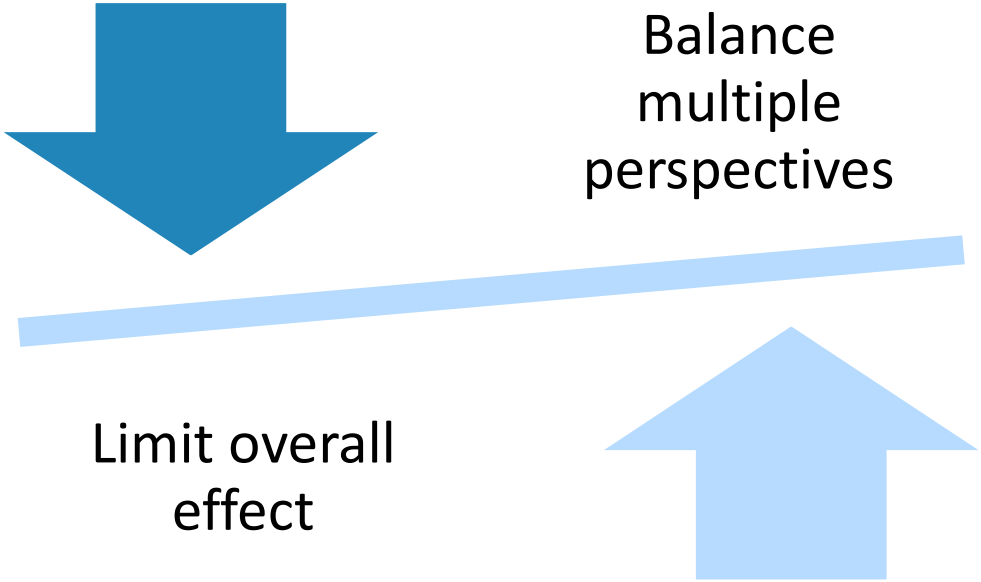
How did concerns influence what is assessed for the project?

We assess matters considered important to those affected by a project:

- Agriculture
- Culture and heritage
- Economy
- Human and community health
- Traditional practices
- Vegetation
- Aquatic environment
- Wildlife and wildlife habitat
- Aesthetics

Manitoba Hydro

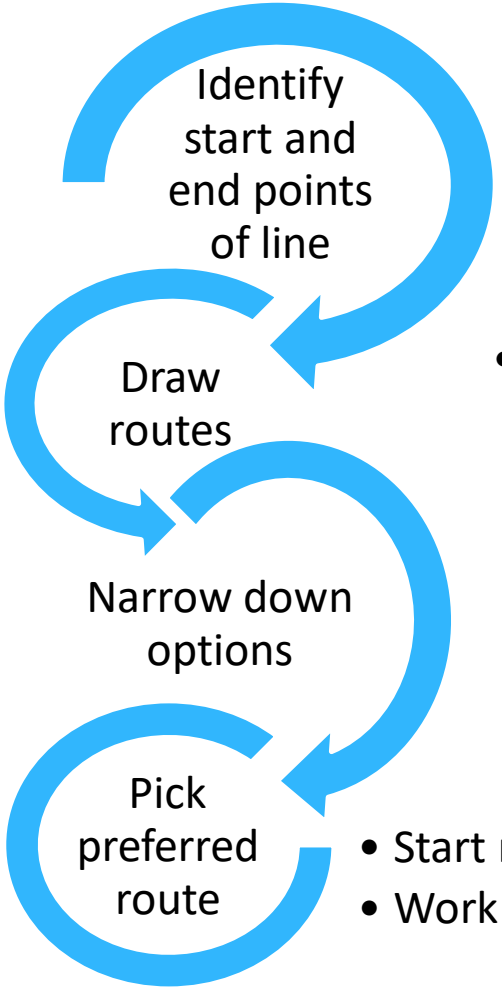
Goals of transmission line routing



Manitoba Hydro

Pathway to selecting a route

- Draw study area

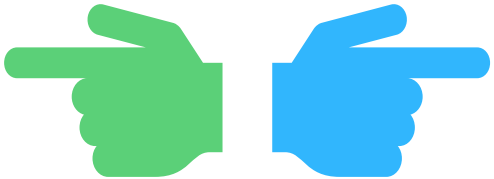


- Start round 1 engagement
  - Gather local knowledge and concerns

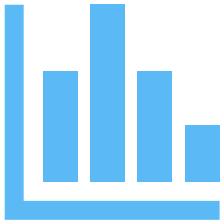
- Compare and evaluate routes
- Hold project team workshops

- Start round 2 engagement
- Work to address concerns

How do we consider routing feedback?

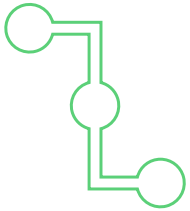


We sometimes hear opposing preferences



Hundreds of routing options are considered by experts with different specialties

The community ranking was determined by representatives from Indigenous communities and rural municipalities



The preferred route is routed in a manner that aims to limit overall effects. Those effects are considered in detail

Why not route along PR 227?

One of the reasons we're building this project is to enhance reliability for customers

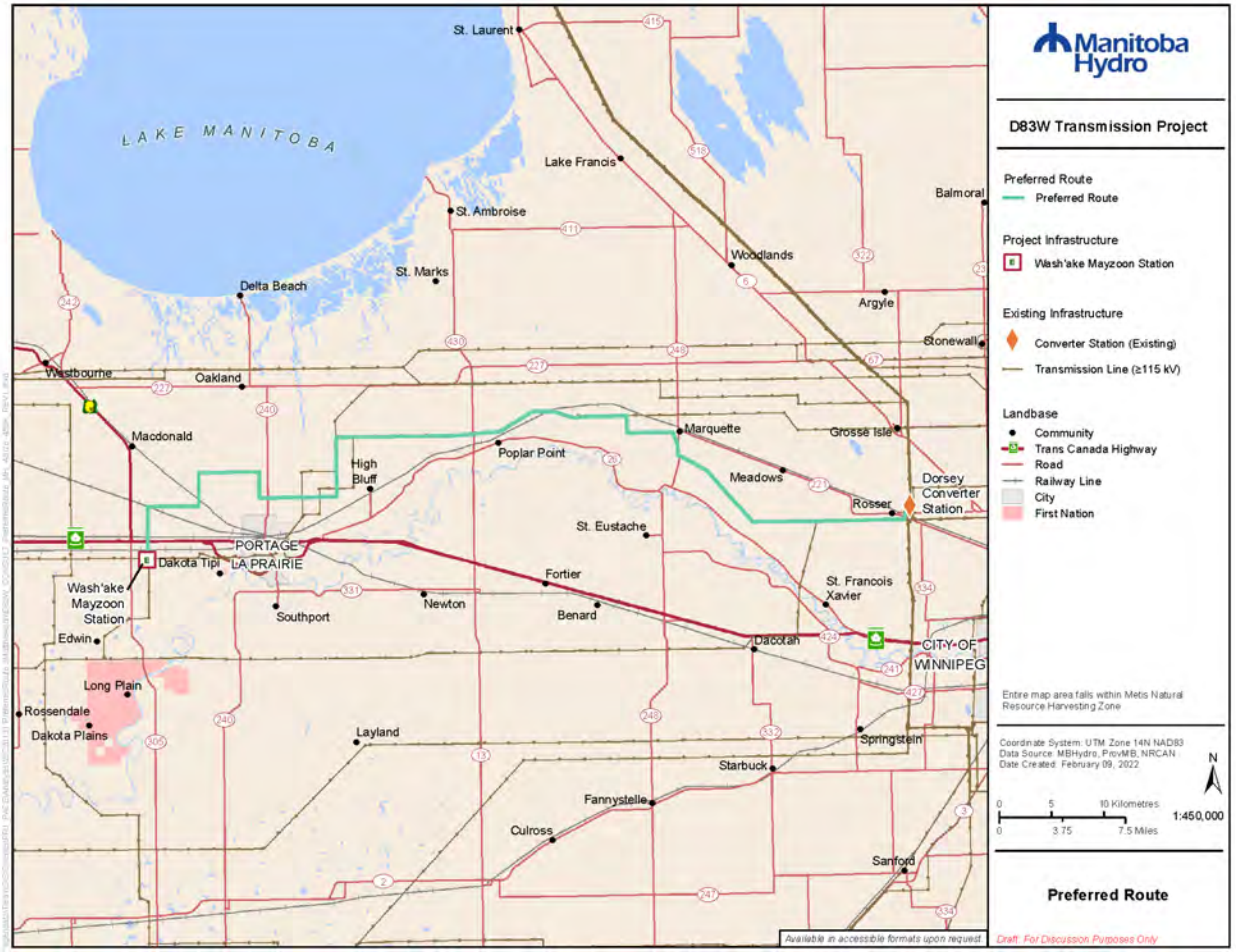
- We need separation from existing 230kV or higher lines
  - Important for severe weather
  - New line and D54N line are only 230kV lines in area that will jointly transmit power to serve load in southwest corner of province
  - Potential compliance violations with legislated reliability standards

We discussed using the Portage Diversion with Manitoba Infrastructure, and the Crown land area for approximately 6.5km along the diversion south of PR 227 is not wide enough to support a transmission ROW and the potential future widening requirements of the diversion channel.

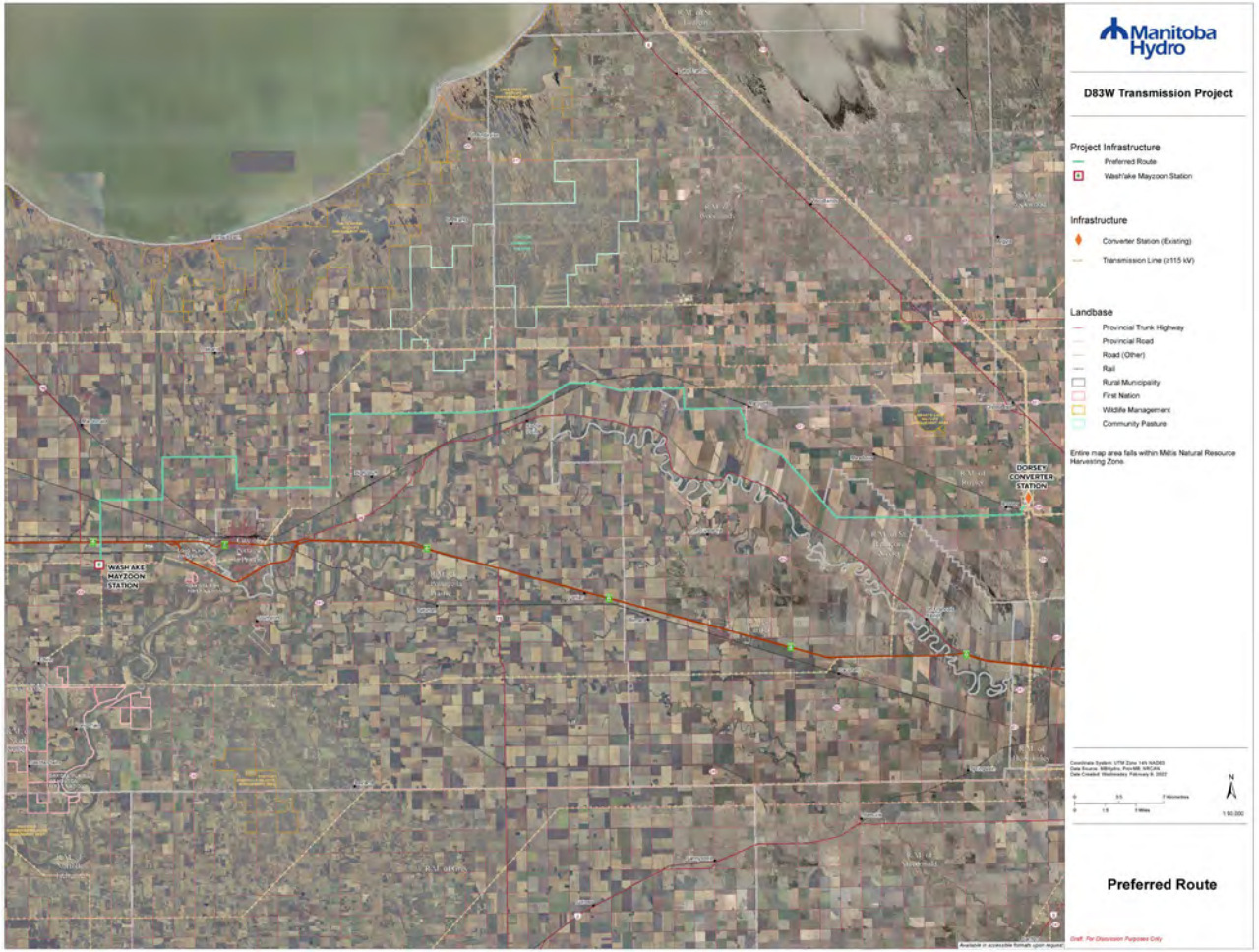
Why not route along PR 227?

We do not own or have easement on any land in the area along PR 227 that is not already occupied with an existing transmission line

A route along PR 227 contributes to approximately 8 km of additional length and higher total costs



Manitoba Hydro



Manitoba Hydro

We want to hear from you

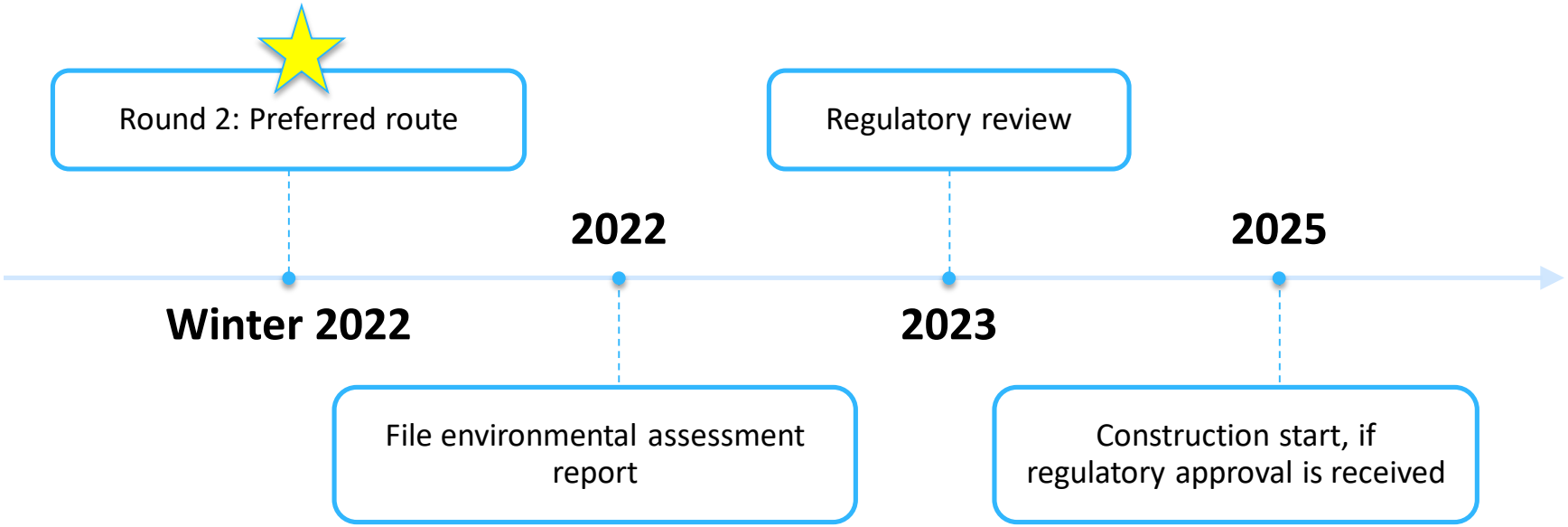
Online survey and feedback portal

Tell us what you think about the preferred route. The survey opens on March 1 and closes on March 25.

www.hydro.mb.ca/pace

Manitoba Hydro

Schedule


Round 2: Preferred route
Regulatory review
2022
2025
Winter 2022
2023
File environmental assessment report
Construction start, if regulatory approval is received

Discussion

- General questions and concerns?
- Location specific concerns?

- Resources
  - online feedback portal
  - map

Manitoba Hydro

Thank you

The project team wants to hear from you.

For more information about D83W and to sign up for email notices, please visit www.hydro.mb.ca/pace

Available in accessible formats upon request

Round 2 virtual information session meeting notes

PACE – D83W Meeting Notes

D83W virtual information session		
Location: Virtual meeting (Microsoft Teams)	Date: February 22, 2022	Time started: 7:00 pm Time ended: 8:45 pm
# of participants	21	

Action Items		
Action Item	Details	Status
Action item 1	Manitoba Hydro to inquire about take-home EMF kits for participants to rent	In progress
Action item 2	Manitoba Hydro to distribute tower footprint calculation estimates to participants	Complete
Action item 3	Manitoba Hydro to upload presentation to website	Complete

Discussions – category specific	
Category	Discussion
Routing	A participant asked if the presentation would be mailed out. • Manitoba Hydro responded that the presentation would be posted to the PACE project webpage. A participant asked if the portion of the line along PR 221 west from Marquette was on the north side or south side of the road. • Manitoba Hydro responded that it is on the south side of the road. The participant responded that this is on their land and asked what the right of way width would be. • Manitoba Hydro responded that when it follows a road allowance, the ROW is 42 m. Manitoba Hydro noted that when a final preferred route is chosen, land agents will reach out to landowners to work to get an easement would offer 150% of fair market value, and noted that landowner would maintain ownership of the land. A participant asked why the line could not be paralleled further north near PR227. • Manitoba Hydro responded that there is D54N and UP80 on either side of the road. It cannot be twinned in this area due to the close proximity to another existing 230KV line (D54N). Manitoba Hydro's reliability requirements for separation (to mitigate outages caused by extreme weather events) of 230kv infrastructure are not met due to this proximity. The participant noted this would be twinning a 115-kV line. • Manitoba Hydro noted they are still quite close together. The 230kV transmission lines are the backbone of the Manitoba electricity grid. The 115kV lines due the

	nature of their purpose can be closer to the 230kV lines without significant reliability concerns. The participant noted that D54N is wood poles. • Manitoba Hydro confirmed that it was built to the standards at the time, which was wood poles. The current standards require greater height clearance for farm equipment. The participant asked if it would be possible to run the line close to the CP rail line. • Manitoba Hydro noted that with 230kV transmission lines, there is a greater chance of interference and induction with rail lines, which have communication signals running along them. Routing lines along rail lines is done on a case by case basis and requires studying the particular section of rail and its infrastructure. The participant noted it would be good to study how close the line could be to the CP rail line in this area. A participant asked about which side of the drain the transmission line would be routed along near Marquette when the line parallels PR248. • Manitoba Hydro noted it is on the east side of the drain, and that along 2-mile road, the line is on the south side of the road. A participant asked to zoom in on the line where it crosses PR240 and asked whether the line would straddle multiple properties. • Manitoba Hydro noted that the line will probably be placed on the south side to avoid straddling properties. The participant noted there are no roads between the properties and asked how crews would access the line in this area. • Manitoba Hydro noted they use existing access where possible and all construction will follow the easement ROW. Roads along the ROW are not required for transmission line construction. As an example the ROW will be entered from the mile road and Manitoba Hydro would build an approach through the ditch and drive along the centre line of the ROW. • This work would ideally be done when crops are not in-field but if crop damage occurs, this would be reimbursed by Manitoba Hydro as per its compensation policy. A participant asked about the specific location of a tower on their property on the far east end of 2-mile road. • Manitoba Hydro noted that tower spotting is not done until the final preferred route and there would be discussion with landowners to determine their preference for tower location which will be a consideration during final tower placement. The participant asked if the route could travel further to the west. • Manitoba Hydro noted that further east, the line parallels an existing 230kV line and the lines split once the existing line travels south. There is no easy way to cross river lots and paralleling the road would require additional angle structures, which are more expensive. The preference is to create as short of a line as possible. Manitoba Hydro will discuss with each landowner their preferences for tower

	placement and take that into consideration during final tower placement. Manitoba Hydro noted the bend at the 2-mile road will have a corner tower. A participant asked why the line moves south, east and back north in the area northeast of Portage la Prairie. • Manitoba Hydro clarified that there were unregistered runways and irrigation infrastructure identified in the area during Round 1 feedback. There needs to be safe clearances for aerial operations, so the route was altered to avoid these features.
Compensation	A participant asked if the land becomes Crown land once the transmission line is placed. • Manitoba Hydro responded that landowners still maintain ownership and if the land is owned privately, it would remain that way. A participant asked if there were any expropriations. • Manitoba Hydro responded that expropriation is the worst-case scenario and that Manitoba Hydro will work with landowners to get easements. Manitoba Hydro also noted that government approval is required to move forward with any expropriation. A participant asked what easement legally implies. • Manitoba Hydro noted it means Manitoba Hydro has the right to build and maintain the transmission line and prevents the landowner from conducting activities that are not safely compatible with a transmission line such as building a home or other building directly underneath the line. A participant asked how much acreage a tower would take up. • Manitoba Hydro provided an estimate that with a tower footprint of 32ft x 32ft, it would take up about 0.02 of an acre. Some farmers will farm right up to the base of the tower and others will leave additional space. Manitoba Hydro clarified that the compensation is based on more than just the project footprint and includes where in the field the tower is placed, how far from the field edge and whether it is adjacent to other Manitoba Hydro infrastructure, as well as the crop type and cropping schedule. • Manitoba Hydro noted they would send the estimates for property footprint and size calculations. Manitoba Hydro clarified that this is an estimate since the dimensions vary from tower to tower and more accurate calculations would be available during the tower spotting phase. A participant asked if could use the land for agriculture beneath the line between the towers. • Manitoba Hydro confirmed that the land underneath the line can still be used for agriculture. A participant asked if Manitoba Hydro would be buying just the land the tower sits on or if they would buy an easement across the whole property. • Manitoba Hydro clarified that the easement is not a purchase and that the landowner would retain ownership. The participant noted that towers in the field would cause significant land loss. • Manitoba Hydro noted that conversations with the land agent would contribute to Manitoba Hydro determining optimal tower placement. Manitoba Hydro will work

	with each landowner to find the best compromise since the line cannot move too drastically between towers. There tends to be an agricultural preference to be as close to the road as possible. All landowners along a section of the transmission line will have a similar tower placement in their fields. A participant asked if the easement was just for the tower location or for the length of the line as well. • Manitoba Hydro clarified the easement is for the entire ROW width on a landowner's property, in addition to the tower payments on land deemed agricultural. Manitoba Hydro added there is the easement (at 150% of fair market value), structure impact payment and additional compensation for impacts to agricultural practices such as modifications to irrigation systems. The participant noted it was not fair to provide one-time compensation since if someone new buys the land they do not receive the financial benefits. • Manitoba Hydro noted they respected the participant's opinion and noted that other people have similar sentiments towards annual payments. The structure payment is based on the long-term impact and that the money given to the landowner can be transferred to the new landowner in the future if the land is sold. The payment is intended to cover the economic loss of the tower being there. The participant noted this was not a good solution and that other countries pay annual payments. The participant noted that Manitoba Hydro gives power away for too cheap and that is why they cannot pay annual payments for compensation. A participant noted that if shelterbelts need to be taken out, that the value lost than just how much it costs to replant mature trees. The participant asked if this was factored into compensation. • Manitoba Hydro noted this question would be best answered by the property department. The discussion on compensation is on a case by case basis and clarified that these costs are negotiable with each individual landowner.
Engagement	A participant noted that it would be beneficial to have the maps have all existing hydro infrastructure on it (with the kV amounts for lines) to make it easier to understand and orientate. The participant asked about the Metis harvesting area (which covers the entire project area) and what that entailed. • Manitoba Hydro noted that there are areas in the province where Metis people with recognized Metis Harvester Cards have the right to hunt, and so the entire area is part of this Metis harvesting area. Manitoba Hydro clarified permission is still needed to hunt on private land. A participant asked if Manitoba Hydro are governed by any obligation to notify. The participant noted that for MMTP, landowners were sent letters during pre-engagement. The participant asked if there were protocols, timeframes, timelines for notifying people in a proposed area. • Manitoba Hydro noted that all landowners affected were sent letters for Round 2, but this information was not available in Round 1. The participant noted they were disappointed by the notification process for Round 1. The participant noted that landowners pay hydro bills so Manitoba Hydro should have their information.

- Manitoba Hydro clarified this information would only be available if the owner has a meter on their land.

The participant noted that Manitoba Hydro should send letters to the ones with meters.

- Manitoba Hydro noted concerns with the engagement process.

The participant noted that if Manitoba Hydro has the addresses in a proposed area, they should send them a letter.

A participant noted their frustration that Manitoba Hydro drove the route to inspect the shelterbelt on their property and did not inform the participant that they were in the area.

- Manitoba Hydro noted they drove the route to understand the proximity of other infrastructure in the area, and that at the time they did not have landowner title information.

The participant noted that they would like to have input and deserve the chance to participate and it is important for Manitoba Hydro to involve participants right away.

- Manitoba Hydro thanked the participant for their feedback and noted they would be happy to set up a one on one conversation about alternatives.

The participant noted the line cannot be on their land. The property has a tree line, shelterbelts and a potential spot to put a new home in the future. The decision made in Winnipeg that this route is preferred is untrue.

- Manitoba Hydro clarified that they do not yet have approval to build since this project requires an Environment Act licence.

The participant noted that they have a neighbour who would be comfortable with the line on their land if it was not in the middle of the field.

- Manitoba Hydro noted they had received this feedback already and it had been shared with the routing team.

A participant asked if this project will have any benefits for the RM of St. Francois Xavier, noting that their RM will carry the brunt of the impacts.

- Manitoba Hydro clarified that this line will not directly enhance the distribution system in St. Francois Xavier. There are lines in many other rural municipalities that serve the distribution lines in St. Francois Xavier. Manitoba Hydro is trying to build a grid that serves all of Manitoba, which involves transporting power from the northern generating stations, through the Bipoles down to Dorsey and Riel stations to be redistributed to the rest of the province. There are rural municipalities from Thompson to Dorsey that have power lines that bring energy to St. Francois Xavier.

The participant clarified whether the RM of St. Francois Xavier would see any benefits.

- Manitoba Hydro noted they did investigate system reliability in St. Francois Xavier but the power coming to the RM is on a different transmission line.

The participant noted that this project does cause significant interference and loss of productive land in St. Francois Xavier and noted the goal is to address concerns and come out of this process with a better understanding. The participant noted that the argument for having shorter mileage does not fully work since there were shorter routes that were

	not chosen. The participant noted cost did not appear to factor into the decision which was concerning. The participant also noted that where the line runs along PR248 to the 2-mile road, the line runs on the west side of PR248. The participant asked if there were any guidelines that Manitoba Hydro operates under related to notification and communication about their projects. • Manitoba Hydro clarified that there are no specific policies and follows best practices. Manitoba Hydro learns with each hydro project and from other utilities to understand and improve best practices for engagement.
Construction & Operations	A participant asked if they would be notified when Manitoba Hydro would be accessing the tower. • Manitoba Hydro noted they would talk with landowners to determine what works best for them for notification and communication. The participant asked if Manitoba Hydro would pay to rebuild the road if there was damage done by construction crews. • Manitoba Hydro noted they would leave the road in similar condition to before construction. During construction, Manitoba Hydro will work with RMs to address concerns related to road damage and will take an inventory of road conditions before construction begins. Manitoba Hydro will work with farmers to schedule work outside of crop windows but if this is not possible, farmers will be paid crop damage compensation and compensation for any un-rehabilitated damage done to the land during construction. If any damages are incurred during operations and maintenance, Manitoba Hydro will pay compensation to fix any damages caused by accessing the line. A participant asked if construction work would be done by contractors or Manitoba Hydro staff. • Manitoba Hydro responded that the construction work would be contracted out since Manitoba Hydro does not have the crews to build large transmission lines. During construction, there will be Manitoba Hydro representatives on site, and Manitoba Hydro staff will be the ones to interact and talk to landowners. A participant asked if there would be disruptions to daily life during the construction phase of the project. • Manitoba Hydro clarified that due to the length and nature of the project, there will not be a large concentration of workforce all in one place. The construction is done in stages, starting with the tower foundations, followed by tower assembly and stringing crews for the wires and conductors. The largest noticeable impact to the community will be during the implode process to fuse two ends of the conductors together. Approximately every 3 miles, there will be an implode sleeve to weld the two ends of the conductors. It causes a large bang sound, but this process will be done at scheduled times with a substantial notification process to landowners, the RCMP and other local law enforcement. A participant asked what the maintenance protocol is for the transmission line. • Manitoba Hydro noted they patrol the infrastructure once a year by air and ground. Ground patrol generally takes place in the winter not to impact agricultural

	operations. Over the life of the line, portions of the line or tower may need to be replaced but this work is minimal. Every 5-10 years there is vegetation management that takes place under the line in areas where trees and shrubs grow back, to prevent safety hazards. The participant asked if a shelterbelt would be removed for the preferred route. • Manitoba Hydro noted this would depend on the specific location. Based on the height and proximity of the participant's trees, Manitoba Hydro is working on investigating engineering solutions to maintain this shelterbelt, which requires design changes. If there are no solutions, the plan would be to replant, rehabilitate and remediate. Manitoba Hydro noted they would work with the landowner with the shelterbelt to get the specific information about the trees to figure out what engineering solutions would be feasible. The participant noted that mature trees takes 2 generations to replace.
EMF	A participant asked about the EMF levels that would be caused by having a 230kV, 115kV and distribution line in proximity to one another. • Manitoba Hydro responded that there are staff researching EMF and have found that there is no scientific evidence with exposure and negative effects to humans, animals or vegetation. Exposure levels will be well below government thresholds and are less than what are caused by common household appliances. The participant asked if Manitoba Hydro had a measurement kit that could be loaned out to people on request to measure EMF levels. • Manitoba Hydro responded that they had this in the past and would look into whether they were available for use currently. Clarification: Manitoba Hydro used to have staff visit landowner's homes with an EMF meter to measures EMF levels, they did not have measurement kits for loan.
Noise	A participant asked if there is any noise that comes off the transmission line, clarifying this was not related to health but to annoyance. The participant noted the line goes close to houses and asked if people would be able to hear the lines from their backyards. • Manitoba Hydro clarified that when standing very close to the towers you can hear some noise and the volume depends on the weather. Higher humidity air causes more static and the lines can give off a crackling sound. With 230kV transmission lines, you can hear a noise if you are standing directly underneath but should not hear much by the time you are 20-30 feet outside the ROW.
Licensing	A participant asked if this project was subject to a Class 2 or Class 3 licence under the *Environment Act.* • Manitoba Hydro clarified that since the line is 230-kV, it is a Class 2 development. The participant noted that there was no information available in the provincial registry. • Manitoba Hydro clarified that they anticipate filing with the province in the fall, at which point information will be on the registry and will have a comment process. The participant noted that a recommendation (2.7) from Bipole III was to develop a written form of reasons for how and why decisions are made and make this available to interested parties. The participant asked if there was a way to access information about the discussions held regarding the decision for the preferred route.

	• Manitoba Hydro noted that when the environmental assessment report is filed, there will be information about the routing process and summaries of meetings held and what was discussed.

D83W virtual information session		
Location: Virtual Meeting (Microsoft Teams)	Date: February 23, 2022	Time started: 12:00 pm Time ended: 1:00 pm
# of participants	9	

Action Items		
Action Item	**Details**	**Status**
Action item 1	Manitoba Hydro to send maps with river lots labelled to participants.	Complete
Action item 2	Manitoba Hydro to provide a participant with a map of the area of the drain near Reaburn.	Complete

Discussions – category specific	
Category	**Discussion**
Aesthetics – shelterbelts	A participant inquired about how aesthetics are considered in making decisions and assessing the project • Manitoba Hydro advised that aesthetics will be considered in the environmental assessment report and will include topics like shelterbelts A participant advised that they had contacted a shelterbelt project coordinator to determine the value of the shelter belt on their property. The estimate shared by the shelterbelt project coordinator was that a shelterbelt consisting of ash trees would be valued at ~$251k, and if 20 years old, it would be valued at ~$453k. • Manitoba Hydro advised the values have been recorded and that justification on the valuation of damages caused by a project can be considered in determining compensation. • Manitoba Hydro is looking into design solutions to see if there are any opportunities to keep the trees on the participant's property. A participant advised they did not understand how that would work as there is not a lot of room to work with given the location of the nearby rail line.

	• Manitoba Hydro will continue to share information as it becomes available. Participants expressed frustration that Manitoba Hydro is going out of the way to avoid a potential airstrip but the existing shelterbelt is planned to be destroyed. • Manitoba Hydro advised they are exploring solutions to minimize the issues with the shelterbelt through tower placement or design.
Maps	Participants shared that they though the that maps could be clearer, stating that it is too bad the maps cannot be updated between meetings. Participants asked how the mapping feedback portal works as there was difficulty figuring out how to draw new lines in the last round • Manitoba Hydro advised that they can assist with drawing sites and navigating the portal one-on-one if people call in. There is also a "how to use this portal" summary pop-up when the portal is first opened. Participants shared they would like to see better maps that don't just include the waterworks. They shared that cleaner maps, perhaps without the imagery, would be useful showing existing homes and other existing developments. They shared it would be easier for other people in the discussions to see how others in the area may be impacted is these types of maps were available. They shared that it is really hard to find stuff with the aerial imagery. • Manitoba Hydro explained that it is tough balance developing maps that suit all audiences and that the feedback is helpful. A participant inquired about the location of the proposed line in relation to specific river lots in the vicinity of the Second Creek Drain, which runs through their property • Manitoba Hydro advised they would send maps of this area with the river lots labelled to enable the landowners to determine the impact the project may have on their property.

Routing	Participants shared that it should be considered to move the line to the other side of the railroad tracks. Participant feels they have a lot of lines both to the north and south on their property. It was stated that it doesn't seem like good management to go through new pristine land with every project, and that in other countries, they build bigger lines to carry more. • Manitoba Hydro advised that a proposed option along the railroad has been shared and Manitoba Hydro will have to look into it, particularly into the issues of induction along the railroad. A participant asked what the required distance is between lines and the longest distance lines could be paralleled. • Manitoba Hydro advised that suitable distances between lines and appropriate use of paralleling lines is determined on a case-by-case basis, advising that lines can't be paralleled for long stretches. The participant stated that lines are going up every ¼ mile and that it would be helpful to have maps with the existing lines. A participant asked how many kilometers have been added for the route to accommodate a proposed runway that does not yet exist? • Manitoba Hydro advised that the proposed runway was not the only reason for the jog, that existing homes right along the road were also a reason the jog was put in place. A participant asked whether the route could just jog around the homes? • Manitoba Hydro shared if the runway was constructed between now and then it would be very difficult to mitigate. Participants shared that they are displeased that Manitoba Hydro was willing to avoid the proposed runway but will not avoid an existing shelterbelt.
EA report	A participant asked if the public can have the opportunity to see the environmental assessment report. • Manitoba Hydro advised that the report gets submitted to the Province and is then made available for public comment on the Province's Public Registry

	A participant shared concerns that the report did not seem accessible to the public and advised that they would like the report in print. • Manitoba Hydro advised that they can determine alternate options for sharing the environmental assessment report and keep interested participants informed once the report is filed with the Province.
Properties in proximity of the Reaburn drain	Two participants indicated that they own property adjacent to a drain near Reaburn, MB. • Manitoba Hydro navigated to the area on the online map One participant determined the route did not cross their property in this area. Another participant requested a map of the area near the drain close to Reaburn to help determine if there will be impacts to their property. • Manitoba Hydro committed to follow up with a map.
Aerial application	A participant inquired about whether there are legal restrictions surrounding aerial application around transmission lines such as how far pilots must stay away from the line or if it is more of a professional judgement call required by the aerial applicator • Manitoba Hydro stated that it is more of a judgement call by the applicator, but advised that if a producer will no longer be able to perform aerial spraying because of the position of a transmission line that there is a compensation formula to account for that impact.
Property questions	A participant inquired as to whether ownership of the land is retained if the line crosses their property. • Manitoba Hydro explained that they obtain an easement for the width of the right-of-way that grants certain rights such as coming onto the property to maintain the line and imposes certain restrictions on the land's use such as not being able to put up buildings under the line. Landowners retain ownership and are able to keep farming the land once the line has been constructed. Participants asked whether the payment landowners receive for use of the land is based on the land value or the crop value.

	• Manitoba Hydro advised that compensation for the easement is based on the land value as determined through an accredited appraisal, but the value is escalated to 150% of the appraised market value to account for the ongoing tax obligation of the landowner. • Appraisers considers soil types, what is located on the landscape, and a number of other factors in establishing the land value. • Structure impact payments are provided in addition to the easement payment if a tower is located on agricultural land. This is to compensate for having to work around the towers on an ongoing basis. The amount of tower compensation provided will vary depending on the type of crop being grown. Participants stated that just because one type of crop is being grown at present that it does not mean that a higher value crop may not be grown in that location in the future. • Manitoba Hydro acknowledged that potential changes in crop types can be considered in the landowner's one-on-one conversations with MH property representatives when discussing compensation A participant inquired about whether Manitoba Hydro has observed an increase in recreational vehicle traffic along transmission line corridors after they are developed. • Manitoba Hydro stated that is has depended on the project; where this is a concern, Manitoba Hydro has worked with landowners to discuss access control options such as gates or fences.
Landowner engagement	A participant inquired about the status of notifications to the property owners that will be affected by the preferred route. • Manitoba Hydro advised that letters have been sent out to all affected landowners and that geotargeted Facebook advertisements and emails have also been sent. The participant asked whether there will there be an opportunity for the landowners to participate in these information sessions. • Manitoba Hydro advised that they hope affected landowners will sign up for information sessions and that they are open to one-on-one conversations with landowners.

PACE – D83W Meeting Notes

D83W virtual information session		
Location: Virtual meeting (Microsoft Teams)	Date: February 28, 2022	Time started: 7:00 pm Time ended: 8:30 pm
# of participants	13	

Action Items		
Action Item	Details	Status
Action item 1	Manitoba Hydro to schedule one on one meetings with two participants	Completed
Action item 2	Manitoba Hydro to investigate rental of EMF measurement kits for participants	In progress

Discussions – category specific	
Category	**Discussion**
Routing	A participant asked what the acceptable distance is between lines to meet reliability standards. • Manitoba Hydro responded that the distance depends on the duration of proximity and the type of lines. There are North American reliability standards that apply to 230kV transmission lines. The distance calculation requires significant engineering input, but the longer 230kV lines parallel, the greater the risk to system reliability. • In this part of the province, there are only 2 major 230kV lines, so separating these lines is the way to improve reliability and provide greater system redundancy. A participant asked if weather data has been used to see the different effects with one mile. • Manitoba Hydro responded that weather data is incorporated and informs the design and planning of transmission line. A participant asked about the cost difference between corner towers and regular towers • Manitoba Hydro responded that it is about $120,000 more per angle tower, but varies based on design. The participant noted that the portion of the line that avoids the proposed airstrip would then cost half a million dollars. • Manitoba Hydro responded that there are other features than the proposed airstrip that are being avoided in that area, including homes, a subdivision, and pivot irrigation.

	A participant asked when Manitoba Hydro would have the data about the minimum proximity to the CP rail line. • Manitoba Hydro responded that discussions need to still take place with the interference engineers. Currently Manitoba Hydro is looking at access to the line and how to inspect the rail line with the amount of snow on the ground. Once an inspection has taken place, it may take 3-4 weeks to complete the analysis and provide a calculation on the setback requirements. The participant asked if CP Rail would have input. • Manitoba Hydro noted that it is typically faster for Manitoba Hydro to undertake this work. If it was confirmed that the route would parallel the rail line, CP Rail would be contacted. In general, the greater the distance of paralleled rail, the greater the distance the transmission line needs to be away from the rail line. A participant asked why the transmission line is not routed along Road 73. • Manitoba Hydro noted that there was no option considered along this road because of the large number of homes along the north and south sides of Road 73. Routing along Road 72 avoided as many homes as possible. The participant asked about the distance for the easement along the road. • Manitoba Hydro responded that it would be 42m. The participant asked what the distance would be into their property. • Manitoba Hydro responded that the centerline of the transmission line would be 12m offset from the edge of road allowance, and then the cleared area of ROW would be 42m from the edge of the road into the property The participant asked whether the line could move closer to the road. • Manitoba Hydro responded that the line cannot be moved closer because of the required setback distance of transmission lines from roads. The participant asked about the distance between the towers. • Manitoba Hydro responded that it is about 385m. Manitoba Hydro noted that they will work with landowners to find the optimal tower placement and would be happy to set up a meeting to talk individually about routing on specific properties. A participant noted that they have grain bins on their property and asked how routing in this area would work. • Manitoba Hydro noted they will need to look at potential grounding and specific mitigations and hazards relating to the bins. Manitoba Hydro will either reimburse the landowner to

	have the bins moved or Manitoba Hydro will move the bins for the landowners outside of the ROW. • Manitoba Hydro noted they would set up a one on one call with the participant to discuss this further. A participant asked how much the feeder lines would need to be moved to accommodate the new 230kV lines. • Manitoba Hydro responded that they are undertaking discussions about moving the distribution lines and determining the required offset of the transmission line. • The current minimum will be 15-20m offset but the details are being studied. A participant asked how many new transmission lines are anticipated to be put in this area. • Manitoba Hydro responded that there are no plans in the near future for additional transmission lines in this part of Manitoba. • Manitoba Hydro noted that the major lines that run north-south are the Bipole lines and these run to the Dorsey and Riel converter stations outside of Winnipeg. A participant asked if there were previous considerations to route south of Highway 1 and connect to Portage la Prairie. • Manitoba Hydro responded that there was a potential project to route to the Portage South station about 10 years ago. Since then, the load growth has increased in the Portage la Prairie and Brandon areas, so system planning design studies evaluated options and determined a new station (Wash'ake Mayzoon) was the best placement for a station to serve the electrical needs of Portage la Prairie and provide additional redundancy to the Brandon area. • Additionally, the electrical grid is aging, and the transmission line infrastructure requires repairs. Taking these lines out of service will affect many customers, so Manitoba Hydro is considering broad reliability to allow for planned outages for repairs and rebuilds. The participant asked if the line could be routed parallel with the 115kV line north of Marquette. • Manitoba Hydro responded that this option was investigated, and it was determined that taking outages on the 115kV line would be challenging since this power currently serves Portage la Prairie. There are also additional costs of double circuiting lines and this requires dramatically different towers, which are also more expensive. With these costs in addition to the costs of salvaging the existing line, this option became cost prohibitive. • Manitoba Hydro noted they try to parallel where possible to minimize the impacts to farming and aerial spraying. Manitoba

	Hydro recognizes the benefits of paralleling, but it is not always possible or feasible.
Regulatory Process	A participant asked for additional information about the regulatory review for the project. • Manitoba Hydro responded that the project requires a Class 2 *Environment Act* Licence from the province and Manitoba Hydro would be submitting an environmental assessment report for the province's review and approval. Manitoba Hydro noted they would be sending a notification to those registered to receive project updates once the report has been filed, and that the province would facilitate a separate public review process of the report.
Compensation and Easements	The participant asked for further information about taxation on the land underneath the towers. The participant's understanding is that Manitoba Hydro buys the land under the tower, but the participant is responsible for the taxes on the land that the towers are on. • Manitoba Hydro responded that the land is not purchased by Manitoba Hydro, an easement is acquired which grants Manitoba Hydro certain rights to the land. The land stays in the landowner's name and tax roll, and they can continue to farm the land. The easement gives Manitoba Hydro consent to have the line there and to access it. The 150% market value payment for the easement area is to recognize the need to pay taxes on the land under the towers. A participant noted they have to pay taxes on the land forever. • Manitoba Hydro responded the land under the line can still be used for agricultural purposes and other purposes with consent from Hydro. The participant responded that farming cannot happen under where the tower is. • Manitoba Hydro confirmed this but noted the compensation is to cover more than the fair market value while allowing the landowner to continue using the land. The easement gives some rights to Manitoba Hydro, and landowners will need consent for certain things such as building in proximity to the line. The participant noted that the tower base is not usable. The participant would have 8 towers on their property and noted each takes up 0.2 acres. The participant asked Manitoba Hydro to consider yearly rental payments since the lump sum is not fair. • Manitoba Hydro clarified that the tower base is 0.02 acres, which is a small fraction of an acre. Manitoba Hydro made the decision several years ago to pay the full amount upfront so landowners can invest the money and accrue interest. By agreeing to an easement, the landowner can decide what to do with this money.

	The participant noted that anyone with land under the tower should benefit from it and that Manitoba Hydro should consider changing their ways of compensation. • Manitoba Hydro asked if the landowner would prefer not to be paid the lump sum. The participant clarified that future generations owning the land would be dealing with tower impacts but not receiving any monetary advantages. The participant agreed that the payment system can sway opinions on the project but that this is not fair for future generations or renters of land. • Manitoba Hydro clarified that the renter could negotiate terms with the landowner, but that Manitoba Hydro would not be involved in these discussions. A participant asked if it was possible to negotiate yearly payments. • Manitoba Hydro noted that this has happened during negotiations with landowners. It is not typically offered, and it is often better financially to take the lump sum payment. The participant noted they were not looking to maximize profits but want to see that the process is done properly. • Manitoba Hydro responded that individual payment details can be determined with the land agent.
EMF	A participant asked if Manitoba Hydro has EMF measurement kits, noting that it would be beneficial to have an understanding of baseline EMF levels and then the impact of the transmission line. • Manitoba Hydro noted they were looking in to whether EMF measurement kits were available for loan. Manitoba Hydro determined that they do not have EMF measurement kits available for loan. The landowner's request to determine the baseline EMF readings on their property was shared with the Project team. Manitoba Hydro will follow up with the landowner to discuss options for determining the baseline readings.
Engagement	A participant asked if there was a landowner database to collect information and why there was no pre-engagement like there was for the Manitoba-Minnesota Transmission Project. The participant asked for the definition of a stakeholder. • Manitoba Hydro noted that the term stakeholder is not used currently for this project, the preferred term is interested party. There is an interested party list for this project and includes groups like RMs, clubs and organizations such as Sno-man, and government departments. The participant noted that these groups receive direct communication but may not live in the area, which is preferential treatment over landowners who did not receive direct information.

	• Manitoba Hydro noted that direct mail was not sent in Round 1 but was sent to landowners in Round 2. During Round 1, Manitoba Hydro did not have land titles or ownership information. Other notification methods were used including postcards, website and Facebook ads, and people were still able to find out about the project and participated. The participant noted they did not find this process fair. The participant looked at the environmental assessment report for Wash'ake Mayzoon station and noted that information packages were mailed out to groups and were followed up with phone calls. The participant was referencing direct mail to specific landowners being potentially impacted by the project. The participant noted they did not receive a postcard and their RM did not get notice. For a project of this magnitude, the RM should receive a written package in pre-engagement with follow-up communication to confirm the information was received. The participant felt there was no time to do any reading, research or to prepare questions. • Manitoba Hydro noted that the RMs were emailed but that letters could be sent in the future. The participant clarified that in the Wash'ake Mayzoon station, information packages were sent out to groups potentially impacted by the station and followed up with a phone call. The participant asked why this process was not followed for this project. • Manitoba Hydro noted that the Wash'ake Mayzoon station had a much smaller scale with fewer adjacent landowners. The participant noted that for projects of this magnitude, even if it is not legally required, they believe Manitoba Hydro has a duty to notify landowners directly. Another participant noted that Manitoba Hydro is owned by Manitoba, so participants have a right to know when meetings are held with interested parties and RMs. • Manitoba Hydro noted that when the environmental assessment Report is filed, it will include information about meetings held with information summaries. A participant noted that it would be helpful to see non-linear features on the map to have a better sense of what is happening in the area. • Manitoba Hydro responded that there is a lot of information being considered and to put all the information onto one map may cause confusion. Manitoba Hydro noted they would be happy to meet with the landowner one on one to discuss each turn and portion of the land and the rationale behind the routing decisions in detail. The participant suggested that for the route segments in Round 1, creating maps for each segment with the houses and other features that may be affected. The participant noted it is difficult to look at the current maps provided by Manitoba Hydro and understand the decisions made about routing.

	• Manitoba Hydro thanked the participant for the suggestion. Manitoba Hydro noted that there are many features that are not visible, including information provided by public meetings and interested party meetings. These features include heritage sites, irrigation pivots and traditional plant gathering sites. Manitoba Hydro will endeavor to provide better explanations of the interests and assets on the land when undertaking future route planning.
Renewable Energy	A participant noted that Manitoba Hydro needs to consider damage to environment and landscape, building new lines is not a feasible option forever unless lines are combined or routed underground. • Manitoba Hydro responded that undergrounding a 230kV line is approximately 10x more expensive and would significantly impact rates. As more hydroelectric infrastructure is placed on the landscape, it becomes more challenging to balance effects when routing. A participant echoed the concern of additional hydroelectric infrastructure and expressed concerns with fragmented landscape caused by hydro lines. The participant noted that solar panels can be on roofs and barns. • Manitoba Hydro clarified that large-scale solar farms would be required to produce similar wattage to what travels along 230kV transmission lines. There is currently a changing landscape on electricity, and the challenge is that hydroelectric power is more reliable than other forms of renewables. As well, people want to sell the excess power to Manitoba Hydro, which would require additional infrastructure to move the power from place to place. A participant noted that solar and wind power are better, and with the St. Leon wind farm it would have made sense to develop a corporate approach like in places such as Denmark to allow everyone to participate and invest. • Manitoba Hydro noted that there is energy innovation in several European countries. Manitoba Hydro clarified that the St. Leon wind farm is not a Manitoba Hydro asset and needed to be connected to the electrical grid. The participant asked why people were not invited to invest in the St. Leon wind farm. A participant noted that Manitoba Hydro is independent of government. • Manitoba Hydro clarified they are a Crown Corporation that is paid for by the Manitoba government. A participant noted it is important to considering the social impacts of how people use and think about electricity.

	• Manitoba Hydro noted they are developing an Integrated Resource Plan which will be investigating different energy futures.

PACE – D83W meeting notes

D83W virtual information session		
Location: Virtual meeting (Microsoft Teams)	Date: March 1, 2022	Time started: 12:00 pm Time ended: 12:30 pm
# of participants	10	

Discussions – category specific	
Category	Discussion
Routing	A participant asked if undergrounding the line had been considered. The participant noted this could be optimal for reliability and minimal disturbance, although there would be a higher initial cost. • Manitoba Hydro noted that undergrounding a 230kV line is not currently done, only some transmission lines have been undergrounded in urban areas of Winnipeg. It costs 10x as much to underground transmission lines. As well, underground lines are not more reliable than overhead lines. In the event of a fault, it is more difficult to determine the location of a fault. With overhead lines, the line can be driven along to easily identify where the issues are that require replacement or maintenance. The participant responded this comment was related to the ice storms, which was part of the need for this project. If the line is underground, ice storms will not create issues. • Manitoba Hydro clarified that this project is not being done in response to the October 2019 storm. There are two lines in the area being rebuilt as a result of this storm. This project is intended to serve load growth in the Portage la Prairie area and southwest Manitoba. Related to storm reliability, it is important to keep 230kV transmission lines as far apart as possible so that storms have less impact on both lines. The participant noted that wherever possible, running the line straight along north-south or east-west is best for aerial spraying, adding it is challenging when lines run at an angle. • Manitoba Hydro responded that routing aimed to minimize the amount of diagonal crossing of farmland and to parallel lower voltage lines where possible, so aerial applicators did not have to adjust operations too significantly. During Round 1 of the public engagement process, information was shared about unregistered runway strips, which helped inform the selection of the preferred route.

PACE – D83W Meeting Notes

D83W virtual information session		
Location: Virtual meeting (Microsoft Teams)	Date: March 2, 2022	Time started: 7:00 pm Time ended: 7:40 pm
# of participants	5	

Action Items		
Action Item	Details	Status
Action item 1	Manitoba Hydro to reach out to the RM of St. Francois Xavier to schedule a meeting	In progress
Action item 2	Manitoba Hydro to schedule meetings with two landowners	In progress

Discussions – category specific	
Category	Discussion
Routing	A participant asked to zoom in on the map to D54N and asked how long the line has been there. • Manitoba Hydro responded that the line has been in place for some time and noted that this line uses older wooden H-frame structures instead of the steel lattice towers that are currently used for 230kV transmission lines. The participant noted they farm two parcels that the line will run through. The participant asked how far from the road allowance the line would be placed. • Manitoba Hydro responded that right of way will extend 42m from the edge of the road allowance. The participant asked if farmers are allowed to grow up to the edge of the tower or if there are rules about farming in proximity to the towers. • Manitoba Hydro responded that farming is allowed within the easement area, and compensation for easement is 150% of fair market value. Farming can take place under the line and there is a one-time lump sum payment for each tower on agricultural land to recognize the challenge of farming around transmission towers. Manitoba Hydro clarified that the easement is the total width under the transmission line and not just where the towers are placed. The participant noted that a field nearby their property has tile drainage and asked how this would be dealt with by Manitoba Hydro. • Manitoba Hydro responded that tower location can often minimize the effects to tile drainage. If tile drainage is affected, then Manitoba Hydro is responsible for paying to have the tile drainage moved. A participant noted that there are wooden towers near their property and asked whether the new transmission line would be placed next to the older towers and how the paralleling would be handled. • Manitoba Hydro responded that the preferred route is on east side of the road and that the 115kV line is on the west side so there will be one line on each side of the road in this area. A participant asked if it is more costly to have corner towers. • Manitoba Hydro confirmed that corner towers are more expensive. A participant asked how far apart the towers are. • Manitoba Hydro responded that the towers will be about 385m apart. A participant asked if towers follow the road allowance for the entire route. • Manitoba Hydro responded that routing along road allowances is ideal but not possible in all cases. One area where the route does not run along a road allowance is the area immediately east of 2-mile road, where the line is in-field.
Compensation	A participant noted that compensation is challenging for farmers who rent land since the owners receive the compensation payments.

	• Manitoba Hydro offered to set up a one-on-one meeting with the participant to discuss their specific concerns. A participant asked when Manitoba Hydro would contact landowners about compensation. • Manitoba Hydro responded that at the soonest, compensation discussions would start in a year and a half to two years. Once a final preferred route is chosen, conversations can start taking place with landowners one on one to discuss specific impacts to properties. If participants would like to have a conversation sooner, they are encouraged to contact the property department to schedule a meeting. A participant asked when compensation is paid to landowners. • Manitoba Hydro responded that once a landowner agrees to the easement, the easement is registered with the Land Titles Branch and the easement compensation is paid. For tower payments, these payments are provided once the foundation for the tower has been placed in the ground.
Engagement	A participant representing the RM of St. Francois Xavier asked what the next steps in the process will be and how participants will know if their comments are listened to and reviewed by Manitoba Hydro. • Manitoba Hydro noted that meeting notes from the sessions will be shared with participants for their review, and they would reach out to set up a meeting with the RM of St. Francois Xavier to discuss any additional specific concerns. When the Environmental Assessment report is filed for the project, there will be an engagement chapter where Manitoba Hydro will share what participants shared and how this feedback influenced the project.

Survey results

SURVEY RESPONDENTS

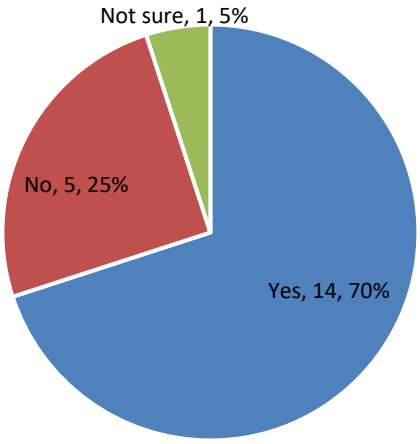
There were 36 survey responses, with only 24 of the responses included. Twelve survey responses were excluded; 11 were excluded as they did not provide responses and one survey was excluded as it was labelled as survey preview.

For each question the number of responses has been represented as n.

Q1. DO YOU HAVE ANY CONCERNS WITH THE PREFERRED ROUTE IDENTIFIED?

- Fourteen (70%) of the survey respondents identified concerns with the preferred route and identified an alternative preferred route, while five (25%) respondents did not have a route preference.

Figure 1. Preferred route identified.



n=20

Q1.1. Please explain your concerns.

Question 1.1 of the survey asked respondents to share their concerns about the preferred route. Some of the respondents shared concerns for:

Table 1. Concerns on preferred route.

Concern	Comment
Proximity to homes and impact on agriculture.	*"It's still too close to my house."*

	"Proximity to homes and impact on farming." *"Proximity to yardsite and the need to remove shelter trees on north side of yard."* *"We have 2 homes just north of the proposed line along the 2 mile road. Our approximately 2 miles of 15 -20 year old trees in shelterbelts are in danger of being removed if this line gets approved."* *"It's Chris from Scherner Farms LTD and our fields are effected by the line... First thing I've noticed right away is that the line will be built along 2mile road but on the south side where it's known under farmers and its also visible on the maps that the 2mile road is the cut between very productive land and not so productive land so I'm wondering why it is being built on the productive land and not on the other side of the road? Our farm land will be effected either way with rental lands so it's not the reason that i don't want to be effected more so seeing the economical effects...and it can't cost hydro more to build on the other side?"* *"The placement of these towers and the line will interfere with my plans of developing this farm when I take it over with my sister"* *"This proposed new line is going to transect the farm I will inherit and take out an established shelterbelt on this organic farm."* *"We live on a small parcel, 24.5 acres(NW 16-12-2W) and the line will run far too close to our home and property and will overwhelm us and will likely have a great negative on our property value. Not mention our health concerns living so close to the lines. The line will dominate our views and lessen the quality of life."* *"Where the route leaves the existing line from the east why do you cut across farmland instead of following the existing line south to the two mile rd. then follow it west. Everywhere else the line follows existing field edges, roads and ditches and doesn't needlessly cut up prime agricultural land."* *"This powerline will transect our property in half for approx. 2 miles. Since this property: River Lot 103-108/9, is 300- 600 meters wide. It will make it very difficult to work around."*
Cost of development.	*"Appears to be far less than direct. Costs will be higher than necessary for no apparent reason."*
Environmental Damage.	*"Just that it will cut up already narrow river lots with the line going across them"*

"Removal of mature shelterbelt (Cunningham/Schoppe property); If more than half a million dollars can be spent to accommodate an unregistered airstrip, a few (no one has indicated how many) homes, and irrigation equipment, I feel that a straight more northerly route should have been costed out."

"We have an established shelterbelt 15-20 years old in the proposed area of the line. It is sequestering carbon and helping the water table."

n=13

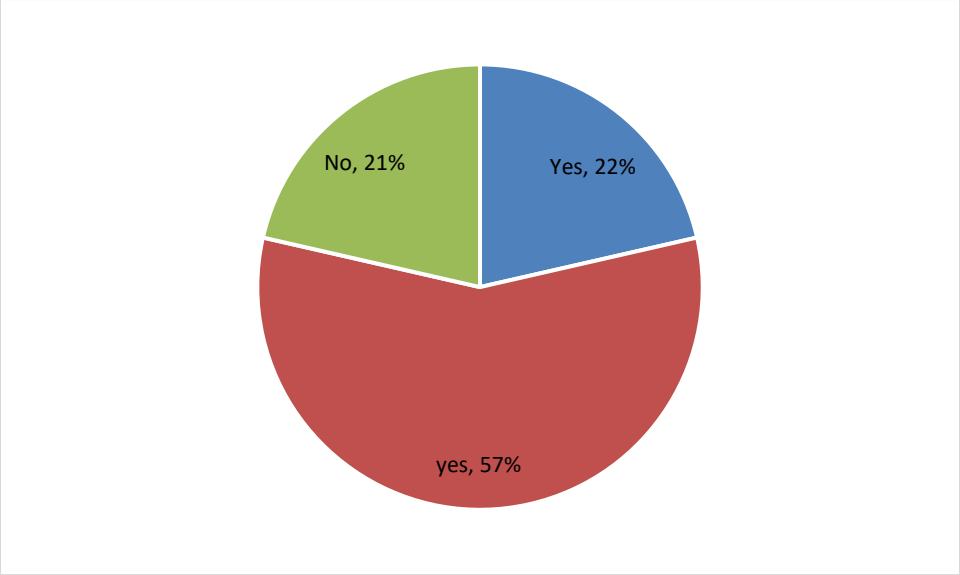
Q1.2. Please explain why you are not sure.

No respondents had additional actions or steps to address their concerns regarding Question 1, on the preferred route.

Q2. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT POTENTIAL EFFECTS ON AGRICULTURE IN THE AREA?

- Nearly three fifths (57%) of respondents did not feel that the information provided addressed their concerns about potential effects on agriculture in the area.

Figure 2. Information address concerns about agriculture in the area.



n=14

Q2.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 2.1 asked respondents to share their opinions and to suggest additional steps to address their concerns about agriculture in the area. Some of the respondents shared concerns for:

Table 2. Concerns about agriculture.

Concern	Comments
Cost of Hydro using property.	*"paying taxes on land that is used by Hydro and unavailable to me does not seem reasonable. The size of the easement prevents further development of this property"* *"structure impact compensation and land compensation are one time only payments that have a YEARLY impact on the farmer/operator in perpetuity. That is not realistic as future owner/operators will not have any benefits of the "compensation". With regards to the compaction of the soil with the traffic on the fields during construction...that affects productivity, and does not resolve in a year. The structure impact compensation does not pay the taxes on the land that they take up, we do; EVERY year! We are farming organically and know that chemical weed control under these structures is contracted out and we could get sprayed either on purpose or accidentally; which would affect our ability to market our organic product."*
Different route and more consultation.	*"Why not run the transmission line further north along the existing transmission corridor D54C. Yes it will cost more but have much less impact."* *"The phrases: "will work with" is used a lot. There is no guarantee of timely resolution; there is an element of inequity to the process, i.e. depending on negotiating skills (and resources), one landowner may receive a much greater level of compensation. I also speak to route adjustments for an unregistered airstrip weighed against the removal of a mature shelterbelt in another segment."*
Concerns on environmental impact.	*"This is an organic farm and the placement of easements and towers will interfere with the building of a home that I plan"* *"On an organic farm no pesticidesare allowed on the land for weed control. There is no mention of this issue"*

n=6

Q2.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

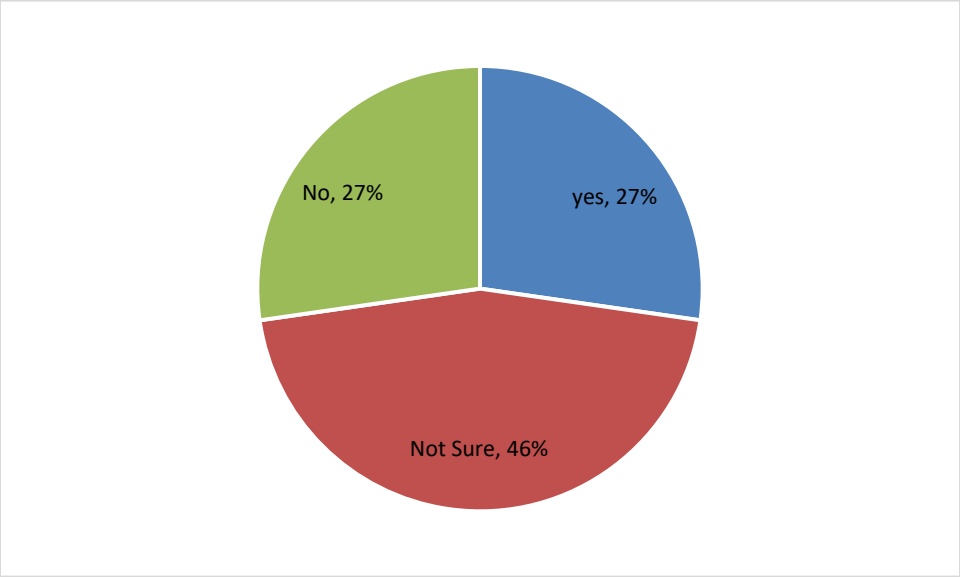
Question 2.2 asked respondents to suggest additional actions or steps to address their concerns about agriculture in the area. One respondent shared:

"*Ne of portage the line takes a detour south to avoid a runway that is proposed. Seems crazy to add an extra few miles of line for a maybe.*"

Q3. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT HERITAGE IN THE AREA?

- Similar numbers (27%) of respondents shared that the information did and did not address their concerns they have about heritage in the area. Over two fifths (46%) were not sure if the information addresses their concerns regarding heritage in the area.

Figure 3. Concerns about heritage in the area.



n=11

Q3.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 3.1 asked respondents to share their opinions and to suggest additional steps to address their concerns about heritage in the area. Some of the respondents shared concerns for:

"*This is our family farm and I feel that this new line will impact our future development of the farm*"

"*Removal of an existing shelterbelt line , on this organic farm is criminal*"

"*Part of our property is slated to be registered with the Nature Conservancy. The established tree lines are corridors for wildlife.*"

n=3

Q3.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 3.2 asked respondents to suggest additional actions or steps to address their concerns about heritage in the area. Two respondent shared:

"*I am grateful St. Paul's will not be impacted. Regarding cultural artefacts, are there existing protocols that must be followed?*"

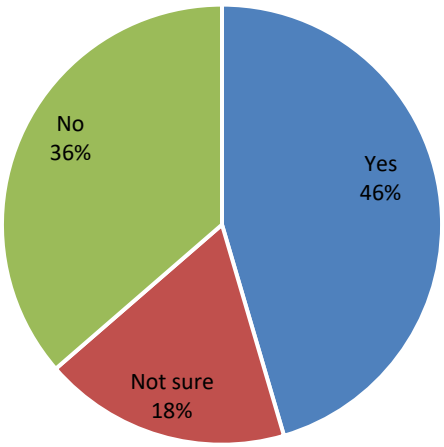
"*What about land that is in nature Conservancy?*"

n=2

Q4. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT THE ECONOMY IN THE AREA?

- Nearly half (46%) of the respondents shared that the information provided addressed their concerns about the economy in the area. While, over a third (36%) of the survey respondents did not find that the information addressed their concerns about the economy in the area.

Figure 4. Concerns about the economy.



n=11

Q4.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 4.1 asked respondents to share their opinions and to suggest additional steps to address their concerns about the economy in the area. Some of the respondents shared concerns for:

Table 4. Concerns about the economy in the area.

Concern	Comments
Use a different location and concerns about environment.	"*Why can the line not be moved further south of the CPR rail line and not destroy our shelterbelt that is fixing carbon, preventing soil erosion, retaining water, and providing shelter from the wind.*" "*What about the effects and impacts of all these lines(in addition to existing lines) crisscrossing prime agricultural lands and operations?*"
Worries about personal property and taxes on Hydro land use.	"*What about the plans that I have for this farm? The towers will impede where I am able to work and situate buildings. I still have to pay land taxes on the tower areas!*" "*Why do we have to pay land taxes on the land that is taken up by the towers?*"

n=4

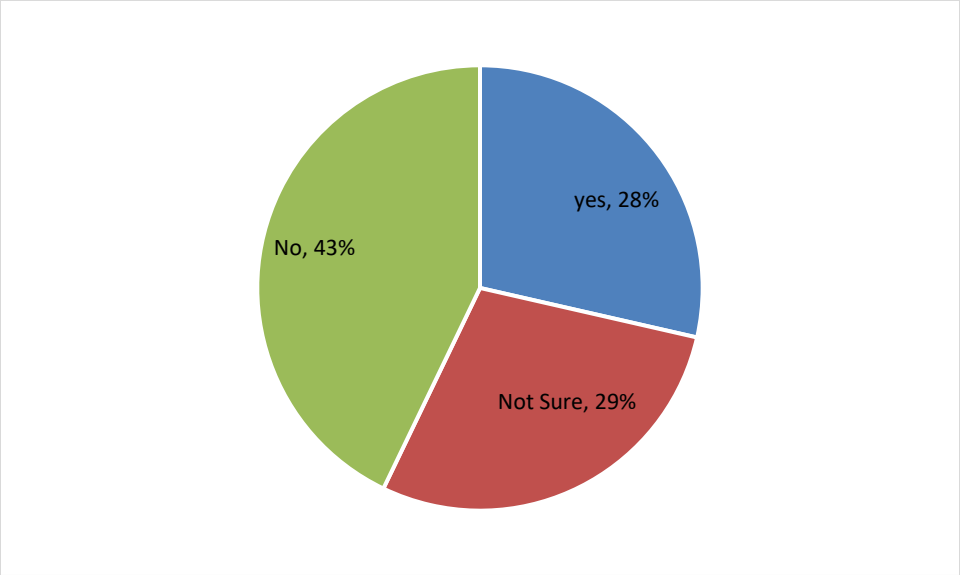
Q4.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

No respondents had additional actions or steps to address their concerns regarding Question 4.1, on the economy in the area.

Q5. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT HUMAN HEALTH?

- Over two fifths (43%) of the survey respondents did not find that the information addressed their concerns about human health.

Figure 5. Concerns about human health.



n=14

Q5.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 5.1 asked respondents to share their concerns and to suggest additional steps to address their concerns about human health. Some of the respondents shared concerns about:

Table 5. Concerns about human health.

Concern	Comments
Worried about environmental impact.	"*We have no proof that the EMF readings are what you say they are in this area or what they will be with the New 230KV line*" "*There is still uncertainty that large amounts of EMF from high voltage does not cause long term problems.*" "*Get an EMF reader and tell us what the EMF will be with all three lines on that road and farm. I have 3 children.*" "*On one of Manitoba Hydro's own publications, they state that currently, Canada has no guidelines or standards for exposure limits to low frequency EMFs. That appears to contradict the information above where you refer to national recommendations. There is no mention of recording baseline levels before construction and readings after construction. The rental of a device to take these measurements is a miniscule expense in the scheme of a multi-million-dollar project, if it serves to allay psychological stress.*"

> "*Have EMF reading equipment available for homeowners to borrow so they can read and know their exposure. We have two residences very close to the proposed new line. Our lane exits onto 2 mile road. We already have 2 lines going down 2 mile road. An H- Line 115Kv on one side; and a single pole line that feeds us locally on the other side of the road. This is a lot of electrical traffic for us to handle.*"
>
> "*Why can't the background EMF reading be given to us before the line goes up?*"

n=6

Q5.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 5.2 asked respondents to suggest additional actions or steps to address their concerns about human health. Two respondent shared:

"*Unsure if "recommended" limits means anything*"

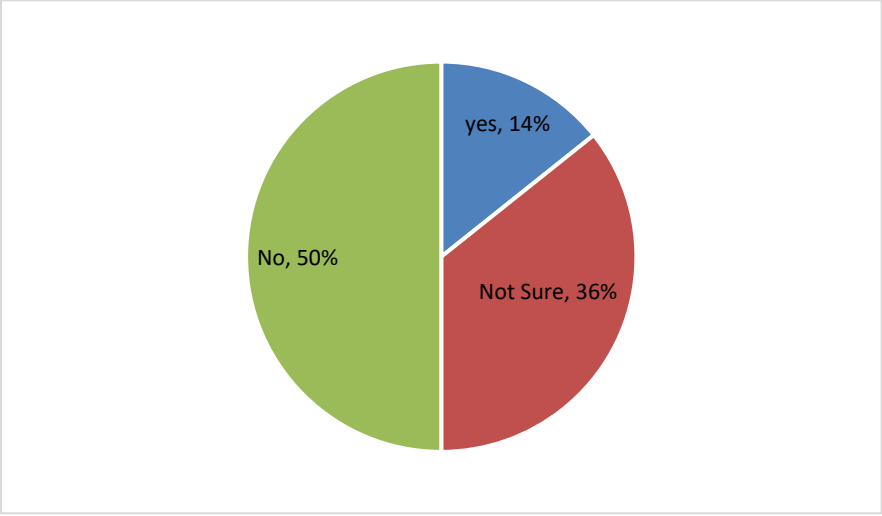
"*So we will be notified so we can prepare for noise and traffic increases? How about attempting to reduce noise and traffic instead of us having to live with it?*"

n=2

Q6. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT COMMUNITY HEALTH?

- Half (50%) of the survey respondents did not find that the information addressed their concerns about community health.

Figure 6. Concerns about community health.



n=14

Q6.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 6.1 asked respondents to share their concerns and to suggest additional steps to address their concerns about community health. Some of the respondents shared concerns about:

Table 6. Concerns about human health.

Concern	Comments
Worried about high voltage impact.	"*Could a monitoring of the EMF be done and given to us?*" "*I have been close to high voltage lines during very humid weather. The corona that radiates of the lines would be very unsettling if it was near my house.*"
Living close to the route.	"*My parents live approx 100 meters from this new proposed line and my house is closer approx 80 meters*" "*The visual imposition of transmission lines is only increasing on the landscape. Because St. Francois Xavier is "in the way" of power that must move from Dorsey westwards to supply western Manitoba, the visual landscape can only be expected to darken with transmission lines. Your session did not address these cumulative effects, which will also impact migratory birds in our municipality's airspace.*" "*It is going to come far too close to our house and the health and visual affects will be overwhelming.*" "*You have not changed the route by our 2 dwellings.*" "*We have two homes close by this proposed route 100 meters from the 2 mile road.*"

n=7

Q6.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 6.2 asked respondents to suggest additional actions or steps to address their concerns about community health. One respondent shared:

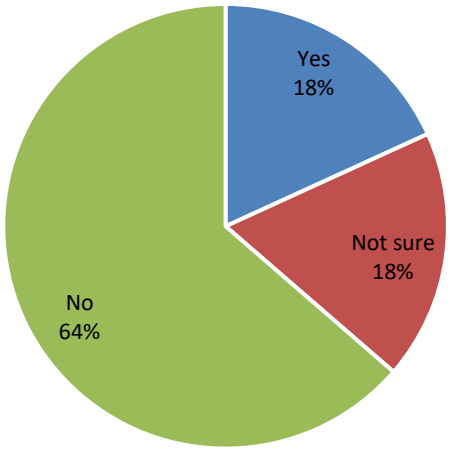
"*i mean the visual aspect of it is just sad to see to be honest*"

n=1

Q7. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT POTENTIAL EFFECTS ON VEGETATION?

- Nearly two thirds (64%) of the survey respondents did not find that the information addressed their concerns about the potential effects on vegetation.

Figure 7. Concerns about effects on vegetation.



n=12

Q7.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 7.1 asked respondents to share their concerns and to suggest additional steps to address their concerns regarding the effects on vegetation. Some of the respondents shared concerns about:

Table 7. Concerns regarding effects on vegetation.

Concern	Comments
Local Environment and concern about the trees and shelterbelt.	"*Please move the route not to destroy the shelterbelts and wetlands of this area.*" "*it is know to have a big effect also on weather or rain developments in some areas not getting the rain they used to get because they're cut off by the line...is it bogus? idk...but it's potentially true*"

"*Saying that a shelterbelt will be replaced sounds like you don't understand what a mature tree stand involves. Replanting with twigs that need to be watered, mulched and weeded is no small task...takes years*"

"*The preferred route will remove a mature shelterbelt. The valued component of sustainable land practice is being casually dismissed. A shelterbelt takes a human generation to mature. The owners will see a generation of care destroyed. You did not address conservation agreements as to how these are addressed - only that you would review the issue.*"

"*Our land is in the middle of an agreement with Nature Conservancy since 2019. Please give us a detailed account of how a mature carbon sequestering shelterbelt can be "replanted" and "established".*"

"*Compensation or re-establishment of our shelterbelts and corridors will take years to do....They are currently sequestering carbon, holding water and providing habitat. Who will establish these shelterbelts if they are to be re-started somewhere else. Do you water, weed and mulch them for those years?*"

"*Very concerned about my mature trees on north side of yardsite. I can't imagine how replacing or paying for trees can replace mature wind break*"

n=7

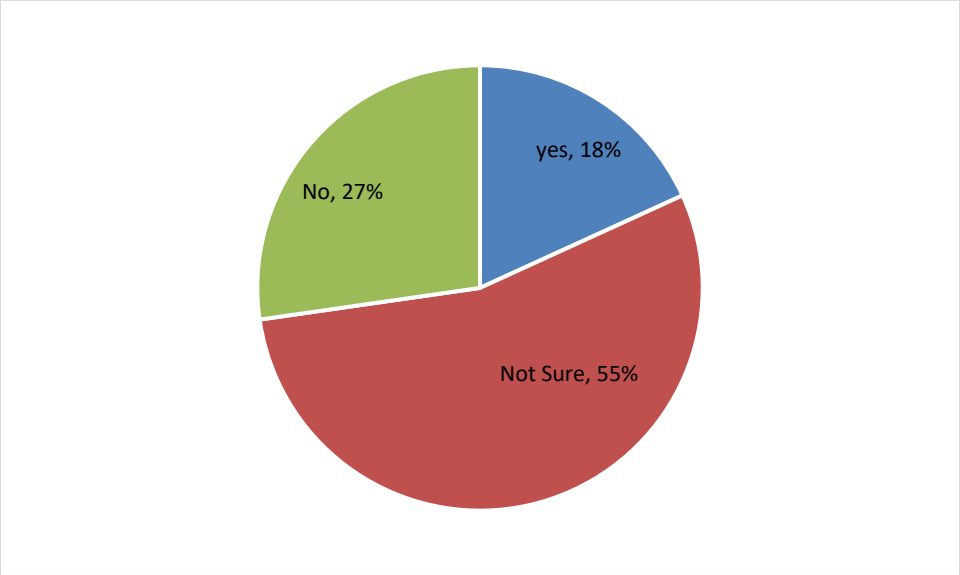
Q7.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

There were no relevant comments for additional actions or steps to address concerns on the potential effects on vegetation.

Q8. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT POTENTIAL EFFECTS ON TRADITIONAL PURSUITS?

- Over half (55%) of the respondents were not sure if the information provided to them on the potential effects on traditional pursuits addressed their concerns.

Figure 8. Concerns about effects on Traditional Pursuits.



n=11

Q8.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 8.1 asked respondents to share their concerns and to suggest additional steps to address their concerns regarding traditional pursuits. Some of the respondents shared concerns about:

"*Since the preferred route does not cross Assiniboine River because of impacts to aquatic life, how do we know it will not impact wildlife?*"

"*What about my traditional pursuits?*

"*The words "review" and "assess" and "will be developed" express only intention. Indigenous peoples have been drowned (literally and figuratively) in Hydro intentions.*

n=3

Q8.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 8.2 asked respondents to suggest additional actions or steps to address their concerns on the potential effects on traditional pursuits. Respondents share their concern with:

"*You acknowledge Metis and Indigenous rights but there was no notification or public knowledge made available.*"

"*Why is our land designated as Metis Harvesting Area?*"

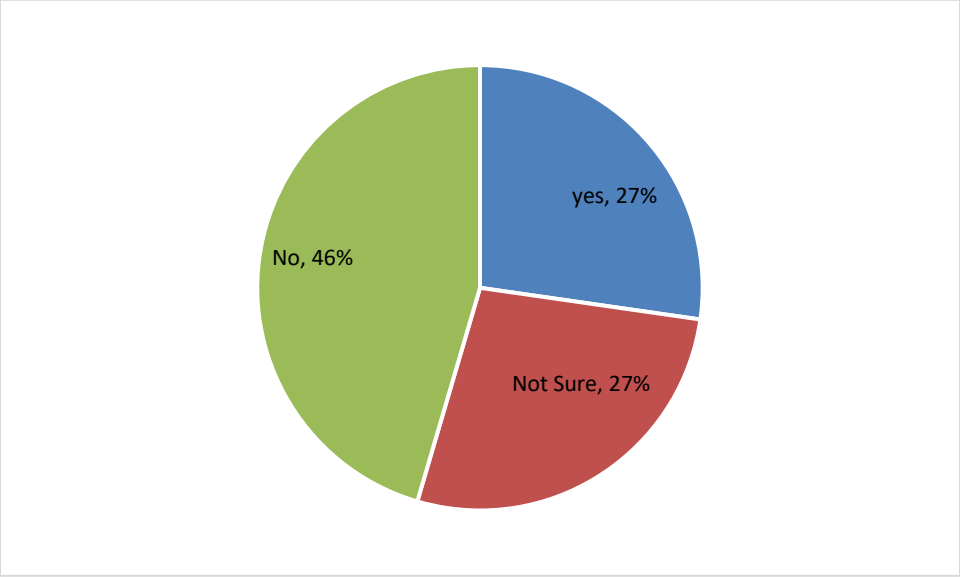
"*Line avoids reserve land. I don't see how this is required*"

n=3

Q9. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT POTENTIAL EFFECTS ON THE AQUATIC ENVIRONMENT?

- There were few respondents (27%) who identified that the information addressed their concerns about the aquatic environment. Under half of respondents (46%) did not find the information provided sufficient to address their concerns of aquatic environment.

Figure 9. Concerns about the aquatic environment.



n=11

Q9.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 9.1 asked respondents to share their concerns and to suggest additional steps to address their concerns regarding the aquatic environment. Some of the respondents shared concerns about:

Table 9. Concerns about the aquatic environment.

Concern	Comments
Local Environment concerns.	"*When there is a easement you will have access any time that you need to repair, build or monitor the line and towers. What about soil compaction, chemical weed control on the tower bases. This is and organic farm; and soil compaction is a big problem with clay based soils*" "*Wetlands and their preservation is important to soil health and water preservation. Don't mess with this.*" "*No comments were given with respect to how tower bases act in flood situations. I am thinking particularly in areas prone to overland flooding and how tower bases may divert water to the detriment of habitat (the forming of erosive channels), also rural roads. To what elevation are tower bases aligned?*" "*We are in a flood zone.*" "*How will tile drained fields be managed with tower construction*"

n=5

Q9.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 9.2 asked respondents to suggest additional actions or steps to address their concerns on the aquatic environment. A respondent share their concern being:

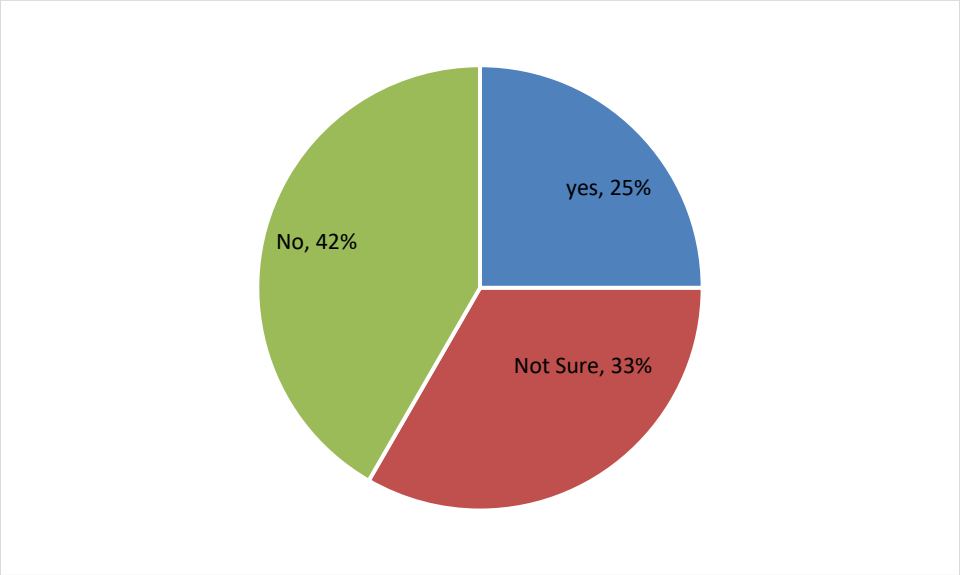
"*We have wetlands on our farm- the proposed site of the new line.*"

n=1

Q10. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT WILDLIFE AND WILDLIFE HABITAT?

- There were few respondents (25%) who identified that the information addressed their concerns about the wildlife and wildlife habitat. Under half (42%) of respondents, did not find the information provided sufficient to address their concerns of the wildlife and wildlife habitat in the area.

Figure 10. Concerns about wildlife and wildlife habitat.



n=12

Q10.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 10.1 asked respondents to share their concerns and additional actions or steps for the wildlife and wildlife habitat. Some of the respondents shared concerns about:

Table 10. Concerns for wildlife and wildlife habitat.

Concern	Comments
Shelterbelt, environmental concerns, and migratory patterns.	"*Taking out an established shelterbelt and EMF interference on honey bees and reduced honey production under or near these lines is a potential problem*" "*How can multiple lines, EMF, and destruction of trees lines help the migration of geese?*"

"*Again, with the expected demand for power to only increase, transmission lines will increase across the rural municipality of St. Francois Xavier, which stretches westward from Dorsey. The cumulative effects include migratory bird routes. Birds don't confine themselves to a cluster of trees (Grants) or a river route. The removal of a 1600 tree shelterbelt (a wildlife/bio-corridor) will further fragment the landscape, a goal its stewards were attempting to overcome. Even if Hydro makes the token gesture of replanting somewhere else, that habitat is gone for a generation, in which time wildlife will seek other scarce habitat, moving away from the area.*"

"*We are in a goose and duck migratory area as they make their way to the marshes by Lake Manitoba 20 min north of us.*"

"*Taking out a shelterbelt and tree corridor does not help the birds and other wildlife. We are on a migratory path for geese, ducks heading toward the marsh, and they always use our fields and wetlands as resting areas.*"

n=5

Q10.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 10.2 asked respondents to suggest additional actions or steps to address their concerns on wildlife and wildlife habitat. Respondent share their concern being:

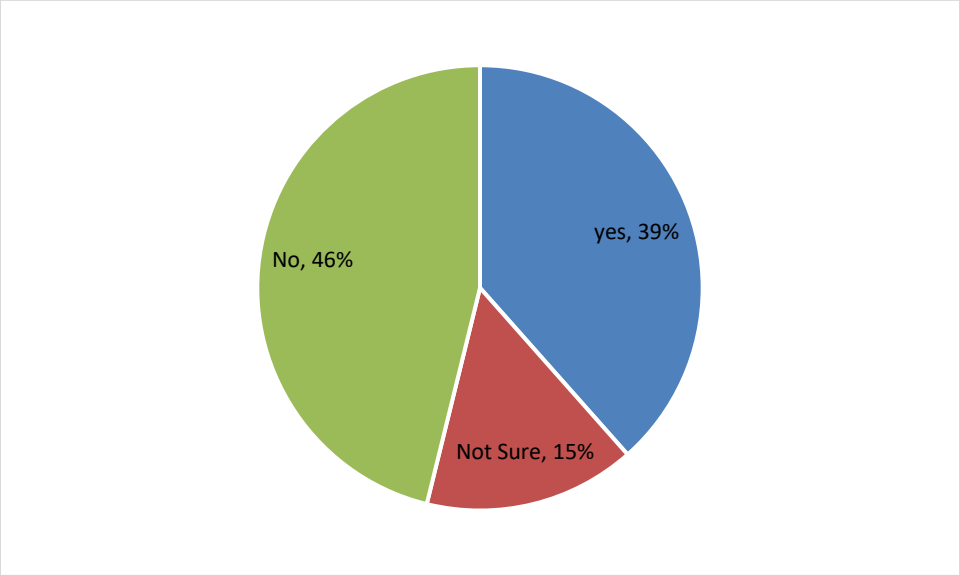
"*We are on a migratory flight path.*"

n=1

Q11. DID THIS INFORMATION ADDRESS CONCERNS YOU HAVE ABOUT POTENTIAL EFFECTS ON AESTHETICS IN THE AREA?

- Nearly half (46%) of the respondents did not find that the information addressed concerns they have on potential effects on aesthetics in the area. Forty per cent of the respondents did feel that the information helped address their concerns about potential effects on the aesthetics of the area.

Figure 11. Concerns about aesthetics in the area.



n=13

Q11.1. Please explain your concerns. Can you suggest additional actions or steps to address your concerns?

Question 11.1 asked respondents to share their suggestions on how to address their concerns.

Table 11. Concerns on aesthetics in the area.

Concern	Comments
Aesthetics.	*"A tower is a tower. The RM of St Francois Xavier has only riparian areas and agricultural fields, with occasional bluffs of trees. The preferred route avoids the length of the Assiniboine and associated forest as well as Grant Wildlife area. The towers will become a permanent fixture in the view-scape. A tower cannot be hidden and it will be a constant reminder of what will only be increased in the future."* *"You cannot reduce the visual impact the line will have at this location."*

	"You will not be able to keep your new line within existing right of ways because of the existing lines on both sides of the road."
Environment concerns.	*"Loss of trees and shelterbelts is not about aesthetics, it is essential for the environment"*
Impact on personal property.	*"This line will transect our property of 240 acres river lots 103-108/9 (approx2 miles long) is only 300 -600 meters deep"* *"We already have a 115KV line running along two mile road as well as our single pole line on the other side of the road…that is enough."*

n=1

Q11.2. Please explain why you are not sure. Can you suggest additional actions or steps to address your concerns?

Question 11.2 asked respondents to share actions or steps to address their concerns. One respondent identified that:

"We *should be compensated for having our view ruined forever*"

n=7

Q11.3. Please provide your comments or questions.

Question 11.3 asked respondents to share their comments or questions for the project.

Table 11. Comments or questions on the project.

Concern	Comments
Change the route.	*"Why can't the preferred route be changed to be on the other side of the railway?"* *"We proposed an alternative route south of the CPR line; It is a very small curve to the proposed route. It would alleviate a lot of the environmental problems."*
More clear communication and engagement.	*"Your maps do not separately show all the pre-existing hydro lines; their capacity and frequency that they cross the land. Also, the CPR track is not shown."* *"Just would like to be informed more about the exact numbers"* *"We are not convinced our concerns will be addressed."*

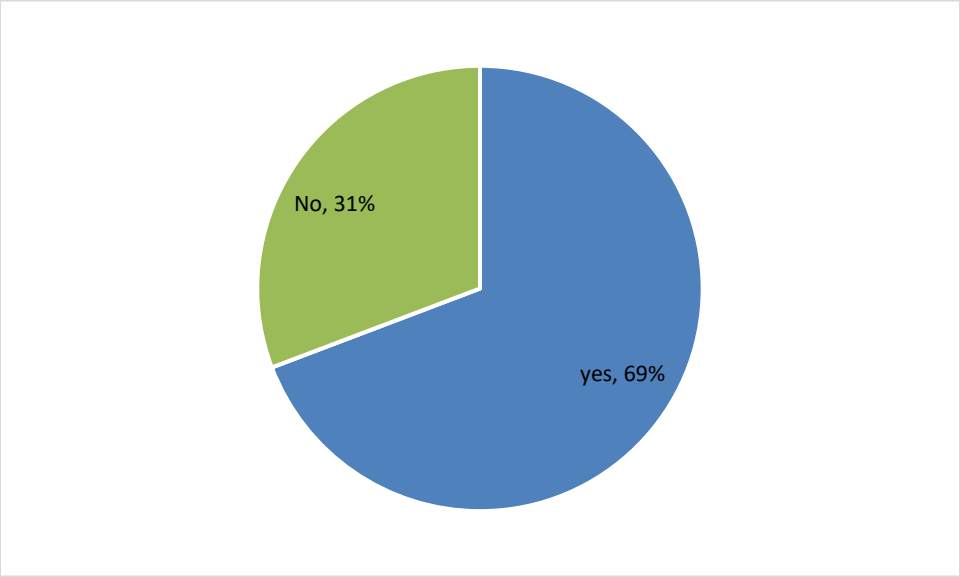
	"Why does it take so long to get answers about proposed changes to this route?"
Route should be cheapest and as short as possible.	*"Follow the shortest route possible and build the line as cheaply as possible. Idiotic transmission lines like Bipole III waste vast sums of taxpayer money for no logical reason. I would like to know if the line will be built on land that we farm what we will get for compensation? price per acre has to be what is being paid in the area not old prices from way back when and also potential crop damage?"*
Paying for towers on personal land.	*"The one time easement and structure fees are not feasible. We are still responsible for paying taxes on land that you have your towers on!"*
Concerns about towers on land.	*"please do not transect this property as I will be setting up a community shared agriculture project here when I take over the farm."*

n=9

Q12. DO YOU HAVE ANY ADDITIONAL COMMENTS OR QUESTIONS ABOUT THIS PROJECT?

- Nine (69%) of respondents identified that they wanted to share their comments or questions about the project.

Figure 12. Additional comments or questions.

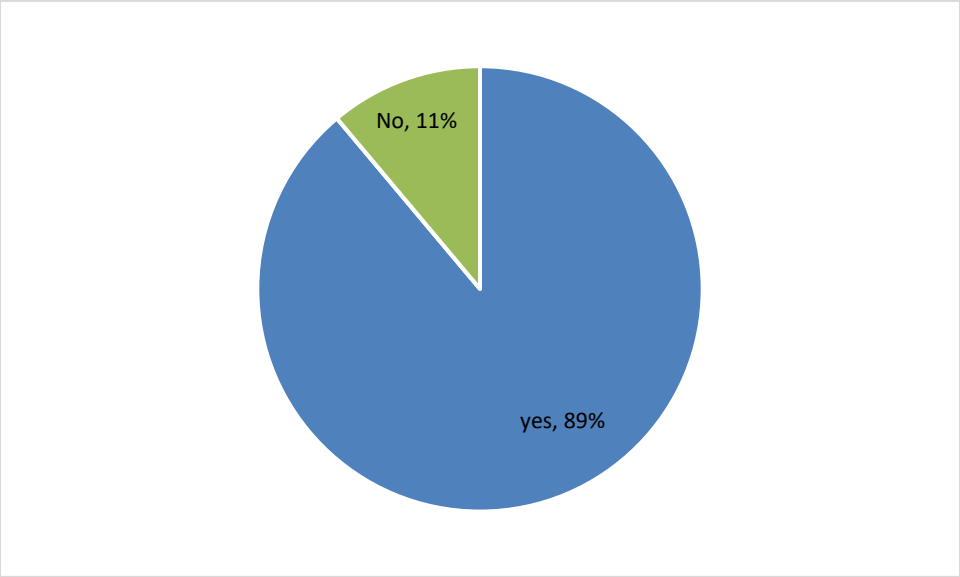


n=13

Q12.1. Would you like to be contacted by the project team to discuss your questions or concerns?

- Most of the respondents (89%) identified that they would like to be contacted by the project team to address their questions and concerns.

Figure 12.1. Would like to be contacted by project team.



n=9

The remaining questions were optional demographic questions to ask participant gender, age, income, connection to the project, and other identity factors. The results of these questions have been removed for confidentiality purposes.

Online feedback portal Round 2 maps

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Project

Project Infrastructure

- Final Preferred Route

Public Feedback Submissions

- Point of Interest

Feature: organic farm shelterbelt
Category: Important
Details: shelterbelt

Feature: shelterbelt
Category: Important
Details: mature shelterbelt that extends approximately 2 miles along this routealong from

Feature: Planned irrigation expansion
Category: Important
Details: Planning to expand water license 2014-048 to include this newly acquired section for irrigated potatoes and corn

Feature: route
Category: Other
Details: Looks good, this is the most common sense route to take, with the least environmental damage overall.

Feature: Tile Drainage
Category: Important
Details: Tile drainage with lift station installed

Feature: Planning irrigation expansion
Category: Important
Details: Planning to expand water license 2014-048 to include this newly acquired section for irrigated potatoes and corn

Woodlands
Warren
Portage la Prairie
Dakota Tipi
Southport
Long Plain
St. François Xavier
Starbuck
South Head

Metis Harvesting Area covers entire map

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 4, 2022

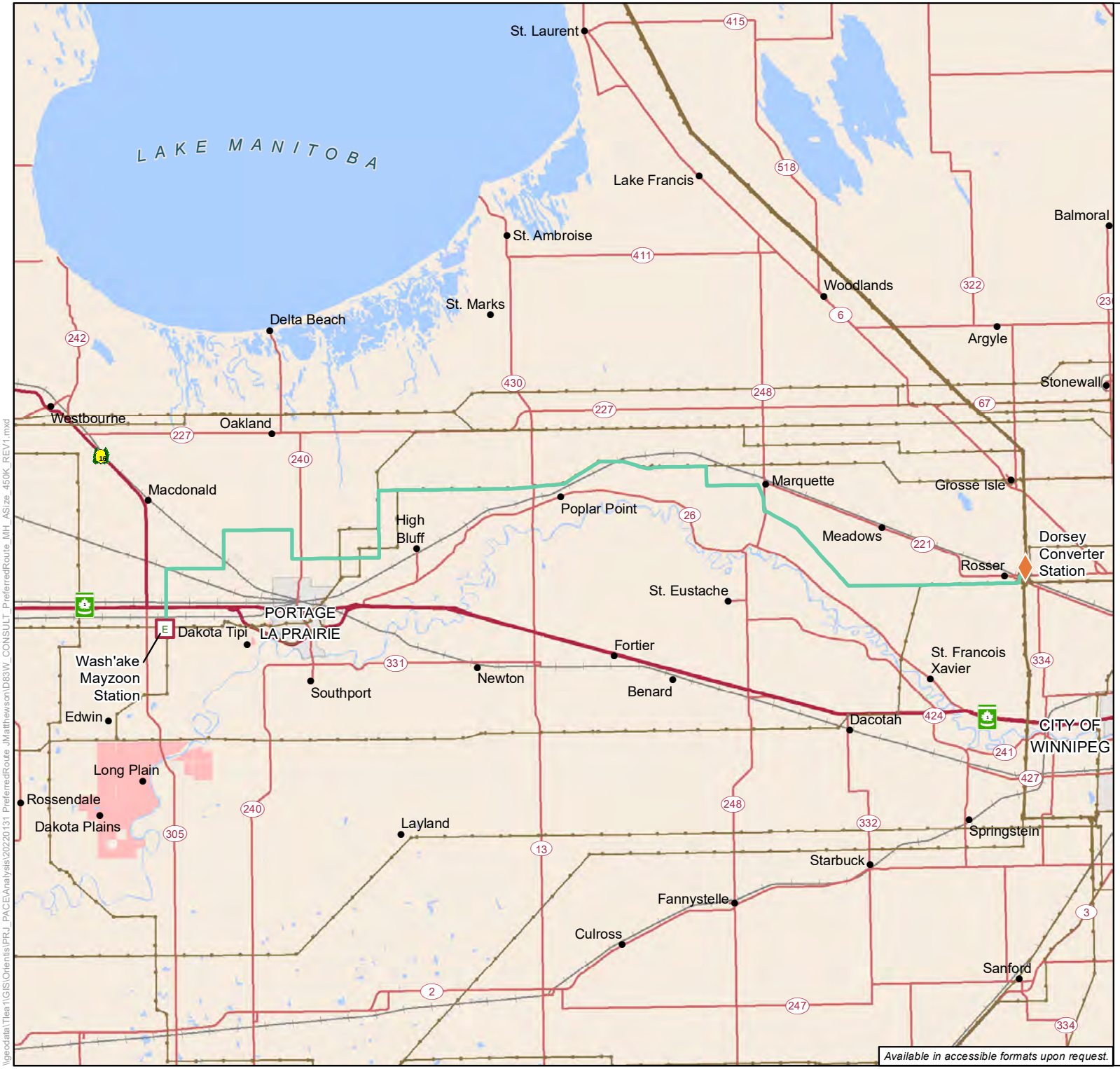
0 2.5 5 10 Kilometres
0 2 4 8 Miles

1:400,000

D83W Feedback Portal Round 2 Comments

Draft: For Discussion Purposes Only

Preferred route maps



Manitoba Hydro

D83W Transmission Project

Preferred Route

- Preferred Route

Project Infrastructure

- Wash'ake Mayzoon Station

Existing Infrastructure

- Converter Station (Existing)
- Transmission Line (≥115 kV)

Landbase

- Community
- Trans Canada Highway
- Road
- Railway Line
- City
- First Nation

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: February 09, 2022

N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Preferred Route

Available in accessible formats upon request.

Draft: For Discussion Purposes Only

\\geodata\Tlea1\GIS\Orients\PRJ_PACE\Analysis\20220131 PreferredRoute_JMatthewson\D83W_CONSULT_PreferredRoute_MH_ASize_450K_REV1.mxd

Manitoba Hydro

D83W Transmission Project

Project Infrastructure

- Wash'ake Mayzoon Station
- Preferred Route

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, February 9, 2022

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Available in accessible formats upon request.

Preferred Route

Index Map

Map 1

Manitoba Hydro

D83W Transmission Project

Project Infrastructure

- Wash'ake Mayzoon Station
- Preferred Route

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

R.M. of Woodlands
Marquette
R.M. of Rosser
R.M. of St. François Xavier
R.M. of Portage la Prairie
R.M. of Cartier
St. Eustache

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, February 9, 2022

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Available in accessible formats upon request.

Preferred Route

Index Map

Map 2

Manitoba Hydro

D83W Transmission Project

Project Infrastructure

- Wash'ake Mayzoon Station
- Preferred Route

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

R.M. of Woodlands
R.M. of St. François Xavier
Poplar Point
R.M. of Cartier
R.M. of Portage la Prairie
High Bluff
227
430
26

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, February 9, 2022

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Available in accessible formats upon request.

Preferred Route

Index Map

Map 3

Manitoba Hydro

D83W Transmission Project

Project Infrastructure

- Wash'ake Mayzoon Station
- Preferred Route

Infrastructure

- Transmission Line
- Dorsey Converter Station

Landbase

- Provincial Trunk Highway
- Provincial Road
- Road (Other)
- Rail
- Rural Municipality
- First Nation
- Wildlife Management
- Community Pasture

Entire map area falls within Métis Natural Resource Harvesting Zone.

R.M. of Portage
la Prairie

City of Portage
la Prairie

Long Plain
First Nation

Dakota Tipi
First Nation

Dakota Tipi

WASH'AKE
MAYZOON
STATION

240

26

Available in accessible formats upon request.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: Wednesday, February 9, 2022

N

0 1 2 Kilometres
0 0.5 1 Miles

1:20,000

Preferred Route

Index Map

Map 4

Summary of First Nation and Métis engagement activities

Summary of First Nation and Métis engagement activities

The following tables provide a summary of engagement activities that took place with each engaged First Nation, the Manitoba Métis Federation, and the Portage Urban Indigenous Peoples Coalition through the FNMEP for the D83W Project.

Summary of Engagement Activities with Brokenhead Ojibway Nation (BON)

Date	Activity	Brief Description of Activity
Pre-Engagement		
24-Sep-2021	Email	Manitoba Hydro sent an email invitation for an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sept-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to BON representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting.
12-Nov-2021	Email	Manitoba Hydro sent an email to a BON representative following up on their interest in meeting to discuss route segment preferences and concerns.
15-Nov-2021	Email	BON sent Manitoba Hydro an email advising that they will not be participating in engagement activities related to the PACE projects but encourage engagement of communities in the Portage area.
15-Nov-2021	Email	Manitoba Hydro advised that they would take BON off the engagement list for D83W but remain open to feedback throughout the Project and will inform of milestones.
Round 2		
10-Feb-2022	Email	A Manitoba Hydro representative sent an email to BON representatives sharing the preferred route and noting the start of Round 2 engagement. Various ways to participate were shared and Manitoba Hydro inquired whether there was interest in virtual meeting to discuss the preferred route.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to BON announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
19-Aug-2022	Email	Manitoba Hydro emailed representatives of BON, announcing the final preferred route for the Project (and announcing the issuance of a licence for BP 6/7).

25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
4-Nov-2022	Email	A representative of BON sent an email to a representative of Manitoba Hydro to advise that BON's office would be closed on Nov. 8, 2022 in observance of Indigenous Veterans' Day.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.

Summary of Engagement Activities with Dakota Plains Wahpeton First Nation (DPWFN)

Date	Activity	Brief Description of Activity
Pre-Engagement		
24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
Round 1		
26-Oct-2021	Letter	Manitoba Hydro began Round 1 engagement with DPWFN by sending a letter by mail, which included a map of alternative route segments and extended an offer to arrange a virtual meeting.
08-Nov-2021	Email	A Manitoba Hydro representative sent an email to the new Chief of DPWFN requesting a meeting to discuss current transmission projects, including D83W.
15-Nov-2021	Email	Manitoba Hydro sent an email to DPWFN representatives to follow up on Round 1 correspondence and offer to schedule a virtual meeting.
17-Nov-2021	Phone call	A Manitoba Hydro representative called DPWFN to confirm if correspondence related to D83W had been received and gauge interest in a virtual meeting. The DPWFN representative offered to forward the information to the Chief.
17-Nov-2021	Email	Manitoba Hydro followed up to the phone conversation with a DPWFN representative, redistributing Round 1 correspondence for D83W and offering to schedule a virtual meeting.
Round 2		
10-Feb-2022	Email	A Manitoba Hydro representative emailed representatives of DPWFN to announce the preferred route for D83W and introduce the different avenues for Round 2 engagement, including extending an offer to meet virtually.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to DPWFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.

2-Mar-2022	Phone call attempts	A Manitoba Hydro representative attempted to call DPWFN to follow up on correspondence about the D83W preferred route and determine if there is interest in a virtual meeting to discuss the project. No answer at any of the 5 extensions provided on the band office automated message. No voicemail options were available.
9-Mar-2022	Voicemail	A Manitoba Hydro representative called a DPWFN representative to follow up on D83W preferred route correspondence and whether there is interest in a virtual meeting, advising that Manitoba Hydro hasn't managed to establish contact through the and office phone number. A voicemail message was left.
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of DPWFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation.
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.

Summary of Engagement Activities with Dakota Tipi First Nation (DTFN)

Date	Activity	Brief Description of Activity
Pre-Engagement		
24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
07-Oct-2021	Meeting	DTFN representatives participated in the heritage workshop intended to inform development of the heritage program for the PACE projects.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to DTFN representatives with initial project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
7-Oct-2021	Meeting	Representatives of Manitoba Hydro and DTFN met virtually to discuss the ICAC position and financial reporting process.
15-Oct-2021	Email	Manitoba Hydro sent two emails to DTFN representatives sharing draft meeting notes from the October 7, 2021 heritage meeting and recapping an October 7, 2021 meeting to discuss the ICAC position and financial reporting process.

26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting with leadership.
9-Nov-2021	Email	Manitoba Hydro sent an email to DTFN representatives requesting a virtual meeting to review route segments and discuss preferences and/or concerns of each.
9-Nov-2021	Email	Manitoba Hydro emailed DTFN to follow up on remaining action items from the October 7, 2021 financial meeting.
12-Nov-2021	Email	Manitoba Hydro sent an email to a DTFN representative to see if a potential meeting date to discuss D83W segments with the community has been confirmed.
12-Nov-2021	Phone call	A DTFN representative called a Manitoba Hydro representative to advise that a date for a virtual meeting to discuss D83W segments and preferences could be confirmed next week.
16-Nov-2021	Email	A Manitoba Hydro representative sent an email to the DTFN ICAC to advise of the 2 upcoming routing workshops and to inquire whether there is a holiday closure period to be aware of before confirming the date of the first workshop.
18-Nov-2021	Email	A Manitoba Hydro representative sent an email to a DTFN representative to inquire as to the status of the financial package they are to submit related to the ICAC.
24-Nov-2021	Email	A Manitoba Hydro representative sent an email to the DTFN ICAC to follow up on Round 1 input or if the community wants to virtually meet.
26-Nov-2021	Email	The DTFN ICAC sent an email to a Manitoba Hydro representative to note that Dakota Tipi should be able to share feedback on D83W segments before December 1, 2021.
30-Nov-2021	Email	The DTFN ICAC sent an email to a Manitoba Hydro representative sharing Round 1 preferences for D83W including photos.
3-Dec-2021	Email	Manitoba Hydro sent a meeting invitation for the 1st of 2 D83W Community Perspective Routing Workshops, scheduled December 16th, 2021.
3-Dec-2021	Email	Manitoba Hydro sent a "Save the Date" for the 2nd of 2 D83W Community Perspective Routing Workshops, scheduled January 13, 2022.
14-Dec-2021	Meeting	The DTFN ICAC participated in a pre-meeting to the D83W routing workshops, which provided an opportunity for participating FNMEP nations to share and understand one another's feedback and preferences, if interested.
16-Dec-2021	Meeting	The DTFN ICAC participated in the 1st Community Perspective Routing Workshop.
Round 2		
13-Jan-2022	Email	A Manitoba Hydro representative sent an invite to a virtual meeting to discuss DTFN's perspectives and scores of the four D83W route alternatives in preparation for the Jan. 27, 2022 routing workshop.

13-Jan-2022	Email	A Manitoba Hydro representative emailed the DTFN ICAC to inquire as to whether there was interest in a virtual meeting to look over the alternative route options and to compile DTFN's perspectives and scores for each route.
14-Jan-2022	Meeting	A Manitoba Hydro representative met with the ICAC from DTFN to discuss DTFN's scoring of the route alternatives in preparation for the Jan. 27, 2022 Community Preference team meeting.
17-Jan-2022	Email	The DTFN ICAC emailed a Manitoba Hydro representative to say thank you for sending the notes from the Jan. 14, 2022 virtual meeting about DTFN scores of the route alternatives.
17-Jan-2022	Email	A Manitoba Hydro representative sent an email to the DTFN ICAC following up on the Jan. 14, 2022 meeting and providing notes of DTFN's proposed route scores and rationale for DTFN to review and edit so it accurately captures DTFN's perspectives.
19-Jan-2022	Email	A Manitoba Hydro representative shared an email invite for an upcoming Community Preference meeting.
20-Jan-2022	Meeting	Representatives of Manitoba Hydro, DTFN, and HTFC met to discuss DTFN's Indigenous Knowledge Study in the Portage area.
21-Jan-2022	Email	A consultant working with DTFN on their IK study for PACE sent an email to the DTFN ICAC and Manitoba Hydro representatives listing the action items from the Jan. 20, 2022 meeting.
25-Jan-2022	Email	The DTFN ICAC emailed a Manitoba Hydro representative confirming that the DTFN scores captured in the meeting on Jan. 14, 2022 were accurate.
25-Jan-2022	Email	A Manitoba Hydro representative emailed the DTFN ICAC to inquire whether there were any revisions to the route alternative scores in advance of the Jan. 27, 2022 Community Perspective Routing Workshop.
27-Jan-2022	Meeting	DTFN representatives participated in the second Community Perspective routing workshop to discuss the rationale and scoring from DTFN for the four route options and hear what the route preferences were from others who attended.
31-Jan-2022	Phone call	The DTFN ICAC called a Manitoba Hydro representative to discuss issues with missing timesheets for PACE and a plan for pulling together some retroactive time reports.
2-Feb-2022	Email	A Manitoba Hydro representative emailed a representative of DTFN and their TK consultant following up on Jan. 20, 2022 meeting action items, including DTFN's MMTP TK study & a link to D83W spatial files. Email did not go through to consultant due to file size.
2-Feb-2022	Email	A Manitoba Hydro representative re-sent a representative of DTFN and their consultant the Jan. 20, 2022 meeting action item follow ups, including a link and password to download DTFN's MMTP TK study & a link to D83W spatial files.

10-Feb-2022	Email	A Manitoba Hydro representative emailed representatives of DTFN to announce the preferred route for D83W and introduce the difference avenues for Round 2 engagement, including extending an offer to meet virtually.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to DTFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
1-Mar-2022	Phone call	The DTFN ICAC and a Manitoba Hydro representative had a call to discuss Round 2 for D83W and completing PACE timesheets. The ICAC committed to find some meeting dates and Manitoba Hydro committed to following up about the outstanding timesheets.
2-Mar-2022	Email	A Manitoba Hydro representative emailed the DTFN ICAC to provide an update that work to reconcile ICAC timesheets was underway and would be provided for a review later in the week.
4-Mar-2022	Email	A Manitoba Hydro representative sent the DTFN ICAC a package of draft timesheets to review for Dec 2020 – Oct. 22 – 2021, and Dec. 27 2021 – January 2022.
10-Mar-2022	Email	A Manitoba Hydro representative sent an email to the DTFN ICAC to see how review of ICAC timesheets is going and to inquire about potential dates for a meeting with DTFN to discuss the D83W preferred route.
14-Mar-2022	Email	The ICAC from DTFN confirmed that he would advise of any gaps in the draft PACE timesheets provided.
18-Mar-2022	Email	A Manitoba Hydro representative emailed the DTFN ICAC to inquire about meeting dates to go through draft ICAC timesheets and for a D83W preferred route meeting with DTFN.
20-Mar-2022	Email	The DTFN ICAC emailed a Manitoba Hydro representative to confirm a meeting date for reviewing timesheets (March 23) and to advise that they would get back with information on preferred route meeting dates with leadership.
22-Mar-2022	Email	A Manitoba Hydro representative emailed Chief Pashe to inquire about whether March 31st would work for DTFN for a meeting about the D83W preferred route.
22-Mar-2022	Phone call	The DTFN ICAC called a Manitoba Hydro representative to advising that the week of Mar. 28 – Apr. 1 may work for a meeting with Chief and Council.
23-Mar-2022	Meeting	A meeting was held between the DTFN ICAC and a Manitoba Hydro representative on March 23, 2022 to review timesheets.
23-Mar-2022	Email	A Manitoba Hydro representative emailed the DTFN ICAC a chronological list of work activities that have taken place on PACE projects to assist with timesheets, following a meeting on March 23, 2022.

30-Mar-2022	Email	A Manitoba Hydro representative emailed DTFN representatives to follow up on when may be a good time to meet to discuss the D83W preferred route.
30-Mar-2022	Email	The Chief of DTFN emailed a Manitoba Hydro representative confirming availability for a meeting about the D83W preferred route on March 31, 2022 (also offering alternate times).
30-Mar-2022	Email	A Manitoba Hydro representative emailed DTFN representatives to confirm March 31, 2022 at 1pm for a meeting about the D83W preferred route.
31-Mar-2022	Meeting	Representatives of DTFN and Manitoba Hydro met to discuss the preferred route for D83W.
7-Apr-2022	Email	A series of emails between Manitoba Hydro and DTFN representatives discussing the status of DTFN's traditional knowledge study.
11-Apr-2022	Email	A Manitoba Hydro representative emailed representatives of DTFN thanking them for the March 31, 2022 meeting about the D83W preferred route and providing meeting notes for review.
12-Apr-2022	Email	A Manitoba Hydro representative emailed the DTFN ICAC to inquire about the anticipated timelines for the IK study work DTFN is working on with HTFC.
15-Apr-2022	Email	The DTFN ICAC emailed a Manitoba Hydro representative to advise that they would follow up about anticipated timelines for their IK study.
18-Apr-2022	Phone call	The DTFN ICAC called a Manitoba Hydro representative to talk about the status of the IK study work and advised that HTFC can share data for the traditional pursuits, culture, and heritage portion of the EA.
5-May-2022	Phone call	A Manitoba Hydro representative called the DTFN ICAC to understand the preference for how the station name is recorded in the Engineer Drawing Management System and to touch base on PACE admin topics.
9-Jun-2022	Email	The DTFN ICAC confirmed availability for meeting on June 19, 2022 to work on timesheets.
9-Jun-2022	Email	A Manitoba Hydro representative sent a meeting invite to the DTFN ICAC for a meeting June 19, 2022 to work on timesheets.
19-Jun-2022	Meeting	A Manitoba Hydro representative had a meeting with the DTFN ICAC to record time worked.
24-Jun-2022	Email	A Manitoba Hydro representative sent the DTFN ICAC a package of updated timesheets in follow up to the June 14, 2022 meeting.
27-Jun-2022	Email	The DTFN ICAC emailed a Manitoba Hydro representative approval of the ICAC timesheets prepared for December 2020 to January 2022.

4-Jul-2022	Email	A representative from HTFC emailed preliminary information from DTFN's Indigenous Knowledge Study in the Portage La Prairie area to a Manitoba Hydro representative.
4-Jul-2022	Email	A Manitoba Hydro representative sent an email to a representative of HTFC to thank for providing DTFN's preliminary Indigenous Knowledge study information.
14-Jul-2022	Email	A Manitoba Hydro representative emailed representatives of DTFN and HTFC to advise of a small typo in the preliminary Indigenous Knowledge Study information provided.
14-Jul-2022	Email	A representative of DTFN sent an email to a representative of Manitoba Hydro to thank them for advising about a typo in the preliminary Indigenous Knowledge Study information.
29-Jul-2022	Email	A representative of DTFN emailed a Manitoba Hydro representative sharing the poster for Elder interviews for their IK study in the Portage la Prairie area.
9-Aug-2022	Email	A representative of Manitoba Hydro emailed representatives of DTFN and HFTC to confirm availability for a meeting to review Manitoba Hydro's draft approach for the traditional pursuits, culture, and heritage portion of the D83W assessment.
9-Aug-2022	Email	The DTFN ICAC sent an email confirming availability to meet with Manitoba Hydro representatives on August 15th or 17th 2022.
10-Aug-2022	Email	A Manitoba Hydro representative emailed an invitation to representatives of DTFN and HTFC for a meeting to discuss the D83W traditional pursuits, culture and heritage draft assessment approach on August 17, 2022.
17-Aug-2022	Meeting	Representatives of Manitoba Hydro met with the DTFN ICAC and representatives from HTFC to discuss Manitoba Hydro's proposed approach for the traditional pursuits, culture, and heritage portion of the environmental assessment.
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of DTFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation.
13-Sept-2022	Email	Following DTFN's election held August 31, 2022, a representative of DTFN sent an email to a representative of Manitoba Hydro inquiring about the status of DTFN's ICAC and contribution agreement.
14-Sept-2022	Email	A representative of Manitoba Hydro sent two emails to a representative of DTFN to share a copy of the signed contribution agreement, copies of ICAC timesheets approved from Manitoba Hydro's perspective, and a copy of an HTFC invoice.
30-Sept-2022	Email	Manitoba Hydro representatives received an email from the DTFN ICAC advising that they would no longer be working in the ICAC role.

12-Oct-2022	Phone call	A representative of DTFN's newly elected Chief and Council called a representative of Manitoba Hydro. The status of current transmission projects, including D83W, an overview of DTFN's involvement, and next steps were discussed.
13-Oct-2022	Email	A Manitoba Hydro representative sent an email to DTFN representatives to follow up on a phone call, sharing Manitoba Hydro contacts, extending the offer to meet to discuss current projects and agreements with DTFN, and advising of key deliverables such as review of the draft IK study report prepared by DTFN and HTFC.
14-Oct-2022	Email	A representative of DTFN emailed representatives of Manitoba Hydro advising that Chief and Council and DTFN's Finance, Management, and Audit Committee would like to meet to discuss DTFN's relationship with Manitoba Hydro.
14-Oct-2022	Email	A representative of Manitoba Hydro sent an email to representatives of DTFN advising that Manitoba Hydro would be happy to meet and requested that DTFN suggest meeting dates that would work for DTFN.
21-Oct-2022	Email	A representative of Manitoba Hydro sent an email to representatives of DTFN to share draft chapters of the D83W environmental assessment report for review, requesting feedback by Nov. 4, 2022. Manitoba Hydro also advised that information from DTFN's preliminary IK study would only be included if DTFN advised that it is permissible.
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
28-Oct-2022	Email	A representative of Manitoba Hydro sent an email to representatives of DTFN following up to confirm DTFN's interest in meeting, to request a meeting date, and to remind that feedback on the draft EA chapters is requested by Nov. 4, 2022.
28-Oct-2022	Email	A representative of DTFN sent an email to a representative of Manitoba Hydro advising that there are concerns with the preliminary study information DTFN previously provided to Manitoba Hydro and that DTFN would provide a letter the next week outlining next steps for projects in the area.
1-Nov-2022	Email	A representative of Manitoba Hydro sent an email to representatives of DTFN to thank them for the update about a forthcoming letter from DTFN and advise that Manitoba Hydro remains interested in meeting to discuss current projects and DTFN engagement preferences.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an email to provide a reminder that Manitoba Hydro requested that feedback about the draft EA chapters be submitted by the present date, Nov. 4, 2022.

6-Nov-2022	Letter	DTFN provided Manitoba Hydro representatives a letter, dated Nov. 1, 2022, by email, reaching out to begin discussions regarding a more structured relationship between DTFN and Manitoba Hydro and requesting an immediate virtual meeting. The letter was addressed to Manitoba Hydro's VPs of Indigenous Relations and Asset Planning & Delivery.

Summary of Engagement Activities with Long Plain First Nation (LPFN)

Date	Activity	Brief Description of Activity
Pre-Engagement		
21-Sep-2021	Email	A Manitoba Hydro representative emailed a LPFN representative potential dates to meet to discuss various transmission project items including PACE, the ICAC agreement and the MMTP Crown Land Offset Measures Plan.
21-Sep-2021	Email	A LPFN representative emailed a Manitoba Hydro representative to confirm a Sept. 22 date to meet to discuss various transmission items.
22-Sep-2021	Meeting	A meeting occurred, where an update was provided on the Portage Area Transmission Projects including the upcoming D83W project.
24-Sep-2021	Email	Manitoba Hydro sent an email invitation for an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
24-Sep-2021	Email	A Manitoba Hydro representative emailed a LPFN representative meeting notes from a Sept. 22, 2021 meeting and action items relating to upcoming projects, the PACE heritage workshop and the CLOMP.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
1-Oct-2021	Meeting	Meeting took place to discuss the ICAC position, how it is working, opportunities for improvement, and preferences for D83W engagement ('Deliverable 5 meeting').
1-Oct-2021	Email	A LPFN representative sent an email to a Manitoba Hydro representative sharing the ICAC's presentation from the Deliverable 5 meeting on October 1, 2021.
1-Oct-2021	Email	A Manitoba Hydro representative sent an email to LPFN representatives to share Manitoba Hydro's presentation from the Deliverable 5 meeting and a recap of the discussion and next steps.
7-Oct-2021	Meeting	A LPFN representative participated in the heritage workshop intended to inform development of the heritage program for the PACE projects.
Round 1		

7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to LPFN representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
15-Oct-2021	Email	Manitoba Hydro sent two emails to LPFN representatives to share Manitoba Hydro's thoughts on discussion points for the bi-weekly meeting that did not occur on October 15, 2021 and to share draft meeting notes from the October 7, 2021 heritage meeting.
15-Oct-2021	Email	A LPFN representative sent an email to a Manitoba Hydro representative to apologize for not attending the scheduled bi-weekly meeting and noting will advise on how to proceed next week.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting.
27-Oct-2021	Email	A Manitoba Hydro representative sent an email to the LPFN ICAC to get an update on the status of the Lands Program Director and to reschedule the bi-weekly meeting.
4-Nov-2021 – 8-Nov 2021	Email	A series of 5 emails between Manitoba Hydro and a member of LPFN Council discussing securing a meeting date with leadership to discuss the new D83W transmission line and engagement efforts with the community via the ICAC.
12-Nov-2021	Email	A Manitoba Hydro representative sent an email to a LPFN Councillor to follow up on whether a meeting date amongst Chief and Council has been secured based on the dates Manitoba Hydro shared.
16-Nov-2021 – 18-Nov-2021	Email	A LPFN representative sent a series of 3 emails to a Manitoba Hydro representative to move back an upcoming meeting twice, landing on November 23, 2021 as the proposed rescheduled date.
18-Nov-2021	Email	A series of two emails between Manitoba Hydro andLPFN representatives confirming a rescheduled meeting time of 3 – 4pm on November 23, 2021.
18-Nov-2021	Email (including Letter)	A Manitoba Hydro representative sent a series of two emails with an attached letter to a LPFN representative in follow up to the Deliverable 5 meeting (October 1/21) and LPFN's opportunities for improvement. Related information to follow in multiples emails.
18-Nov-2021	Email	A Manitoba Hydro representative sent a series of 3 emails to a LPFN representative sharing additional engagement information specific to BP6/7 and the ICAC position.
18-Nov-2021	Phone call	A Manitoba Hydro representative called a LPFN representative to confirm receipt of all the emails from November 18 following up on the October 1 Deliverable 5 meeting.

18-Nov-2021	Phone call	A LPFN representative called a Manitoba Hydro representative to acknowledge receipt of the emails from November 18, 2021.
23-Nov-2021	Meeting	Meeting with LPFN and Manitoba Hydro representatives to provide an overview of the new transmission line (D83W), get LPFN perspectives on the segments, and discuss engagement on the Project.
25-Nov-2021	Letter including meeting notes for review	A Manitoba Hydro representative sent an email to LPFN representatives to share outcomes from the November 23, 2021 meeting including draft meeting notes for review, the presentation, and other related documents.
2-Dec-2021	Email	A Manitoba Hydro representative sent an email to a LPFN representative inquiring as to whether feedback will be submitted regarding the Round 1 D83W transmission line segment options as the deadline to submit was December 1, 2021.
2-Dec-2021	Email	A LPFN representative sent an email to a Manitoba Hydro representative to share that the feedback on the D83W alternative segments will be shared once the representative is back in the office.
3-Dec-2021	Email	Manitoba Hydro sent a meeting invitation for the 1st of 2 D83W Community Perspective Routing Workshops, scheduled December 16th, 2021.
3-Dec-2021	Email	Manitoba Hydro sent a "Save the Date" for the 2nd of 2 D83W Community Perspective Routing Workshops, scheduled January 13, 2022.
14-Dec-2021	Phone call	A Manitoba Hydro representative called a LPFN representative asking if available to attend the Sharing Routing Preferences meeting that just started.
15-Dec-2021	Email	A Manitoba Hydro representative sent an email to a LPFN representative to follow up on the sharing preferences meeting (Dec. 14) that was missed and asking if representatives will be able to attend the Community Preferences workshop on Dec. 16.
16-Dec-2021	Email	A Long Plain representative sent an email to Manitoba Hydro apologizing for missing the Dec. 14, 2021 meeting and noting will be attending the Community Perspectives workshop #1 on Dec. 16, asking Manitoba Hydro if available for a call that morning.
16-Dec-2021	Email	A Manitoba Hydro representative sent an email to a LPFN representative noting availability for a call this morning.
16-Dec-2021	Phone call/text	A series of two text messages between a Manitoba Hydro representative and a PLFN representative confirming LPFN would call at 10am Dec. 16, 2021. No call received.
16-Dec-2021	Phone call	A Manitoba Hydro representative sent a text to a LPFN representative to ask if LPFN will be attending the Dec. 16

		Community Perspectives workshop #1. No response.
17-Dec-2021	Phone call/text	A series of two text messages between a Manitoba Hydro representative and a LPFN representative to arrange a phone call for Dec. 20, 2021, to provide a project update.
20-Dec-2021	Email	A Manitoba Hydro representative sent an email to a LPFN representative to recap the phone discussion on D83W feedback and the ICAC position as well as follow up items for each.
20-Dec-2021	Phone call/text	A series of two text messages between a Manitoba Hydro representative and a LPFN representative to arrange a time for a phone call.
20-Dec-2021	Phone call	A LPFN representative called a Manitoba Hydro representative to discuss D83W feedback and provide an update on the ICAC position. Information was shared on the upcoming Community Preferences workshop #2 in January and a meeting was set for January 5, 2022 to further discuss the ICAC position and the transition to a new ICAC.
Round 2		
12-Jan-2022	Email	A Manitoba Hydro representative sent an email to a LPFN representative to ask if LPFN is interested in going over Manitoba Hydro's routing process to assist with the request for scoring and feedback of the 4 route options shared on January 7.
19-Jan-2022	Email	A Manitoba Hydro representative shared an email invite for the upcoming second Community Preference meeting.
21-Jan-2022	Email	A Manitoba Hydro representative sent an email to a LPFN representative following up on a request to submit scoring and rationale for the 4 route options being considered for D83W in advance of the January 27 community preference meeting.
25-Jan-2022	Email	A Manitoba Hydro representative sent an email to LPFN representatives to follow up on the request for Long Plain to submit scoring and rationale for the 4 route options in advance of the January 27 community preference meeting.
26-Jan-2022	Email	A LPFN representative sent an email to a Manitoba Hydro representative sharing LPFN's route preference submission to be included in the January 27th community preference meeting.
26-Jan-2022	Email	A Manitoba Hydro representative sent an email to LPFN representatives thanking them for their D83W submission on scoring and rationale for each route option.
27-Jan-2022	Meeting	LPFN representatives participated in the second Community Perspective routing workshop to discuss the rationale and scoring from LPFN for the four route options and hear what the route preferences were from others who attended.

9-Feb-2022	Email	A Manitoba Hydro representative sent an email to a LPFN representative requesting a meeting to receive a progress update on ICAC activities and next steps in addition to scheduling a financial reporting discussion.
10-Feb-2022	Email	A Manitoba Hydro representative sent an email to LPFN representatives sharing the preferred route and noting the start of Round 2 engagement. Also sharing various ways to participate and a request for a virtual meet to discuss the preferred route.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to LPFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
23-Feb-2022	Phone call	A LPFN representative called a Manitoba Hydro representative to discuss scheduling a virtual meet to provide an update on the ICAC position and progress made to date and the D83W preferred route. A meeting date of March 8 was agreed to; Manitoba Hydro sent out a meeting request.
3-Mar-2022	Email	A Manitoba Hydro representative sent an email to a LPFN representative to confirm the agenda and order of items for the upcoming March 8, 2022 meeting.
8-Mar-2022	Email	A LPFN representative sent an email to a Manitoba Hydro representative requesting for a reschedule of the March 8, 2022 meeting to discuss the preferred route for D83W due to COVID-19 related issues.
11-Mar-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to discuss rescheduling the March 8/22 virtual meeting to provide an update on the ICAC position, progress made to date, and the D83W preferred route. A meeting date of March 16 was agreed to; Manitoba Hydro sent out a meeting request.
16-Mar-2022	Phone call	A Manitoba Hydro representative called a LPFN representative to confirm if the March 16, 2022 virtual meeting to discuss the ICAC position and the D83W preferred route was still on this afternoon. LPFN asked that it be rescheduled. The Manitoba Hydro representative asked the LPFN representative to advise on a date(s) that would work.
16-Mar-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to confirm the March 16, 2022 meeting. The LPFN representative asked that the meeting be rescheduled to a date to be determined.
23-Mar-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to confirm a time to meet to further discuss the D83W project. A phone discussion was agreed to on March 24, 2022.
24-Mar-2022	Phone call	A LPFN representative made a call to a Manitoba Hydro representative to discuss scheduling a new date for a virtual meet to provide an update on the ICAC position and progress

		made to date plus discussion on the D83W preferred route as part of Round 2 engagement. A potential meeting date was not secured.
29-Mar-2022	Email	A Manitoba Hydro representative sent an email to a LPFN representative sharing a recap of discussion items from the March 24, 2022 phone call including: Round 2 feedback on the preferred route, and the environmental assessment for the project.
25-May-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to set up a time for a quick call to discuss progress on LPFN's submission related to D83W. The LPFN representative indicated 1:00 pm would work however ended up being not available when the call was made; noted would call back but did not.
6-Jun-2022	Phone call	A Manitoba Hydro representation made a call to a LPFN representative asking if available today to discuss D83W and pending submissions from LPFN for purposes of the assessment.
10-Jun-2022	Phone call	A LPFN representative made a call to a Manitoba Hydro representative noting that was away this week so was not able to discuss D83W.
20-Jul-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to find a time to discuss the status of the new D83W transmission line and inputs from LPFN for the Environmental Assessment. A phone call was scheduled for Monday, July 25 at 9 am.
25-Jul-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to discuss the new D83W transmission line and the progress on inputs from LPFN for the Environmental Assessment as scheduled. The LPFN representative did not answer and a voicemail was left. The LPFN representative did not respond to subsequent efforts to find a new time to discuss.
26-Jul-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to set up a D83W meeting to discuss ICAC deliverables and feedback from LPFN for the Environmental Assessment. A meeting date of August 3, 2022 at 1:00pm was agreed to. The Manitoba Hydro representative sent out a meeting request.
15-Aug-2022	Email	A Manitoba Hydro representative sent an email to a LPFN representative requesting a meeting to discuss any outstanding concerns with D83W, inputs to the project EA and how Manitoba Hydro plans to use feedback provided to date in the EA.
19-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of LPFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation

20-Sept-2022	Phone call	A Manitoba Hydro representative made a call to a LPFN representative to inquire about meeting to discuss D83W and any outstanding submissions to be made to inform the environmental assessment for the project. Voicemail left; no response.
11-Oct-2022	Email	A LPFN representative sent an email to a Manitoba Hydro representative authorizing use of the preliminary results from the D83W study and work. Note: no results were attached.
13-Oct-2022	Email	A Manitoba Hydro representative emailed a representative of LPFN to advise that there were no attachments to the Oct. 11, 2022 email authorizing Manitoba Hydro's use of information prepared by Asinnii Consulting for PACE under the ICAC agreement.
21-Oct-2022	Email	A representative of Manitoba Hydro sent an email to representatives of LPFN to share draft chapters of the D83W environmental assessment report for review, requesting feedback by Nov. 4, 2022.
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
28-Oct-2022	Email	A Manitoba Hydro representative sent an email to LPFN representatives following up on the draft EA chapter reviews to see if any there were any questions and to note that additional information from studies or engagement can still be shared by LPFN.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an email to provide a reminder that Manitoba Hydro requested that feedback about the draft EA chapters be submitted by the present date, Nov. 4, 2022.

Summary of Engagement Activities with the Manitoba Métis Federation (MMF)

Date	Activity	Brief Description of Activity
Pre-Engagement		
15-Sep-2021 & 4-Nov-2021	Email	A Manitoba Hydro representative emailed the MMF ICAC a PDF of ICAC training materials from Module 3: IK in Routing & Assessment (September 15) and Modules 4&5: Bringing It All Together and Coordinator Specific Report Preparation (November 4).
24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.

28-Sep-2021	Email	Manitoba Hydro sent two emails to the MMF to provide an agenda for the October 1, 2021 heritage workshop and to discuss the MMF's engagement preferences for D83W and the station.
1-Oct-2021	Meeting	Meeting to discuss upcoming engagement related to the Portage Area Projects and the ICAC coordinator role.
1-Oct-2021	Email	A series of emails coordinating the date and location of the heritage workshop for PACE projects.
7-Oct-2021	Meeting	MMF representatives participated in the heritage workshop intended to inform development of the heritage program for the PACE projects.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to MMF representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
15-Oct-2021	Email	Manitoba Hydro provided the MMF with draft notes from the October 7, 2021 heritage workshop.
22-Oct-2021	Email	Manitoba Hydro shared draft meeting notes from the October 1, 2021 meeting with the MMF regarding PACE and the ICAC coordinator role.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting.
4-Nov-2021	Email	A series of emails between the MMF and Manitoba Hydro setting up a call to discuss status of current projects.
5-Nov-2021	Email	Manitoba Hydro sent an email requesting discussion on D83W segment preferences and acknowledging Métis Citizens in the project area.
12-Nov-2021	Email	A series of emails between the MMF and Manitoba Hydro setting up a meeting to seek feedback on D83W preferences.
16-Nov-2021	Email	A Manitoba Hydro representative sent an email to the MMF ICAC to advise of the 2 upcoming routing workshops and to inquire about date preferences.
17-Nov-2021	Email	An email from a Manitoba Hydro representative requesting the MMF's feedback on D83W.
24-Nov-2021	Email	A Manitoba Hydro representative notified the MMF that participants in the public engagement process who have identified as Métis have indicated that they have tried to reach out to the St Eustache local office without response.
1-Dec-2021	Email	A series of emails from a Manitoba Hydro representative requesting feedback on the D83W Project.
3-Dec-2021	Email	Manitoba Hydro sent a meeting invitation for the 1st of 2 D83W Community Perspective Routing Workshops, scheduled December 16th, 2021.

3-Dec-2021	Email	A series of emails to MMF representatives asking for feedback on the Round 1 engagement process for D83W.
3-Dec-2021	Email	Manitoba Hydro sent a "Save the Date" for the 2nd of 2 D83W Community Perspective Routing Workshops, scheduled January 13, 2022.
14-Dec-2021	Meeting	MMF representatives participated in a pre-meeting to the D83W routing workshops, which provided an opportunity for participating FNMEP nation representatives to share and understand one another's feedback and preferences, if interested.
14-Dec-2021	Email	A representative of the MMF emailed a representative of Manitoba Hydro, submitting report titled 'Manitoba Métis Specific Concerns (Unconcluded)' for D83W.
16-Dec-2021	Meeting	MMF representatives participated in the 1st Community Perspective Routing Workshop.
Round 2		
19-Jan-2022	Email	A Manitoba Hydro representative shared an email invite for the upcoming second Community Preference meeting
21-Jan-2022	Meeting	Manitoba Hydro and MMF representatives discussed work for the upcoming year, including D83W
26-Jan-2022	Email	A representative of the MMF emailed a representative of Manitoba Hydro, submitting the MMF's routing preferences and scoring for the second Community Preference Team meeting.
27-Jan-2022	Meeting	MMF representatives participated in the second Community Perspective routing workshop to discuss the rationale and scoring from the MMF for the four route options and hear what the route preferences were from others who attended.
10-Feb-2022	Email	A Manitoba Hydro representative sent an email to representatives of the MMF sharing the preferred route and noting the start of Round 2 engagement. Also sharing various ways to participate and a request for a virtual meeting to discuss the preferred route.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to the MMF announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
15-Feb-2022	Email	A Manitoba Hydro representative sent an email sharing upcoming work with the MMF on a variety of projects, identifying opportunities for feedback and participation in events.
11-Mar-2022	Meeting	Manitoba Hydro representatives and MMF representatives met to discuss Round 2 engagement for D83W.

22-Mar-2022	Email	A Manitoba Hydro representative send an email to share draft meeting minutes from a Round 2 meeting about D83W.
23-Mar-2022	Email	A series of emails between Manitoba Hydro and the MMF regarding Round 2 engagement for D83W.
6-May-2022	Phone call	An MMF representative called a Manitoba Hydro representative to advise that colleagues may reach out to discuss interests in wetland and TK studies.
24-May-2022	Meeting	Manitoba Hydro and the MMF met to discuss roles for the ICAC position.
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of the MMF to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation.
21-Oct-2022	Email	A representative of Manitoba Hydro sent an email to representatives of the MMF to share draft chapters of the D83W environmental assessment report for review, requesting feedback by Nov. 4, 2022.
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
2-Nov-2022	Email	A representative of the MMF emailed a representative of Manitoba Hydro the MMF's report submission for the PACE projects, advising the MMF is very concerned about the projects' impacts and that the MMF looks forward to discussion about Métis specific mitigation.
2-Nov-2022	Email	A representative of Manitoba Hydro emailed a representative of the MMF to thank them for submission of the MMF's PACE report.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an email to provide a reminder that Manitoba Hydro requested that feedback about the draft EA chapters be submitted by the present date, Nov. 4, 2022.
4-Nov-2022	Email	A chain of two emails in which a representative of the MMF emailed a representative of Manitoba Hydro to inquire about funding support for review of draft EA chapters. Manitoba Hydro responded that reimbursement for review is supported as per the PACE contribution agreement.

Summary of Engagement Activities with Peguis First Nation (PFN)

Date	Activity	Brief Description of Activity

Pre-Engagement		
13-Sep-2021	Email	Manitoba Hydro responded by email to PFN's questions about upcoming projects, the PACE heritage workshop, and the Crown Land Offset Measures Plan (MMTP).
21-Sep-2021	Meeting	Manitoba Hydro and PFN had an update meeting to discuss the status and next steps for recent and current projects, including D83W. Following the meeting, Manitoba Hydro provided a summary by email.
21-Sep-2021	Email	A Manitoba Hydro representative introduces herself to the new PFN Special Projects Officer and welcomes discussion on Portage Area projects.
24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
7-Oct-2021	Meeting	PFN representatives participated in the heritage workshop intended to inform development of the heritage program for the PACE projects.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to PFN representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
8-Oct-2021	Email	PFN emailed a Manitoba Hydro representative requesting a map of the proposed routes over satellite imagery and asking questions about routing. Manitoba Hydro responded to questions and provided links to maps by email.
15-Oct-2021	Email	Manitoba Hydro provided PFN with draft notes from the October 7, 2021 heritage workshop.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting.
12-Nov-2021 – 15-Nov-2021	Email	A series of emails between PFN and Manitoba Hydro setting up a meeting to discuss D83W preferences.
24-Nov-2021	Meeting	Meeting took place to discuss D83W and Peguis' segment preferences and concerns. Following the meeting, Manitoba Hydro emailed a copy of the meeting presentation, links to the project webpage and online mapping tool, and a map of Crown land in the project area.
24-Nov-2021	Email	An email from a representative from PFN sharing the TLE Framework Agreement.
25-Nov-2021	Email	A series of emails in which PFN shared their rationale for a mitigative segment they have recommended, and Manitoba Hydro confirmed understanding of the information PFN provided.

25-Nov-2021	Email	An email confirming understanding of PFN's plan to review D83W route segments.
30-Nov-2021	Email	A Manitoba Hydro representative shared the mileage and honorarium form with PFN to support their field work endeavors for D83W segment review.
1-Dec-2021	Email	PFN emailed Manitoba Hydro a report outlining PFN's preferred route and areas of concern regarding Round 1 segments.
1-Dec-2021	Email	An email from a Manitoba Hydro representative confirming receipt of PFN's segment preferences for D83W's Round 1 feedback.
3-Dec-2021	Email	Manitoba Hydro representative sent a meeting invitation for the 1st of 2 D83W Community Perspective Routing Workshops, scheduled December 16th, 2021.
3-Dec-2021	Email	An email to PFN from a Manitoba Hydro representative providing draft minutes and a copy of the presentation for the meeting held November 24, 2021.
3-Dec-2021	Email	Manitoba Hydro sent a "Save the Date" for the 2nd of 2 D83W Community Perspective Routing Workshops, scheduled January 13, 2022.
14-Dec-2021	Meeting	PFN representatives participated in a pre-meeting to the D83W routing workshops, which provided an opportunity for participating FNMEP nation representatives to share and understand one another's feedback and preferences, if interested.
16-Dec-2021	Meeting	PFN representatives participated in the 1st Community Perspective Routing Workshop.
Round 2		
5-Jan-2022	Email	Manitoba Hydro emailed a letter response to PFN regarding a question about whether the Manitoba Framework Agreement applies.
6-Jan-2022	Meeting	A meeting with PFN representatives, their archeologists, and Manitoba Hydro to discuss heritage concerns/policies and programs
14-Jan-2022	Meeting	A meeting with PFN representatives and Manitoba Hydro discussing PFN's interest in hosting a climate adaptation workshop
19-Jan-2022	Email	A Manitoba Hydro representative shared an email invite for an upcoming Community Preference meeting
27-Jan-2022	Meeting	PFN representatives participated in the second Community Perspective routing workshop to discuss the rationale and scoring from PFN for the four route options and hear what the route preferences were from others who attended.
3-Feb-2022	Meeting	A methodological discussion between PFN archeologists and the Project archeologists related to heritage work on PACE projects

10-Feb-2022	Email	A Manitoba Hydro representative sent an email to PFN representatives sharing the preferred route and noting the start of Round 2 engagement, also sharing various ways to participate and a request for a virtual meeting to discuss the preferred route.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to PFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
15-March-2022	Meeting	PFN and Manitoba Hydro met to discuss upcoming work on PACE and other projects for the year
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of PFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation.
23-Aug-2022	Meeting	Representatives of PFN and Manitoba Hydro met to review PFN's proposal for work on D83W and the Pointe du Bois Renewal Project.
6-Sept-2022	Email	An email from PFN responding to proposed dates for the Heritage Meeting #2.
15-Sept-2022	Email	Manitoba Hydro emailed PFN responding to questions regarding archeology on the PACE and PREP projects.
21-Oct-2022	Email	A representative of Manitoba Hydro sent an email to representatives of PFN to share draft chapters of the D83W environmental assessment report for review, requesting feedback by Nov. 4, 2022.
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
3-Nov-2022	Email	A representative of PFN sent an email to a representative of Manitoba Hydro to advise that PFN's office would be closed on Nov. 8, 2022 in observance of Indigenous Veterans' Day.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an email to provide a reminder that Manitoba Hydro requested that feedback about the draft EA chapters be submitted by the present date, Nov. 4, 2022.

Summary of Engagement Activities with Roseau River Anishinabe First Nation (RRAFN)

Date	Activity	Brief Description of Activity
Pre-Engagement		

24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to RRAFN representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting.
8-Nov-2021	Phone call	A Manitoba Hydro representative called a RRAFN representative to confirm receipt of the October 7 email and to discuss setting up a meeting with leadership. No answer and no voicemail available.
15-Nov-2021	Phone call	A Manitoba Hydro representative called a RRAFN representative to confirm receipt of the October 7 email and to discuss setting up a meeting with leadership. No answer and no voicemail available.
Round 2		
10-Feb-2022	Email	A Manitoba Hydro representative sent an email to RRAFN representatives sharing the preferred route and noting the start of Round 2 engagement, also sharing various ways to participate and a request for a virtual meet to discuss the preferred route.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to RRAFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
14-Feb-2022	Phone call	A Manitoba Hydro representative made a call to the Chief of RRAFN to follow up on the D83W preferred route announcement email sent February 10, 2022 and see if there is interest in meeting. Also to follow up on the G79L construction update provided on February 8, 2022. Left a voicemail.
23-Feb-2022	Phone call	A Manitoba Hydro representative made a call to the Chief of RRAFN to follow up on the D83W preferred route announcement email sent February 10, 2022 and see if there is interest in meeting. Also to follow up on the G79L construction update provided on February 22, 2022. Left a voicemail.
9-Mar-2022	Email	A Manitoba Hydro representative sent an email to a RRAFN representative acknowledging the thank you and noting to let Manitoba Hydro know if other information is required or if there is a desire to meet on either the G79L project or the proposed new D83W t-line.
1-Apr-2022	Email	A Manitoba Hydro representative sent an email to RRAFN representatives to provide an update on several current and upcoming projects that RRAFN may be interested in learning about and requested an opportunity to meet to further discuss.

6-Apr-2022	Phone call	A Manitoba Hydro representative called the Chief of RRAFN to ask if there is interest in meeting to discuss the current and upcoming projects shared in the April 1, 2022 email, including D83W preferred route, G79L and the upcoming Red River Pipeline work.
6-Apr-2022	Phone call	A Manitoba Hydro representative called a RRAFN representative to ask if Chief and Council is interested in meeting to discuss the current and upcoming projects shared in the April 1, 2022 email, including D83W preferred route, G79L and the upcoming Red River Pipeline work. Voicemail left.
19-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of RRAFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation.
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.

Summary of Engagement Activities with Sandy Bay Ojibway First Nation (SBOFN)

Date	Activity	Brief Description of Activity
Pre-Engagement		
24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to SBOFN representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting. An email was also sent resharing Round 1 information and links.
15-Nov-2021	Email	A Manitoba Hydro representative sent an email to SBOFN representatives to follow up on Round 1 correspondence for D83W and offer to schedule a virtual meeting.
17-Nov-2021	Phone call/ voicemail	A Manitoba Hydro representative called SBOFN to follow up on D83W correspondence. There was no answer. Automated message indicated the office is closed to the public due to Covid-19. A voicemail message was left.

Round 2		
10-Feb-2022	Email	A Manitoba Hydro representative emailed representatives of SBOFN to announce the preferred route for D83W and introduce the difference avenues for Round 2 engagement, including extending an offer to meet virtually.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to SBOFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
1-Mar-2022	Phone call	A Manitoba Hydro representative called SBOFN to follow up on D83W preferred route correspondence and discuss whether there is interest in a virtual meeting. A representative of SBOFN advised that the office would be closed Wednesday, but provided the name of a contact to call back to talk to on Mar. 3, 2022.
3-Mar-2022	Phone call	A Manitoba Hydro representative called SBOFN to speak to a representative about D83W. A voicemail was left following up on D83W correspondence sent in February 2022 and advising that Manitoba Hydro would be happy to hear any feedback the community may have and arrange a virtual meeting to discuss the project if there is interest.
15-Mar-2022	Phone call	A Manitoba Hydro representative called SBOFN to follow up on interests and preferences about the D83W preferred route and engagement options; the Manitoba Hydro representative was forwarded to a SBOFN representative's voicemail and a message was left.
15-Mar-2022	Phone call	A Manitoba Hydro representative called a representative of SBOFN to discuss the status of the D83W Project and inquire if SBOFN has feedback to share or interest in meeting. The representative of SBOFN advised they would review project information and follow up if there are concerns or questions.
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of SBOFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.

Summary of Engagement Activities with Swan Lake First Nation (SLFN)

Date	Activity	Brief Description of Activity
Pre-Engagement		

24-Sep-2021	Email	Manitoba Hydro sent an email invitation to an October 7, 2021 heritage workshop to discuss how to design a culturally specific heritage program for upcoming projects in the Portage area.
28-Sep-2021	Email	An agenda for the October 7, 2021 heritage meeting was provided by email.
Round 1		
7-Oct-2021	Email	Manitoba Hydro began Round 1 engagement by sending an email to SLFN representatives with initial Project information, details on virtual information sessions, and links to the project website, maps, and an online survey.
26-Oct-2021	Letter	Manitoba Hydro sent a letter by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting. An email was also sent resharing Round 1 information and links.
4-Nov-2021	Email	A Manitoba Hydro representative sent an email to the Chief of SLFN requesting a meeting with the new leadership to provide an overview of current projects and to meet each other.
5-Nov-2021	Phone call	The Chief of SLFN called a Manitoba Hydro representative to discuss the request to meet, agreeing it would be good to meet to provide new leadership with an overview of current Manitoba Hydro projects and meet each other. The Chief asked to reach out to the Executive Assistant to find a meeting time that works.
8-Nov-2021	Email	A Manitoba Hydro representative sent an email to a SLFN representative sharing feedback from the Chief on setting up a specific meeting with leadership and asking for potential meeting dates.
12-Nov-2021	Email	A Manitoba Hydro representative sent an email to a SLFN representative to confirm who is sending out the virtual meeting invitation for November 23, 2021.
15-Nov-2021	Email	A Manitoba Hydro representative sent an email to SLFN representatives to follow up on D83W and options for sharing feedback, one of the topics to be discussed at the November 23, 2021 meeting.
23-Nov-2021	Meeting	A virtual meeting took place in which Manitoba Hydro representatives described transmission projects in the Portage la Prairie area (BP 6/7, Wash'ake Mayzoon station, and D83W line) and SLFN shared concerns & interests of the community.
6-Dec-2021	Email including meeting notes for review	A Manitoba Hydro representative sent an email to SLFN to share meeting notes, the presentation, and follow up items from the November 23, 2021 meeting,
9-Dec-2021	Phone call	A Manitoba Hydro representative called a SLFN representative to follow up on the Nov. 23, 2021 meeting, advise that information on employment and training is being compiled for discussion in winter 2022, that general feedback on D83W can still be shared,

		and that Manitoba Hydro will reach back out for feedback on D83W when a preferred route has been established.
Round 2		
6-Jan-2022	Email	A Manitoba Hydro representative emailed SLFN representatives to share a job posting that may be of interest and provide a recap of upcoming follow ups regarding D83W Round 2 and SLFN's interests related to jobs, training, and employment.
10-Feb-2022	Email	A Manitoba Hydro representative emailed representatives of SLFN to announce the preferred route for D83W and introduce the difference avenues for Round 2 engagement, including extending an offer to meet virtually.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to SLFN announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
25-Feb-2022	Email	A Manitoba Hydro representative sent SLFN Chief & Council a report on Indigenous and SLFN employment & training on transmission construction projects and advised the natural gas service person program is open to applications.
1-Mar-2022	Phone call	A representative from SLFN returned a missed call to a Manitoba Hydro representative. Manitoba Hydro followed up on an employment report sent Feb 25 and D83W preferred route communication sent Feb. 10/2022 and inquired whether there is interest in a virtual meeting to discuss the preferred route Manitoba Hydro is to call back on Mar. 4th if SLFN has not followed up.
4-Mar-2022	Phone call	A Manitoba Hydro representative called a SLFN representative to follow up on whether there is interest in a meeting about the D83W preferred route or if there are any questions or needs related to the project or the employment report sent February 25, 2022. No answer. A voicemail was left.
15-Mar-2022	Phone call	A Manitoba Hydro representative called a representative of SLFN and left a voicemail message following up on interest in meeting to discuss the preferred route for D83W, whether there are any questions about the employment report provided in Feb.2022, and whether there is a specific member of Chief & Council or staff recommended for follow up.
17-Mar-2022	Phone call/ voicemail	A Manitoba Hydro representative called a representative of SLFN to follow up about the D83W preferred route and employment report sent by Manitoba Hydro in Feb. 2022 and see if there is interest in a virtual meeting to discuss the preferred route. No answer. Voicemail was left.
23-Mar-2022	Phone call	A Manitoba Hydro representative called the Land Manger at SLFN to follow up on the D83W preferred route correspondence and employment report sent in Feb.2022, inquire if there are any questions, and discuss the option of having a meeting to discuss the preferred route.

23-Mar-2022	Email	The Lands Manager at SLFN sent an email to SLFN Chief and Council and Manitoba Hydro representatives in follow up to a phone call with a Manitoba Hydro representative about correspondence on the D83W PR and employment report sent in Feb. 2022.
3-Jun-2022	Phone call	A Manitoba Hydro representative left a voicemail message with the Land Manager at SLFN advising that Manitoba Hydro would like to touch base on the D83W preferred route, any questions from the employment and training report provided in Feb. 2022, and the CLOMP and would be happy to arrange a meeting or provide more info that is of interest to SLFN.
8-Jun-2022	Text message conversation	Text messages from June 8 & 9, 2022 between a representative of Manitoba Hydro & a representative of SLFN. Manitoba Hydro inquired whether SLFN has feedback on the PR for D83W and if there is interest in meeting to discuss that project or the CLOMP.
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of SLFN to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation
25-Oct-2022	Email	A representative of Manitoba Hydro emailed a meeting invitation and agenda for the second heritage meeting scheduled Nov. 8, 2022.
4-Nov-2022	Email	A representative of Manitoba Hydro sent an update to the meeting invite for the second heritage meeting, changing the date to Nov. 9, 2022.

Summary of Engagement Activities with Portage Urban Indigenous Peoples Coalition (PUIPC)

Date	Activity	Brief Description of Activity
Round 1		
26-Oct-2021	Letter	Manitoba Hydro initiated engagement with PUIPC through a letter sent by mail, which included a map of Round 1 alternative route segments and extended an offer to arrange a virtual meeting.
15-Nov-2021	Email	A Manitoba Hydro representative sent an email to a representative of PUIPC to follow up on Round 1 correspondence for D83W and offer to schedule a virtual meeting.
19-Nov-2021	Phone call	A Manitoba Hydro representative called a PUIPC representative to follow up on introductory correspondence on D83W, discuss the options for engagement, and PUIPC's preferences.
7-Dec-2021	Phone call	PUIPC called to propose having Manitoba Hydro make a presentation about projects in the Portage La Prairie area at an upcoming board meeting.
13-Dec-2021	Email	A representative from PUIPC emailed a Manitoba Hydro representative the agenda and meeting link for the December 16, 2021 PUIPC virtual board meeting.

14-Dec-2021	Email	A Manitoba Hydro representative sent an email confirming attendance for December 16, 2021.
16-Dec-2021	Phone call	A PUIPC representative called a Manitoba Hydro representative to provide some details about the upcoming board meeting and potential questions.
16-Dec-2021	Meeting	Manitoba Hydro made a presentation on the Portage area projects, focusing on D83W, at the PUIPC board meeting.
17-Dec-2021	Email	In follow up to the Dec. 16, 2021 PUIPC board meeting, a Manitoba Hydro representative emailed a copy of the presentation slides and links to project webpages.
Round 2		
10-Feb-2022	Email	A Manitoba Hydro representative emailed a representatives of PUIPC to announce the preferred route for D83W, introduce the different avenues for Round 2 engagement, and extend an offer to meet virtually.
11-Feb-2022	Letter	Manitoba Hydro sent a letter to the PUIPC announcing the preferred route for the Dorsey to Wash'ake Mayzoon Transmission Line, initiating Round 2 engagement, and offering to arrange a meeting.
2-Mar-2022	Phone call	A Manitoba Hydro representative called a representative of PUIPC to follow up on correspondence about the D83W preferred route and see if there is interest in a meeting or any questions. A voicemail was left.
2-Mar-2022	Phone call	Representative of PUIPC called in response to a voicemail and indicated that PUIPC received the information about the D83W preferred route and does not have any questions or information needs at this time, but will follow up if the Coalition expresses any further interests or questions. Manitoba Hydro advised they would keep PUIPC informed.
17-Aug-2022	Email	A Manitoba Hydro representative emailed representatives of PUIPC to announce: 1) the BP 6/7 licence has been issued, and 2) the D83W final preferred route has been selected, offering to meet about outstanding concerns and mitigation.

Summary of concerns and comments received through the FNMEP

Summary of First Nation and Métis concerns and comments

The following tables include feedback, concerns, and questions raised through the First Nation and Métis Engagement Process for the D83W Project, responses prepared by Manitoba Hydro. A separate table is provided for each engaged audience and the tables are organized by category.

Summary of Concerns and Comments from Brokenhead Ojibway Nation (BON) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of BON Concerns and Comments	Summary of Manitoba Hydro Response
Engagement	BON advised that they were not interested in participating in engagement on D83W but noted that communities in the Portage la Prairie area should be engaged.	Manitoba Hydro remains available to engage with BON if there is interest in the Project at any phase.

Summary of Concerns and Comments from Dakota Plains Wahpeton First Nation (DPWFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of DPWFN Concerns and Comments	Summary of Manitoba Hydro Response
n/a	Manitoba Hydro did not receive any feedback from Dakota Plains Wahpeton First Nation during the FNMEP for the Project.	Manitoba Hydro continues to share information with DPWFN during the FNMEP for the Project. Following a decision regarding the Project, Manitoba Hydro will notify First Nations engaged on this Project, the MMF and the PUIPC about the decisions and keep them informed about construction schedules and activities. Manitoba Hydro will remain open and responsive to any questions or concerns from communities. The telephone line and email address will remain operational throughout the regulatory review, construction and operation phases for the Project.

Summary of Concerns and Comments from Dakota Tipi First Nation (DTFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of DTFN Concerns and Comments	Summary of Manitoba Hydro Response
Engagement	Discussed the importance of ceremonies to acknowledge and respect the land and spirits affected by projects.	Manitoba Hydro participates in and supports ceremonies and works with communities to understand appropriate ways to respect the land and spirits in its projects.
Engagement, traditional knowledge	DTFN advised that the new Chief and Council, elected August 31, 2022, has several areas of concern regarding the preliminary IK study report shared with Manitoba Hydro on July 4, 2022.	Manitoba Hydro is anticipating a meeting with DTFN to discuss these concerns about the preliminary IK report. In absence of a meeting to further discuss these concerns and DTFN's permission to use information from the preliminary study report, it has not been reflected in this assessment.
Routing	In Round 1, DTFN identified a preferred route consisting of segments 1, 3, 6, 8, 9, 11, 16, 21, 23, 25, 27, 30, and 33. The preference is to follow portions of existing lines and pre-disturbed land where possible, minimizing use of Crown land, new disturbance, and river and stream crossings; not as concerned with crossing the floodway as it is already pre-disturbed.	This feedback was helpful in informing the transmission line routing process. DTFN directly participated in the Community Preference Team.
Heritage	Significant heritage concerns with all proposed route segments. Segments 6-23 are very sensitive due to the history of the Dakota Nation. Minimizing brush clearing and river crossings and paralleling existing lines segments is preferred due to less ground disturbance and potential for heritage impacts.	This feedback was helpful in informing the transmission line routing process. DTFN directly participated in the Community Preference Team. Manitoba Hydro acknowledges the importance of heritage values to DTFN and are undertaking ongoing discussions to better understand these concerns and mitigate potential effects.
Heritage	Concerns that development anywhere in the Portage la Prairie area has the potential to encounter heritage or cultural sites as Dakota people have lived and harvested throughout the land in this area.	Manitoba Hydro acknowledges the importance of heritage values to DTFN and are undertaking ongoing discussions to better understand these concerns and mitigate potential effects.

Category	Summary of DTFN Concerns and Comments	Summary of Manitoba Hydro Response
Heritage	The final preferred line closely matches Dakota Tipi First Nation's preferred route minimizes disturbance of natural areas and stream or water crossings. There is the potential that construction disturbs yet undiscovered Dakota heritage resources.	Manitoba Hydro acknowledges the importance of heritage values to DTFN and are undertaking ongoing discussions to better understand these concerns and mitigate potential effects.
Traditional plants	Like with BP6 and BP7, the new transmission line will require brush and timber clearing along the route. Some of the places may hold traditional plants and medicines as well.	Manitoba Hydro will provide opportunities for First Nations and the Manitoba Métis Federation to identify sensitive sites to help inform the Environmental Protection Program for the Project. Manitoba Hydro will consider non-chemical vegetation management for areas on Crown lands with identified traditional plant harvesting, if any.
Employment, training and business opportunities	DTFN shared that there is interest in discussing how to increase employment opportunities on the projects. DTFN has a construction company that just started, 295 Construction, as well as security services.	Economic opportunities associated with the Project will include Indigenous-related provisions regarding training, employment, and business opportunities, with a focus on trades training for Indigenous women, and Indigenous content will be included as a tender evaluation criterion. Specifics around the various contracts and Indigenous-related provisions and opportunities of each are currently under review. MH is open to having further discussion on this topic and will be reaching out to set up meetings with First Nations, including DTFN, and the MMF, engaged on the Project to discuss opportunities and ways to maximize the employment and training benefits, especially for Indigenous women.

Category	Summary of DTFN Concerns and Comments	Summary of Manitoba Hydro Response
Employment barrier	DTFN shared the experience of DTFN members who applied to work on the G79L project construction and how the majority applicants were not able to pass the drug screening due to their use of marijuana (recreational and/or medicinal) therefore were not able to work on the project. DTFN asked if this policy is something that should be updated since the legalization of marijuana in Manitoba.	Ensuring a safe work environment is of critical importance on a construction site. All workers must be fit to perform work without any limitations due to the use of drugs or alcohol, including marijuana and certain prescription medications (i.e. any medication that carries a "Do Not Operate Heavy Machinery" warning). While these substances are legal and may be medically prescribed, it is not safe for a worker to be on a construction site while under the influence of any substance that could affect judgment and reaction time. Drug and alcohol testing is not uncommon in the construction sector, and different contractors have different employment protocols. Individuals interested in employment on a transmission construction project should know that some contractors may require drug and alcohol testing as a condition of employment (i.e. individuals may be required to pass a drug and alcohol test before they can be hired). Drug and alcohol testing protocols vary but would typically test for a range of substances, including marijuana, alcohol, and various illegal substances.

Summary of Concerns and Comments from Long Plain First Nation (LPFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
Routing	LPFN provided routing preferences, scoring the four route options being considered during the preferred route determination process. Route A was identified as the preferable option to LPFN, as it avoided sites identified in LPFN traditional land use maps. It was acknowledged that the option may be more intrusive to waterways, but in consideration of traditional sites along the more northern route options, LPFN found the southerly option preferable. LPFN acknowledged that options B, C, and D avoided major waterways, however they all are in close proximity to identified traditional sites. Option C was identified as being the least preferred option due to the added concern that the route would dissect parcels currently under consideration for LPFN TLE (NE 1-12-8 W, NW 6-12-7W, and SW 7-12-7W.	This feedback was helpful in informing the transmission line routing process. LPFN directly participated in the Community Preference Team. Manitoba Hydro understands that both Crown and private lands contribute to the fulfillment of TLE agreements in Manitoba. Manitoba Hydro reviews TLE selections and Addition to Reserve selections through geospatial information (mapping) provided by the Province of Manitoba and through the FNMEP. Any TLE selections within the Project area were identified as areas of least preference during the transmission line routing process. No part of the ROW crosses any TLE selections or Addition to Reserve selections.
Routing, engagement	LPFN became aware of parcels being considered for TLE after the route segments had already been narrowed down, which speaks to the fact that interests will evolve and change, even during the course of this project.	Manitoba Hydro designed the FNMEP to engage with First Nations, the Manitoba Métis Federation, and Indigenous organizations early in the project assessment process, and at every stage, to enable feedback to meaningfully influence the Project. Manitoba Hydro understands that one of the factors at the core of meaningful engagement is that engagement occurs early and often. Engagement that is often allows for continual and evolving feedback to be shared throughout. LPFN shared three specific parcels under consideration for TLE in the Project area. The ROW does not cross these parcels.

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
Vegetation	At the October 7, 2021 heritage meeting, the LPFN ICAC asked if trees would be replanted if cleared if looking to find ways to off-set potential impacts (e.g. planting cedar somewhere else).	Manitoba Hydro advised that cleared trees would not be replanted within the ROW as they are not compatible with the safe operation of transmission lines. Manitoba Hydro continues to fund its Forest Enhancement Program, which supports the planting of trees by community organizations. A preferred method of mitigation when possible is to avoid areas of trees that are important to Indigenous communities for traditional uses such as the MMTP cedar grove. To date no specific sites have been identified, very limited clearing is to occur and there is no cedar grove on this project.

Summary of Concerns and Comments from the Manitoba Métis Federation (MMF) related to the Dorsey to Wash'ake Mayzoon Transmission Project[1]

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
Heritage	Concern that specific consideration be given to Métis cultural heritage and Métis governance structure in how finds are reported, ensuring communities get information they need while protecting sites. Concern that common models related to heritage finds are based on precontact and may not consider settlement patterns associated with Métis use of the area. Concern that archaeological finds are a likely event regardless of where the route is in the area and that there is need for an intensive plan on what will happen when archaeological finds occur.	Manitoba Hydro acknowledges the importance of considering Métis specific cultural heritage and governance in the EA and heritage plans. Manitoba Hydro is undertaking ongoing discussions to better understand concerns related to Métis heritage and cultural sites and mitigating potential effects. Manitoba Hydro will be conducting a Heritage Resources Impact Assessment (HRIA) for the Project. A Cultural and Heritage Resources Protection Plan will also be developed for the Project to help address concerns shared by the MMF and as recommended by the First Nations and the MMF at the two heritage focused workshops for the Project (October 7, 2021 and November 9, 2022).
Monitoring	Discussed the importance of monitoring during project construction and how monitoring allows for the identification of areas of concern that may not otherwise be known.	Manitoba Hydro's transmission monitoring program has evolved over the last 10 years with feedback and direct involvement of the MMF.

[1] In a report submitted for this Project, 'Manitoba Métis Specific Concerns (Unconcluded)', The Manitoba Métis Federation shared that "Métis concerns identified through past studies not focused on this project, are evidence of the potential for impact to the Métis way of life due to the cumulative impacts of the proposed D83W project in addition to the PACE and BP6/BP7 project and other development components in the project area." As such, concerns from the following reports have been included here:

- Métis Specific Concerns: Portage Area Capacity Enhancement Project.
- Métis Specific Concerns: Brandon-Portage La Prairie (BP6/BP7) Transmission Line Replacement.
- Métis Land Use and Occupancy Study as input to the Manitoba to Minnesota Transmission Line Project by Calliou Group in 2017.
- Métis Land Use and Occupancy Study as input to the Birtle Transmission Project by MNP in 2017.
- Métis Land Occupancy and Use Study as input to the Bipole III Transmission Line Project by SVS in 2015

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
	Concerns with the administration of monitoring programs. (From Bipole III Métis Land Occupancy and Use Study)	Manitoba Hydro acknowledges this interest and continues to be open to discussing specific concerns and suggestions about the administration of monitoring programs.
Engagement	Concerns with the challenges in engaging Citizens when in-person engagement activities are not an option; virtual means can limit reach and not bolster enough discussion.	Manitoba Hydro acknowledges there can be challenges with engaging virtually.
Engagement and assessment process	Inadequate time and resources have impeded the ability for full and meaningful consultation with potentially impacted Manitoba Métis Citizens to occur. (From Wash'ake Mayzoon Station)	It is Manitoba Hydro's understanding that the MMF has had since the signing of the Contribution Agreement on March 10, 2021 to collect Traditional Knowledge and Métis specific values and interests and to develop Métis-specific mitigation measures for projects in the Portage la Prairie area. The MMF submitted their Manitoba Métis Knowledge, Land Use and Occupancy Study for Manitoba Hydro Portage Area Projects on November 2, 2022. Following the submission of the MMF's study report, Manitoba Hydro worked to incorporate feedback into this assessment and will continue to discuss the MMF's concerns, values, interests, and suggested mitigation measures.
Engagement and assessment process	Appropriate distinctions-based consultation processes should be advanced separately and labeled as 'Métis Engagement' and 'First Nations Engagement. (From Wash'ake Mayzoon Station) Concerns about Métis Valued Components being considered in the process, including 'Harvesting' and 'Available Lands'. (From Wash'ake Mayzoon Station; MMTP Métis Land	Manitoba Hydro appreciates the MMF's recommendation to have a distinctions-based approach to engagement. The FNMEP for the Project included a distinctions-based approach labeled as First Nations and Métis Engagement and included discussions on engagement preferences to have an engagement process specific to the Red River Métis. Manitoba Hydro also reflected this distinction in Section 8.9 by looking at Project effects on specific cultural groups.

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
	Use and Occupancy Study; Bipole III Métis Land Occupancy and Use Study) Manitoba Hydro has not accurately captured the project effects that are important to the Manitoba Métis community, therefore it is considered incomplete. (From Wash'ake Mayzoon Station) Manitoba Hydro has missed assessing the effects with the Manitoba Métis community in the project area specifically as project effects that are important to the Manitoba Métis community have not been accurately captured. (From Wash'ake Mayzoon Station)	Based on experience from past projects, feedback provided through the FNMEP, and existing literature, Manitoba Hydro identified three valued components (VCs) that are directly related to matters considered important to rights-bearing communities and of cultural or heritage importance. On past projects, the MMF has communicated concerns that assessments should consider Métis specific VCs with one of the MMF's suggested VCs being Harvesting. Manitoba Hydro welcomed the MMF's feedback on drafts of Chapter 5.0 and Section 8.9 of this assessment. Following the submission of the MMF's report on November 2, 2022, Manitoba Hydro worked to incorporate feedback into this assessment and will continue to discuss the MMF's concerns, values, interests, and suggested mitigation measures.
Cumulative effects, Traditional pursuits	Métis Citizen concerns with any Manitoba Hydro project go well beyond the project area. Cumulative effects have the potential to significantly impact Métis Citizens' Constitutionally protected rights to harvest. Métis concerns identified through past studies not focused on this project, are evidence of the potential for impact to the Métis way of life due to the cumulative impacts of the proposed D83W project in addition to the Portage Area Capacity Enhancement (PACE) and BP6/BP7 project and other development components in the project area. The cumulative effects of these components and others before it, have the	Cumulative effects are discussed in the environmental assessment for the Project. Manitoba Hydro welcomes further information from the MMF to inform the assessment of cumulative effects on Métis Citizens for future projects. Manitoba Hydro's intent in developing and providing an Indigenous Community Assessment Coordinator (ICAC) position to the MMF was to engage Métis Citizens on three projects in the Portage la Prairie area, including BP6/BP7, Wash'ake Mayzoon Station, and the D83W transmission line. Having one dedicated ICAC for the MMF was intended to facilitate understanding amongst the Red River Métis Citizens of the interrelation and interdependence of the projects, including the cumulative

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	potential to significantly impact Métis Citizens' Constitutionally protected rights to harvest, and any further impact on these rights, claims or interests needs to be adequately and appropriately assessed and, if necessary, accommodated and mitigated for. Cumulative effects of development on the ability to harvest. (From Bipole III Métis Land Occupancy and Use Study, Wash'ake Mayzoon Station)	effects of those projects, and to build upon knowledge gained during engagement for each project to obtain a more wholesome understanding of the Portage la Prairie area and impacts of all three projects on Métis Citizens.
Agriculture, Cumulative effects	The reality of smaller size agricultural operations and available land due to negative historical impacts and cultural values has impacted many Citizens. Citizens with smaller farm sizes experience a greater relative impact to the loss of lands, while imposing tougher personal financial decisions due to having smaller margins and capital than larger agriculture producers in the area. With the recent drought conditions of 2021 causing significant financial burden to our farmers and ranchers, the MMF has a multitude of concerns that must be further addressed regarding the impacts of this new transmission line. These concerns go beyond those previously addressed by the MMF and must continue to be identified and monitored to avoid all financial and cultural impediments.	Manitoba Hydro acknowledges this concern and continues to welcome Métis perspectives on the Project to inform the Environmental Protection Program. Concerns regarding cumulative effects on agriculture are considered in the environmental assessment for the Project – see Section 8.1.5

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Agriculture	Métis Citizens living and/or harvesting within the project area have begun to identify serious concerns regarding the negative affects to land they use for farming. Additional impacts to agricultural land have begun to be identified including concerns over the threats to apiary production and pollinator health, as well as an overall reduction in land availability to provide hay or crops for local Métis agriculture producers.	Manitoba Hydro acknowledges that the Project area includes highly productive agricultural lands. Agriculture has been selected as a Valued Component (VC) and is assessed in the environmental assessment for the Project in Section 8.1. Pollinators have been assessed under this VC as well.
Traditional Pursuits, Health	Concerns from Métis Citizens harvesting within the project area regarding the negative affects to the land their families rely on for hunting to feed their family. Their families rely on the ability to access local foods to support traditional values including winter eating habits from hunting and gathering. Concerns about the loss of ability to hunt in the area. Métis nation also harvests on private farmland with permission from landowners. Impacts on harvesting are not limited to Crown land.	Manitoba Hydro acknowledges that Métis Citizens harvest on private land and that impacts of the Project on traditional pursuits are not limited to Crown land.
Traditional Pursuits, Wildlife and wildlife habitat	Citizen notified us of their hunting practices in the project area and is concerned about the loss of ability to hunt in the area. Specifically, the landowners where he hunts rely on him to manage wild animal populations and control invasive wild boar from destroying their lands. This symbiotic importance to balancing wild animal populations to support the health of the ecosystem was identified as being a significant concern of this project.	Manitoba Hydro understands that there are no new legal restrictions imposed with respect to hunting practices on the right-of-way. Métis Citizens, and others, will be able to carry out harvesting activities as they had prior to construction of the Project. Manitoba Hydro recognizes that having the Project would increase some activities along the right-of-way during construction or maintenance work, but those interferences are not a new legal restriction and would be significantly limited

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		geographically (particularly maintenance work) and would be for very limited times.
Wildlife and wildlife habitat	Concerns regarding the migration paths in the area. If chased away, they will develop a new migratory path – this could impede other migrating species, it could push them into areas of higher predators such as wolves, it could also force them to move into areas with higher disease, risking their health. (From Bipole III Métis Land Occupancy and Use Study) Potential changes to wildlife habitat and the ability to harvest in the area. (From Bipole III Métis Land Occupancy and Use Study) Concerns over habitat fragmentation. (From Bipole III Métis Land Occupancy and Use Study)	Manitoba Hydro acknowledges this concern and welcomes information on wildlife and habitat related concerns specific to the Project to inform the Environmental Protection Program. The environmental assessment considers anticipated effects of this Project on wildlife and wildlife habitat (Section 8.8). Breeding bird, bird migration, and vegetation surveys were conducted to inform the EA.
Traditional Pursuits	Concerns about impacts to Métis Rights, Claims and Interests in the area including Change to water quality, Fishing, Hunting, Ecological knowledge, Historic trapping. (From Wash'ake Mayzoon Station; MMTP Métis Land Use and Occupancy Study; Bipole III Métis Land Occupancy and Use Study) Concerns that contiguous unoccupied Crown Land will not be maintained. (From Wash'ake Mayzoon Station and MMTP Métis Land Use and Occupancy Study; Bipole III Métis Land Occupancy and Use Study)	Manitoba Hydro acknowledges these areas of concern and remains open to discussing these topics in relation to this Project throughout the FNMEP. To the best of our knowledge there is no contiguous unoccupied Crown land in the D83W Project area. Manitoba Hydro supported the MMF to undertake a self-directed study on Métis Knowledge, land use and occupancy, including a description of Métis-specific values and interests in the broader Portage Area Projects area and an assessment of the predicted effects of the projects on those values and interests. The MMF submitted their Manitoba Métis Knowledge, Land Use and Occupancy Study for Manitoba Hydro Portage Area Projects on

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	Potential for impact to lands for Métis use. (From Wash'ake Mayzoon Station and MMTP Métis Land Use and Occupancy Study) Potential for impact to Lands and waterways for use by Métis Citizens. (From Bipole III Métis Land Occupancy and Use Study) Potential changes to wildlife habitat and the ability to harvest in the area. (From Wash'ake Mayzoon Station)	November 2, 2022. The final report for the study included a description of the outcome of interviews of Métis Citizens, including an understanding of both past and contemporary use of the land in the area of the Portage Area Projects and a description of the projected effects in this broader projects area on Métis Citizens and their culture and way of life. This study also included maps indicating the locations of areas and sites in the broader Portage area that are of importance for Métis cultural interests and identified several methods for addressing or compensating the impacts identified. Following the submission of the MMF's study report, Manitoba Hydro worked to incorporate feedback into this assessment and will continue to discuss the MMF's concerns, values, interests, and suggested mitigation measures.
Traditional Pursuits, Culture and Cumulative Effects to traditional pursuits	Contributors also indicated that they would not harvest where they could hear industrial developments. This is an important distinction, that can be understood to cause a greater affect to loss of accessible lands for Métis use beyond the immediate land below and surrounding transmission line infrastructure. (From Birtle Métis Land Use and Occupancy Study) Contributors also indicated that they would not harvest where they could see industrial development. This is important as the Project has the potential to change the visual quality of the landscape in areas of importance to MMF citizens. A contributor indicated that they have concerns that the Project could "…spoil the	Manitoba Hydro acknowledges concerns related to potential effects of transmission lines' visual presence and sound on the harvesting experience. Manitoba Hydro included a discussion on visual and noise effects within the assessment and sought specific feedback from the MMF to better reflect these concerns in the assessment by sharing the draft of Section 8.9 where these effects are discussed. Manitoba Hydro values the feedback provided by the MMF on routing through the FNMEP. Manitoba Hydro appreciates the information shared by the MMF in the context of this Project and for contributions to cumulative effects through FNMEP and through the self-directed study described above.

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	landscape, the air around it, the water, hunting, gathering of berries, trees surrounding it" (Section 6.3, Pg 64). As a result, one great concern is the inability to quantify the visual value of a landscape that is lost once developed. However, this should not minimize the importance of this concern. (From Birtle Métis Land Use and Occupancy Study) Cumulative effects to MMF harvester experiences through changes in locations available to those harvesters and changes to the species available for harvest. Specifically, the harvesting experience could be affected by displacement of species of importance, reduction in solitude while harvesting in the area, and reduction in level of success, which would all contribute to changes to MMF harvesters preferred means of harvest. (From Birtle Métis Land Use and Occupancy Study)	
Wildlife; Traditional Pursuits; Economy	Concern for bird migration & bird strikes on powerlines. Concerns of how this will impact the routes they have taken and their altered migration route risks.	Manitoba Hydro undertook studies to better understand breeding bird populations and migration patterns in the Project area and to identify optimal locations for bird diverters that reduce bird-wire collisions.
Wildlife; Traditional Pursuits	Linear corridors caused by installing transmission lines allowing predator access, increased predation on prey species causing disturbance to predator-prey balance. (From Bipole III Métis Land Occupancy and Use Study)	Manitoba Hydro acknowledges this concern and continues to welcome Métis perspectives on the Project to inform the Environmental Protection Program. Much of this Project will be constructed within cleared and developed areas. Manitoba Hydro does not anticipate a measurable increase in predator access as a result of this Project.

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Noise	Potential impacts from noise during construction, maintenance, and continual noise during entire lifecycle of the transmission line. (From Bipole III Métis Land Occupancy and Use Study)	Manitoba Hydro remains open to discussing specific locations or times where noise is of high concern and potential mitigation. Manitoba Hydro will follow local noise bylaws during construction and operation of the project.
Traditional pursuits; Wildlife health; Wildlife habitat	Numerous concerns related to transmission line project impacts including the following: o Aquatic harvesting and water quality o Chemical spraying and maintenance disturbances. o Human population increases pressures on harvesting o Impacts on animal health and sensitive habitat o Sensitive Habitat such as wetlands, trees, berries, and medicines (From Bipole III Métis Land Occupancy and Use Study)	Manitoba Hydro acknowledges these areas of concern, has described our understanding of these potential impacts along with mitigation measures to address these impacts within the environmental assessment and remains open to further discussing the specific concerns related to this Project.
Routing	The MMF noted that the use of red and green colours and the "best" and "worst" wording on the presentation should not be used since it implies someone chose D as being a good route and they do not want Manitoba Hydro to leave this meeting thinking that this is the route agreed to by stakeholders and rightsholders as the best option.	The group discussed language around scoring. During the Community Preference routing meetings, Manitoba Hydro heard concerns about certain terminology used in the process. A Community Preference Team participant shared that referring to a route option as most preferred did not accurately reflect their perspectives about the same route option as it differed from the route option, which they preferred. The final preferred route for the Project is Manitoba Hydro's preferred route and is the language used in the routing process and in this assessment. Manitoba Hydro acknowledges this concern with terminology and is reviewing its routing terminology for future assessments.
Unresolved concerns	The MMF shared concerns that many of their previously identified concerns from submissions	Manitoba Hydro acknowledges these areas of concern and offers the following:

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	for BP6/7 replacement project (MMF, 2021a) and Wash'ake Mayzoon station (MMF, 2021b) are unresolved. "Both submissions also outlined a number of concerns related to transmission line project impacts more generally, drawing on information from Métis Knowledge and Land Use studies completed for past projects, including the Manitoba to Minnesota Transmission Line Project (Calliou Group, 2017), Birtle Transmission Project (MNP, 2017), and Bipole III Transmission Line (SVS, 2015). These concerns have applicability for any transmission line development, including both the BP6/7 replacement and PACE projects, and include (but are not limited to): Concerns about impacts to Red River Métis rights, claims and interests Concerns about Métis Valued Components being considered in the process Concerns about the adequacy of the Indigenous Engagement Process and lack of a distinctions-based approach Potential for impacts to Red River Métis Land Use Potential changes to wildlife habitat and the ability to harvest in the area Concerns about the cumulative effects of development on the ability to harvest Concerns with the administration of monitoring programs" (MMF MKLUO Study (2022), pg. 65-66)	In its project assessments, Manitoba Hydro does not assess impacts to rights as the duty to consult and accommodate does not rest with Manitoba Hydro. Manitoba Hydro's assessments focus on potential impacts to Métis interests such as harvesting and the ability to harvest. For the Project, Manitoba Hydro included Section 8.9 in the assessment whereby the topics/values chosen were informed by feedback received through FNMEP. These include Harvesting and Important Sites. The FNMEP for the Project included a distinctions based approach labeled as First Nations and Métis Engagement and included discussions on engagement preferences to have an engagement process specific to the Red River Métis. In this Project assessment, the potential for impacts to Métis land use are discussed in Sections 8.9.6.4 (Métis harvesting) and 8.9.7.4 (Métis important sites). Manitoba Hydro discusses cumulative effects of the three projects in this Project assessment along with other past, current, and future projects. Manitoba Hydro's transmission monitoring program has evolved over the last 10 years with feedback and direct involvement of the MMF. Manitoba Hydro acknowledges this interest and continues to be open to discussing specific concerns and suggestions about the administration of monitoring programs. Manitoba Hydro also remains open to further discussing these unresolved concerns with the MMF.

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Engagement	The MMF requested that Manitoba Hydro fully review and respond to all concerns and recommendations provided from BP6/7, Wash'ake Mayzoon Station and those related to the route options proposed and the preferred route selected for D83W. The response is to document "how the issues, concerns, and potential impacts identified have been addressed in a way that is satisfactory to the MMF." (MMF MKLUO Study (2022))	Manitoba Hydro is currently drafting a response and looks forward to further discussions with the MMF.
Routing	The study includes concerns about their involvement in routing for BP6/BP7 and D83W not being meaningful engagement. The report indicates that by grouping Community together as 30% of the routing decision, Manitoba Hydro did not differentiate between community members and Section 35 rights holders or did not provide the MMF the opportunity to provide their own criteria or weightings. Based on these concerns, the study shares that the preferred routes do not reflect the routes preferred by the Red River Métis.	Manitoba Hydro evaluates environmental, socio-economic and technical considerations, while striving to balance concerns and feedback from the First Nations, the MMF, landowners, project specialists, interested parties, and the public to determine the final preferred route of a transmission project.
Routing	"The MMF request that Manitoba Hydro both distinguish between the inputs of 'community' members and those of Section 35 rights-holders in their criteria and weighting, and provide the opportunity for rights-holders to contribute to weighting decisions to ensure they reflect their distinct rights, claims and interests."	In the routing process for the Project, the Community perspective is inclusive of those involved in the PEP and FNMEP. For the Community Preference Team meeting, First Nations, the MMF and representatives from rural municipalities were invited to share their preferences and concerns with route options, route scores for each route option and their rationale for each score. This Team meeting considers many diverse interests, land uses and perspectives. The goal of the Community Preference Team meeting was to determine a preferred route from the Community Preference Team perspective by

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		balancing multiple perspectives and limiting overall effects.
Routing	The study indicates that the MMF has raised concerns with each of the different route options in their previous submission. (MMF MKLUO Study (2022), pg. 8)	Many diverse interests, land uses, and perspectives are considered for each route option. Manitoba Hydro evaluates environmental, socio-economic and technical considerations, while striving to balance concerns and feedback from First Nations, the MMF landowners, project specialists, interested parties, and the public to determine the final preferred route of a transmission project. The goal in determining a preferred route is to balance multiple perspectives and limit overall effect. The MMF directly participated in the Community Preference Team and shared their feedback and concerns with route options and shared their route scores for each route option and rationale for each score. Manitoba Hydro acknowledges in trying to balance the concerns from all perspectives it may not be possible to resolve all concerns from each party through routing and attempts to employ mitigation measures during construction and operation of the line to address unresolved concerns
Routing	An interview participant shared concern with routing the new transmission line on their property that already has two lines to the south of the property. This concern was characterized as: "…one of the lines, the north most one, is actually right across one of my fields. It's on a… It goes right through the section… So, we don't want the line going through the middle of the section. That's going to be a real problem if that's the route they choose. And I have a bad feeling about that because on the south side of	Manitoba Hydro shared the preferred route with landowners and remains open to discussing and working to resolve specific concerns identified by landowners.

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	my property there's already a transmission line on one side of the road, and there's a three-phase line on the other side of the road. So, obviously there's nowhere for a third line. So, that's probably why they picked going out into my field half a mile; to get away from the other two lines. It would be cheaper for them. So, we have to deal with that. I don't know what the magic is there, but… That's a real problem." (MMF MKLUO Study (2022), pg. 67-68)	
Land use	Interview participants shared concerns that the loss of land as a result of the Portage area projects will impact ability to use the land and exercise rights.	Manitoba Hydro has made its best efforts during the planning and assessment of the Portage area projects to minimize the cumulative effect of loss of land.
Compensation	Interview participants suggested Manitoba Hydro compensate the MMF (either in land or financially) for the loss of land and impacts on Métis hunters. An interviewee described "… how the land that will be taken away will be "significant" and impact Red River Métis hunters in particular. To address this loss, they suggested that Manitoba Hydro either give land back to the Red River Métis as compensation or compensate Red River Métis citizens through annual payments to the MMF. Well, it's a tough question because everybody looks at it differently. But, in all reality, I don't believe Manitoba Hydro has land to give you in compensation for the land they're taking away. And the hunting area that they're taking out of the picture by going across the middle of a section and never to be changed, never to be brought back, is significant. And some sort of	Outside of the small area of land occupied by transmission towers on primarily developed agricultural land, Manitoba Hydro understands that there are no new legal restrictions imposed with respect to hunting practices on the right-of-way. Métis Citizens, and others, will be able to carry out harvesting activities as they had prior to construction of the Project.

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	compensation to the Métis hunters and Métis people would need to be brought into the picture as an annual payment to the [Manitoba] Métis Federation." (MMF MKLUO Study (2022), pg. 67)	
Ability to practice culture	Interview participants shared concerns about the impact of the project on current and future generations ability to practice Métis culture.	The environmental assessment for this Project includes a collective effects assessment that considers system-level effects of the Project through a valued component called cultural landscape. Through conversations during the FNMEP and through past projects, Manitoba Hydro came to understand that the Project area supports a cultural well-being component through linkages between place, activities and land use, knowledge of the area, and cultural context. Concerns related to the ability for current and future generations to practice Métis culture, for example, are assessed through this collective effects approach and lens included in the cultural landscape section (Section 8.9.9).
Engagement	Interview participants shared a lack of direct engagement between Manitoba Hydro and Red River Métis citizens in the Portage la Prairie area and suggested that Manitoba Hydro work with the MMF to set up in person meetings. (MMF MKLUO Study (2022), pg. 66)	Manitoba Hydro follows the direction for engaging with Red River Métis Citizens provided by the MMF in Resolution 8. Through this process Manitoba Hydro relies on the expertise of staff in the Department of Energy, Infrastructure and Resource Management to outline engagement preferences for projects and when and how to engage with River Métis citizens. For the Portage area projects, Manitoba Hydro provided the MMF funding to hire an ICAC to assist with direct engagement with Métis Citizens. Manitoba Hydro remains open to engaging directly with Métis Citizens and will seek direction from the MMF on such opportunities.

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Ongoing Communications	"MMF requests that Manitoba Hydro work with the MMF to develop an appropriate communications plan or protocol focused on communicating with Red River Métis citizens, including an established process for voicing concerns over the lifecycle of the project. For example, a phone line could be set up for citizens to call with questions, or report concerns or environmental issues. Manitoba Hydro should also provide clear and timely communication and notification to the MMF surrounding project updates, changes, etc. for distribution to Red River Métis citizens." (MMF MKLUO Study (2022)	Manitoba Hydro is always open to understanding engagement preferences of the Red River Métis to develop engagement plans that are unique to the MMF and Red River Métis Citizens. The FNMEP for the Project was designed over the lifecycle of the Project and Manitoba Hydro will notify all First Nations, the MMF and the Portage Urban Indigenous Peoples Coalition (PUIPC) engaged on the project about Project decisions and keep them informed about construction schedules and activities. The dedicated telephone line and email address for people to voice concerns or ask questions will remain operational throughout the regulatory review, construction and operation phases for the Project.
Engagement	"Through further engagement with the MMF, Manitoba Hydro should develop appropriate avoidance, mitigation and accommodation measures for Red River Métis land use and occupancy features identified as being potentially impacted by the proposed projects." (MMF MKLUO Study (2022)	Manitoba Hydro acknowledges measures shared to date and remains open to further discussions about Métis specific avoidance, mitigation and accommodation measures for the Project to inform the Environmental Protection Program. Manitoba Hydro will also include additional mitigation measures proposed by the MMF in the Environmental Protection Plan for BP6/BP7 and Wash'ake Mayzoon Station.
Engagement, Environmental Assessment	"the MMF request a written response from Manitoba Hydro demonstrating how the Métis Knowledge and land use data presented in this study specifically was integrated and used to inform the Environmental Assessment process for BP6/7, PACE, and Wash'ake Mayzoon" (MMF MKLUO Study (2022)	Manitoba Hydro is currently drafting a response and looks forward to further discussions with the MMF on this request.

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Ongoing Engagement	"Manitoba Hydro should continue to consult with the MMF surrounding the concerns and issues expressed by Red River Métis citizens, including harvesters who use the lands and waters in close proximity to the proposed projects. There remain unanswered questions and concerns to be addressed, for example, how Red River Métis citizens will be compensated if their land use is impacted by the proposed projects." (MMF MKLUO Study (2022)	Following a decision regarding the Project, Manitoba Hydro will notify First Nations engaged on this Project, the MMF and the PUIPC about the decisions and keep them informed about construction schedules and activities. Manitoba Hydro will remain open and responsive to any questions or concerns from communities. The telephone line and email address will remain operational throughout the regulatory review, construction and operation phases for the project.
Cumulative Effects	"The Portage Area Projects, as discussed in this study, need to be assessed as a whole due to their interrelation and interdependence. The MMF should be given adequate time and resources to conduct a rigorous analysis of the cumulative impacts of these projects to inform their development. As stated in the MMF's Métis Specific Concerns report for Wash'ake Mayzoon (MMF, 2021a) "splitting of transmission enhancements project phases into multiple EAs despite their interrelation and interdependence, specifically and intentionally excludes an assessment of the cumulative impacts of these projects on the rights, claims and/or interest of the Manitoba Métis." (MMF MKLUO Study (2022)	Manitoba Hydro appreciates the MMF sharing their preference for cumulative effects assessment. Manitoba Hydro's intent in developing the ICAC positions to engage on all three projects in the Portage la Prairie area, including BP6/BP7, Phase 1 of PACE Wash'ake Mayzoon Station and Phase 2 of PACE – new transmission line (D83W), was to facilitate understanding of the interrelation and interdependence of the projects. A separate licence was required for each project, which resulted in the development of three separate EAs. However, the intent was to build upon knowledge gained during engagement for each project to obtain a more wholesome understanding of the Portage la Prairie area and impacts of all three projects. Manitoba Hydro discusses cumulative effects of all three projects in the new transmission line (D83W) EA.
Cumulative Effects (Access)	Interview participants shared concerns about reduced access to harvesting areas as the result of physical barriers such as municipal infrastructure and increased private property, and how the Portage Area Projects (D83W) will	During construction, any Manitoba Hydro access restrictions are temporary in nature and are for the sole purpose of providing a safe working environment for its employees and contractors while maintaining the safety of the public within the active construction zone. During the operation of the Project, access permissions will be similar

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	exacerbate this issue. (MMF MKLUO Study (2022)	to those held prior to construction, which will enable rights-based activities to continue within the Project right-of-way.
Cumulative Effects (Ability to harvest)	Interview participants shared concerns about how regulatory and legal barriers, such as hunting restrictions and licensing, over time have impacted their ability to harvest in the area and the importance of considering this in the larger context of the Project. (MMF MKLUO Study (2022)	Cumulative effects are discussed in the environmental assessment for the Project where Manitoba Hydro acknowledges that the Project occurs in a region that has substantially changed. Manitoba Hydro appreciates the information shared by the MMF in the context of this Project and for contributions to cumulative effects through FNMEP and through the Manitoba Métis Knowledge, Land Use and Occupancy Study for Manitoba Hydro Portage Area Projects dated September 2022.
Cumulative Effects (Portage Diversion)	Interview participants shared concerns about flooding and damage caused by the Portage Diversion to the environment. (MMF MKLUO Study (2022)	Cumulative effects are discussed in the environmental assessment for the Project where Manitoba Hydro acknowledges that the Project occurs in a region where the lands have been substantially changed as a result of human development, including changes from industrial sites such as the Portage Diversion. Manitoba Hydro appreciates the information shared by the MMF in the context of this Project and for contributions to cumulative effects through FNMEP and through the Manitoba Métis Knowledge, Land Use and Occupancy Study for Manitoba Hydro Portage Area Projects dated September 2022.
Cumulative effects	"Given the information presented here, it is critical that potential impacts of the proposed projects on Red River Métis rights, claims and interests are appropriately assessed within this context and not separate from other	Cumulative effects are discussed in the environmental assessment for the Project and consider changes that have taken place in the Project area over time as being relevant to understanding the cumulative effects resulting from past, current, and future projects. Existing Manitoba Hydro

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	developments, especially those already implemented or managed by Manitoba Hydro." (MMF MKLUO Study (2022), pg. 64)	infrastructure is considered in this context along with other past and current developments.
Monitoring	"The MMF requests that adequate time and funding be provided by Manitoba Hydro to support Red River Métis participation in environmental and cultural monitoring throughout all phases of the project. This may include training, involvement, and employment of MMF environmental and cultural monitors. The specifics of such a monitoring program should be agreed upon by both Manitoba Hydro and the MMF." (MMF MKLUO Study (2022)	Manitoba Hydro will offer opportunities for the MMF to participate in the environmental and cultural monitoring programs for BP6/BP7, Wash'ake Mayzoon Station and in the Dorsey to Wash'ake Mayzoon Transmission Line.
Harvesting	"The mapped data provides evidence of several of ecologically significant areas within 10 km of the proposed projects, including fish spawning areas, mammal migration routes, bird habitat, reptile and amphibian habitat and other important habitat. These locations are concentrated primarily in two areas. One, including extensive bird habitat around Portage la Prairie encompassing Crescent Lake and part of the Assiniboine River, and the second including plant habitat, mammal habitat, and fish spawning areas around Saint Eustache area north of the Trans Canada highway. Notably, to the north of both the BP6/7 and PACE preferred routes, participants also identified sensitive and ecologically significant marshlands south of Lake Manitoba where duck and geese live during the summer months. This same area is	The Manitoba Metis Knowledge, Land Use, and Occupancy Study (MMF, 2022) shared valuable knowledge regarding wildlife and vegetation that Manitoba Hydro has worked to incorporate into this assessment.

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	where pickerel/walleye, carp, and perch spawn, extending from the area west of Delta Beach northeast to St. Ambroise. Directly overlapping the BP6/7 preferred route, Red River Métis citizens identified bird habitat for prairie chicken[1] and migration routes for geese between Macdonald and Long Plain extending east towards Oakville; they identified these same features plus additional bird habitat for geese and ducks, as well as plant habitat for purple lady slipper overlapping with the D83W preferred route just east of Portage la Prairie." (MMF MKLUO Study (2022), pg. 32)	
Mitigation	"To date, the MMF has developed and communicated to Manitoba Hydro a number of recommendations to address the potential impacts on Red River Métis citizens related to BP6/7, PACE, and Wash'ake Mayzoon as well as the insufficiencies in Manitoba Hydro's approach to consultation with the Red River Métis. Given the MMF's previously identified concerns, especially those related to the route options proposed and preferred route selected for D83W, the MMF request that Manitoba Hydro review these recommendations in full and provide a written response demonstrating how the issues, concerns, and potential impacts identified have been addressed in a way that is satisfactory to the MMF." (MMF MKLUO Study (2022)	Manitoba Hydro is currently drafting a response and looks forward to further discussions with the MMF on this request.

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Mitigation	"Through further engagement with the MMF, Manitoba Hydro should develop appropriate avoidance, mitigation and accommodation measures for Red River Métis land use and occupancy features identified as being potentially impacted by the proposed projects. The presence of these features in the area strongly supports a need for further research and planning prior to construction of the projects, especially those which are particularly sensitive such as the identified burial sites." (MMF MKLUO Study (2022)	Following the submission of the MMF's study report (2022), Manitoba Hydro worked to incorporate feedback into this assessment and will continue to discuss the MMF's concerns, values, interests, and suggested mitigation measures.

Summary of Concerns and Comments from Peguis First Nation (PFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
Heritage	Concern related to three archaeological sites located approximately 4.25 km from proposed segment 21 near the intersection of PR 240 and 227. General high concern regarding the potential for archaeological finds in the project area. Heritage concerns remain even if paralleling existing transmission infrastructure or roads because depending on the timing of construction the areas may not have been tested and there remains potential for archaeological finds with any additional disturbance. Preference to work to avoid oxbows and old river systems that are likely to have been travelways. Near the floodway would have been a trade route.	This feedback was helpful in informing the transmission line routing process. PFN directly participated in the Community Preference Team. Manitoba Hydro acknowledges the importance of heritage values to PFN and are undertaking ongoing discussions to better understand these concerns and mitigate potential effects.
Engagement	Peguis First Nation shared that it would be helpful if Manitoba Hydro shared the CHRPP as a plain language document explaining Manitoba Hydro's process and when archaeologists and monitors are on site.	In response to this concern, Manitoba Hydro prepared a plain language summary of the process and sent via email on February 2, 2022. PFN's recommendations on improving the CHRPP were further discussed at the second heritage meeting held on Nov. 9, 2022.
Waterways	Preference to avoid the Assiniboine River as much as possible. Also, the river has moved from where it used to be and there are lots of oxbows and old riverbeds within the project area that are likely to have high potential for archaeological finds.	This feedback was helpful in informing the transmission line routing process for the Project. PFN directly participated in the Community Preference Team. The ROW does not cross the Assiniboine River and does not traverse route options that had contained the most oxbows.

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
	Most concerns are concentrated north of Portage La Prairie and close to the Station because of all the old river segments. It is also a direct route to Lake Manitoba and lots of small rivers and potential old travel routes. PFN suggested that when get closer to Portage for the route to stick closer to the city to avoid smaller creeks and streams.	
Routing	In Round 1, PFN identified a preferred route consisting of segments 2, 5, 8, 9, 11, 16, 21, 22, 24, 26, 29, 31, and 33. High potential for environmental impacts and archaeological finds guided identification of preferences. In Round 1, PFN suggested a new segment heading straight south at the intersection of segments 16 & 22 and connecting to section 20. The suggestion is focused on avoiding the high number of river oxbows located on segments 21 & 22 and the high potential for archaeological finds. With the mitigative segment, PFN's preferred Round 1 route is: 2, 5, 8, 9, 11, 16, 15A, 20, 24, 26, 29, 31, and 33. Highly oppose Round 1 segments 7 and 10 for the reason of crossing the Assiniboine River. Round 1 segment 12 was too close to the river, so segment 11 is preferred. Round 1 segment 23 crosses a high number of river oxbows, streams, and creeks.	This feedback was helpful in informing the transmission line routing process for the Project. PFN directly participated in the Community Preference Team. The ROW does not cross the Assiniboine River and does not traverse route options that had contained the most oxbows. Manitoba Hydro included PFN's mitigative segment in the routing process.

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
	Round 1 segment 30 crosses an active creek surrounded by wetlands.	
Routing, Heritage	PFN asked where cultural heritage is considered in the routing model.	Manitoba Hydro responded that cultural heritage is considered both in the built environment and through the community perspective.
Routing	Peguis First Nation asked why cost is more important than community concerns. Peguis First Nation noted that this project affects the culture, history and economic future of these areas and whether this was an example of the needs of the many outweighing the needs of the few.	As a provincial Crown Corporation, Manitoba Hydro responds to feedback from taxpayers and customers. Keeping costs low is feedback overwhelmingly and consistently communicated to Manitoba Hydro. Manitoba Hydro recognizes that the routing process is complex and that most people do not want a transmission line in their backyard. Members of the Community Preference Team, including representatives of PFN, provided direct input on the evaluation of route options, which informed the selection of a preferred route. The routing methodology considers values from multiple perspectives. As a result, the final preferred route (FPR) is often a balance of perspectives.
Routing, engagement	Peguis First Nation noted that people do want to be part of the conversations, but it is challenging to be brought in when many choices have already been eliminated. The perception is that participants must choose what is left and it does not feel inclusive since participants do not understand why other options have been excluded. Peguis First Nation noted that "least worst" was an appropriate term, since no one is happy with the final 4 options being presented.	Manitoba Hydro noted that on a past transmission line projects communities engaged on the project were asked to draw their own routes from the start to the end point, but many communities did not want to provide certain sensitive information if a transmission line would not end up in the area. During the Community Preference routing meetings, Manitoba Hydro heard concerns about certain terminology used in the process. A Community Preference Team participant shared that referring to a route option as most preferred did not accurately reflect their perspectives about the same route option as it differed from the route option, which they preferred. The final preferred route for the

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
		Project is Manitoba Hydro's preferred route and is the language used in the routing process and in this assessment. Manitoba Hydro acknowledges this concern with terminology and is reviewing its routing terminology for future assessments.
Climate change	PFN expressed interest in hosting climate change workshops with other Indigenous communities in the area.	Manitoba Hydro met with PFN on January 14, 2022 to further discuss this interest.
Treaty land entitlement (TLE)	Concern about potential impacts to PFN's ability to select TLE land within the area now and in the future on both Crown and private lands.	Manitoba Hydro sent a letter to PFN on January 5, 2022 to better understand PFN's TLE concerns in the area. Manitoba Hydro understands that both Crown and private lands contribute to the fulfillment of TLE agreements in Manitoba. Manitoba Hydro reviews TLE selections and Addition to Reserve selections through geospatial information (mapping) provided by the Province of Manitoba and through the FNMEP. Any TLE selections within the Project area are identified as areas of least preference during the transmission line routing process. No part of the ROW crosses any TLE selections or Addition to Reserve selections.

Summary of Concerns and Comments from Portage Urban Indigenous Peoples Coalition (PUIPC) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
Engagement	PUIPC expressed interest in staying informed about the project and opportunities available for members to share feedback.	Manitoba Hydro continues to reach out and share information with the PUIPC during the FNMEP for the Project. Following a decision regarding the Project, Manitoba Hydro will notify First Nations engaged on this Project, the MMF and the PUIPC about the decisions and keep them informed about construction schedules and activities. Manitoba Hydro will remain open and responsive to any questions or concerns from communities. The telephone line and email address will remain operational throughout the regulatory review, construction and operation phases for the Project reach out to the PUIPC to advise of Project milestones and share opportunities to participate in the FNMEP.

Summary of Concerns and Comments from Roseau River Anishinabe First Nation (RRAFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
n/a	Manitoba Hydro did not receive any feedback from Roseau River Anishinabe First Nation during Round 1 engagement.	Manitoba Hydro continued to and continues to reach out and share information with RRAFN during the FNMEP for the Project. Following a decision regarding the Project, Manitoba Hydro will notify First Nations engaged on this Project, the MMF and the PUIPC about the decisions and keep them informed about construction schedules and activities. Manitoba Hydro will remain open and responsive to any questions or concerns from communities. The telephone line and email address will remain operational throughout the regulatory review, construction and operation phases for the Project.

Summary of Concerns and Comments from Sandy Bay Ojibway First Nation (SBOFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
n/a	Manitoba Hydro did not receive any feedback from Sandy Bay Ojibway First Nation during engagement on the Project to date.	Manitoba Hydro continues to reach out and share information with SBOFN during the FNMEP for the Project. Following a decision regarding the Project, Manitoba Hydro will notify First Nations engaged on this Project, the MMF and the PUIPC about the decisions and keep them informed about construction schedules and activities. Manitoba Hydro will remain open and responsive to any questions or concerns from communities. The telephone line and email address will remain operational throughout the regulatory review, construction and operation phases for the Project

Summary of Concerns and Comments from Swan Lake First Nation (SLFN) related to the Dorsey to Wash'ake Mayzoon Transmission Project

Category	Summary of Concerns and Comments	Summary of Manitoba Hydro Response
Employment and training opportunities	Concerns about continuity of Indigenous employment and training opportunities across Manitoba Hydro projects. SLFN is interested in longer-term employment opportunities. Concerns with how Indigenous employment opportunities have been implemented on past projects.	Manitoba Hydro compiled a report including statistics on employment and training outcomes for Indigenous people, and specifically for SLFN members, on Manitoba Hydro transmission projects between 2014 and 2022. The report also included information on how Manitoba Hydro's contracting strategy has evolved over time in terms of its approach to promoting Indigenous content on transmission construction projects.
Monitoring	Interest in Indigenous monitor positions.	Manitoba Hydro acknowledges this interest and looks forward to further discussions with Swan Lake First Nation about their interest in monitoring.
Heritage	SLFN expressed interest in having representation at heritage discussions with the project archaeologist, noting that the Nation has traditional land use beyond reserve land.	Manitoba Hydro acknowledges this interest and has invited SLFN representatives to take part in heritage discussions on the Project.
Climate change	Interest in climate change considerations being assessed for the Project.	Chapter 9.0 includes an assessment of the project effects on Greenhouse Gases and Climate Change.

Round 1 FNMEP meetings

Presentation slides from pre-Round 1 meeting with PFN held Sept. 21, 2021

Peguis First Nation - Manitoba Hydro

Update meeting

September 21, 2021

Heather McCorrister - PFN
Mike Sutherland - PFN
Sarah Coughlin - MH
Maria M'Lot - MH

Topics

- Birtle – complete
- G79L - Mike sent text to Chief.
- Projects in the Portage la Prairie area
  - BP 6/7
  - Wash’ake Mayzoon Station
  - New transmission line (D83W)
  - Heritage workshop (Oct 7, 2021)
- MMTP
  - Crown land offset plan (Cultural Representative)
  - Monitoring?

G79L

- G79L - Mike sent text to RRAFN Chief re: G79L ceremony
  - Mike will chat with staff at 1075
- Peguis will give ceremony.
  - Find out vaccine policy (Sarah to find out)
  - Set up meeting to discuss ceremony, sooner the better due to safety.
    - Ceremonial protocols important. Chat with Mike sometime this week! He's going away. His soul needs this!
    - Sarah set up meeting. Wednesday at 10. Add Kevin Monkman (Thursdays are bad for Mike)
- Mike knows someone that can visit site for tours when MH sends invite (Lawrence Asham or Geralyn Chochrane)

Projects in the Portage la Prairie area

- BP 6/7
- Wash'ake Mayzoon Station
  - Keenan (Env. Sci) may be interested in a site visit.
- New transmission line (D83W)
  - Send email to PFN (same as BP6/7)
  - Interested in tender info
- Heritage workshop (Oct 7, 2021)
  - Mike also hosting workshops on this topic (2nd for archaeologists and ceremony process) and a 3-4 day training program with HRB for Indigenous monitors.
  - Joseph Sutherland may also attend Oct 7 meeting

Hiring women and gender diverse

- PFN targeted workshop that brings in women
- 10-12 women
- First air, CPR, powerline training
- LGBTQ2S

- Climate change workshop
  - Mike wants this!
  - Trust – facilitator (who manages the Trust? Sharon Stevenson)
  - Water, water keepers, terrestrial, air, talk to Elders and they share
  - Youth working with RRBC
  - Maria to set up meeting with PFN to discuss further

MMTP

- Crown land offset plan (Cultural Representative)
  - Mike will be cultural rep
  - TLE office – Lloyd Stevenson and Myrna Hefferman. Maria and Sarah will set up meeting
- Monitoring?
  - Mike may bring Keenan on monitor-crown land plan

CDI

- Chief is asking about CDI and MMTP
- Can talk to us after case closes.

- Training initiatives – why not have an interesting 50% female hiring?

Presentation slides from Round 1 meeting with LPFN held Nov. 23, 2021

Dorsey to Wash’ake Mayzoon Transmission Line

Seeking Feedback from Long Plain First Nation on D83W

November 23, 2021

Manitoba Hydro

Working Together: MH and LPFN

- Values LPFN feedback on projects
- Learning from past projects:
  - Bipole III
  - MMTP
  - MH work in the Long Plain First Nation area
  - Portage Area Projects
- Work to improve the process each time to seek a real understanding of concerns.

Manitoba Hydro

Feedback at ALL Stages of the Projects

How should we route the project?	Round 1 – feedback on segments Round 2 – feedback on route
What should be studied in assessment report?	Valued components
How can we mitigate concerns?	
How LPFN traditional knowledge can inform the project?	
Review our chapters - did we capture concerns accurately?	
If approved, construct and monitor	

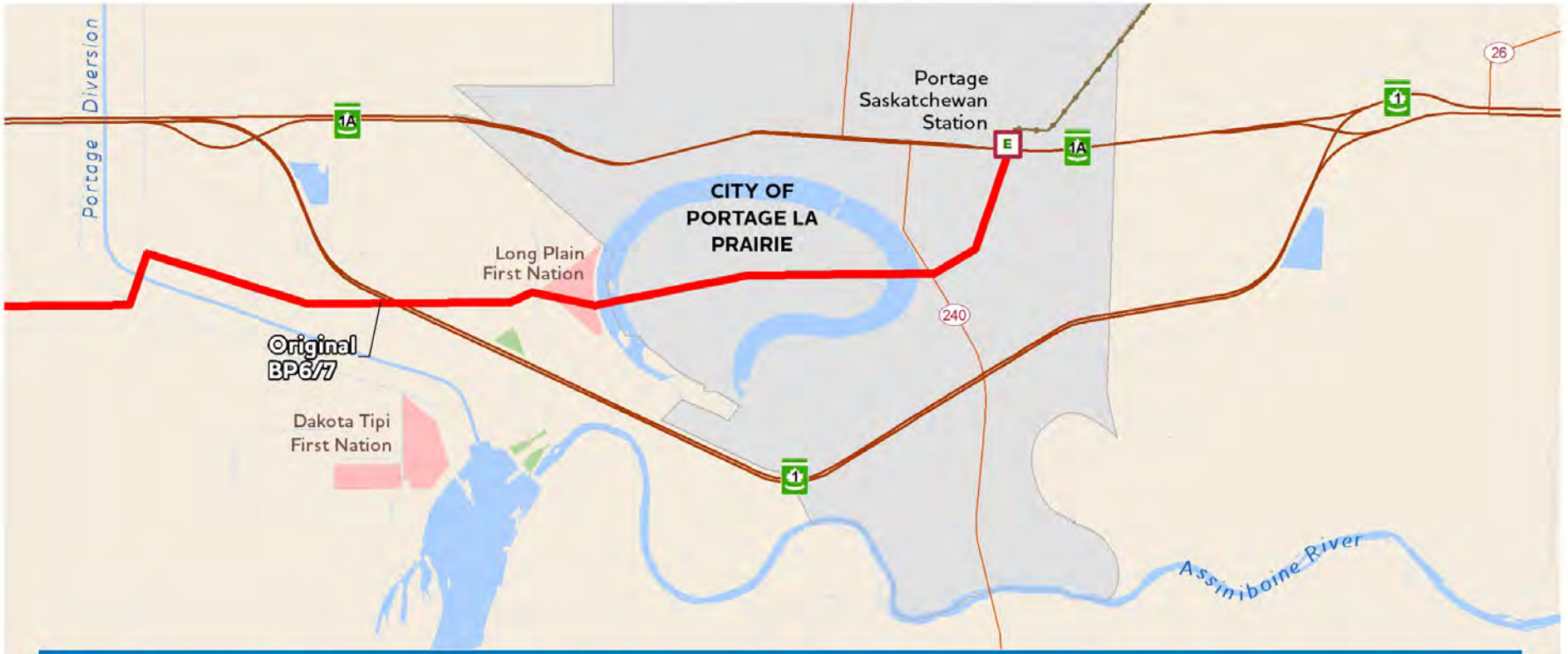
Portage Area Projects

- Engagement on projects began summer 2020
- Coordinator Agreement signed in January 2021
- Includes funding for:
  - LPFN-led engagement, interviews, tours
  - A coordinator position, part-time for 3 years
  - Study preparation, mapping
  - Meeting time
  - Training
  - A 'check-in' to see if we're okay to proceed in phase 2 of agreement
- Updated agreement in May of 2021 to reflect LPFN preferences with Lands Director and Asinii Consulting Inc.

Manitoba Hydro

Portage Area Projects

- Phase 1
  - BP 6/7
- *Check-in – feedback shared, letter response from MH*
- Phase 2
  - Wash'ake Mayzoon Station
  - Dorsey to Wash'ake Mayzoon Transmission Line



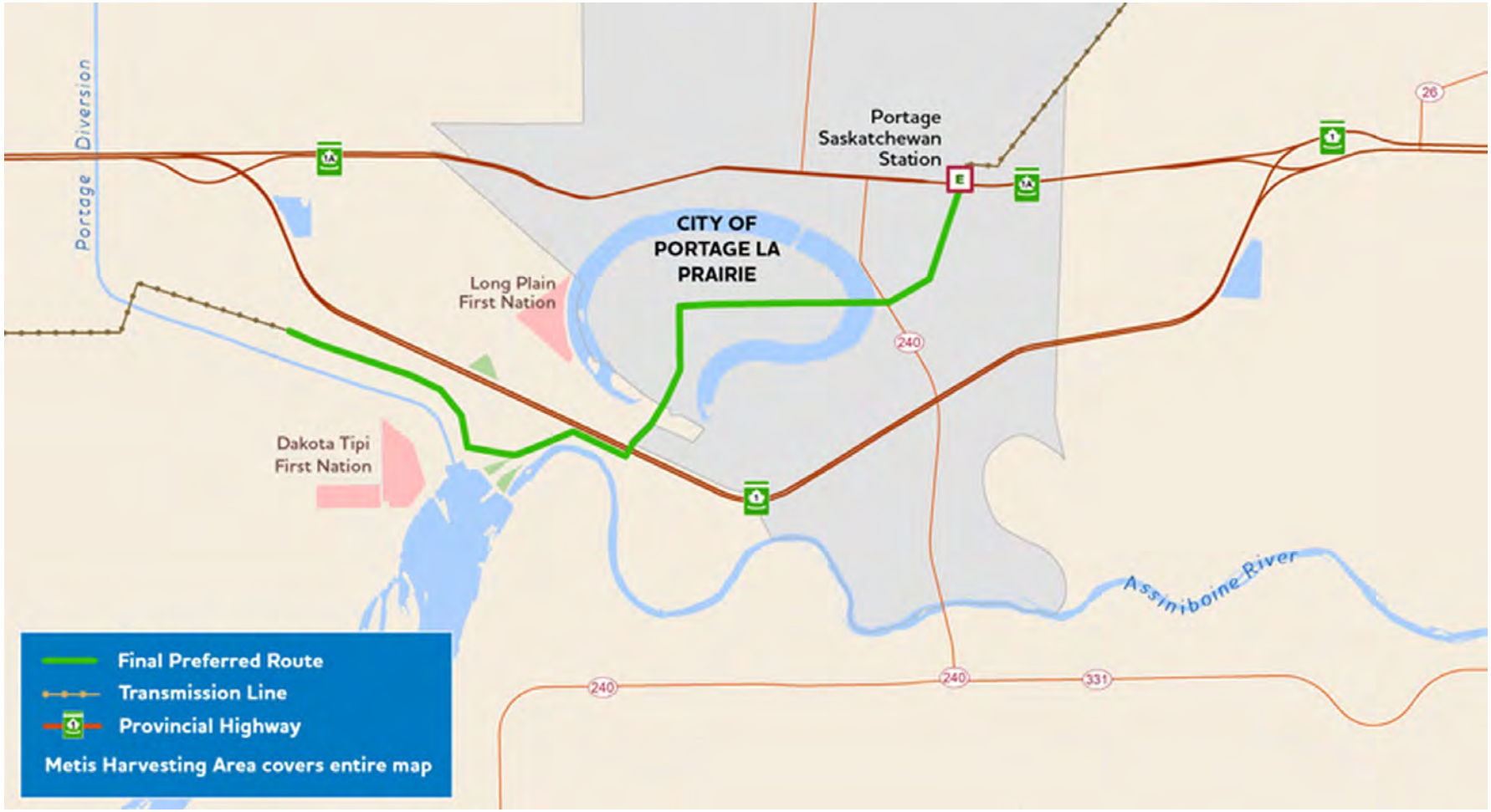
Original BP6/7
Transmission Line
Provincial Highway
First Nation
City
Provincial Park
Metis Harvesting Area covers entire map

The original BP6/BP7 transmission line was built between 1949 – 1964. The purpose of this 115kV transmission line is to carry power from Portage la Prairie to Brandon.


Meeting Minutes
Meeting: Long Plain First Nation Route Planning Area Discussion
Meeting Purpose: Discussion on Route Planning Area
Meeting Date: July 16, 2020
Meeting Time: 1:30pm
Meeting Location: LPFN Madison Street Boardroom
Meeting Facilitator: Chief Dennis Meeches
Attendees: J.Matthewson, G.Penner, Chief Meeches R.Roulette jr, Rosalind Merrick, Marvin Daniels, Stephen Prince, Steve Petes, Liz Merrick
Minutes Issued By: James Ma
Next Steps: (Task, Assigned to, Ch
Owner
Due Date
James to have TL Design cor
on LPFN land adjacent to fe
respond to
August 1
Status of Easement on LP
Alec and respo
Maria to clarify with Ralp
and are not being
Ralph Requ
at meeting, James to pro
Agenda topic 1: North Boun
Speaker:
Discussion:
Chief Meeches
Ralph ad
Upcoming Portage la Prairie Transmission Projects
- a new approach
Environmental Assessment
BP6/7 Transmission Project
Indigenous Community Assessment Coordinators
March 2, 2021
Manitoba Hydro
PORTAGE AREA PROJECTS
INDIGENOUS COMMUNITY COORDINATOR GUIDEBOOK
PORTAGE AREA PROJECTS
Phase I
PARTICIPANT WORKBOOK
With a focus on the BP6/BP7 Project
Community Ranking in Transmission Line Routing
Process overview
Maggie Bratland, Senior Environmental Specialist
Licensing and Environmental Assessment
Manitoba Hydro

What We Heard from Long Plain First Nation re: BP6/7

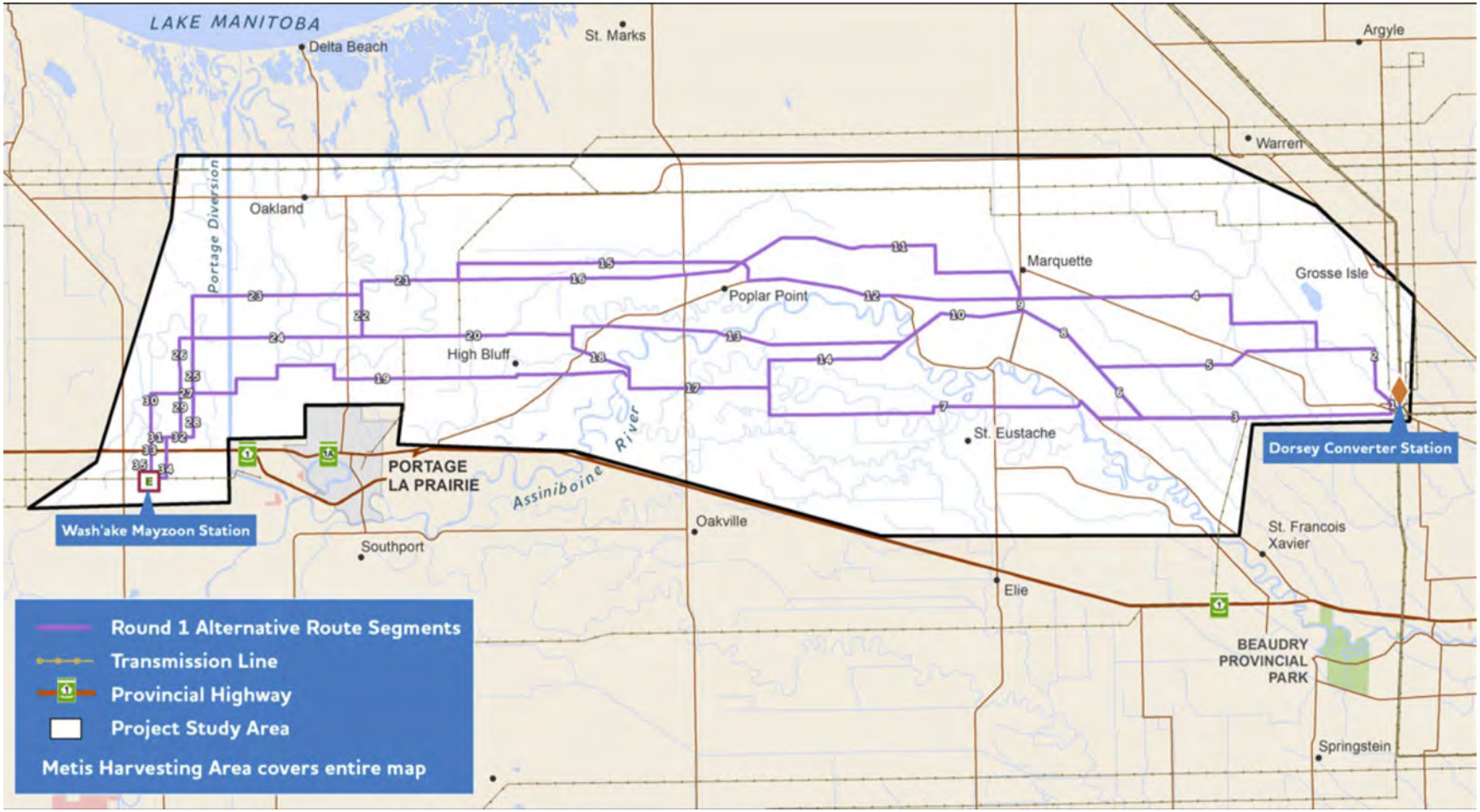
- Ralph Roulette, Shaun Peters contributed to routing BP6/7
- Substantial development in the area
- Your community plans for ongoing use and development of the area
- Transmission line along north side of Highway 1 would conflict with future planned residential and commercial development



Manitoba Hydro

Wash'ake Mayzoon Station

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



Project Description

- New 230-kV transmission line from Dorsey converter station to proposed, Wash'ake Mayzoon station

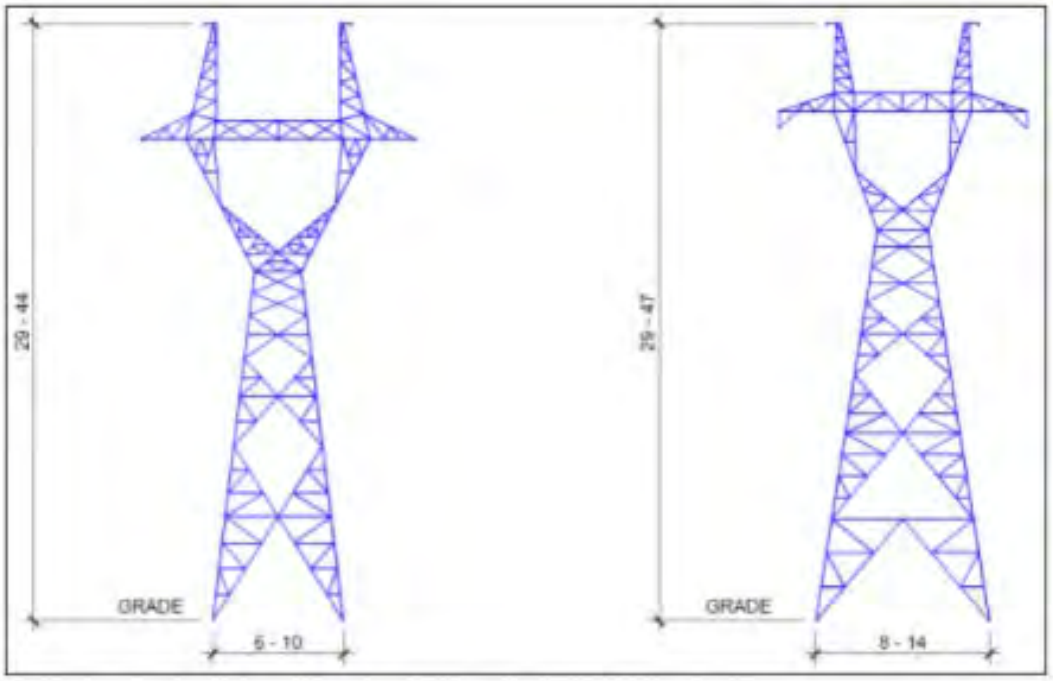


Figure 2-1: Typical self-supporting steel lattice suspension tower

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Why is this project needed?

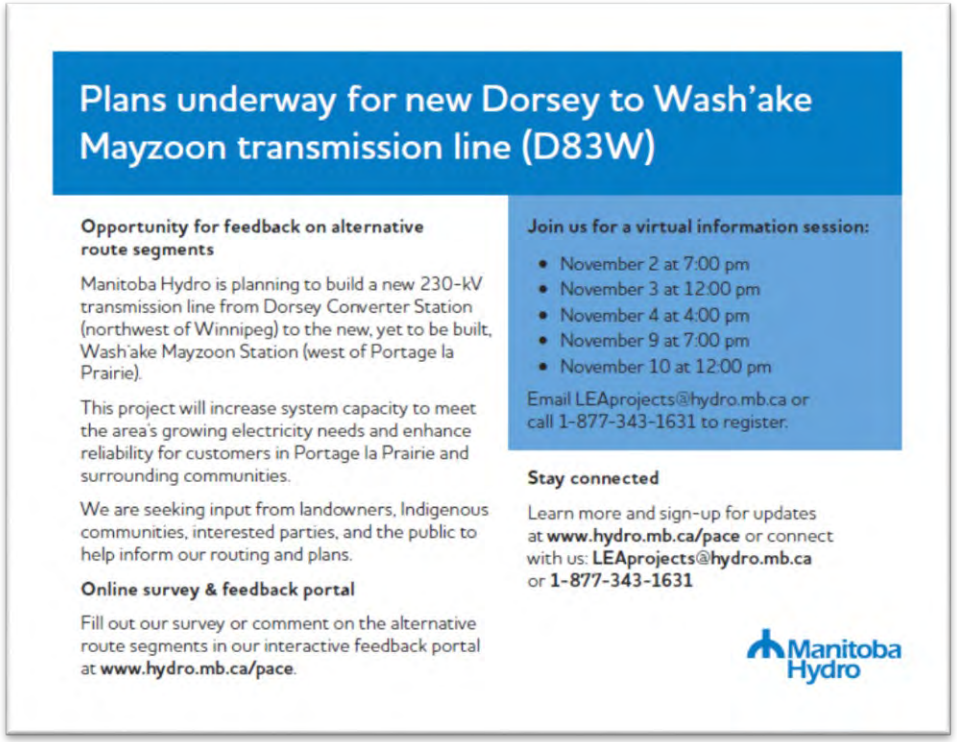
Project will increase system capacity to meet growing electricity needs

Enhance reliability for customers in Portage la Prairie and surrounding areas

Manitoba Hydro

How we're sharing information

- Working directly with Indigenous communities in a manner preferred by them
- Project webpage
- Printed materials
- eCampaign
- Emails
- Social media
  - Facebook



Plans underway for new Dorsey to Wash'ake Mayzoon transmission line (D83W)

Opportunity for feedback on alternative route segments

Manitoba Hydro is planning to build a new 230-kV transmission line from Dorsey Converter Station (northwest of Winnipeg) to the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie).

This project will increase system capacity to meet the area's growing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding communities.

We are seeking input from landowners, Indigenous communities, interested parties, and the public to help inform our routing and plans.

Online survey & feedback portal

Fill out our survey or comment on the alternative route segments in our interactive feedback portal at **www.hydro.mb.ca/pace**.

Join us for a virtual information session:

- November 2 at 7:00 pm
- November 3 at 12:00 pm
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Stay connected

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Manitoba Hydro

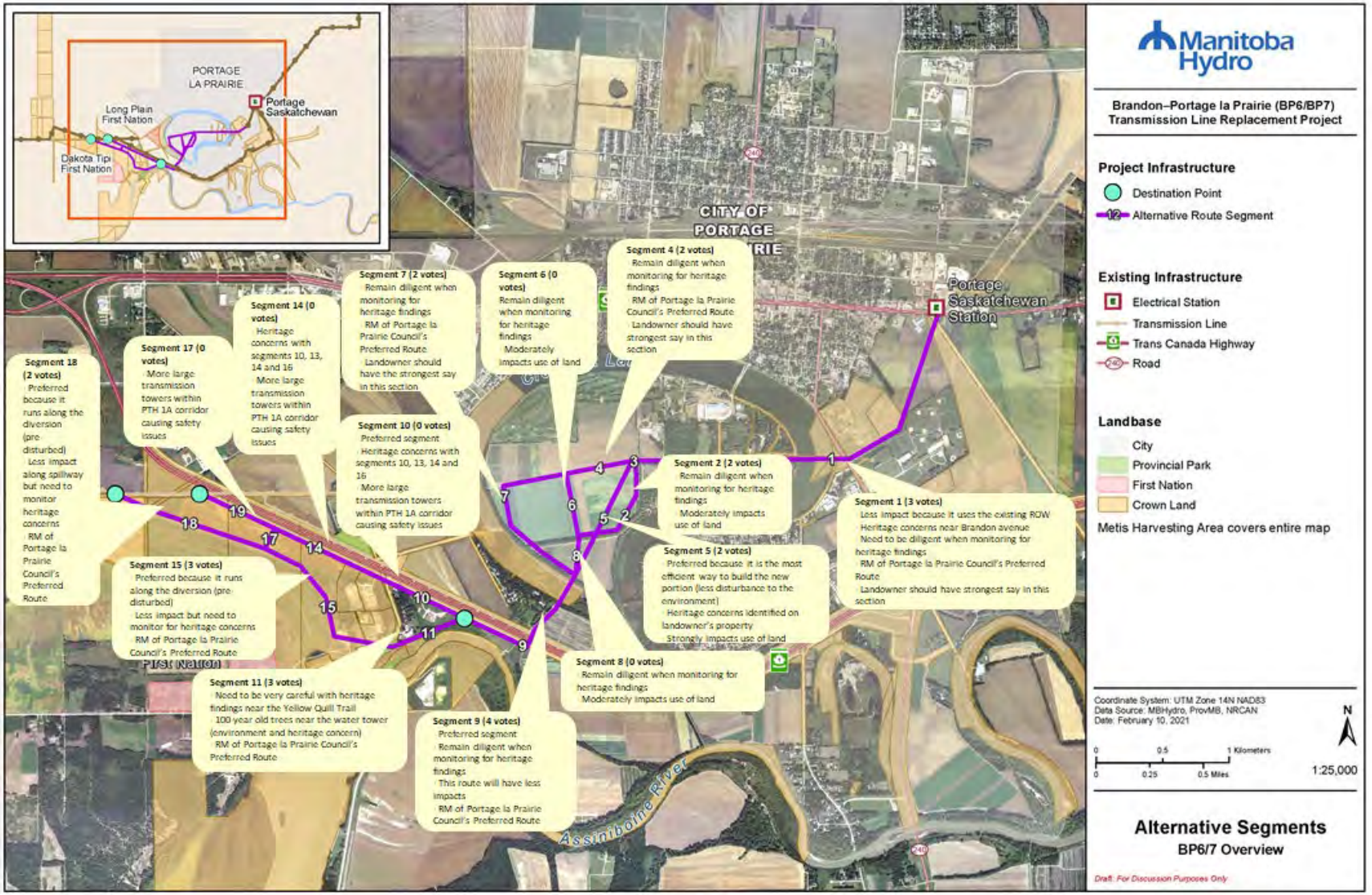
Manitoba Hydro

How we're engaging

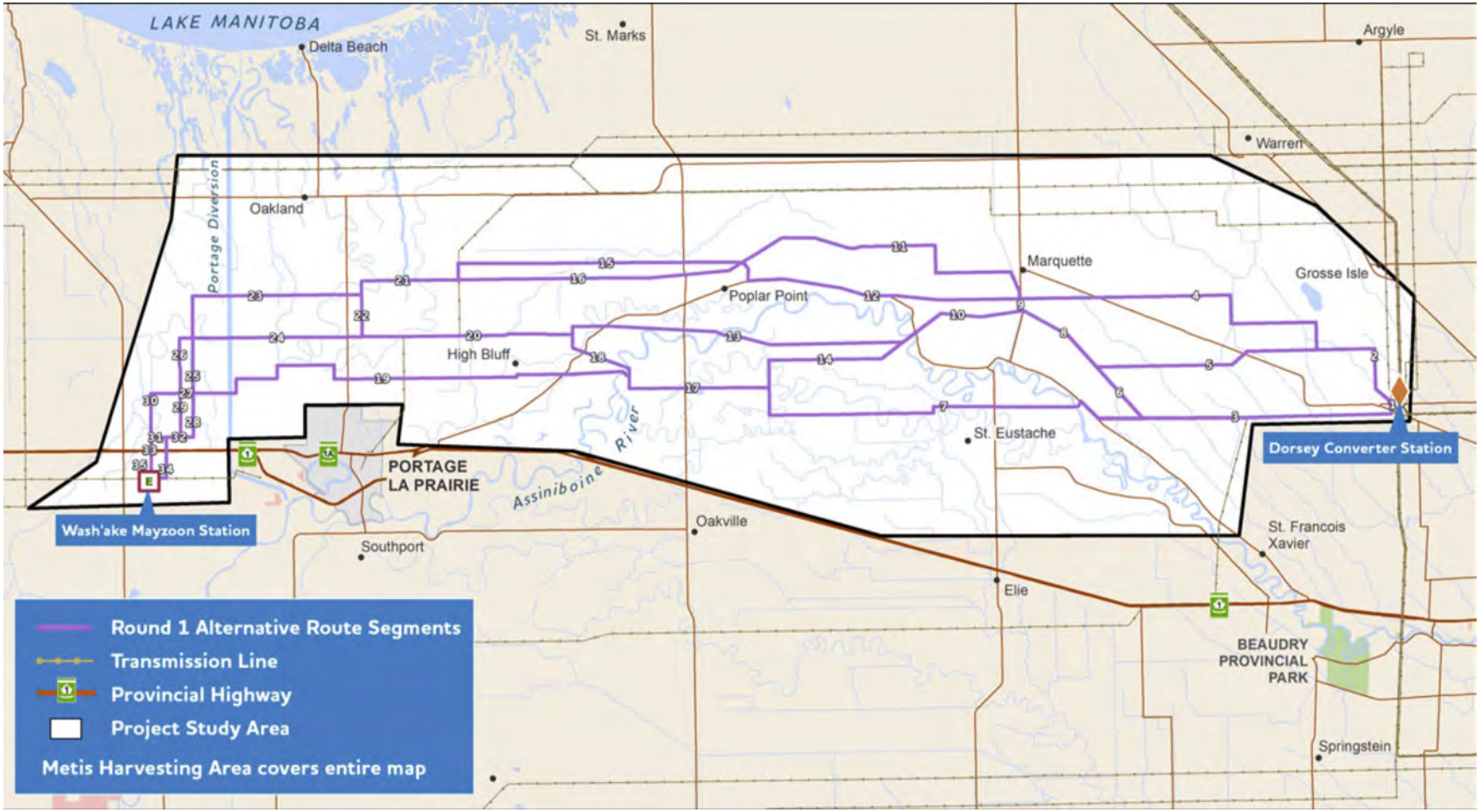
- Virtual information sessions
- Community meetings
- Interested parties' meetings
- Online survey
- Feedback portal
- Email and telephone communication
- Tours

Feedback portal

Segment-specific feedback



Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



Dorsey to Wash'ake Mayzoon Transmission Line

- What are LPFN preferred segments and why?
- Participate on routing team
  - December 14 or 16, 2021: Introduction to routing process (what day works better for you?)
  - January 13, 2022: Community Perspective Discussion

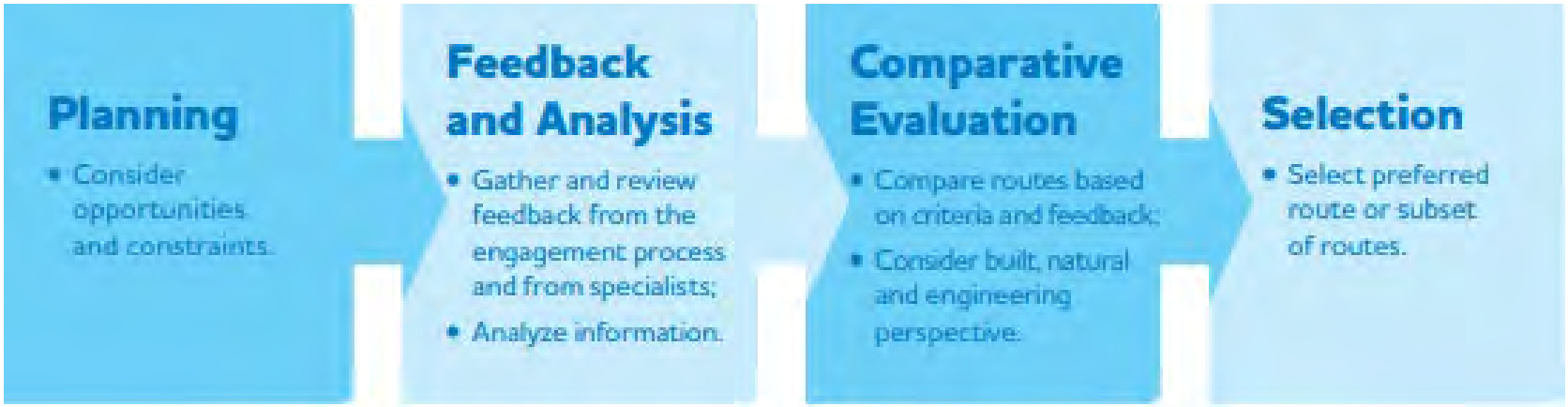
Manitoba Hydro

Discussion

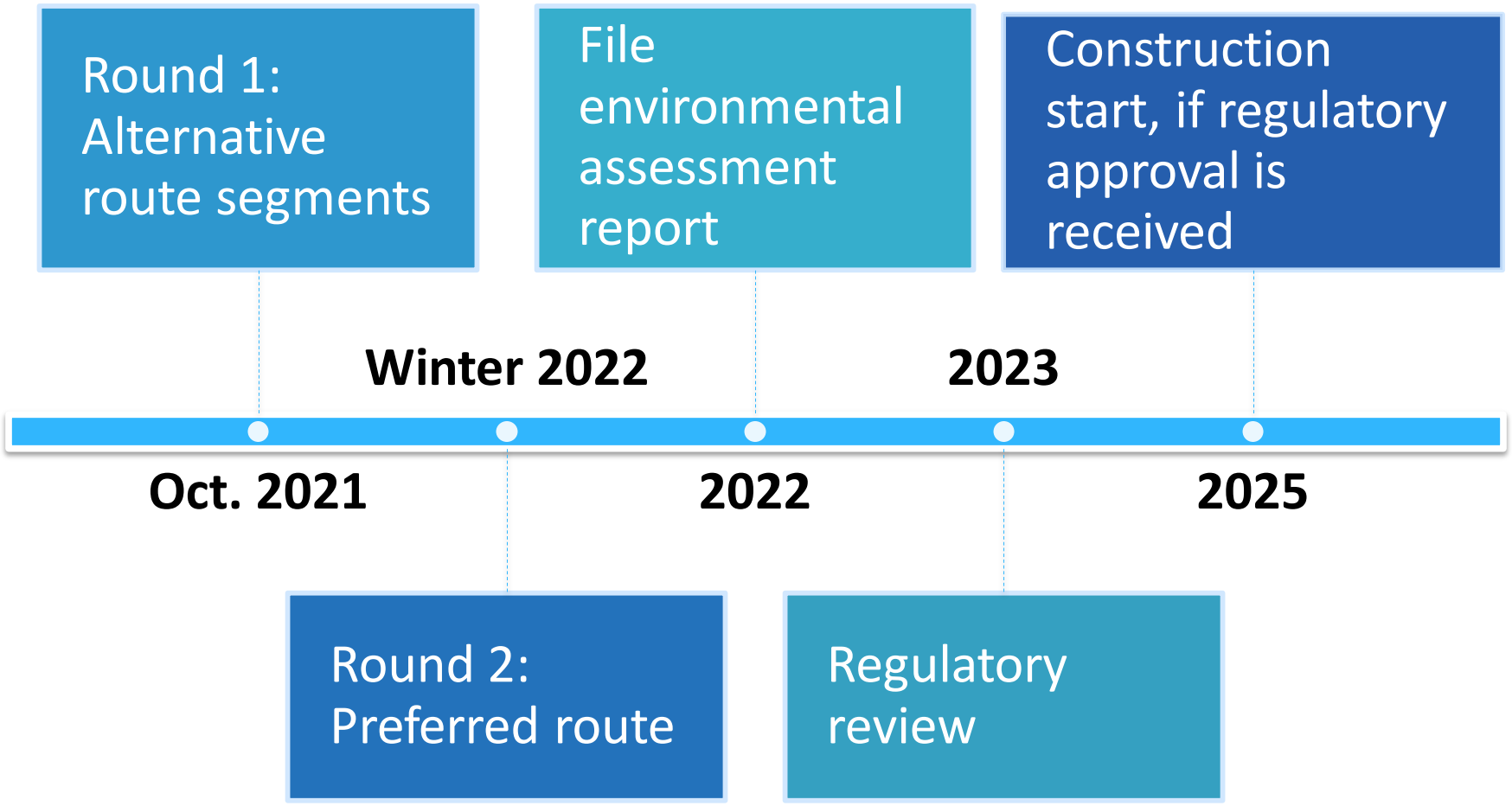
- General questions and concerns?
- Location specifics - segments

- Resources
  - online feedback portal
  - map

How do we move between routing stages?



Schedule


Round 1: Alternative route segments
File environmental assessment report
Construction start, if regulatory approval is received
Winter 2022
2023
Oct. 2021
2022
2025
Round 2: Preferred route
Regulatory review

We want to hear from you

Online survey and feedback portal

Tell us what you think about the proposed alternative route segments. The survey closes on December 1.

www.hydro.mb.ca/pace

Feedback portal

Thank you

The project team wants to hear from you.

For more information about Dorsey to Wash'ake Mayzoon transmission line and to sign up for email notices, please visit http://www.hydro.mb.ca/pace

QUESTIONS?

Presentation slides from Round 1 meeting with SLFN held Nov. 23, 2021

Introductory Meeting
&
Overview of Current Transmission Projects

Swan Lake First Nation

November 23, 2021

Manitoba Hydro

Meeting Outline

- Welcome
- Introductions
- Current Transmission Projects
  - Portage Area Capacity Enhancement Projects:
    - Brandon-Portage (BP6/7) Transmission Line Replacement
    - Wash'ake Mayzoon Station
    - Dorsey to Wash'ake Mayzoon Transmission Line (D83W)
  - MMTP Monitoring Committee
  - MMTP Crown Land Offset Measures Plan
- Questions & Answers
- Next Steps

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Working Together: MH and SLFN

- Values SLFN feedback on projects
- Learning from past projects:
  - Bipole III
  - MMTP
  - Portage Area Projects
- Work to improve the process each time to seek a real understanding of concerns.

Manitoba Hydro

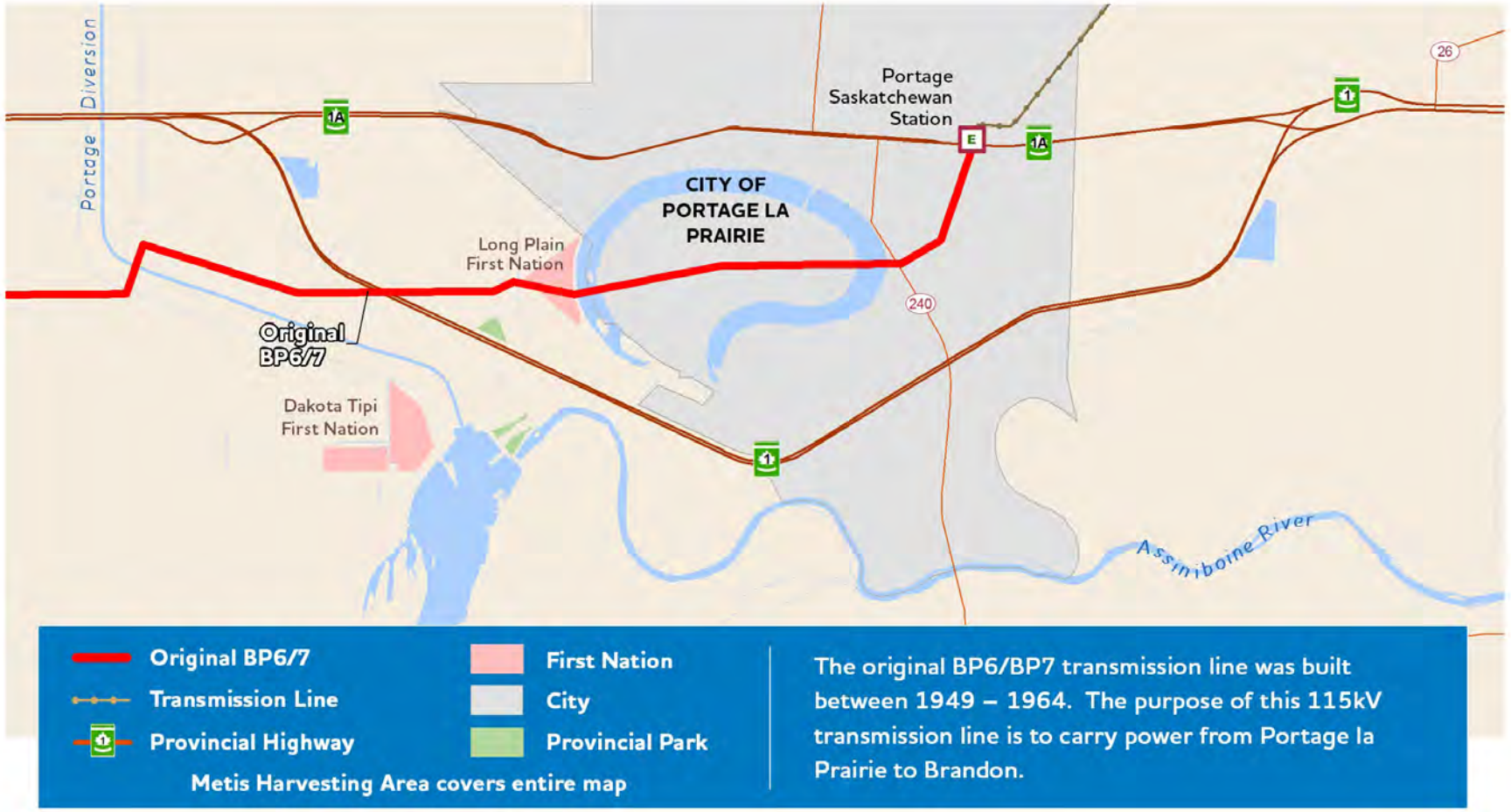
Feedback at ALL Stages of the Projects

How should we route the project?	Round 1 – feedback on segments Round 2 – feedback on route
What should be studied in assessment report?	Valued components
How can we mitigate concerns?	
How SLFN traditional knowledge can inform the project?	
Review our chapters - did we capture concerns accurately?	
If approved, construct and monitor	

Portage Area Projects

- Brandon to Portage (BP 6/7) Line Replacement
- Wash'ake Mayzoon Station
- Dorsey to Wash'ake Mayzoon Transmission Line

BP 6/7 Transmission Line Replacement



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BP 6/7 Transmission Line Replacement

- Round 1 – Identify & evaluate alternative routes: fall 2020 (completed)
- Round 2 – Select preferred route: March 2021 (completed)
- **File environmental assessment report for regulatory review: April 2021 (completed)**
- Construction start, if regulatory approval is received: 2022 (anticipated)

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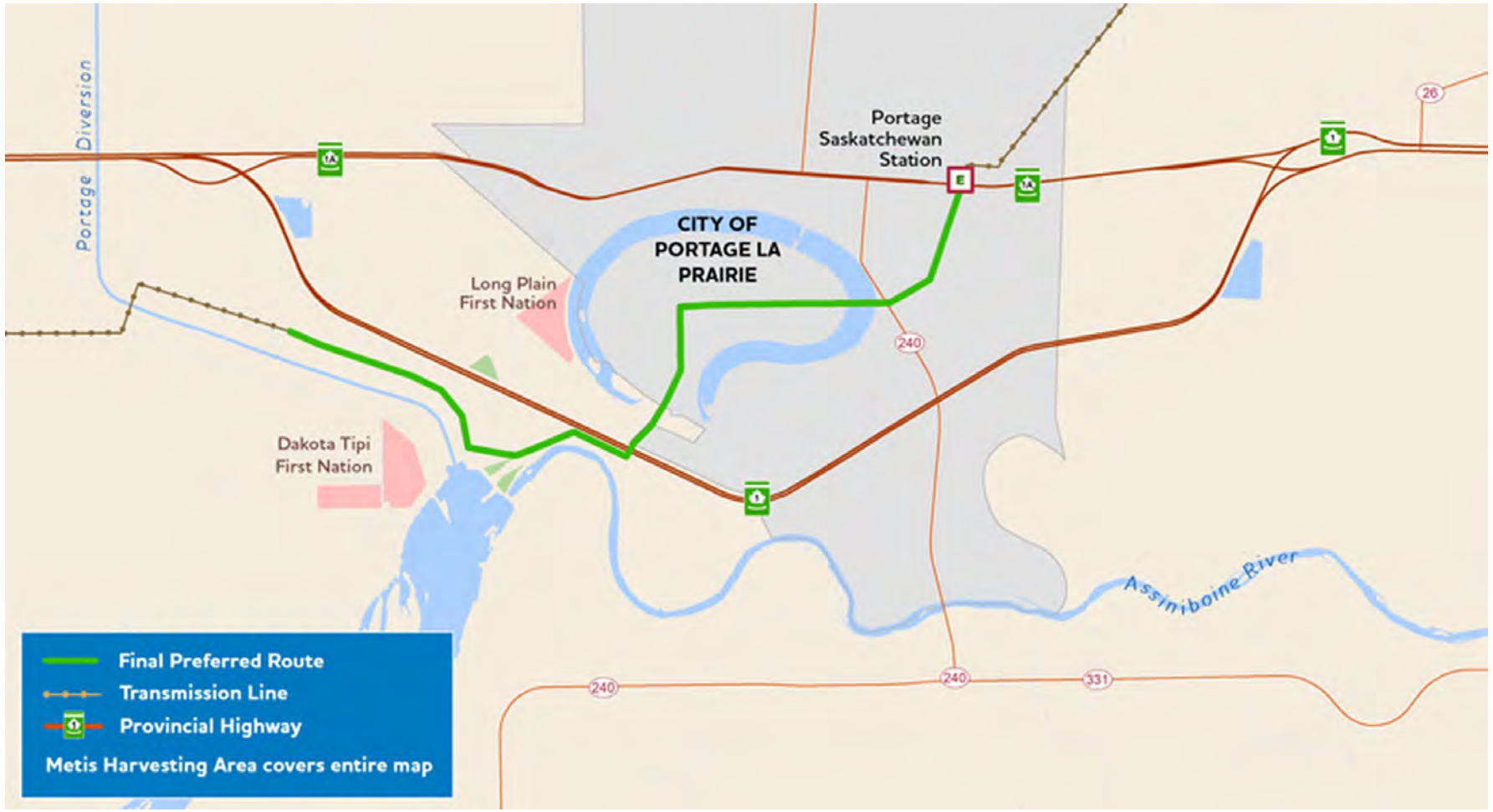
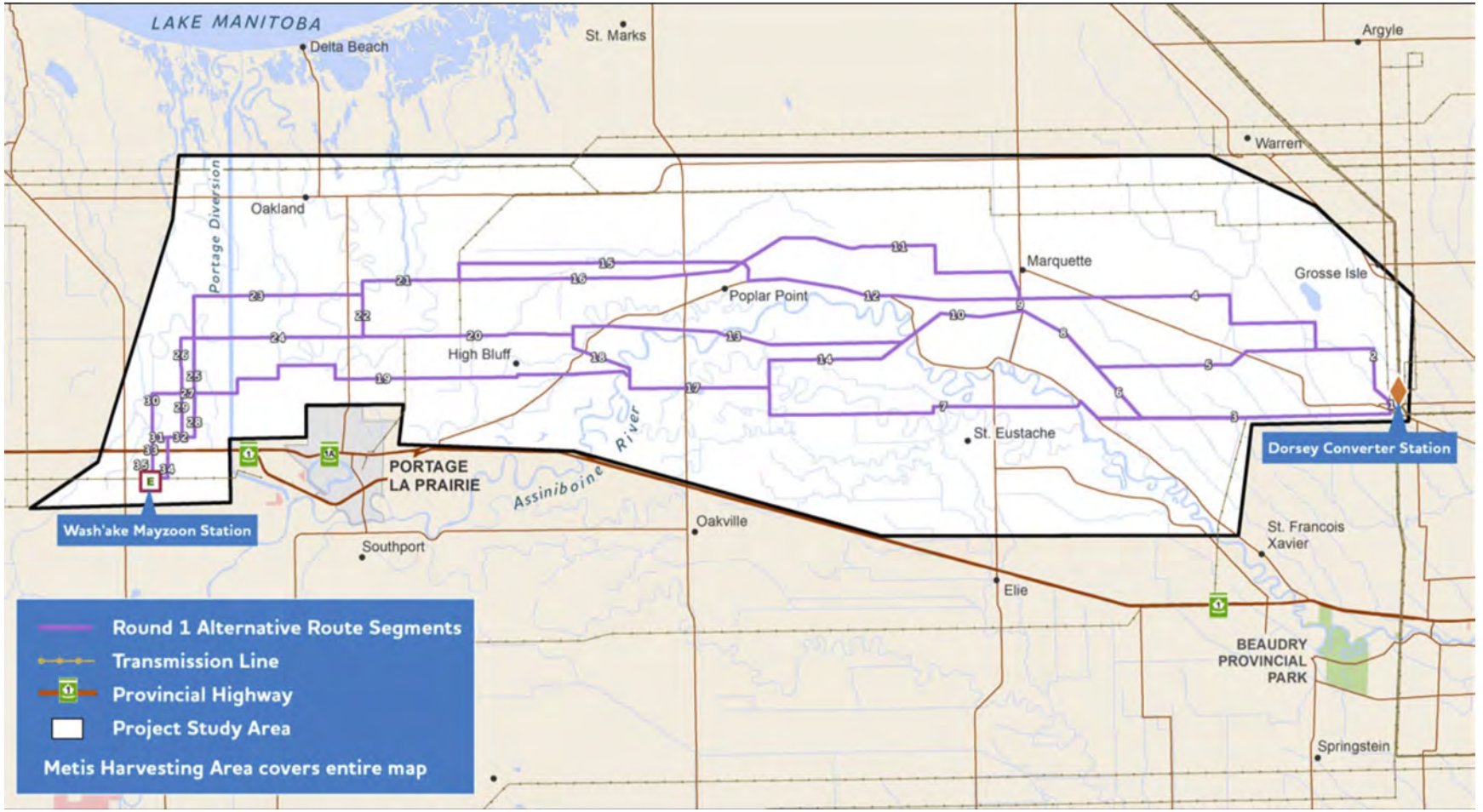

Portage Diversion
Portage Saskatchewan Station
CITY OF PORTAGE LA PRAIRIE
Long Plain First Nation
Dakota Tipi First Nation
Assiniboine River
26
240
240
240
331
Final Preferred Route
Transmission Line
Provincial Highway
Metis Harvesting Area covers entire map

Wash'ake Mayzoon Station

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



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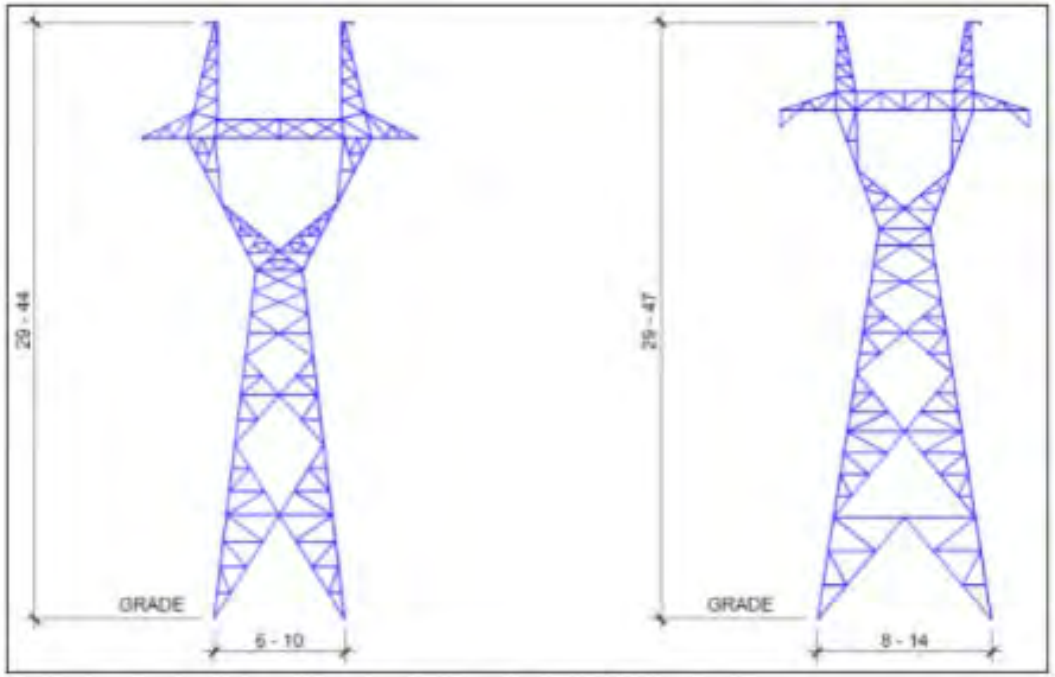

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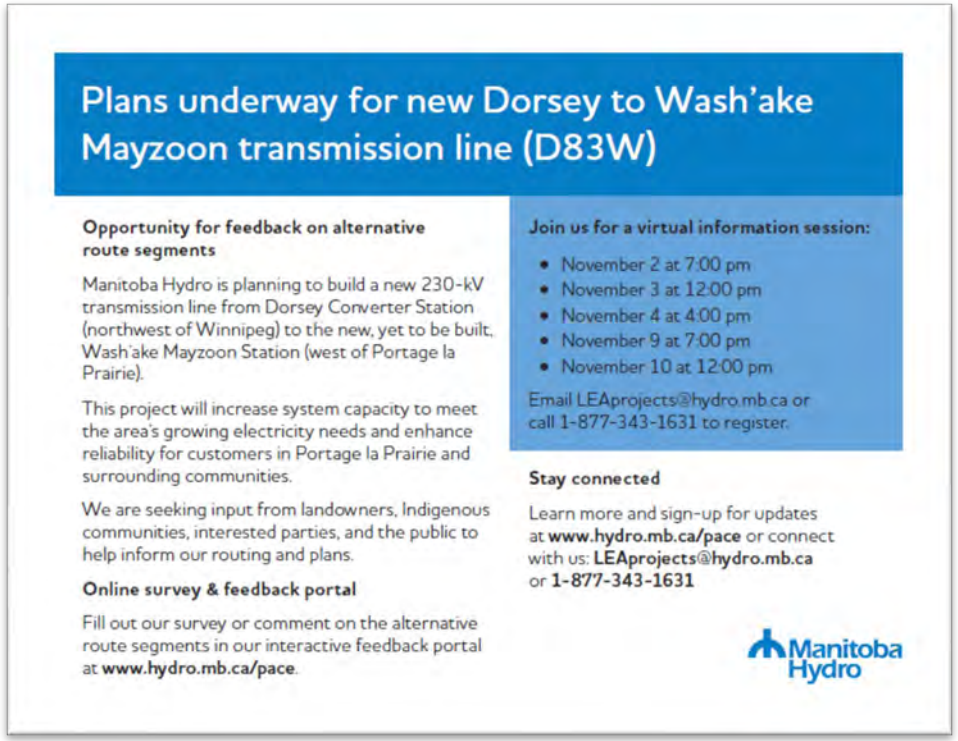

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Manitoba Hydro

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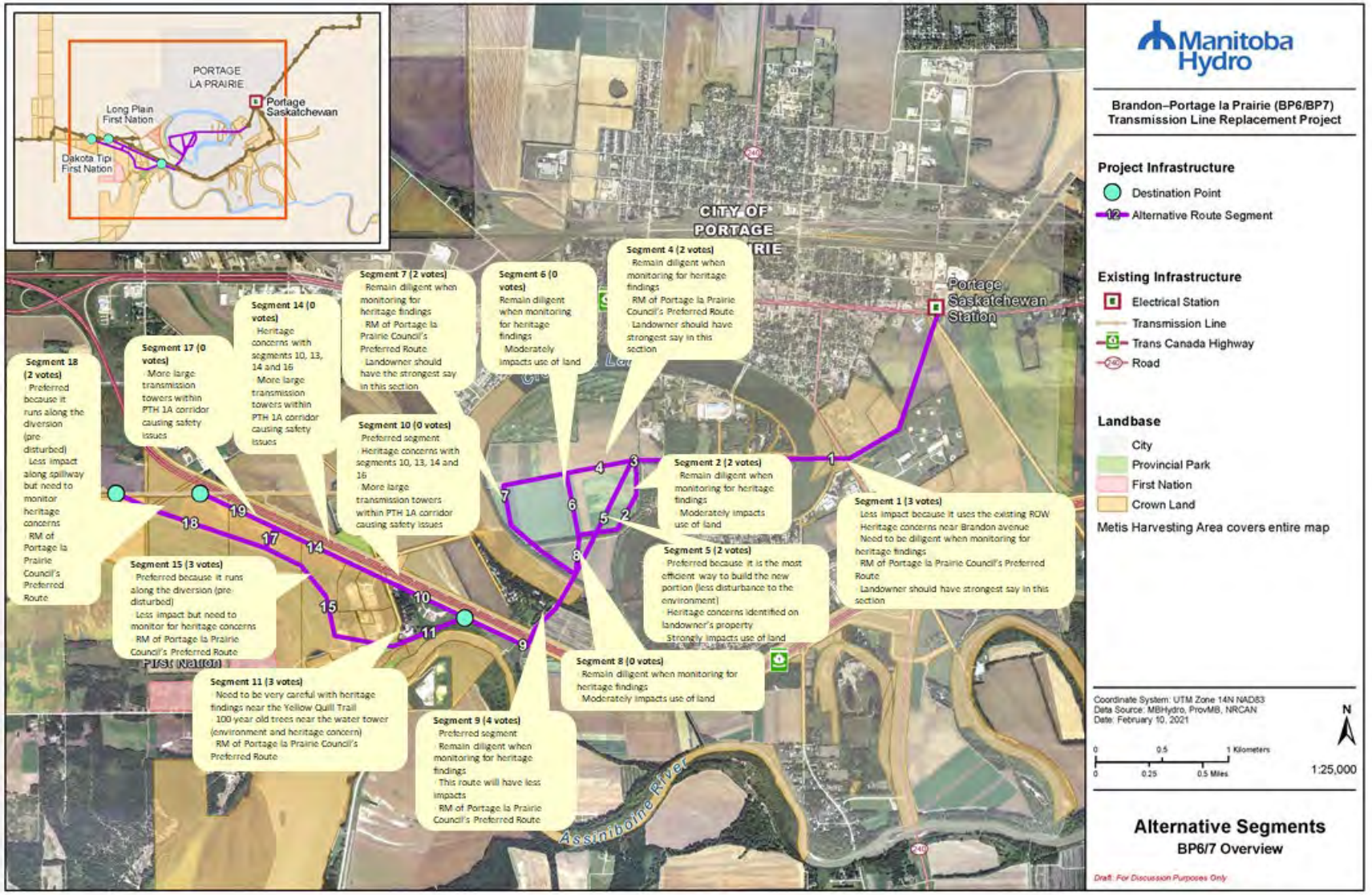
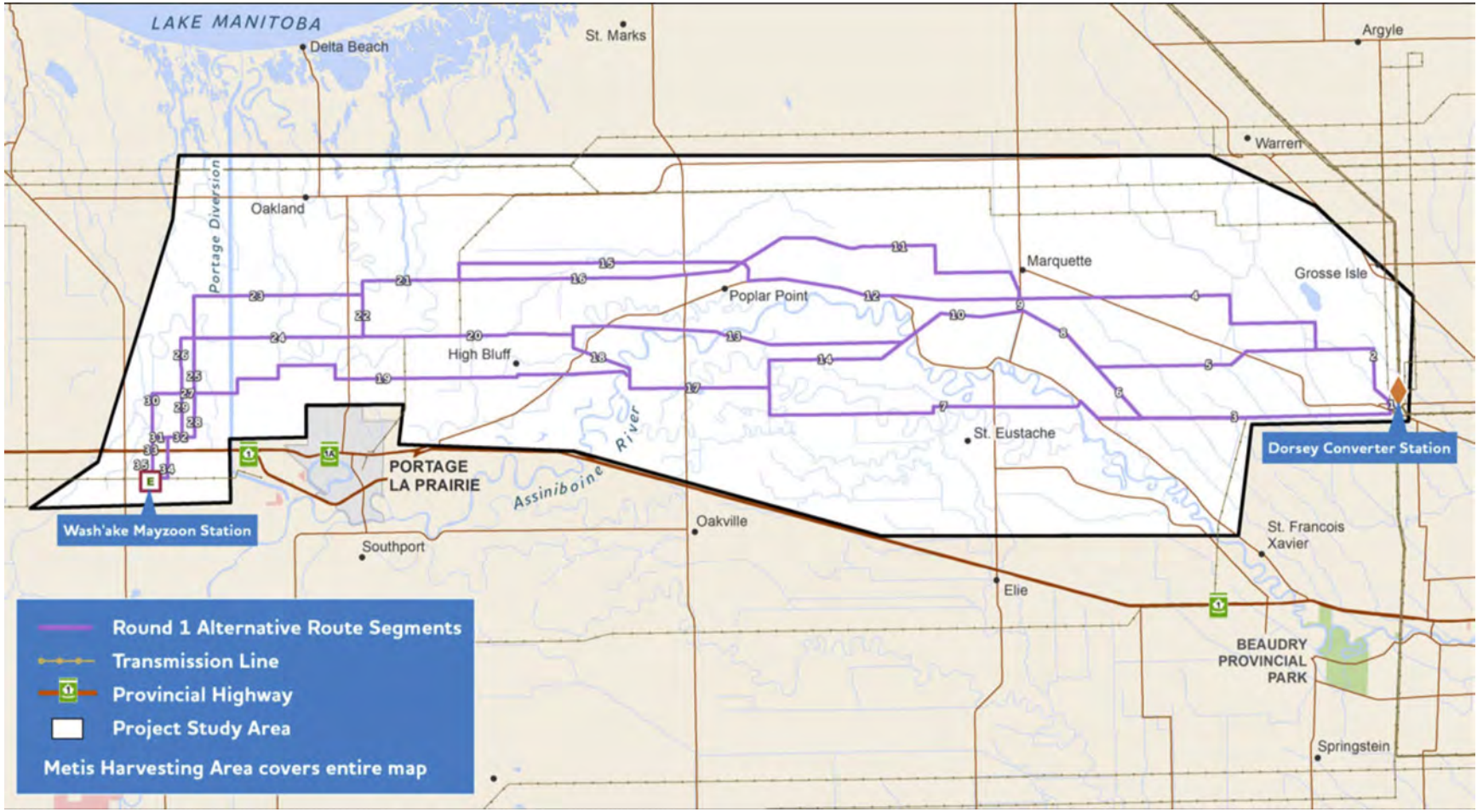
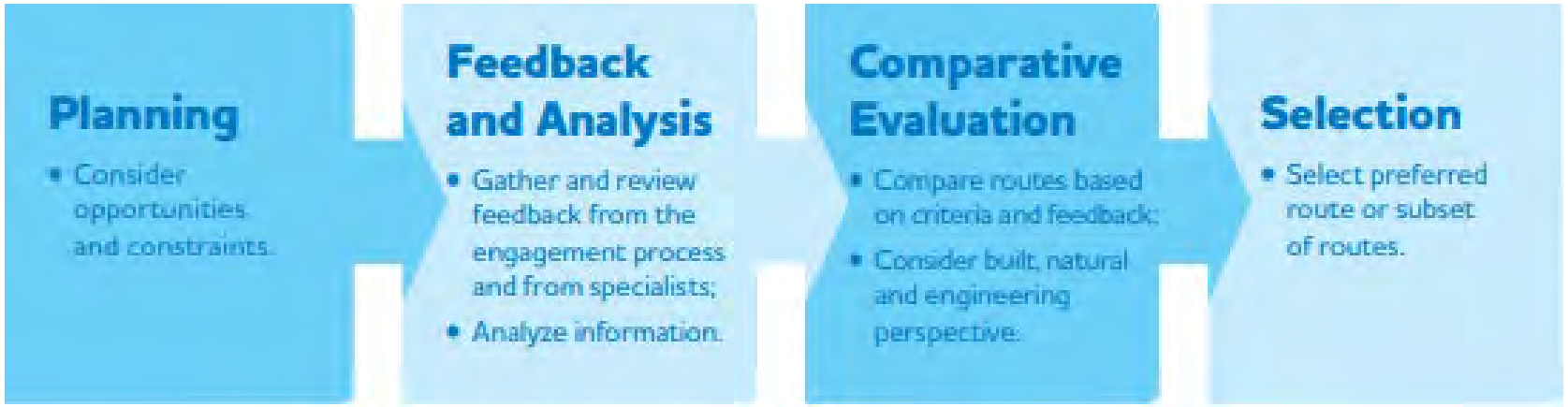


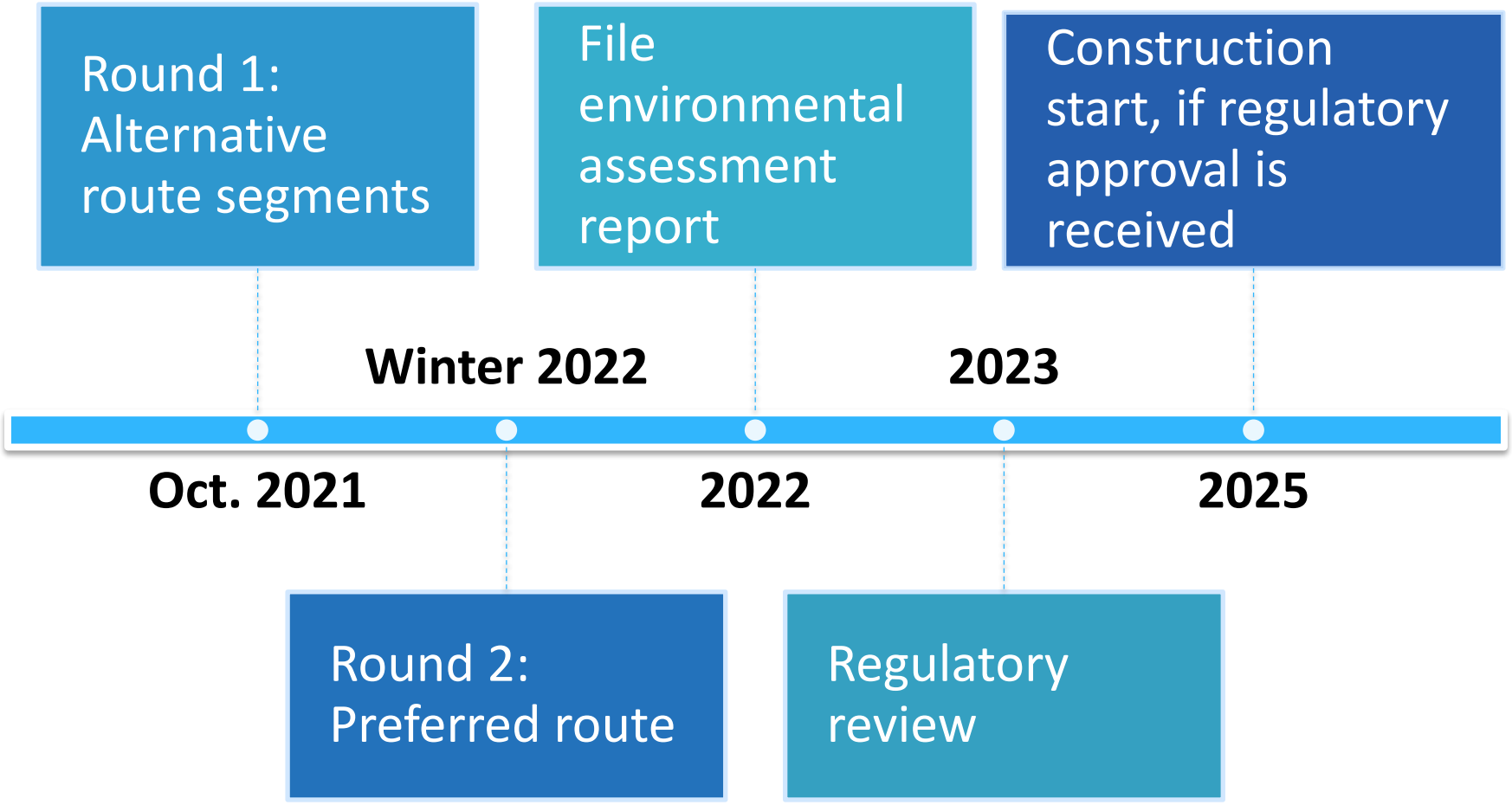
Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



How do we move between routing stages?



Schedule


Round 1: Alternative route segments
File environmental assessment report
Construction start, if regulatory approval is received
Winter 2022
2023
Oct. 2021
2022
2025
Round 2: Preferred route
Regulatory review

We want to hear from you

Online survey and feedback portal

Tell us what you think about the proposed alternative route segments. The survey closes on December 1.

www.hydro.mb.ca/pace

Feedback portal

Virtual information sessions

Join us for a virtual information session on:

- November 23 at 7:00 p.m.
- November 24 at noon.

To register, e-mail LEAprojects@hydro.mb.ca or call 1-877-343-1631.

Dorsey to Wash'ake Mayzoon Transmission Line

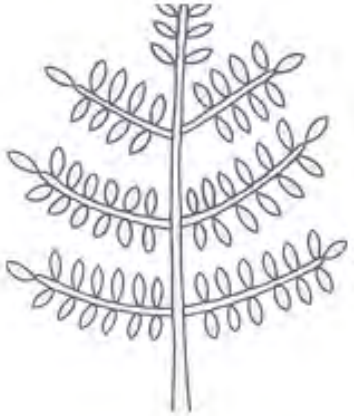
- What are SLFN preferred segments and why?

Manitoba Minnesota Transmission Project (MMTP)

- MMTP Monitoring Committee
- Crown Land Offset Measures Plan

Manitoba Hydro

MMTP Monitoring Committee



GOAL 1

Manitoba Hydro does what they say they would do and is compliant with licence conditions

GOAL 2

The land and water is respected as we use our knowledge to monitor its health

GOAL 3

Leadership, members and staff at my community or organization feel informed about the status of MMTP and information is accessible to those who just want to check in if interested.

GOAL 4

There is a place to discuss topics of interest to us that are beyond MMTP

HOME | WHAT'S HAPPENING? | CLOMP LAND PARCELS | COMMITTEE GOALS | More

MMTP Monitoring Committee

Information

Share information in a cooperative and transparent manner relating to the environmental issues of the Project

Collaboration

Create a platform for understanding issues of concern to Indigenous participants and Manitoba Hydro in order to collaboratively provide informed advice on how to address issues of concern

Participation

Support Indigenous participants' effective and meaningful participation in the monitoring of the Project

More

Learn more about who we are and what we do by visiting our *About* page
and
Committee Goals

WHAT'S NEW?

MMTP Crown Land Offset Measures Plan

- National Energy Board licence condition
- Intended to offset the permanent loss of Crown lands available for traditional use by Indigenous Peoples resulting from MMTP

- MMTPMonitoring.com shares the candidate land parcels and provides a place for your community to share your views

Questions & Answers

Next Steps

Presentation slides from Round 1 meeting with PFN held Nov. 24, 2021

Dorsey to Wash’ake Mayzoon Transmission Line

Seeking Feedback from Peguis First Nation on D83W

November 24, 2021

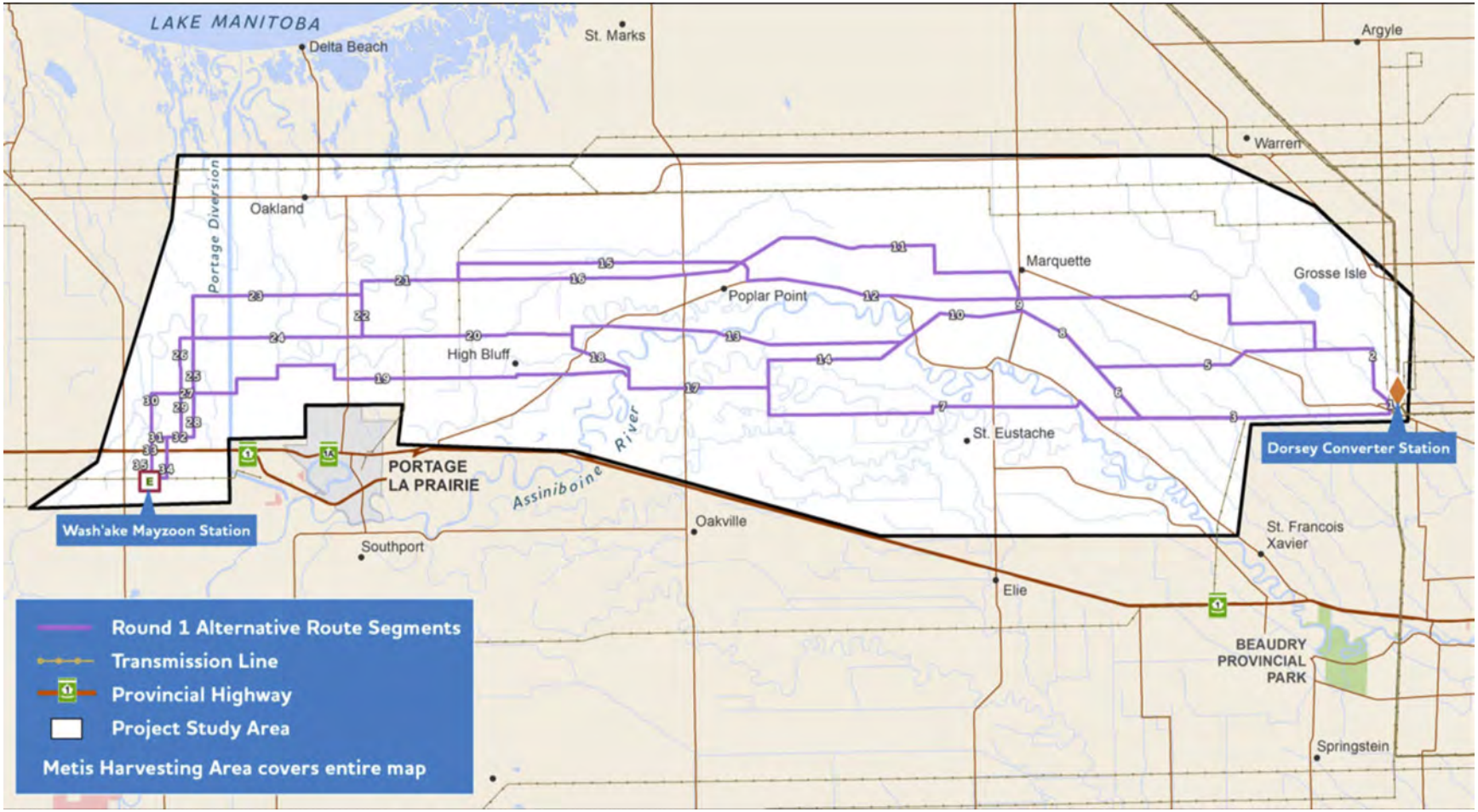
Manitoba Hydro

Working Together: MH and Peguis First Nation

- MH values PFN feedback on projects
- Learning from past projects
- Work to improve the process each time to seek a real understanding of concerns
- Thank you for taking part in heritage workshop on Oct 7, 2021

Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



Wash'ake Mayzoon Station

Project Description

Depending on final tower design:

- 60 m right-of-way infield
- 42 m right-of-way edge of road allowance
- 29 to 47 m high towers
- 230-kV transmission line from Dorsey converter station to proposed, Wash'ake Mayzoon station

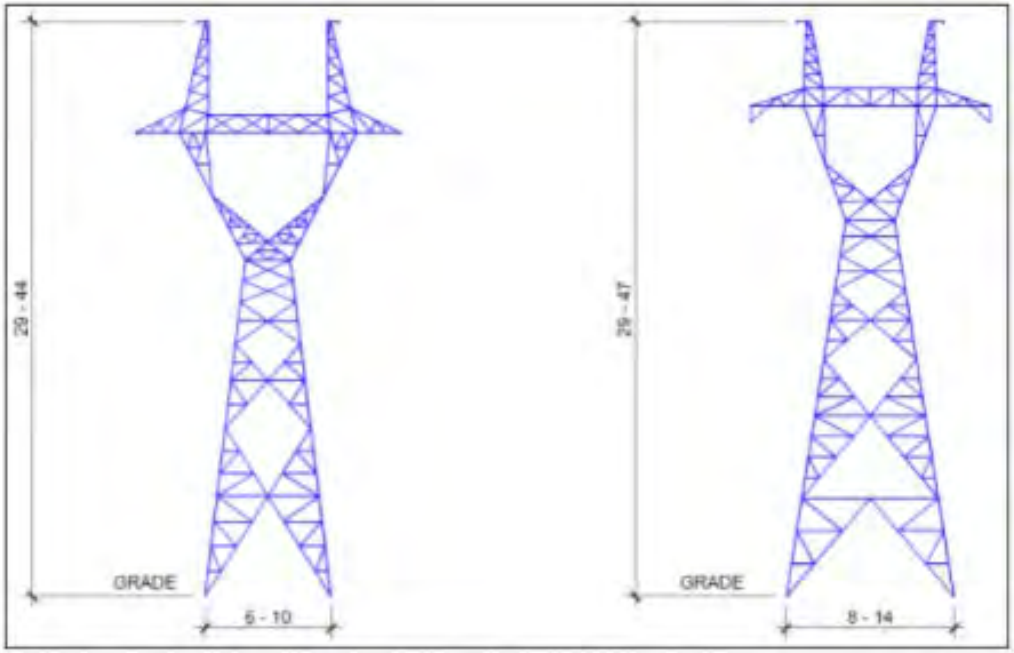


Figure 2-1: Typical self-supporting steel lattice suspension tower

Manitoba Hydro

Why is this project needed?

Project will increase system capacity to meet growing electricity needs

Enhance reliability for customers in Portage la Prairie and surrounding areas

Manitoba Hydro

Feedback on the Projects

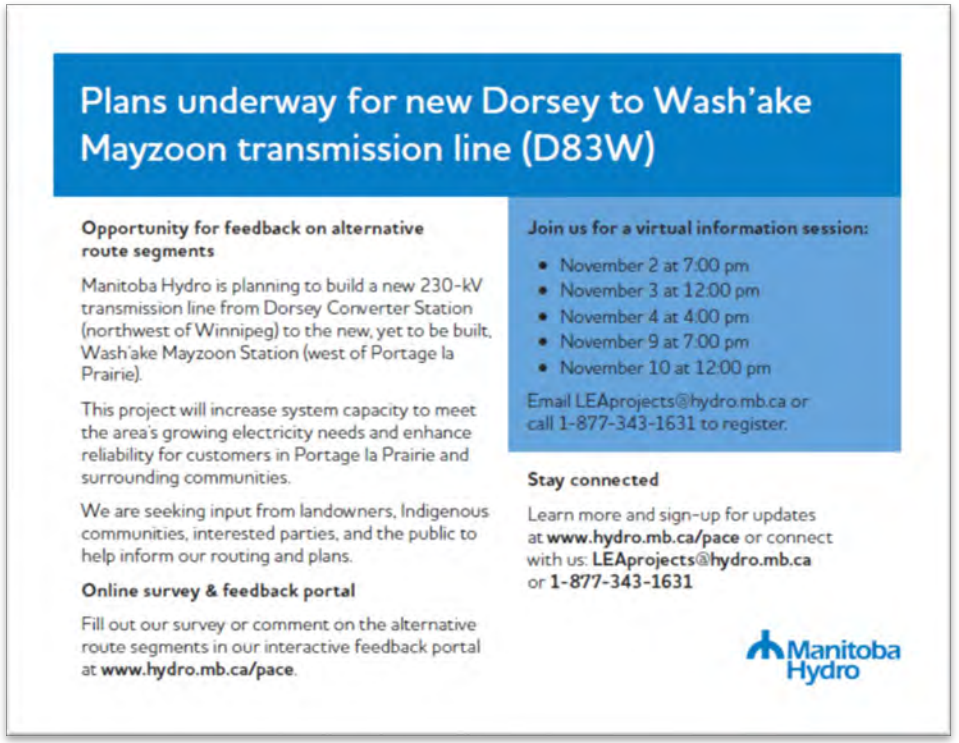
How should we route the project?	Round 1 – feedback on segments Round 2 – feedback on route
What should be studied in assessment report?	Valued components
How can we mitigate concerns?	
How PFN can inform the project?	
If approved, construct and monitor	

What We Heard from Peguis First Nation to date with Portage area Projects

- Concerns regarding heritage finds during construction
- Request to be part of all stages of project environmental assessment
- Interested in employment opportunities, but in the right way
- Preference for MH to include construction monitors
- Interest in hosting a climate workshop

How we're sharing information

- Working directly with Indigenous communities in a manner preferred by them
- Project webpage
- Printed materials
- eCampaign
- Emails
- Social media
  - Facebook



Plans underway for new Dorsey to Wash'ake Mayzoon transmission line (D83W)

Opportunity for feedback on alternative route segments

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We are seeking input from landowners, Indigenous communities, interested parties, and the public to help inform our routing and plans.

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Manitoba Hydro

How we're engaging

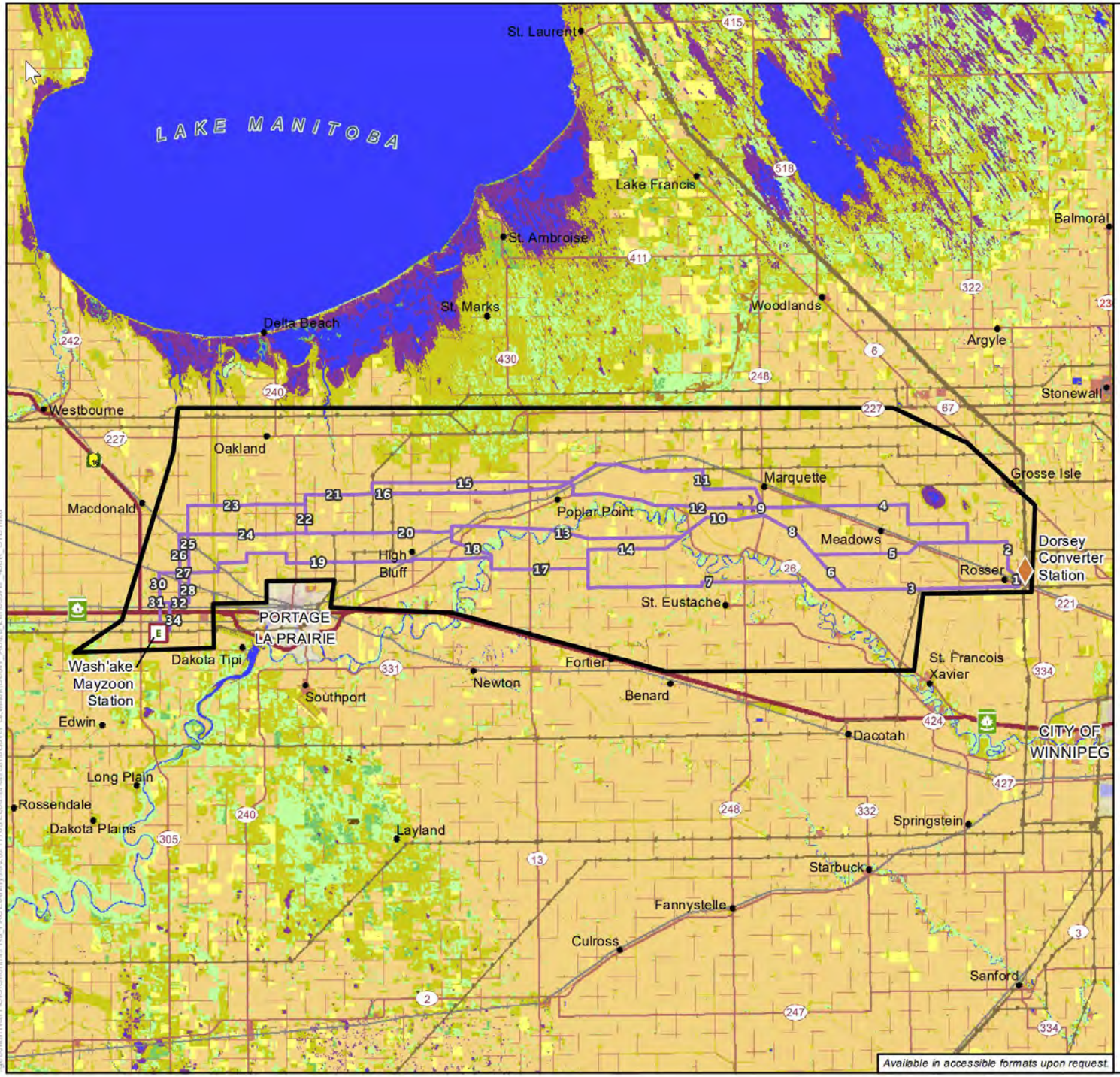
- Virtual information sessions
- Community meetings
- Interested parties' meetings
- Online survey
- Feedback portal
- Email and telephone communication
- Tours

Feedback portal

Dorsey to Wash'ake Mayzoon Transmission Line

- What are Peguis First Nation’s preferred segments and why?
- Are some segments strongly preferred (or not)?
- Are some of no or little concern?

Manitoba Hydro



Manitoba Hydro

D83W Transmission Project

Landcover

- Agricultural Cropland
- Bare Rock, Gravel and Sand
- Coniferous Forest
- Cultural Features
- Deciduous Forest
- Forage Crops
- Forest Cutover
- Marsh and Fens
- Mixedwood Forest
- Open Deciduous Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Project Infrastructure

- Wash'ake Mayzoon Station
- Round 1 Segment
- Regional Assessment Area

Existing Infrastructure

- Converter Station (Existing)
- Transmission Line (>115 kV)

Landbase

- Community
- Trans Canada Highway
- Road
- Railway Line
- City

Entire map area falls within Metis Natural Resource Harvesting Zone

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date Created: November 23, 2021

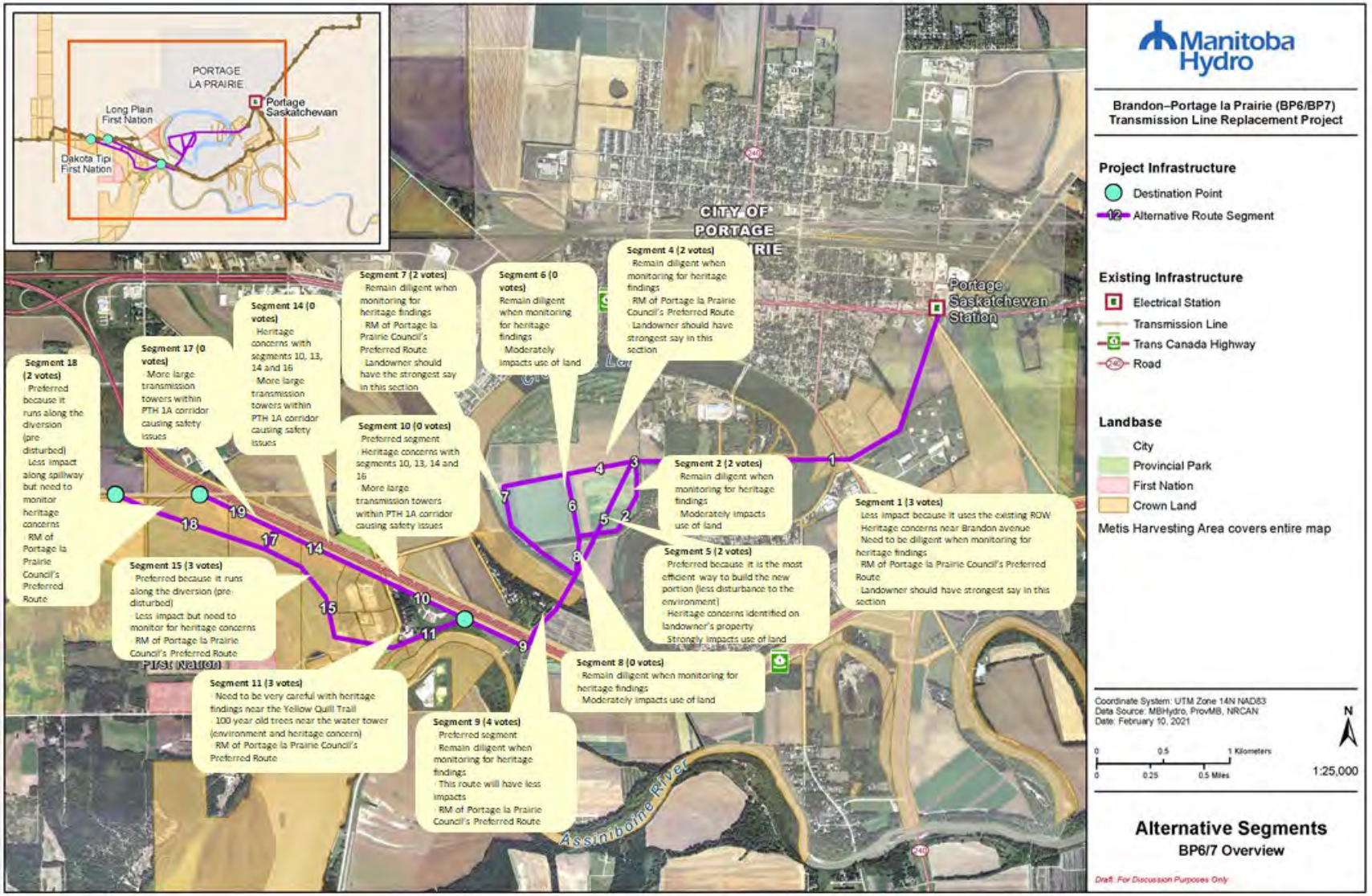
N

0 5 10 Kilometres
0 3.75 7.5 Miles
1:450,000

Land Cover Classes in the Regional Assessment Area

Draft: For Discussion Purposes Only

Segment-specific feedback



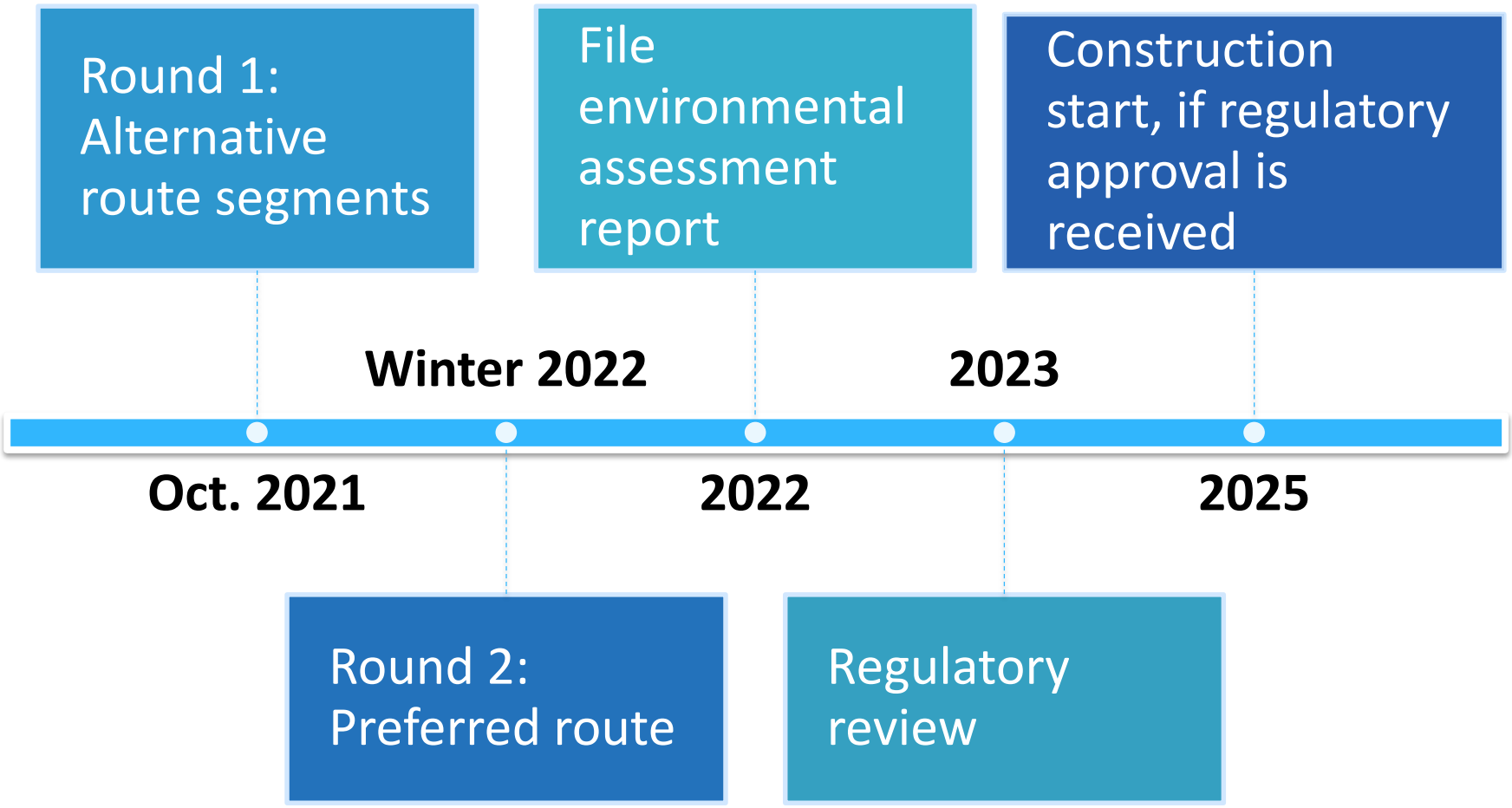
Good maps to help with segment preference determination

- Dorsey to Wash'ake Mayzoon station transmission line index map of alternative route segments (hydro.mb.ca)
- Dorsey to Wash'ake Mayzoon station transmission line alternative route segments maps (hydro.mb.ca)
- online feedback portal

Discussion

- General questions and concerns?
- Location specifics – segments
- Or are there general characteristics you'd like us to consider?

Schedule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2022
2025
Round 2: Preferred route
Regulatory review

Thank you

For more information about Dorsey to Wash’ake Mayzoon transmission line, please visit http://www.hydro.mb.ca/pace

QUESTIONS?

Presentation slides from Round 1 meeting with PUIPC held Dec. 16, 2021

Update on Manitoba Hydro's Portage Area Capacity Enhancement Project (PACE)

Portage Urban Indigenous Peoples' Coalition
Virtual Board Meeting
December 16, 2021

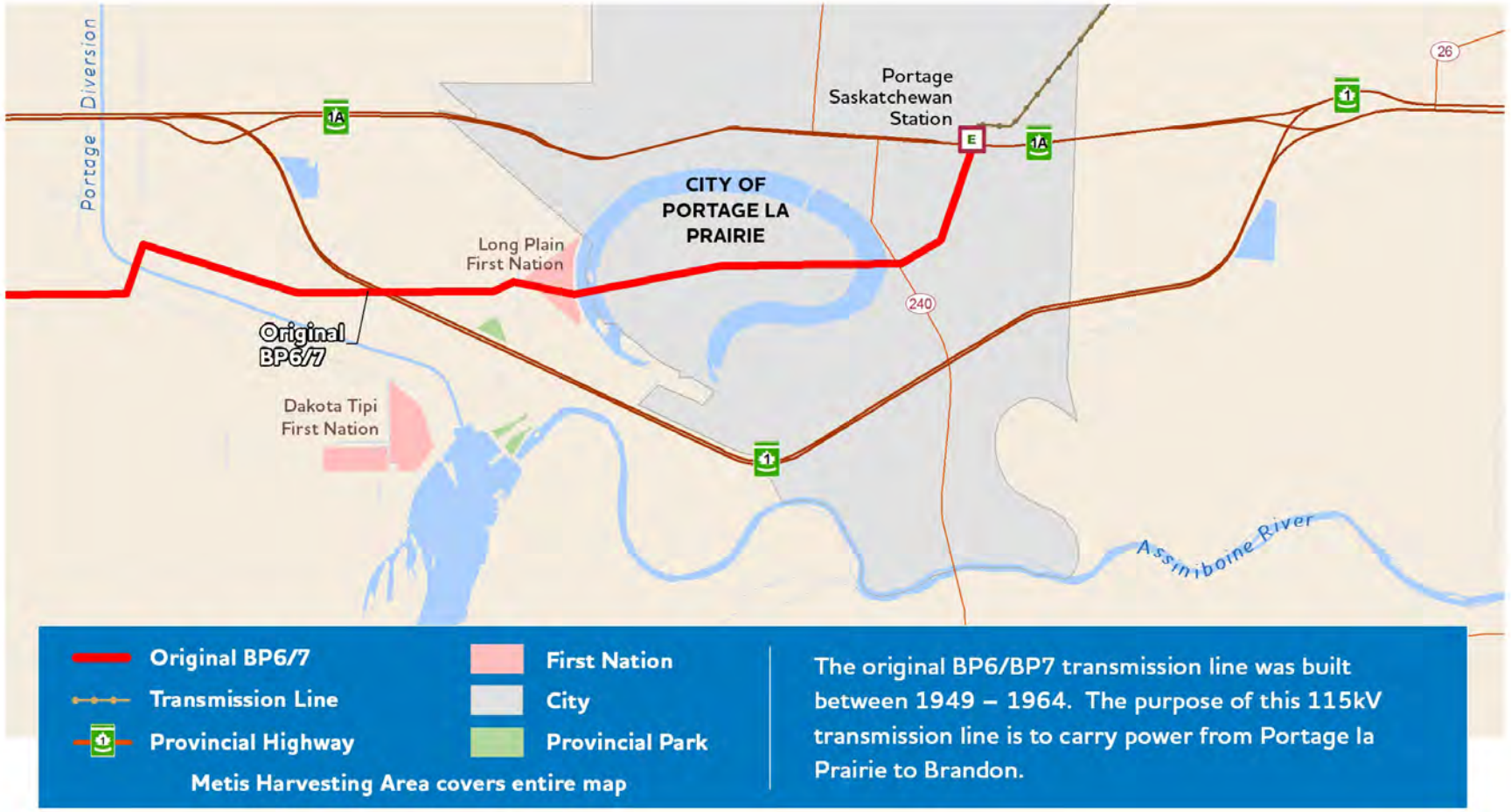
Manitoba Hydro

Outline

- Portage Area Projects:
  - Brandon to Portage (BP 6/7) Line Replacement
  - Wash'ake Mayzoon Station
  - **Dorsey to Wash'ake Mayzoon Transmission Line (D83W)**
- Next Steps

Manitoba Hydro

BP 6/7 Transmission Line Replacement

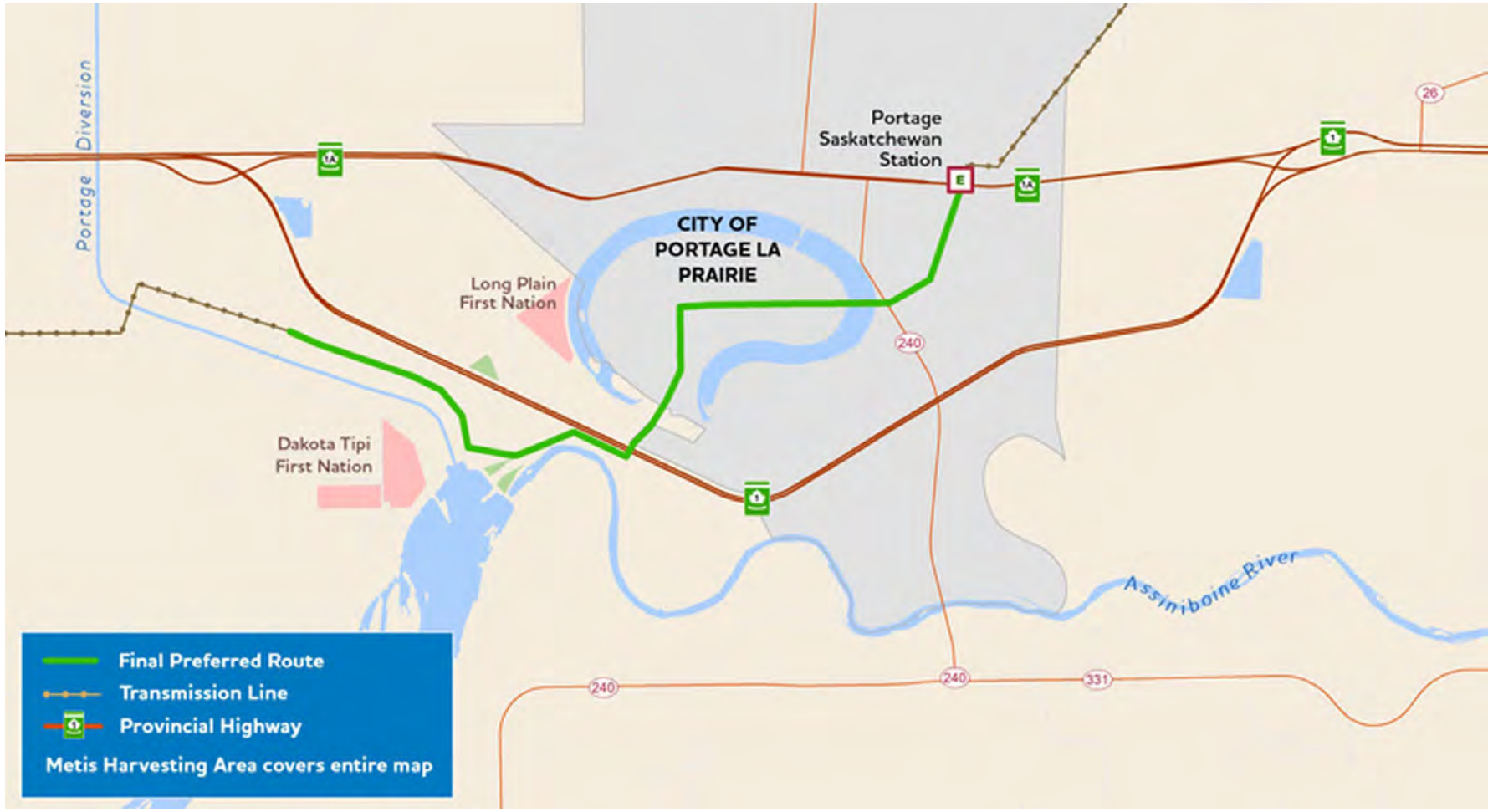


Manitoba Hydro

BP 6/7 Transmission Line Replacement

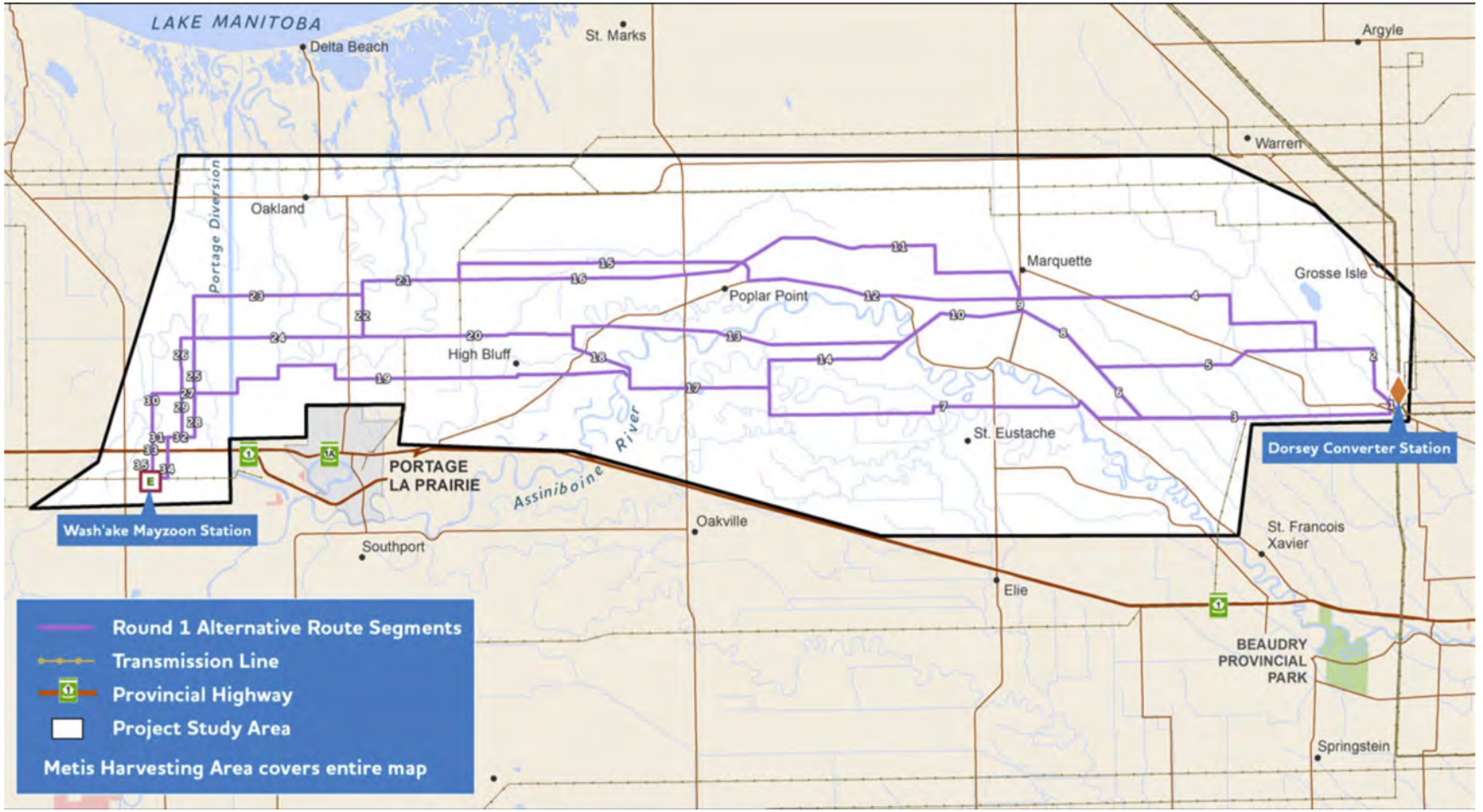
- Round 1 – Identify & evaluate alternative routes: fall 2020 (completed)
- Round 2 – Select preferred route: March 2021 (completed)
- **File environmental assessment report for regulatory review: April 2021 (completed)**
- Construction start, if regulatory approval is received: 2022 (anticipated)

Manitoba Hydro


Portage Diversion
Portage Saskatchewan Station
CITY OF PORTAGE LA PRAIRIE
Long Plain First Nation
Dakota Tipi First Nation
Assiniboine River
26
240
240
240
331
Final Preferred Route
Transmission Line
Provincial Highway
Metis Harvesting Area covers entire map

Wash'ake Mayzoon Station

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



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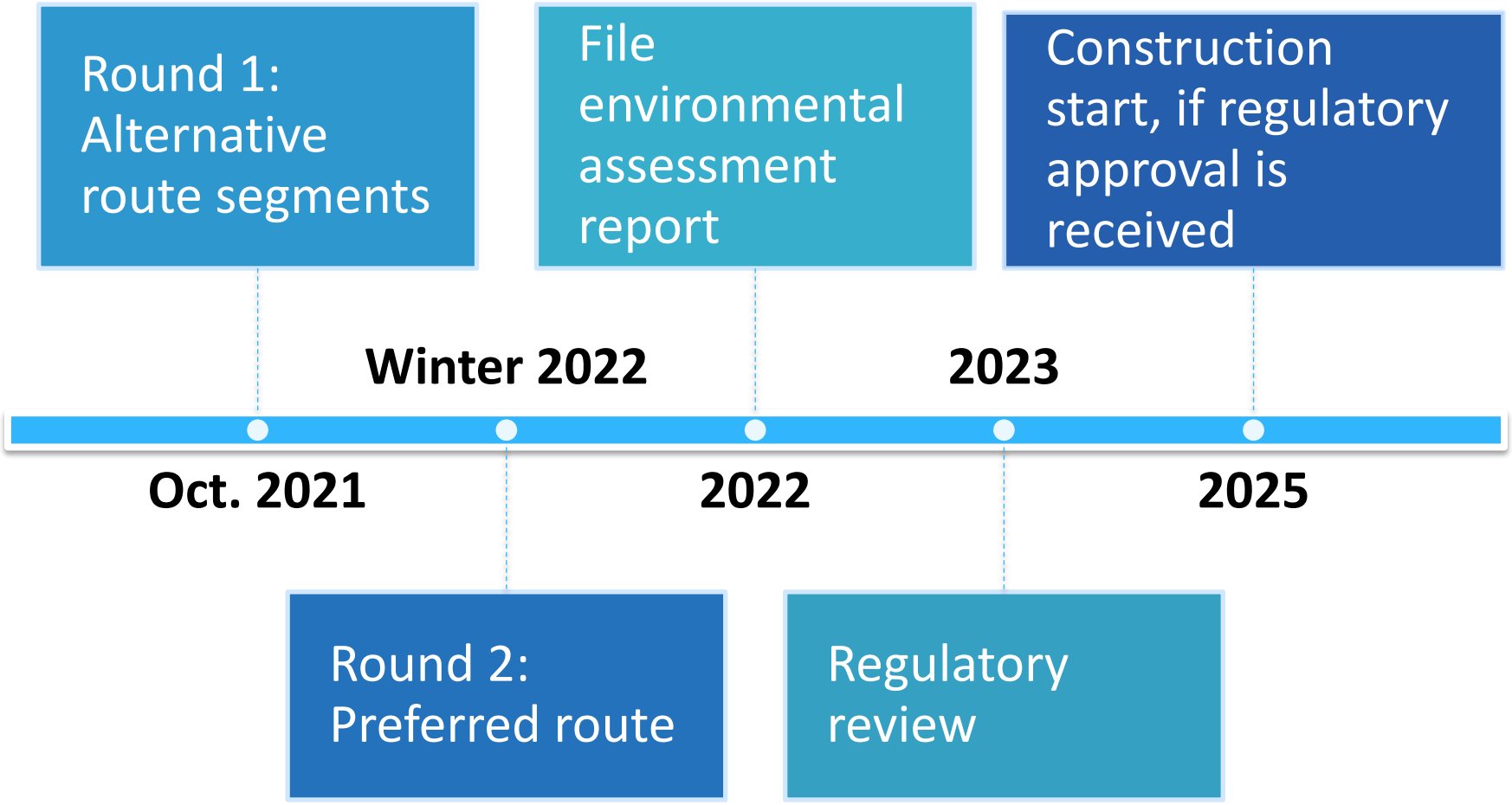
Enhance reliability for customers in Portage la Prairie and surrounding areas

Schedule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File environmental assessment report
Construction start, if regulatory approval is received
Winter 2022
2023
Oct. 2021
2022
2025
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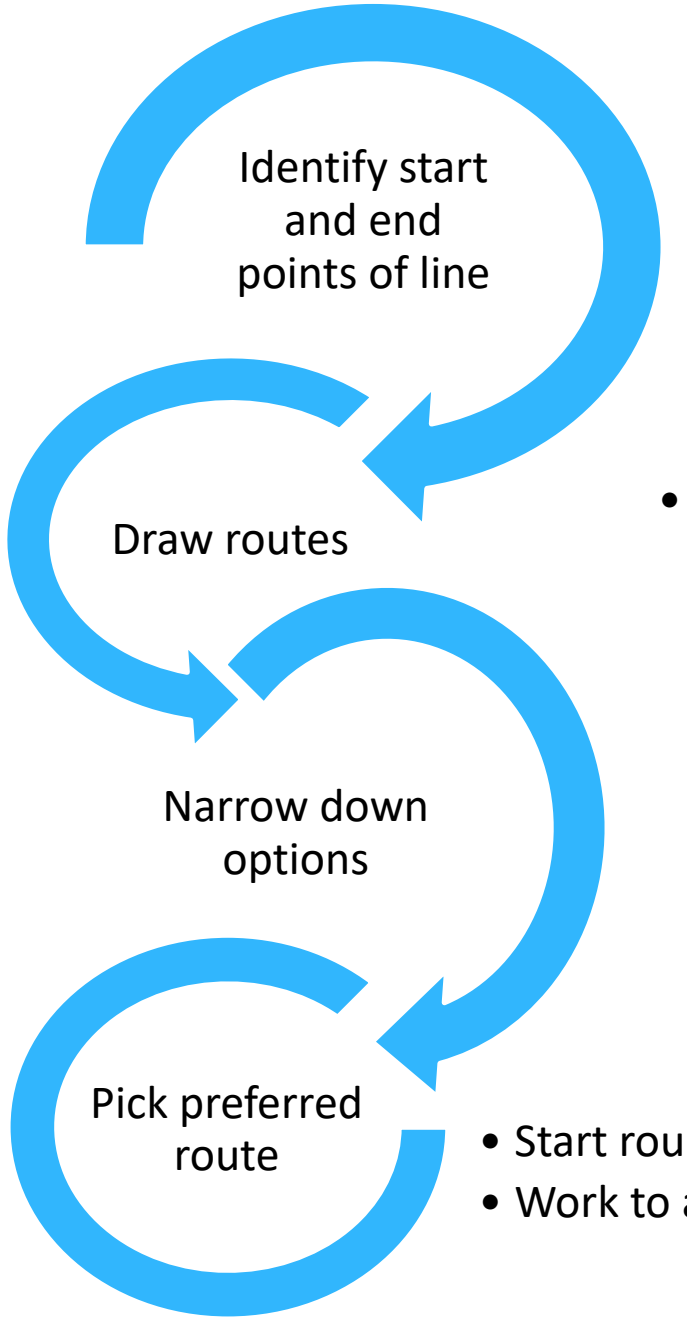
Regulatory review

Pathway to selecting a route

- Draw study area

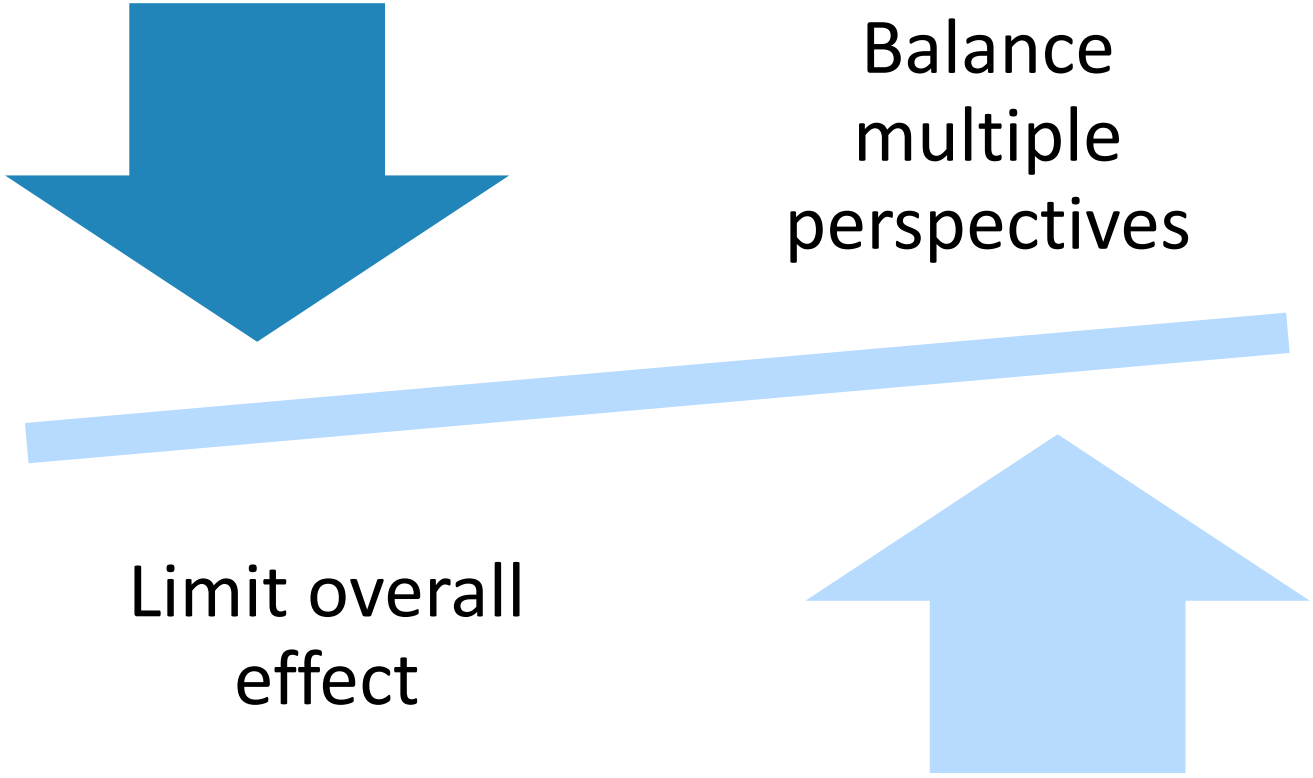


- Start round 1 engagement
  - Gather local knowledge and concerns

- Compare and evaluate routes
- Hold project team workshops

- Start round 2 engagement
- Work to address concerns

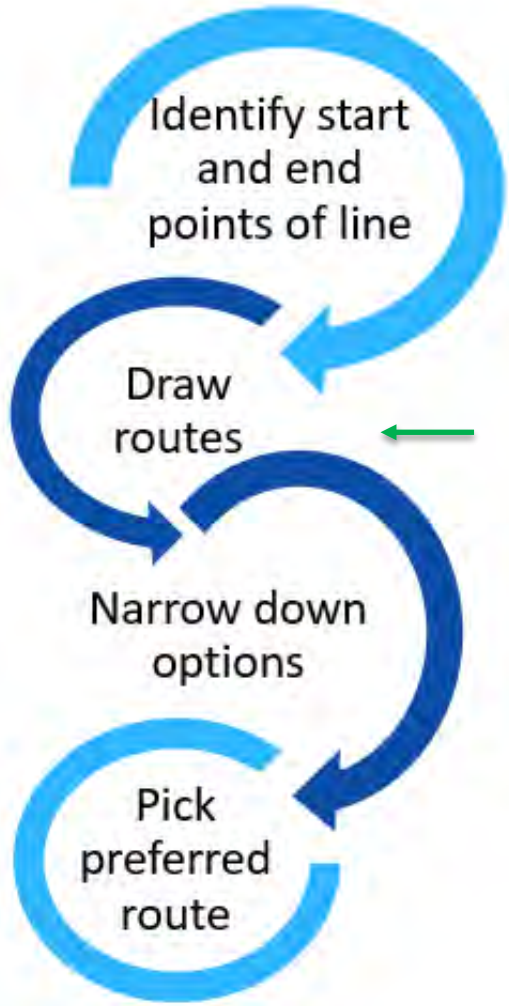
Goals of transmission line routing



Manitoba Hydro

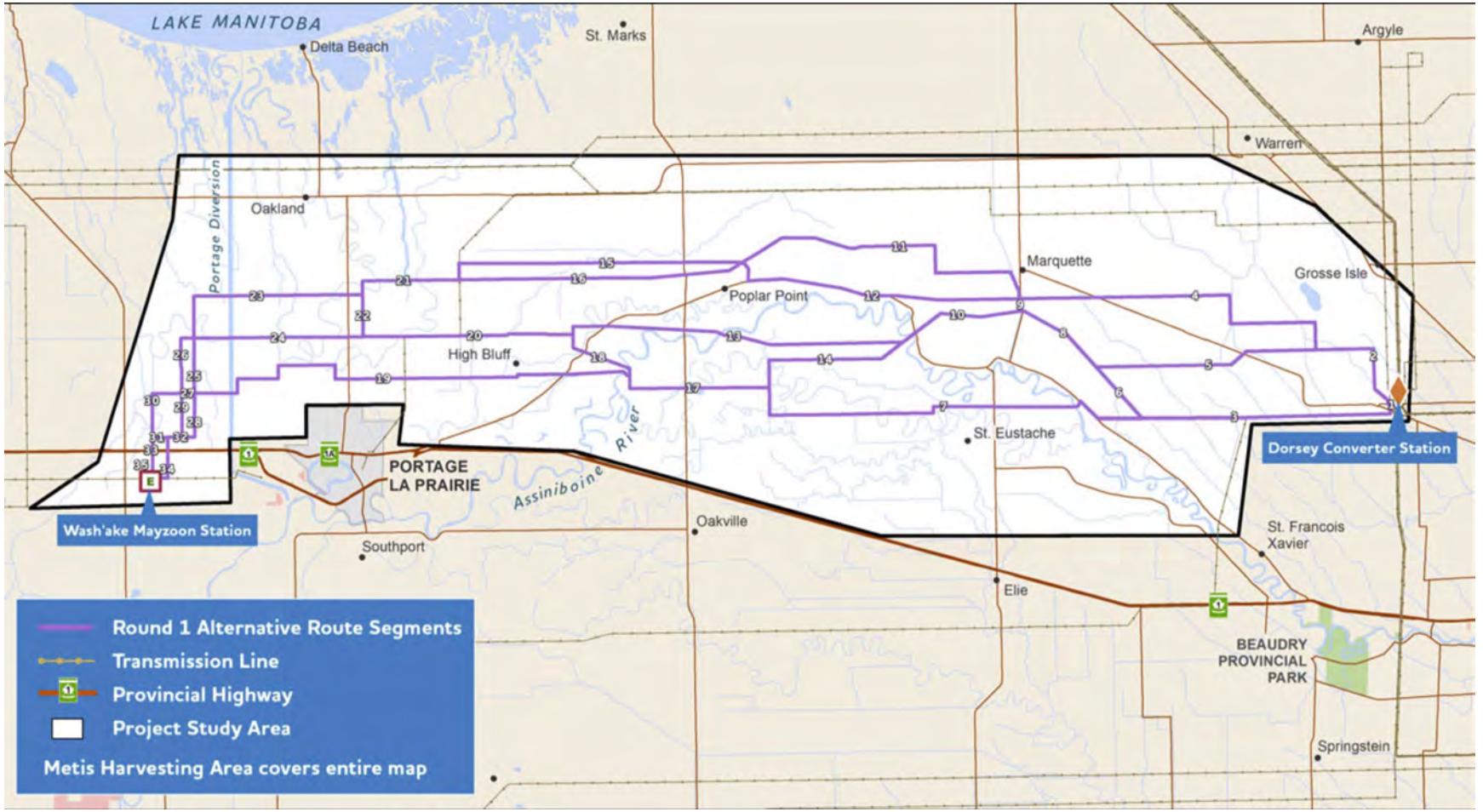
Round 1 engagement

- 35 route segments were proposed
- Manitoba Hydro learns from local knowledge and hear concerns



Manitoba Hydro

Dorsey to Wash'ake Mayzoon Transmission Line (D83W)



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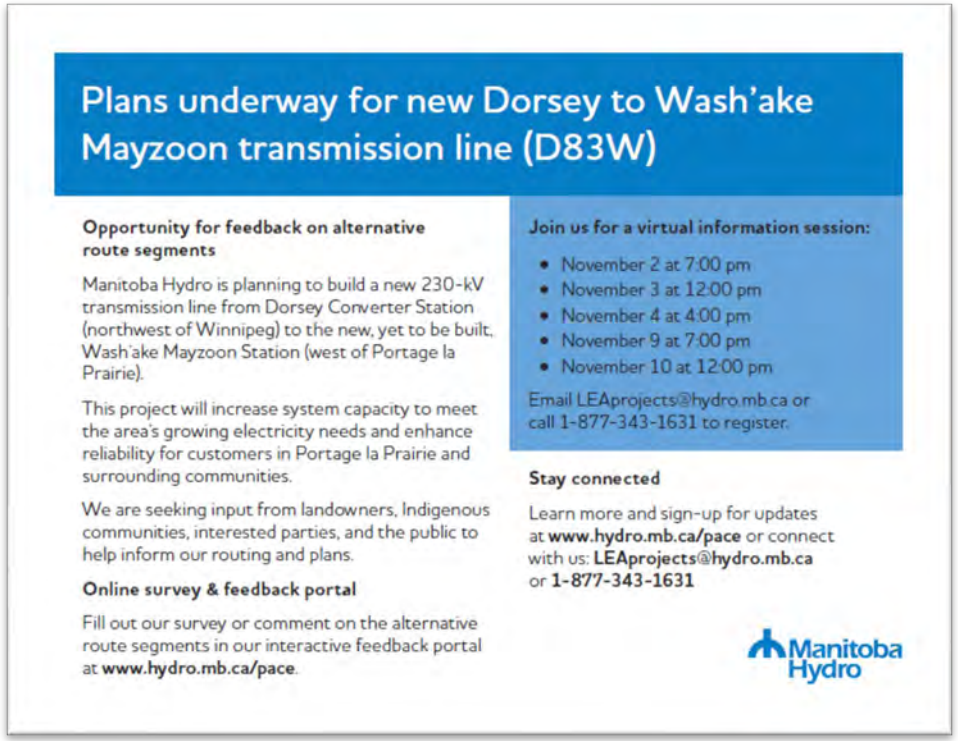

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Manitoba Hydro

How we're engaging

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- Community meetings
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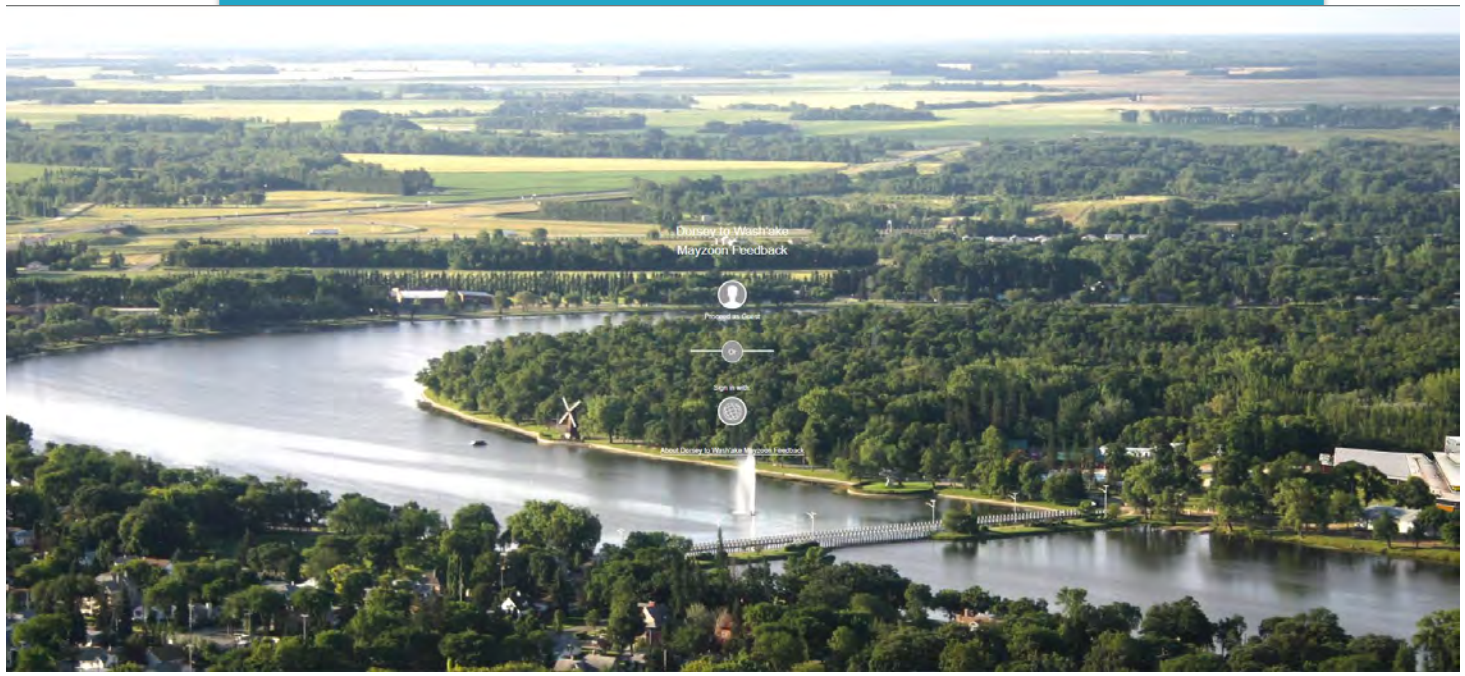
- Tours

Feedback portal

Project website:

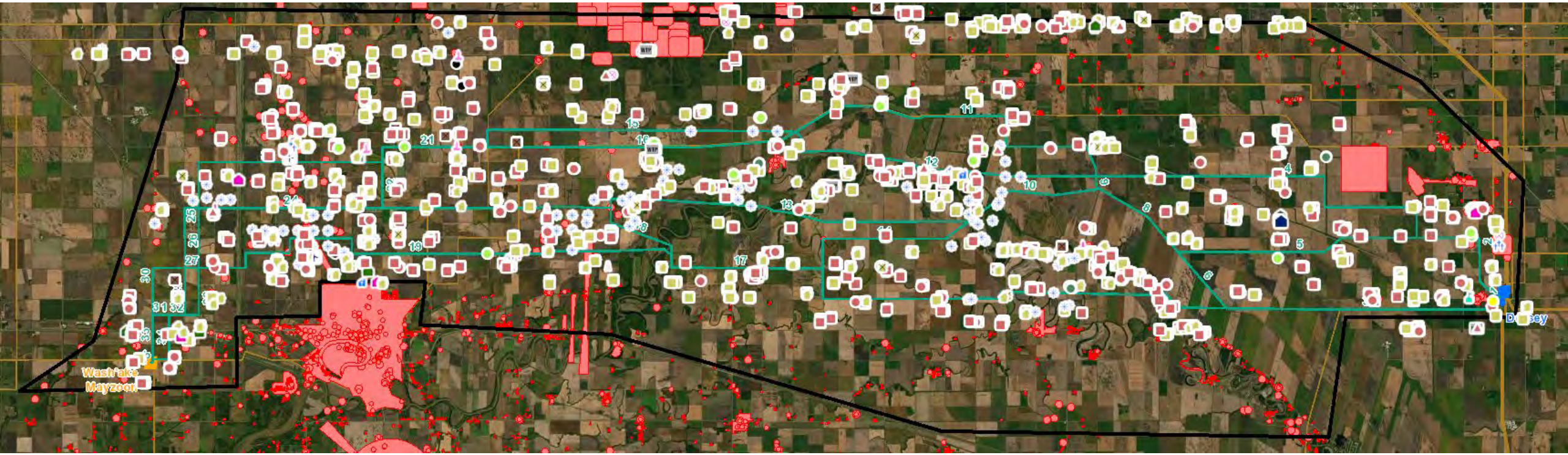
www.hydro.mb.ca/pace

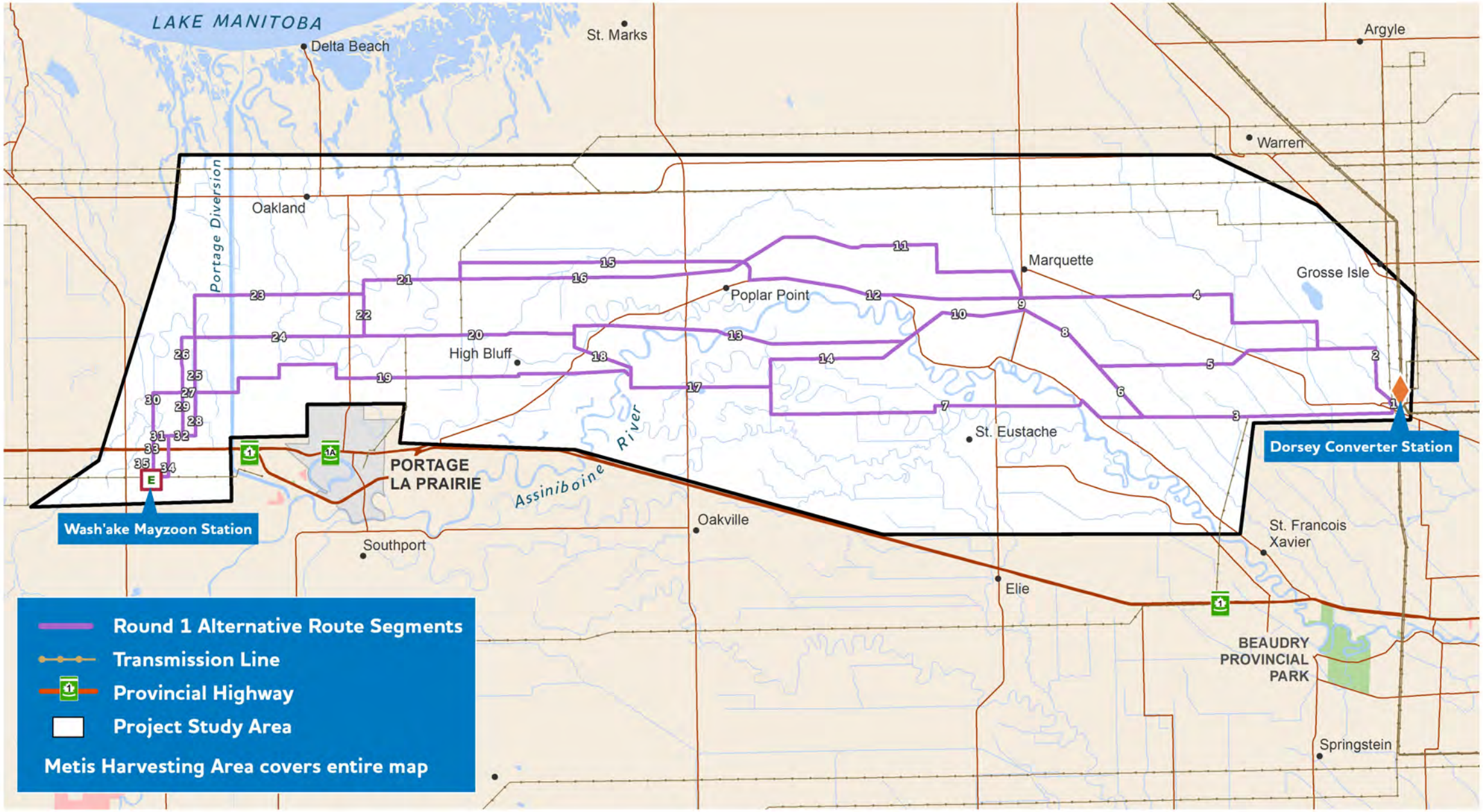
Feedback portal



The challenge of routing a transmission line

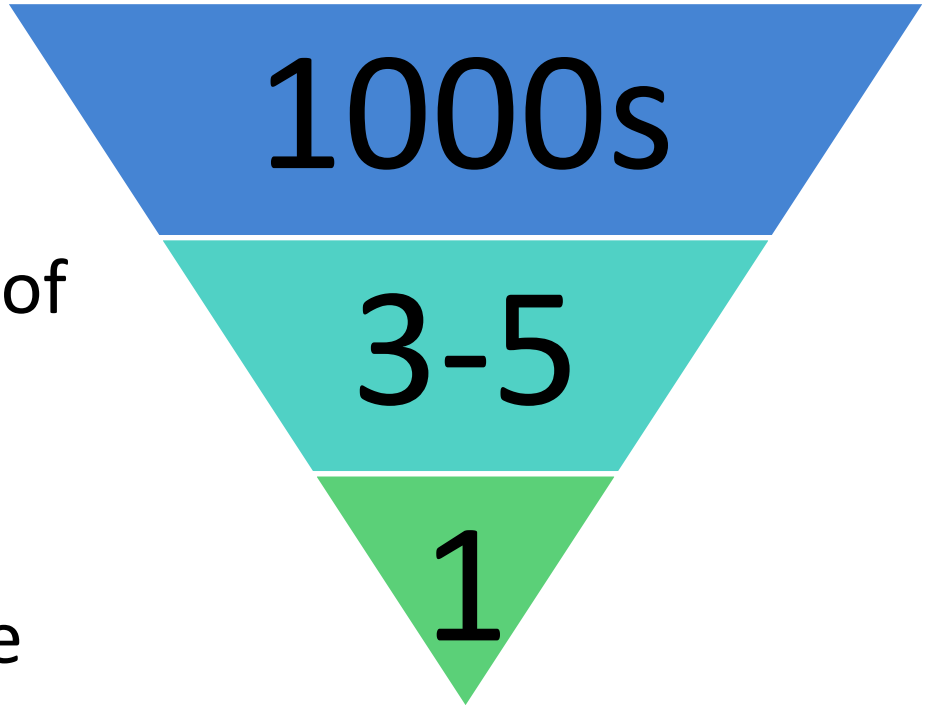
- Identifying the start and end points of the line
- Threading a needle through many constraints
- Considering many diverse interests, land uses and perspectives

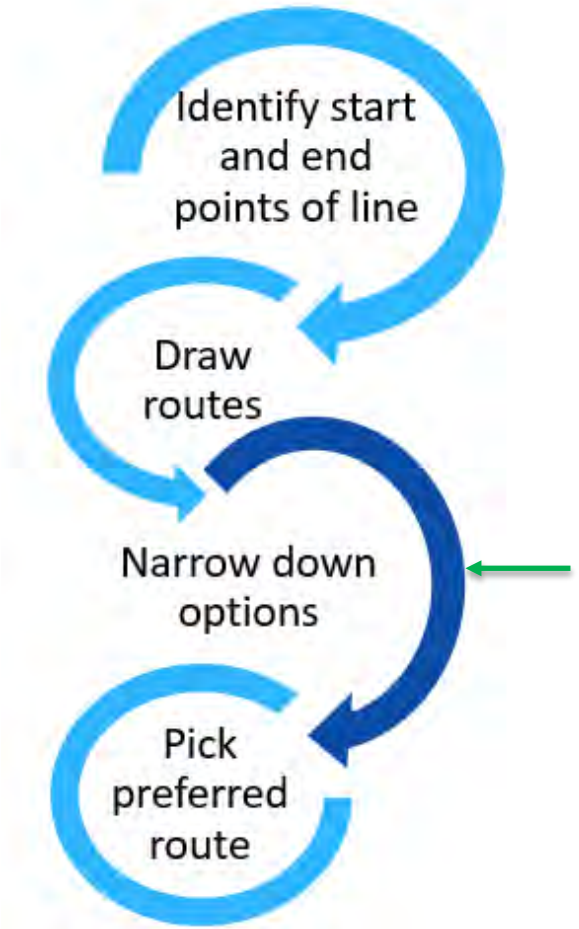



LAKE MANITOBA
Delta Beach
St. Marks
Argyle
Warren
Portage Diversion
Oakland
Marquette
Grosse Isle
Poplar Point
High Bluff
St. Eustache
Dorsey Converter Station
Wash'ake Mayzoon Station
PORTAGE
LA PRAIRIE
Assiniboine River
Oakville
Southport
St. Francois
Xavier
Elie
BEAUDRY
PROVINCIAL
PARK
Springstein
Round 1 Alternative Route Segments
Transmission Line
Provincial Highway
Project Study Area
Metis Harvesting Area covers entire map

Project team selects a narrow set of routes

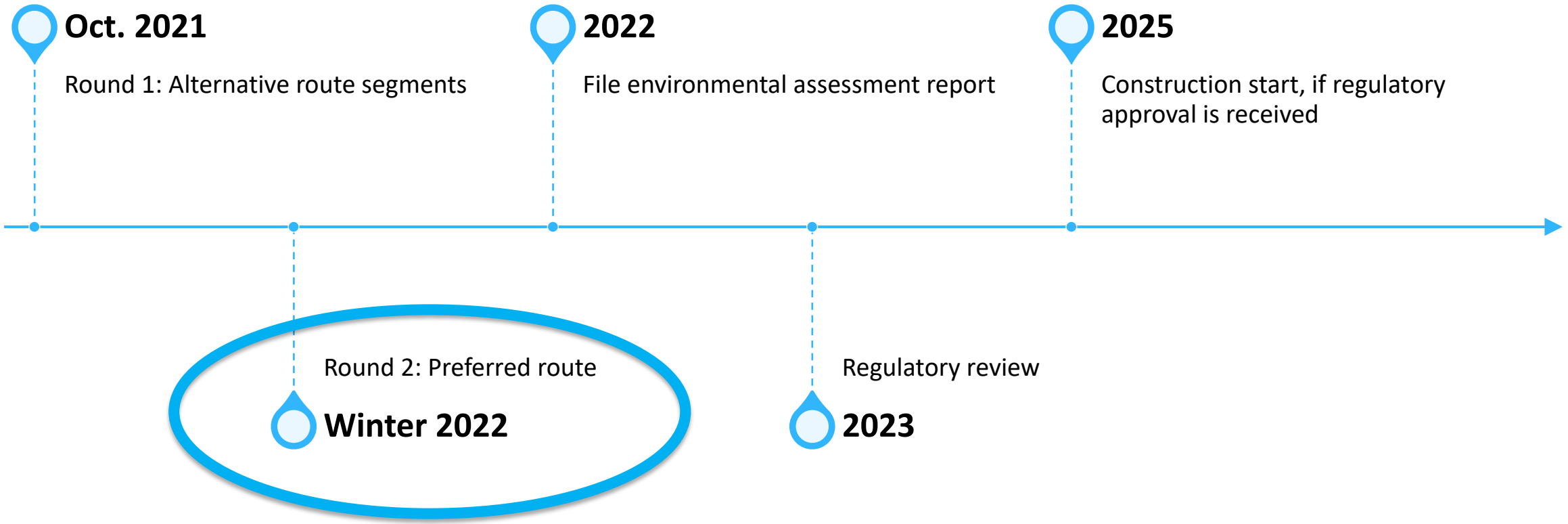
- Using information from further study and engagement
- A set of criteria help compare thousands of alternatives
- Helps keep things transparent and decisions defendable





Manitoba Hydro

Schedule


Oct. 2021
Round 1: Alternative route segments
2022
File environmental assessment report
2025
Construction start, if regulatory approval is received
Round 2: Preferred route
Winter 2022
Regulatory review
2023

Next Steps

- Round 2 Engagement – will begin in winter 2022 after selection of preferred route
- In the meantime, general concerns are welcome

Manitoba Hydro

Thank you for the opportunity to share.

Routing preferences from FNMEP

Round 1 routing preferences from DTFN (scores redacted)

From: Darryl Taylor <buffalostone23@gmail.com>
Sent: Tuesday, November 30, 2021 11:47 AM
To: Coughlin, Sarah <scoughlin@hydro.mb.ca>
Cc: Eric Pashe <e.pashe@live.ca>
Subject: D83W / Pace project / segment observations (1-35)

Segments - 1-3-6-8-9-11-16-21-23-25-27-30-33.
Dakota Tipi / ICAC preferred route .

Segment 1-3
Existing line 1-3, currently a operating line ground already has been disturbed, vegetation management minimal majority of segment 1/3 are on private land which is all open farmland.
No crownland or wildlife concerns.

Segment 6-8-9-11
Open fields with minimal trees and marshes .
Private land / no crownland/ the segments don't cross any rivers or major streams.
9 connects to 11 which is pre-existing line.
Ground has been predisturbed from past construction and vegetation management measures would be in place.
Open fields very few trees in the area and no wildlife concerns.

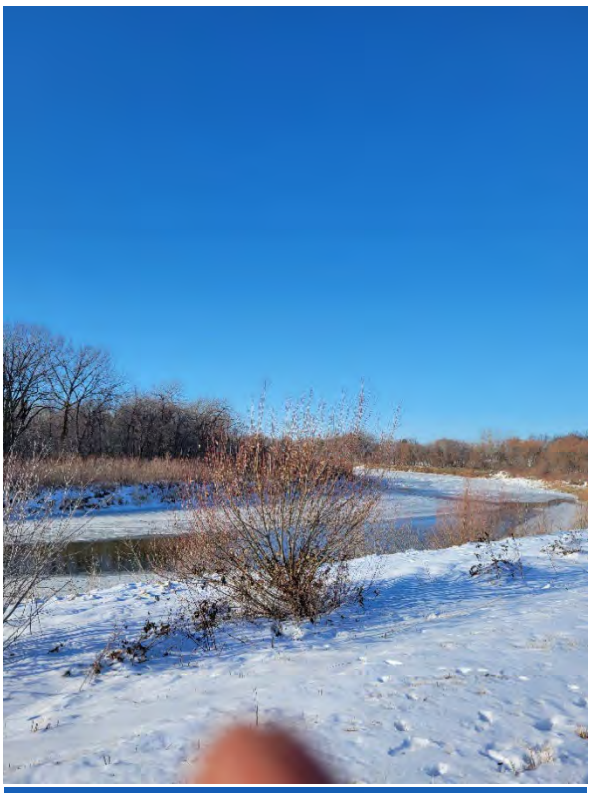
Segment 11-16-21-23
Private land / mostly farmland open fields pre-existing line , the line crosses the floodway, which is man made and ground has been predisturbed and the line is almost straight from east to west less corners (possibly).
These segments have minimal wildlife due to the fact they are open fields and have been farmed yearly.

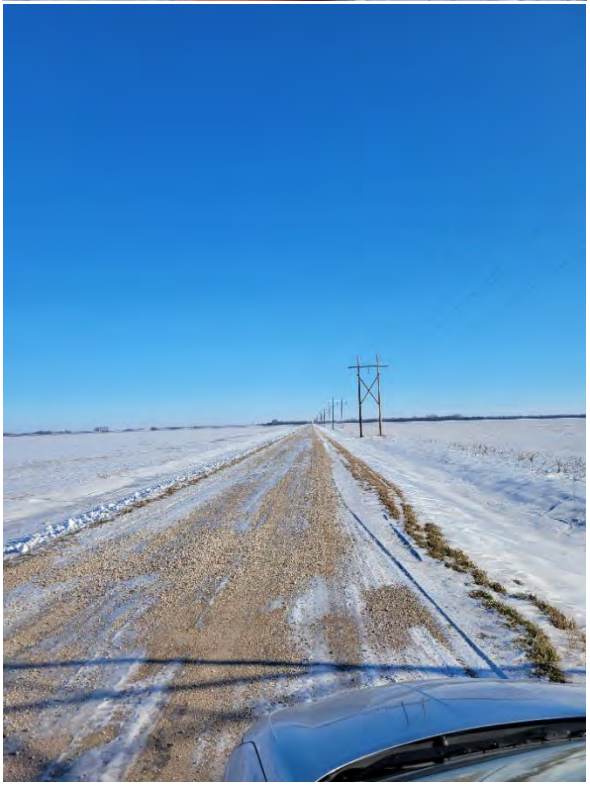
Segment 25-27-30-33
Open fields / private land
More of a straight line less corners / the line will be going over the #1highway.
No crownland/ minimal wildlife

I would like to express all of these segments on the PACE PROJECT have alot of significant heritage concerns ...
Segments 6-23 are very sensitive due to the history of the Dakota Nation. This route was difficult based on trying to have less brush clearing and less river crossings.
Using pre-existing lines would have less heritage and ground impact , touring the segments with the winter conditions was a challenge and informative majority of the land is on private land open fields and pre-existing lines.

The photos were taken at Dorsey Station and along the segments with a river crossing and pre-existing lines all the way to wash'ake mayzoon station.

Darryl Taylor
ICAC / DTFN/MH
KNOWLEDGE KEEPER





DTFN Scores and Rationale for Community Preference Meeting #2

Route	Community Score	Rationale for Score
A	[redacted]	This route is considered DTFN's least preferred option as it involves two crossings of the Assiniboine River, which has high potential to disturb heritage resources.
B		Routes B & C are quite similar and both match DTFN's Round 1 preferred route from segments 1 – 16. Because the remainder of the route is mainly through open farmland and there is no river crossing, this route would avoid DTFN's most significant concerns. Slightly less preferred then Route C, but significantly more preferable than Route A.
C		Routes B & C are quite similar and both match DTFN's Round 1 preferred route from segments 1 – 16. Because the remainder of the route is mainly through open farmland and there is no river crossing, this route would avoid DTFN's most significant concerns. This option is DTFN's second preference. It is more preferable than route B because the latter portion of the route heads further west before cutting south to enter the station.
D		Route D is the preferred option as it best reflects the interests of DTFN, particularly avoiding the river and minimizing the need for vegetation removal and ground disturbance by utilizing areas that are already developed or cleared of vegetation. This option matches DTFN's Round 1 preferred route from segments 1 – 16 and again from segment 27 to the station. The route is preferred because it involves a significant amount of open private farmland with minimal Crown land, trees, marshes, wildlife concerns, and does not cross any rivers or major streams. The route follows existing routes on segments 1-3 & 11, which minimizes the need for new vegetation clearing.

Round 1 routing preferences from LPFN (scores redacted)

Long Plain Lands Department

Akiin

Box 430 Portage la Prairie, Manitoba R1N 3B7 Email: reception@lpfnlands.com
Phone: (431) 495-0196 Fax: 204-252-2012

Lands Department

Liz Merrick
Councillor
Portfolio

Adam Myran
Program Director

Harley Myran
Lands Manager

Jody Merrick
Lands Manager

Jutta Ducharme
Reception

Jan. 26, 2022

Please accept this as Long Plain First Nation's route preference submission to be included in the January 27th meeting.

We have undergone some internal restructuring once again and appreciate your patience and diligence in making sure Long Plain First Nation's considerations are included in this major project.

Thank-you,

Adam Myran
LPFN Lands Director

Long Plain Lands Department

Akiin

Box 430 Portage la Prairie, Manitoba R1N 3B7 Email: reception@lpfnlands.com
Phone: (431) 495-0196 Fax: 204-252-2012

Lands Department

Liz Merrick
Councillor
Portfolio

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Route		Rationale
A		This route is preferable to Long Plain. Attached are the pertinent Traditional Land Use maps. Consulting the "Regional Map" along with maps F,G, and H the southern trajectory of Route A avoids all sites identified. We are cogniscent of the fact that this route may be more intrusive to major waterways, however in consideration of the traditional sites identified along the northern routes, it is preferable to choose route A.
B		Long Plain respects that this route avoids major waterways however it's northern trajectory is in close proximity to traditional site identified. Considering routes B, C, and D all have identical routes up until the west side of Portage la Prairie, this will be true for all three. This, along with route D avoid current TLE considerations making them more desirable.
C		Long Plain respects that this route avoids major waterways however it's northern trajectory is in close proximity to traditional sites identified. Considering routes B, C, and D all have identical routes up until the west side of Portage la Prairie, this will be true for all three. Route C borders and discects parcels currently under consideration for Long Plain TLE. Namely NE-1-12-8-W, NW-6-12-7-W and SW-7-12-7-W. We were made aware of the parcels the week of Jan. 10, 2022 so after the segments had already been narrowed down. This speaks to the fact that interests will evolve and change, even during the course of this project.
D		Long Plain respects that this route avoids major waterways however it's northern trajectory is in close proximity to traditional site identified. Considering routes B, C, and D all have identical routes up until the west side of Portage la Prairie, this will be true for all three. This along with route B avoid current TLE considerations making them more desirable.

Round 1 routing preferences from the MMF (scores redacted)

Manitoba Métis Federation Routing Preferences (Unconcluded)

Manitoba Hydro Dorsey to Wash'ake Mayzoon Transmission Line (D83W) Project

Manitoba Métis Federation

January 26, 2022

The Manitoba Metis Federation (MMF)

The MMF, as the democratically-elected self-government representative of the Red River Métis, and the singular federally recognized Indigenous government in Canada – the responsibility to promote and protect the rights, claims, interests, and responsibilities of our Citizens as environmental stewards remains the foundation of our work. As this transmission project spans an area encompassed within the traditional Homeland of the Red River Métis, and within the Recognized Métis Harvesting Area (RMHA), our concerns remain the same as we have always presented such. Due to the nature of the project, the impacts associated with the development of the transmission line reach beyond the project area in question. The rights of our Citizens are collectively held, and constitutionally protected as recognized and affirmed under s. 35 of the Constitution Act, 1982. Specifically, the following concerns are of immense importance

MMF Consultations With Our Citizens:

As part of the on-going consultations with our Citizens regarding the D83W Manitoba Hydro project, the MMF conducted a first-round total of 7 interviews between January 13th and 14th 2022. The interviews were all held virtually, and only MMF Citizens that live and/or harvest in the project area defined by Manitoba Hydro were permitted to participate. In total 12 Citizens participated in the first round of interviews. We ensured that our Citizens spoke in confidence, by clearing explaining that their personal information or concerns will not be shared in a manner that jeopardizes their anonymity. For legal purposes, all interviews were recorded and archived solely for use by the MMF, and Citizens were made aware of this prior to beginning the interview.

Due to time constraints, the holiday break, and ongoing challenges caused by the COVID-19 pandemic, our consultations with Red River Métis Citizens are unconcluded, and do not fully capture the concerns held by all Red River Métis. A second round of interviews with Red River Métis Citizens is currently being scheduled for the beginning of February.

Manitoba Hydro has not yet accurately captured all project effects that are important to the Red River Métis. MMF concerns identified through previously concluded studies are evidence of the potential for impact to the Métis way of life due to the cumulative impacts of the proposed D83W project and all prior Hydro development in the project area. The cumulative effects of this project together with other projects before it, raise concerns about impacts to Red River Métis Citizens' Constitutionally protected Rights, Claims, and Interests.

Routing Preferences Criteria

The following MMF routing preferences below are based on the following Manitoba Hydro criteria:

- Review the 4 route options and provide a score between 1 and 3 for each of the routes following the methodology discussed during the December 16, 2021, meeting.
- If a route is highly preferred, it would receive a score of 1.

- If a route is preferred somewhat, provide a score somewhere between 1 and 2 (1.1 to 1.9).
- If a route is not preferred, provide a score somewhere between 2 and 2.9.
- Only the least preferred routes should receive a 3.
- Please use just one decimal place for all scores (1.2, not 1.197).

MMF Routing Score (unconcluded)

While the MMF has not concluded our complete assessment of the four proposed routes determined by Manitoba Hydro, we have given a ranking based on our incomplete knowledge of the four proposed routes. More discussion is required, and time to consult with our Citizens on the four finalist route options A, B, C, and D suggested by Manitoba Hydro. Due to the inability to share the finalist routing preference map during interviews with our Citizens, we are not able to conclude a final preference on route options B, C, or D currently, but have provided a list of concerns heard by our Citizens.

Route	MMF Score (Unconcluded)	Rationale for Score (Unconcluded)
A		Significant environmental and cultural concerns were identified along much of this route. These concerns include but are not limited to: - Year-round use immediately within and adjacent area to this route including living, cultural uses, sacred sites, hunting, harvesting, farming, and recreational uses. - Overwhelming concerns over the environmental impacts associated with the multiple river and creek crossings involved with this route. Citizens do not wish to have any further transmission development along ecologically and culturally critical areas such as the Assiniboine River. - One Citizen said this route "Would be the kiss of death" and stated it would have a "direct and catastrophic impact". - Concerns raised by residents of cultural and sacred sites surrounding the communities of St. Eustache, St. Francois Xavier, Poplar Point and High Bluff, which all have a history of Métis settlement and natural resource harvesting. - Waterways considered by some to be sacred due to how it makes one feel spiritually connected with their ancestors. - Impacts on available agricultural land of high value and productivity.

		- Impacts on the availability of land for harvesting activities including hunting, fishing, and berry picking, firewood collection, and medicine collection. - Access to historic and culturally important harvesting areas and impacts on gathering local foods without having to travel greater distances in search of these foods relied on by their family. - Decreased access to areas used to pass along traditional knowledge and techniques to youth, as altered landscape changes traditional methods. - Concerns over access to lands and changes to habitat for harvesting, and disturbances to the predator-prey balance. - Threats to pollinator species from transmission lines and loss of available land used by pollinators. - Aesthetically unpleasant along waterways. - Concerns with noise disturbance during construction, maintenance, and continual noise during entire lifecycle of the transmission line. - Concerns with waste generated during construction and repairs. - Recreational activities along waterways impacted. - Concerns over habitat fragmentation. - Concerns over lack of insight on route specifics to determine the most preferred route based on limited public information available on the four finalist options determined by Manitoba Hydro. -
B, C, D		Citizens have raised numerous concerns. The following concerns have been raised by our Citizens to date, and summarized collectively for route options B, C, and D. - Year-round use immediately within and adjacent area to this route including living, cultural uses, sacred sites, hunting, harvesting, farming, and recreational uses. - Preference for avoiding more naturalized areas including waterways, forest, wetlands, bush, and areas with less existing development. - Concerns over habitat fragmentation. - Concerns with noise disturbance during construction, maintenance, and continual noise during entire lifecycle of the transmission line. - Concerns with any waste generated during construction and repairs.

		- Concerns over access to lands and changes to habitat for harvesting, and disturbances to the predator-prey balance. - Access to historic and culturally important harvesting areas and impacts on gathering local foods without having to travel greater distances in search of these foods relied on by their family. - Decreased access to areas used to pass along traditional knowledge and techniques to youth, as altered landscape changes traditional methods. - Threats to pollinator species from transmission lines and loss of available land used by pollinators. - Impacts on available agricultural land of high value and productivity. Multiple Citizens noted that these routes crossed slightly less productive lands in general, and therefore were considered less of an impact compared with Route option A. - Impacts on the availability of land for harvesting activities including hunting, fishing, and berry picking, firewood collection, and medicine collection. - Preference for avoiding more naturalized areas including waterways, forest, wetlands, bush, and areas with less existing development. - Concerns over lack of insight on route specifics to determine the most preferred route based on limited public information available on the four finalist options determined by Manitoba Hydro.

Round 1 routing preferences from PFN (scores redacted)

Peguis Consultation & Special Projects
P.O. Box 10, Pegius First Nation, MB R0C 3J0
T: (204)594-7488 C: (204)430-0808
E: SpecialProj.Coord@peguisfirstnation.ca

December 1, 2021

Sarah Coughlin
Manitoba Hydro
360 Portage Avenue
Winnipeg, MB R3C 0G8

Dear Ms. Coughlin:

Peguis Consultation and Special Projects, on behalf of Peguis First Nation, conducted Site visits on November 26 & November 30, 2021 of Manitoba Hydro's proposed routes for D83W Transmission Line from Dorsey Station to Wash'ake Mayzoon Station, as well as viewed Peguis' Preferred Route.

Three members from Peguis Consultation and Special Projects started November 26, 2021 at the Wask'ake Mayzoon Station and Finished near Poplar Point. On November 30, 2021 the remaining proposed sections from Poplar Point to Dorsey Station were visited. A few sections presented a high potential for environmental impacts and archeological finds and this was a large deciding factor in choosing Peguis' Preferred Route.

Please be noted that it was brought to our attention that there are 3 archeological sites located approximately 4.25 kilometers away from the proposed route section #21, the archeological sites are located near the intersection of PR 240 and 227 directly north of Portage la Prairie. This brings forward a high concern for potential archeological finds within the proposed route segments.

Peguis' initial route selection completely avoids the sections which cross the Assiniboine River due to the potential environmental impacts and potential archeological finds. With this in mind, the remaining sections were picked with high concern to proximity of waterbodies. Peguis finished its desk study of the remaining proposed sections and needed a Site visit of the remaining sections to further determine their preferred route.

After the Site Visits of the remaining sections were complete, Peguis' Preferred Route consists of the following sections. From Dorsey Station 2, 5, 8, 9, 11, 16, 21, 22, 24, 26, 29, 31, 33, finishing at Wash'ake Mayzoon Station.

With regards to a potential new section from 15, going straight south at 16 and 22 intersection, connecting at section 20 and reconnecting at section 24. The reason for this new section is that there are a high number of oxbows on sections 21 and 22, which could have a high chance of archeological finds.

If the new section is approved, referred to as 15A, the Preferred Route for Peguis is 2, 5, 8, 9, 11, 16, 15A, 20, 24, 26, 29, 31, 33.

Peguis Highly opposes Section 7 and 10 for the reason of crossing the Assiniboine River. Section 12 was looked at, but after the Site Tour, the proximity to the river was considered too close so Section 11 was preferred. Section 23 was not considered as it crosses a high number of oxbows, streams and creeks. Section 30 also crosses an active creek which is surrounded by wetlands.

Prepared By:

Kinnan Stevenson-French, B.Env.

Environmental Projects Coordinator

Reviewed By:

Mike Sutherland

Director

Suboffice:
Peguis Consultation & Special Projects
202-1075 Portage Avenue
Winnipeg, MB R3G 0R8
T: (204) 891-5237

Peguis Consultation & Special Projects
P.O. Box 10, Pegius First Nation, MB R0C 3J0
T: (204) 594-7488 C: (204) 430-0808
E: SpecialProj.Coord@peguisfirstnation.ca

D83W Transmission Line Scoring – Peguis First Nation

Route	Score	Rationale
A	[redacted]	Crosses Assiniboine River, Peguis stated in its route selection that the transmission line should avoid crossing the Assiniboine river.
B		Does not cross the Assinboine River. Uses existing infrastructure corridors (Portage Diversion, Railway along #1 highway).
C		Does not cross the Assiniboine River. relatively direct route and avoids "wandering" through area.
D		Least Direct route. Many changes in direction near Portage la Prairie.

Notes:

- Routes B, C, and D are relatively similar to end of Segment 19, Rationale for selection is based on the changes in routes from Segment 19 to Wash'ake Mayzoon Station.
- What is the reasoning for going down to Segmant 19 then back up to segment 24? Instead of going down to 20 and across to 24.
    - New segment for 19 up to 24 crosses existing streams and oxbows, increasing chance of heritage finds
    - Existing oxbows and streams have created wildlife corridors, by infringing upon these corridors it causes wildlife to change natural patterns. These changes could lead to increase in wildlife interactions with roadways (vehicle collisions) or agriculture (crops, livestock).
    - By going down to segment 19, transmission line is also being extended ~5 km, therefore increasing the amount of ground intrusion for transmission towers, increasing costs and chance of heritage finds.
    -
- Does the new segment (one paralleling Portage Diversion) intend to be built within diversion ROW? Or is it constructed between ROW and Road 40 W? or on the east side of Road 40 W?

Presentation slides from Community Preference Team meeting 1 (Dec. 16, 2021)

Community ranking in transmission line routing

Process overview

Lindsay Thompson, Senior Environmental Specialist
Licensing and Environmental Assessment

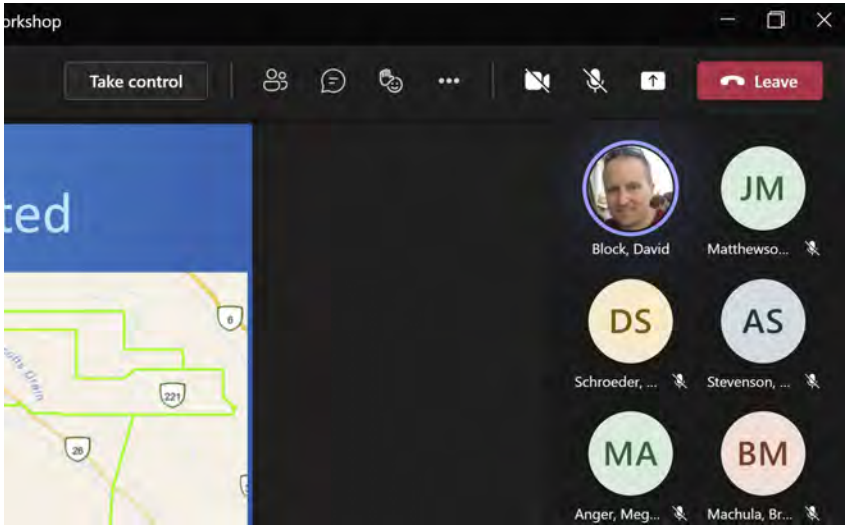
Manitoba Hydro

Land acknowledgement

I acknowledge that we are within Treaty 1 territory and that the land on which this project is being planned is the traditional territory of Anishinaabe, Cree, Oji-Cree and Dakota Peoples, and the traditional Homeland of the Red River Métis, and within the Recognized Métis Harvesting Area. I also want to acknowledge that others may be joining us from different lands and territories.

During the presentation

- Please mute your microphone
- Question period at key points and at end of the presentation
- Questions can also be typed in the comment box



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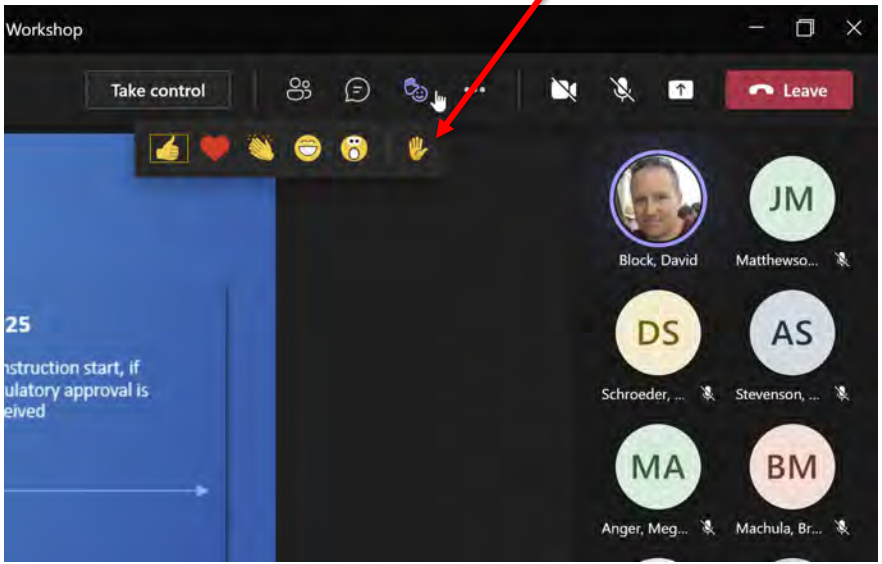

Etiquette for today

- We appreciate your participation, mutual respect and attention today
- Pausing for questions at set points
- Key for today is understanding our process, not sharing our route preferences (that comes in January)

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Agenda

- Introductions
- Review objectives of meeting
- Background on transmission line routing and the D83W project timeline
  - How the MH process works
  - How community engagement informs the outcome
- What we heard during engagement to date
- Process discussion
- Wrap up

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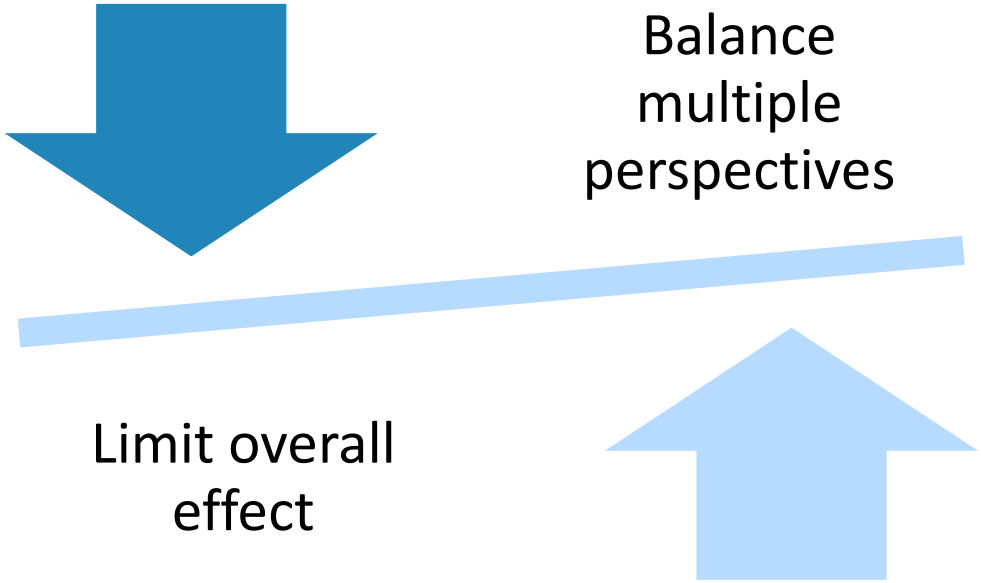
Objectives

Share background on how we make routing decisions and answer questions

You leave feeling like you understand how your participation will inform the routing process

Goals of transmission line routing



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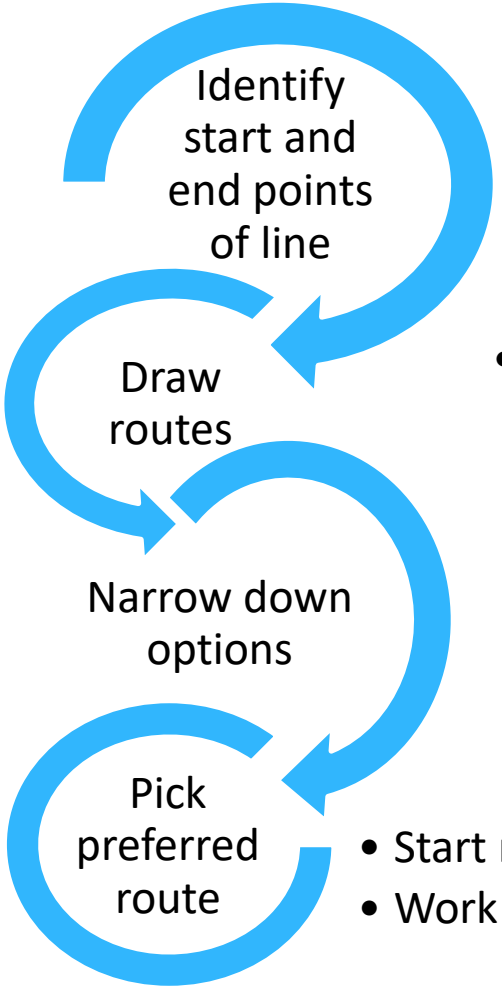
Pathway to selecting a route

- Draw study area



- Start round 1 engagement
  - Gather local knowledge and concerns

- Compare and evaluate routes
- Hold project team workshops

- Start round 2 engagement
- Work to address concerns

Mitigating potential effects

- The routing process is a key tool used to reduce effects
  - some effects are more challenging to mitigate so avoidance through routing is preferred (runways, cemeteries)
  - Manitoba Hydro will work to develop mitigation where we can't avoid effects
  - If we cannot mitigate or avoid, may need to compensate (i.e. purchase home)

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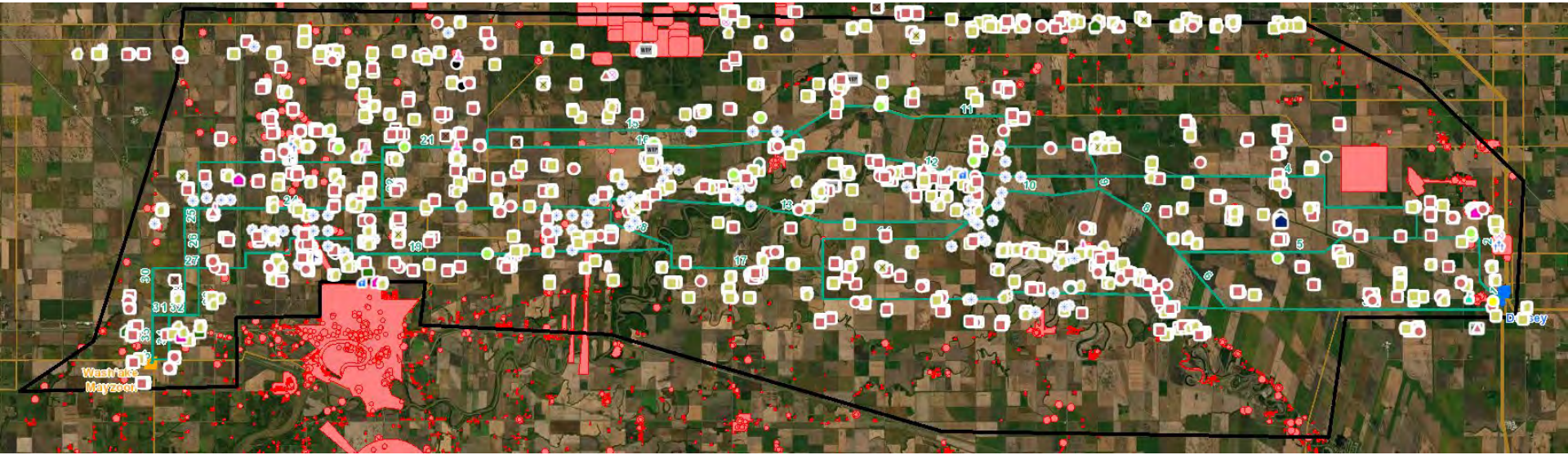
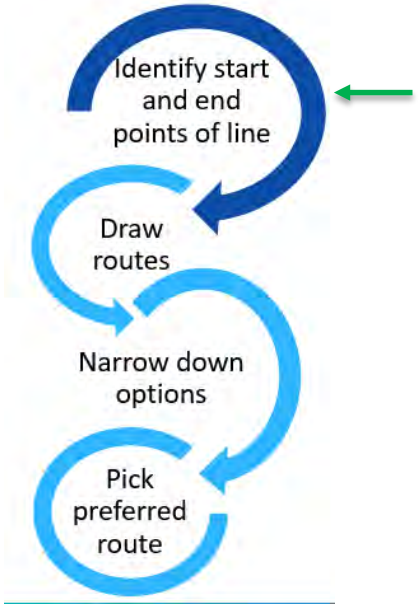
The challenge of routing a transmission line

- Identifying the start and end points of the line
- Threading a needle through many constraints
- Considering many diverse interests, land uses and perspectives



We study the area

- Look for homes and other buildings
- Examine land use
- Identify existing linear infrastructure like pipelines, roads
- Map out areas of least preference



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Routes are drawn to try and limit effects

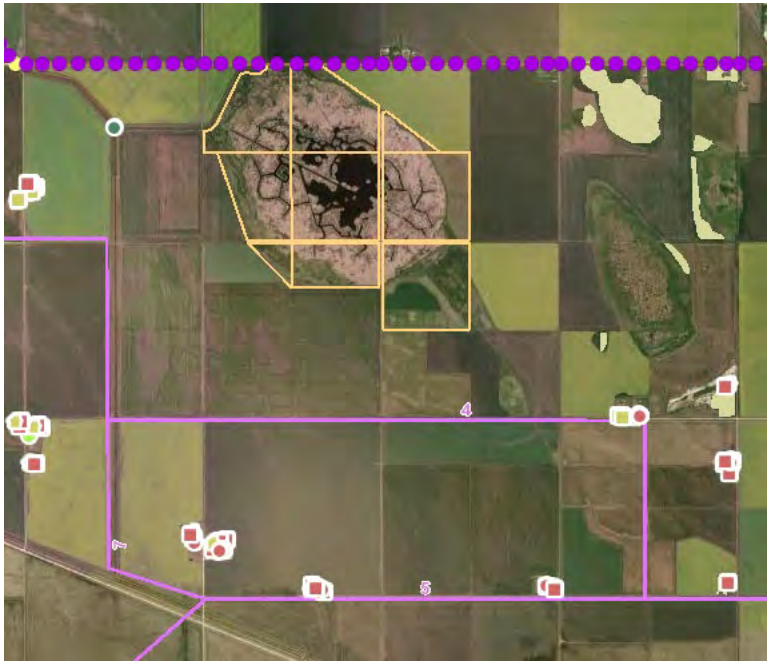
For example, we try to avoid or limit effects to:

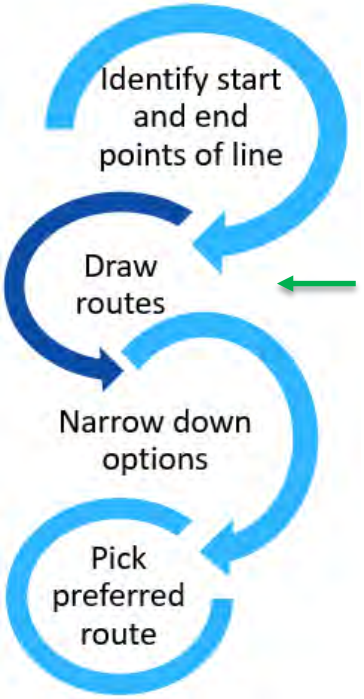
- **residences**
- **land of importance to Indigenous communities**
- **recreational areas**
- **agricultural operations**

Avoid or limit **environmental effects**

Parallel or follow existing linear developments i.e. roads and drains

Consider length and cost of proposed facilities





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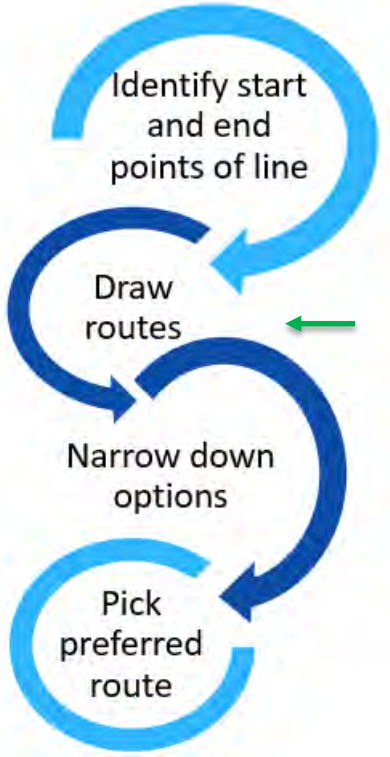
Round 1 engagement

- Routes discussed in engagement where we learn from local knowledge and hear concerns



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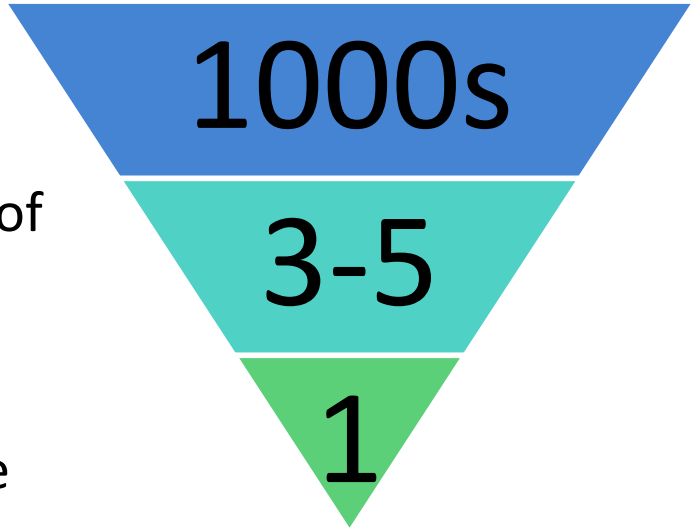
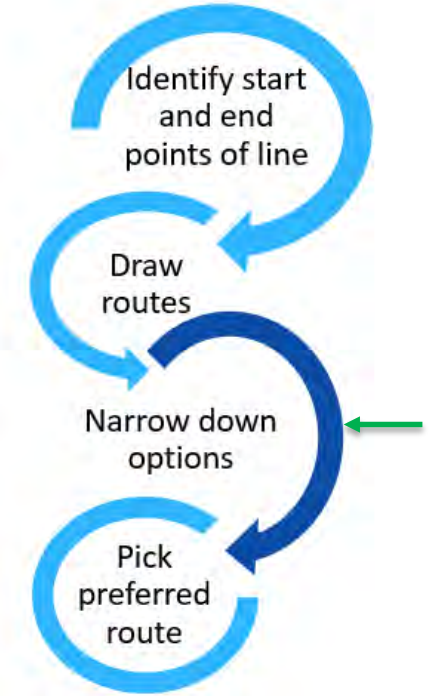
Project team selects a narrow set of routes

- Using information from further study and engagement
- A set of criteria help compare thousands of alternatives
- Helps keep things transparent and decisions defendable





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How do we narrow down to 3-5 route alternatives? It’s not just about the #s

Engineering criteria

- Construction/design costs ($) (40%)
- Seasonal construction and maintenance restrictions (17%)
- Accessibility (17%)
- Transmission reliability (17%)
- Proximity to gas and rail (9%)

Natural environment criteria

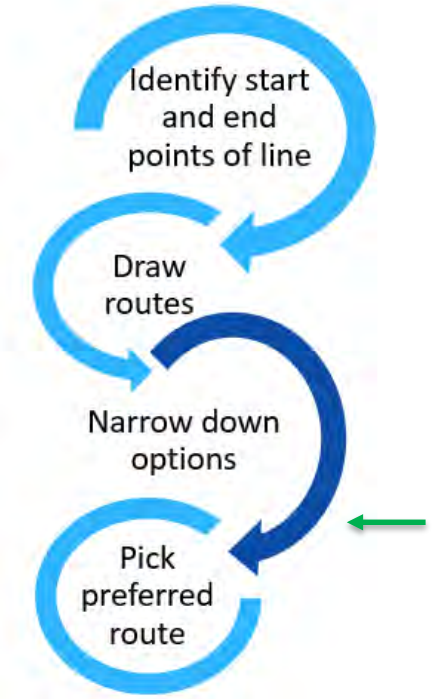
- Critical habitat - ROW (40%)
- Native grassland - ROW (20%)
- Crown land natural (18%)
- Wetlands - ROW (16%)
- Natural forests - ROW (3%)
- Stream / river crossings - centreline (3%)

Built environment criteria

- Relocated residences - within ROW (30%)
- Potential relocated residences - EOROW to 100m (18%)
- Proposed developments - within ROW (16%)
- Diagonal crossing of agriculture crop land - ROW (11%)
- Proximity to residences - 100-400m from edge of ROW (6%)
- Special features - schools, daycares, churches - EOROW to 250m (5%)
- Historic/cultural resources - EOROW to 250m (5%)
- Current agricultural land use - ROW (4%)
- Proximity to buildings and structures - EOROW to 100m (3%)
- Land capability for agriculture - ROW (2%)

Where we are now

- Will be applying a decision-making process for the community perspective that helps to:
  - Share how decisions are made
  - Keep decisions focused on values and from a regional perspective



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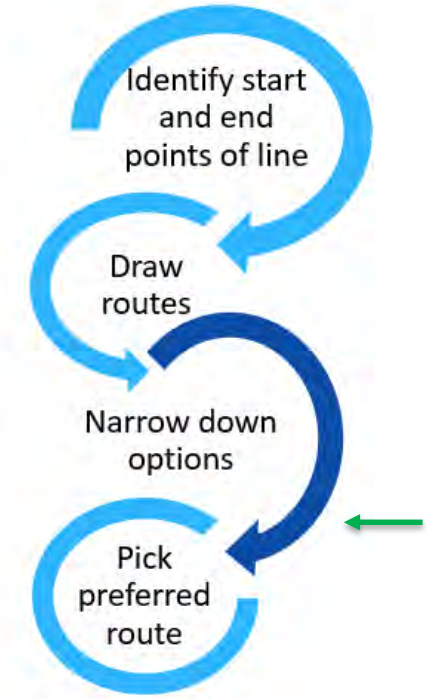
Project criteria and weightings

- Cost (40%)
- Community (30%)
- Risk to schedule (7.5%)
- Effect on built environment (7.5%)
- Effect on natural environment (7.5%)
- System reliability (7.5%)



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Comparing routes

- If a route is the **best** option, it gets a **1**
- If all routes are **equally good**, they all get a **1**
- If a route is the **worst** of all the options, it gets a **3**
- If the route is similar to the best option but not quite as good – gets a number larger than 1, by as much to **represent the difference**

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Compare 3 options for dessert

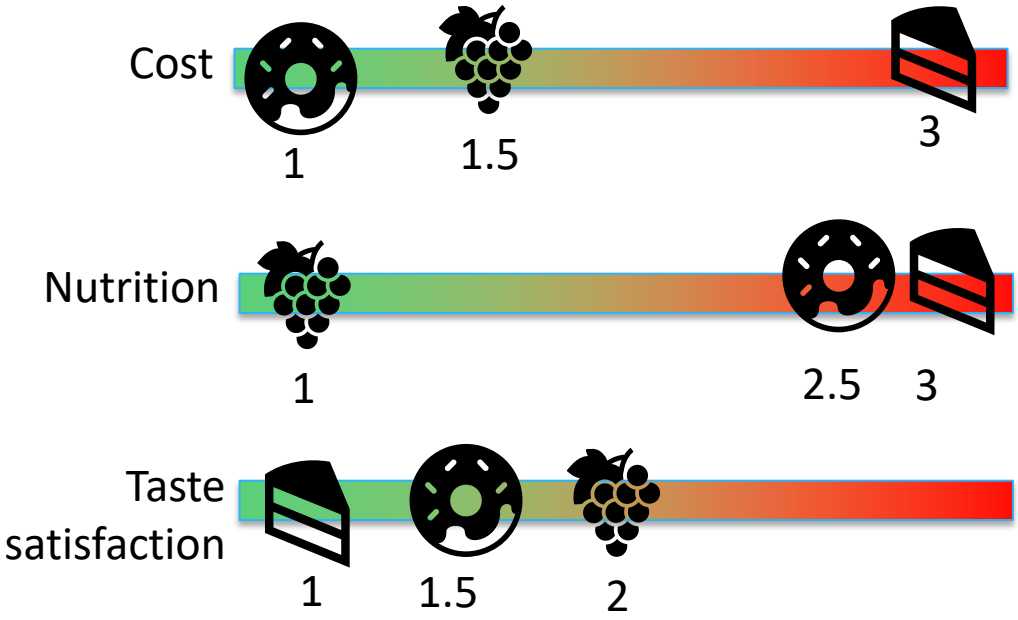
- cake
- fruit
- donut

Your **criteria** are:

Cost

Nutrition and

Taste satisfaction



How important is each criteria?

What should we choose?

Criteria	%	Cake	Donut	Fruit
Cost	50%	3	1	1.5
Expected taste satisfaction	40%	1	1.5	2
Nutrition	10%	3	2.5	1
		2.2	1.35	1.65

Best option

Manitoba Hydro

- pollev.com/thecar811

On January 13, 2022 you will be asked to rank a narrowed down list of routes

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What are the factors your community is considering when ranking?

- Ask group to share their considerations on Poll Everywhere

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	Order of preference						
Community	**1**	**Why?**	**2**	**3**	**4**	**Why?2**	**Level**
Dakota Tipi First Nation							
Long Plain First Nation							
Manitoba Metis Federation							
Peguis First Nation							
Rural Municipality of Cartier							
Rural Municipality of Portage la Prairie							
Rural Municipality of Rosser							
Rural Municipality of St. Francois Xavier							
Rural Municipality of Woodlands							

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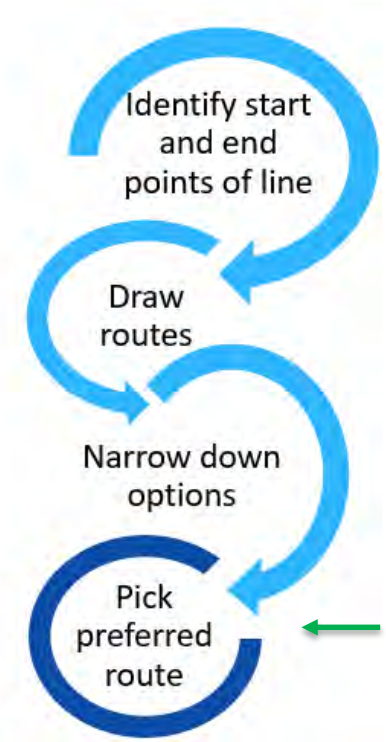
Preferred route picked from set of finalists

Information gathered is considered

Routes compared against one another using a set of criteria and weighting

Using a model makes the decision more structured, and clear

- Cost (40%)
- Community (30%)
- Risk to schedule (7.5%)
- Effect on built environment (7.5%)
- Effect on natural environment (7.5%)
- System reliability (7.5%)



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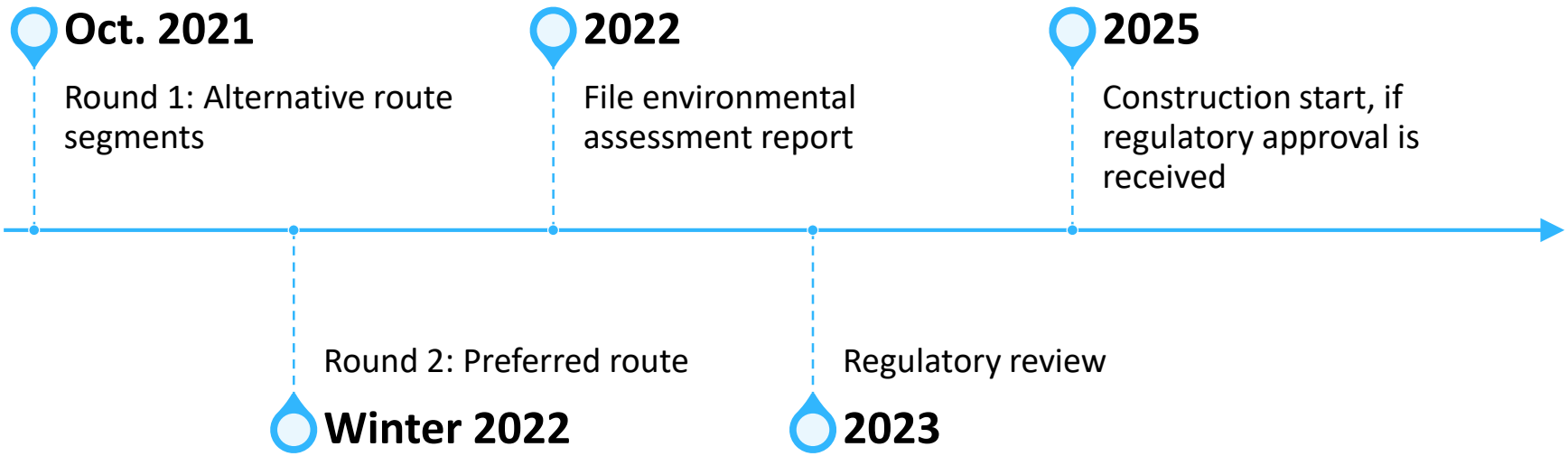
Schedule


Oct. 2021
Round 1: Alternative route segments
Winter 2022
Round 2: Preferred route
2022
File environmental assessment report
2023
Regulatory review
2025
Construction start, if regulatory approval is received

Next steps

- Review engagement feedback
- Discuss process for ranking route finalists from community perspective

D83W – Round 1

What we heard

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Virtual information session feedback

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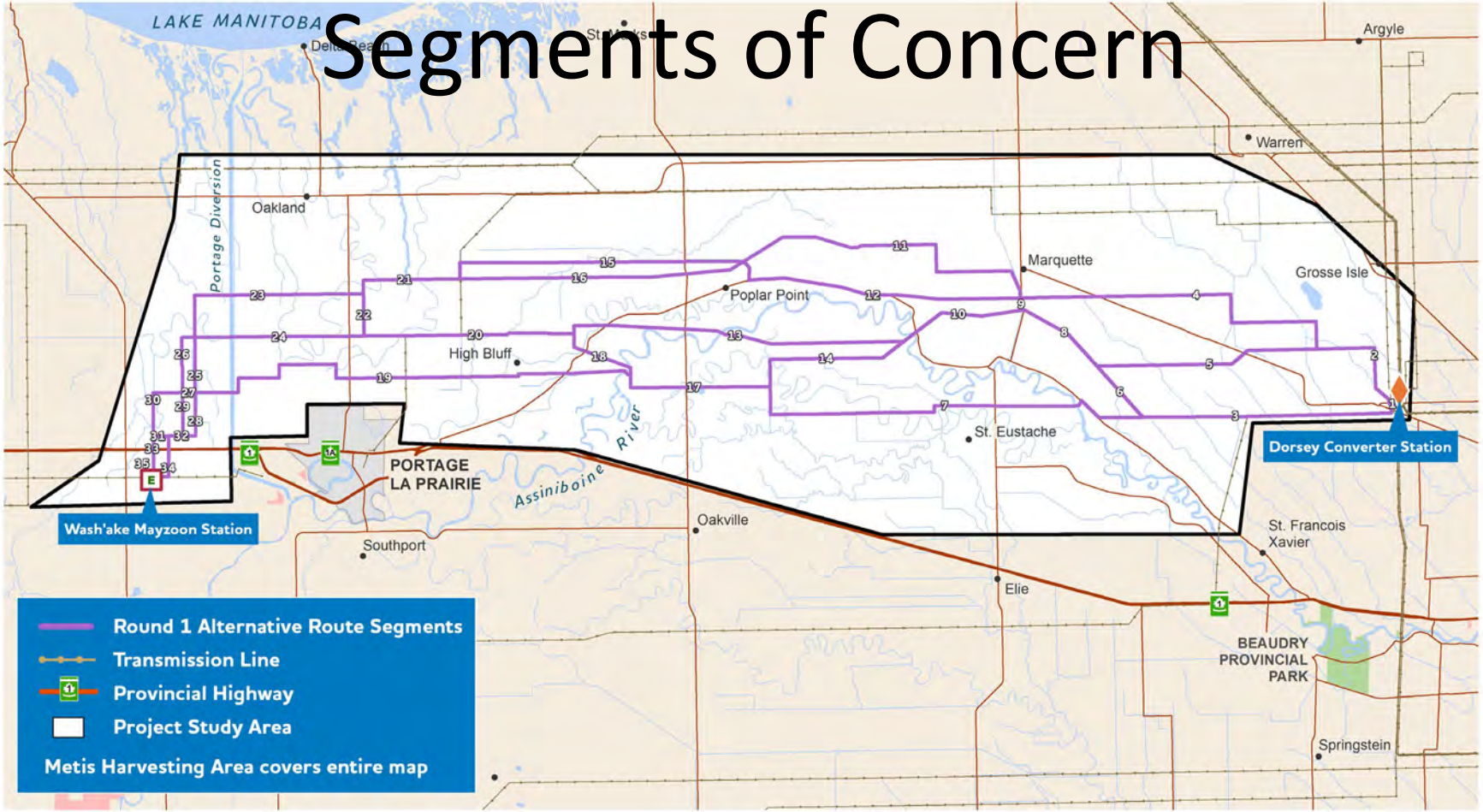
Segments of Concern



What we heard - aesthetics

- Questions on tower size, span, ROW
- Other tower design options
- Proximity of transmission line to St. Eustache
- Potential degradation to property values
- Removal of trees

What we heard – heritage concerns

- Substantial concerns shared about potential to impact culture and heritage values in the area
- Important to adopt a culturally-specific approach to understand impacts and protect heritage resources in the area
- Segments close to rivers, old ox bows and areas north of Portage la Prairie have a high potential for finds

Manitoba Hydro

What we heard – heritage, continued

- Municipal heritage site of concern along the routes (near St. Eustache)
  - St Paul's Anglican Church

What we heard – agriculture

- Aerial spraying
- Pivot irrigation
- Tile drainage
- Runways for aerial spraying
- Preference for northern routes (less high-productivity for agriculture)
- GPS use for agriculture
- Biosecurity
- Follow road allowances
- Economic impacts / economic loss

Manitoba Hydro

What we heard – concerns about engagement process

- Feedback on engagement processes:
  - Preference for Manitoba Hydro to contact individual landowners
  - Issues with contacting Manitoba Hydro team via email or 1-800 number
  - Include a Metis-specific engagement process, separate and distinct from the First Nation process
  - Alternative avenues to submit information
  - Lack of communication by Manitoba Hydro about the project
- How feedback influences routing process
- Questions about project timelines and next steps

Manitoba Hydro

What we heard - economic impacts

- The need for the project
  - 2019 storm being used as justification for damaged poles that were ready for replacement
  - Those most affected by project are not in need of more power
  - Request for economic impact study
  - Crops in the area have high economic multipliers
- Employment and training benefits
  - Employment opportunities should be focused on those affected by the project
  - Manitoba Hydro should consider continuity between projects when hiring for transmission projects

Manitoba Hydro

What we heard – EMF

- Potential effects to GPS signaling on precision agricultural application
- Potential human health impacts
- Interference from towers with GPS and livestock
- Concerns about increased risk of miscarriage, leukemia, other diseases

What we heard – health and safety

- Potential introduction of invasive species
- Biosecurity – clubroot
- Proximity to homes and perceived health risk
- Interference with livestock

What we heard – property value

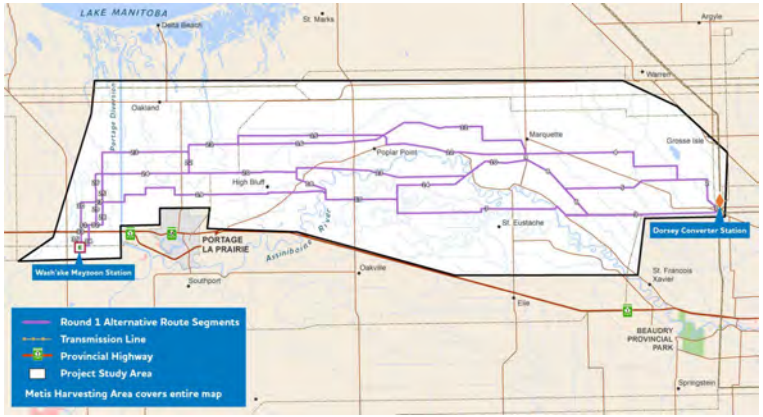
- Loss of use of land as a result of hydro towers
  - Direct impacts to agricultural production
  - Proposed routes cutting through the middle of fields
- High value river property potentially affected
- **Easements and compensation** – when in the process this happens, what happens when the preferred route is selected
- **Expropriation –** expropriation process, when the preferred route is selected, can people be expropriated?

What we heard – proximity to homes

- Associated health concerns with homes in proximity to the line
- Potential effects on internet service
- Routes in proximity to towns (St. Eustache, Marquette)
- Overwhelming to have power lines outside property

What we heard – routing

- **Need for the project** – use of Bipole III for power, twinning existing ROWs, originating from Dorsey vs. Brandon
- **Riverfront properties** – previous flooding in properties along the river
- **Northern routes / PR 227** – preference to route along PR 227 and Portage Diversion, preference for land north of study area (less agriculturally productive). Also heard from some communities a distinct preference to avoid PR 227 due to heritage potential
- **Decision-making** – questions about factors considered when choosing preferred route
- **Road allowances** – following existing ROWs and road allowances as much as possible
- **Southern routes** – some preference to route south of Trans-Canada, route closer to Elie
- **Crown land** – preference of using Crown Land to route the Project
- **Runways** – concern about private runways in the area that Manitoba Hydro might not be aware of



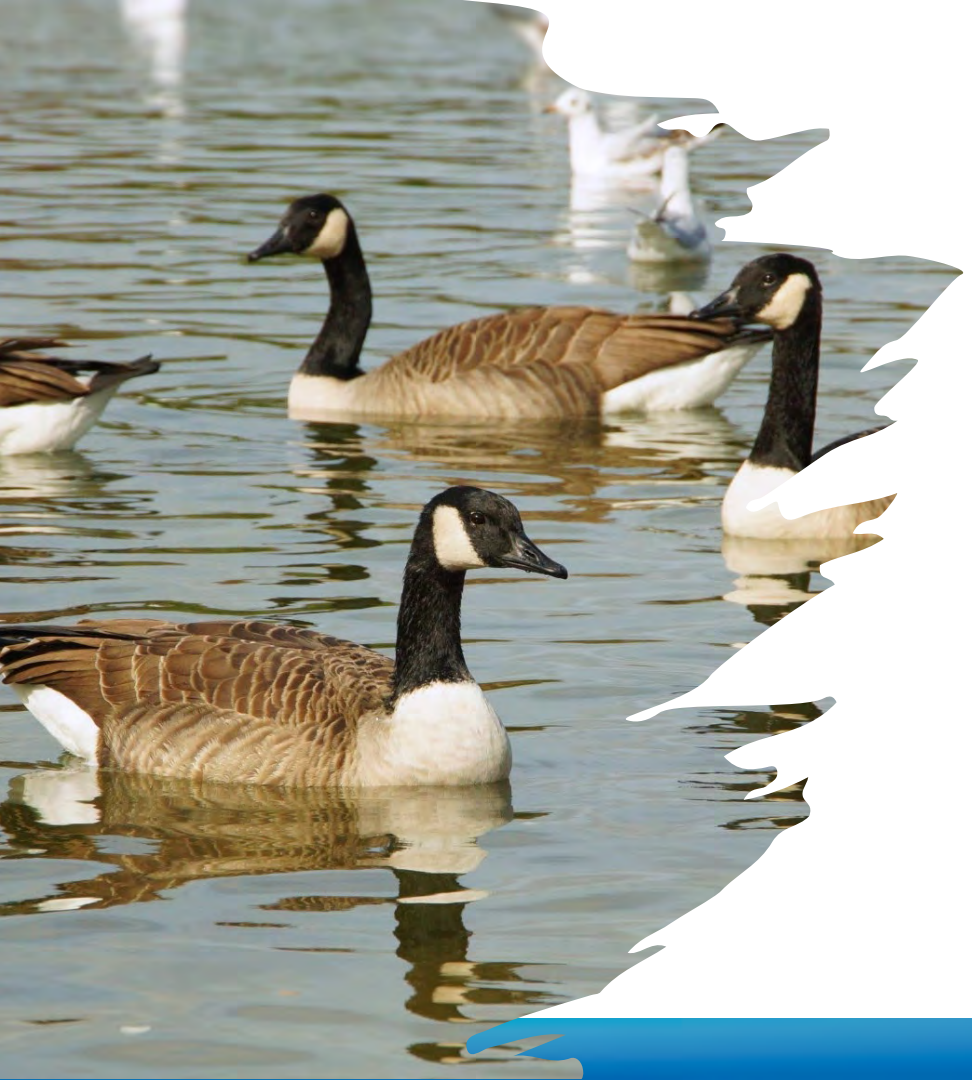
Manitoba Hydro

What we heard – trees & vegetation

- Conservation agreement lands and whether special considerations would be given to these areas
- Concerns about removing trees
- Tree line along properties that may be impacted by routes

What we heard – land

- Trees along Assiniboine River are valued
- Crown land is limited in the area and important for practicing rights-based activities
- Respect should be given to the land



What we heard – wildlife

- Rivers and creeks have high concentrations of birds and wildlife, popular spots for hunting and fishing
- Concern of transmission line impacts on chickens and other birds
- Route #4's proximity to Grant's Lake Wildlife Management Area
- Major flyway for geese (for migrating, staging and feeding)
- Metis harvesting area
- Eagles nesting in the area around Route #7

Survey results

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Survey results – what we heard

- 88 respondents
  - 61 male
  - 20 female
  - 1 gender diverse
  - 6 did not disclose

- All participants pass through the project area on a regular basis
- 76 participants visit or work in the project area
- 60 participants live within 1 mile of an alternative route segment
  - (7 do not, 21 unsure/no answer)
- 74 participants own property in the project area

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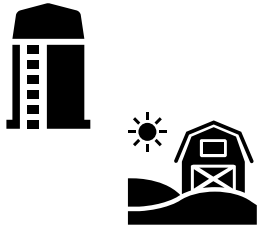
Survey results - what we heard

Agricultural activities



- Pivot irrigation
- Productive farmland
- Aerial spraying

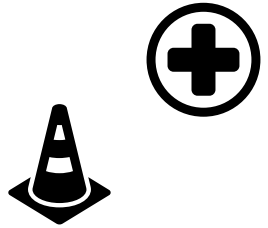
Participants with concerns:
70/88

Proximity to homes

- Aesthetics
- Impacts to property value
- Future development
- Associated EMF & health effects

Participants with concerns:
62/88

Health & safety



- Biosecurity
- EMF
- Migratory birds
- Leukemia

Participants with concerns:
57/88

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Preferred methods of engagement and information sharing

Providing feedback

- Online survey = 39 participants
- Email = 38 participants
- One-on-one meetings = 34 participants
- Virtual Information Session = 28 participants
- Phone call = 25 participants
- Interactive online feedback portal = 19 participants
- Other = 8 participants

  Town hall meetings, community forum in a community hall, meetings/info sessions with RM and MMF and other groups, public meetings, by letter

Receiving information

- Email = 64 participants
- Postcards/letters = 13 participants
- Newspaper/radio = 9 participants
- Manitoba Hydro Social Media channels = 6 participants
- Project webpage = 5 participants
- Other = 11 participants
  - Phone calls, longer letters/mail, messages from RM, hard copy information

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Summary

- Participation in decision making is a heavy burden. We appreciate your involvement.
- You'll be sent top routes via email
- Environmental assessment underway

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Presentation slides from Community Preference Team meeting 2 (Jan. 27, 2022)

Community ranking in transmission line routing

Route scores, preferences and discussion

Sarah Coughlin, Senior Environmental Specialist
Licensing and Environmental Assessment

January 27, 2022

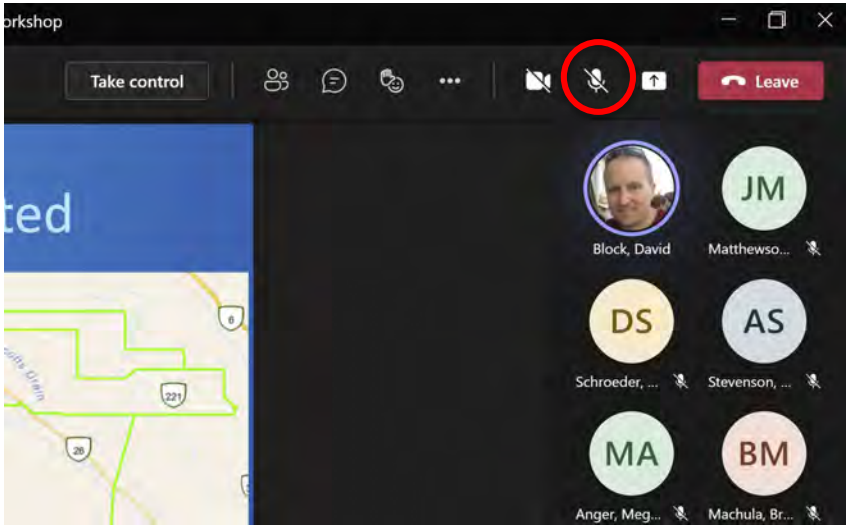
Manitoba Hydro

Land acknowledgement

I acknowledge that we are within Treaty 1 territory and that the land on which this project is being planned is the traditional territory of Anishinaabe, Cree, Oji-Cree and Dakota Peoples, and the traditional Homeland of the Red River Métis, and within the Recognized Métis Harvesting Area. I also want to acknowledge that others may be joining us from different lands and territories.

During the meeting

- Please have your camera on
- Please mute your microphone if not speaking
- This meeting will be more conversational than the last
- People are not expected to but may share confidential information. We appreciate your candor, respect and confidentiality



Agenda

- Welcome Back
- Review
  - Objectives of December 16, 2021 and meeting today
  - Purpose of this scoring exercise
  - Refresher of the MH routing process and how community engagement informs routing outcome
- Share decision making process/rationale for scoring
- Discuss scores
- Next Steps and Wrap up

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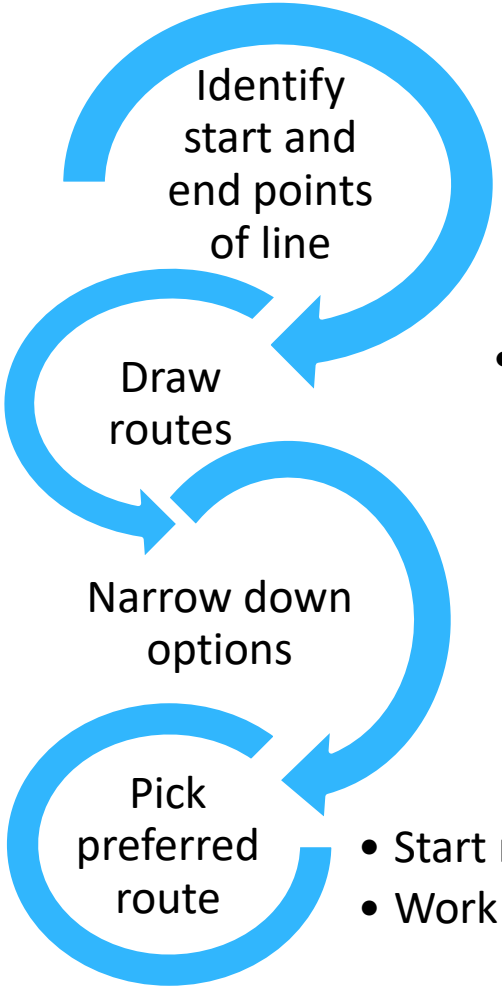
Objectives – December 16, 2021 (Meeting 1)

- Share background on how we make routing decisions and answer questions
- You leave feeling like you understand how your participation will inform the routing process

Pathway to selecting a route

- Draw study area



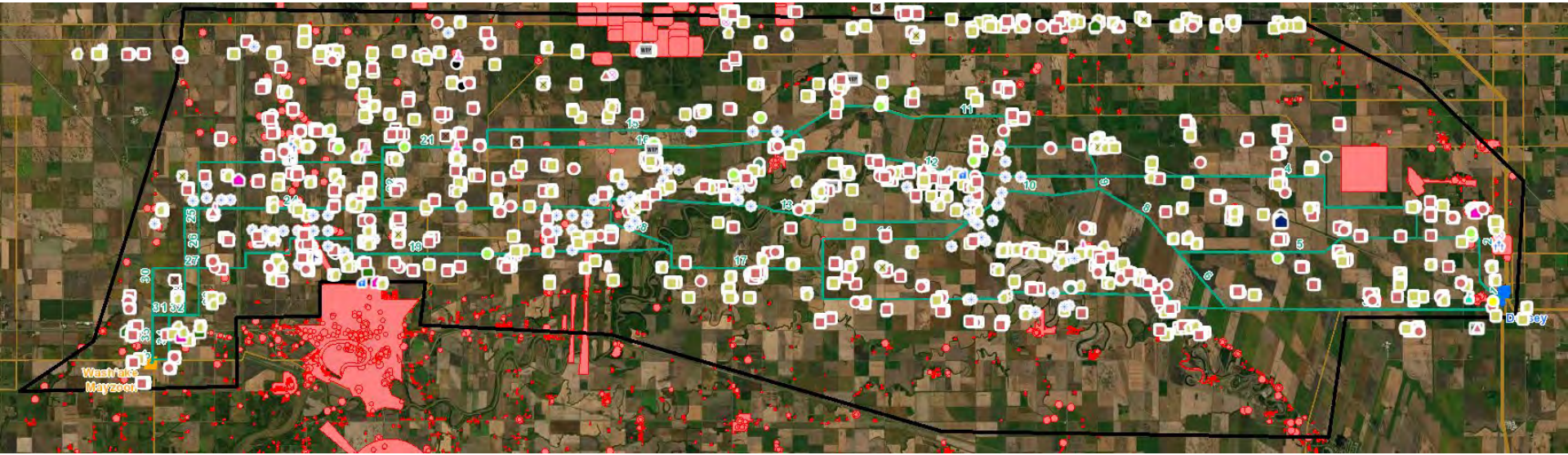
- Start round 1 engagement
  - Gather local knowledge and concerns

- Compare and evaluate routes
- Hold project team workshops

- Start round 2 engagement
- Work to address concerns

The challenge of routing a transmission line (Round 1)

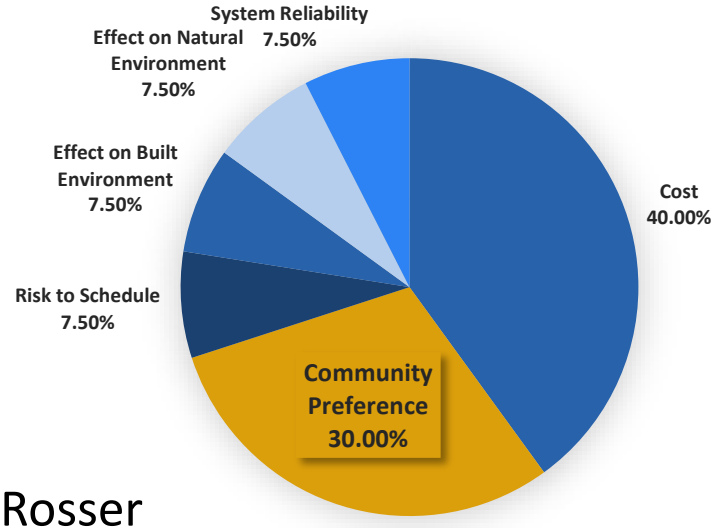
- Identifying the start and end points of the line
- Threading a needle through many constraints
- Considering many diverse interests, land uses and perspectives
- Shared a survey
- Asked for feedback on a map portal
- Mitigative segments



Objectives – Today (Meeting 2)

- Understand preferences from Community Team participants
- Ambitious Objective: Determine a preferred route for the Community Preference Team (30% of decision)

Community Preference Team



- RM of Cartier
- Dakota Tipi First Nation
- Long Plain First Nation
- Manitoba Metis Federation
- Peguis First Nation
- RM of Portage la Prairie
- RM of Rosser
- RM of St. Francois Xavier
- RM of Woodlands
- Manitoba Hydro

Transmission Line Engagement

- Evolved over time
- MH representatives conveyed key concerns in routing process
- Recently move to more inclusive process

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Dealing with lives, homes, livelihoods, cultures and constitutional rights

- Thank you for taking part
- There is no perfect process
- The final route won't be perfect

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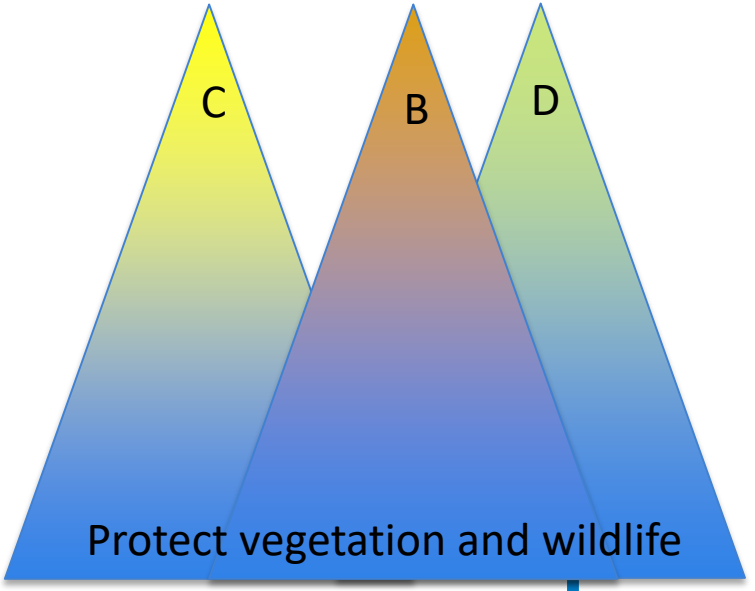
Putting a number to values

- Different scores but common values described in your responses



Reason behind scores matter

- Some scored their preferred route and no others
- Some scored their least preferred route and gave all others the same score
- Some scored all routes the same
- Some didn’t score
- The ‘why nots’ are often more important than the ‘why’

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Sharing Rationale

- The ‘why’ matters
- You may hear something you were not aware of
- It’s okay to change a score

Mitigating potential effects

- Some effects are easier to mitigate than others
  - tower placement, easement and tower payments can reduce impacts to agriculture
  - No machine zones, riparian buffers, sediment fencing reduce impacts to waterways
  - Impacts to runways, cemeteries are very difficult to mitigate

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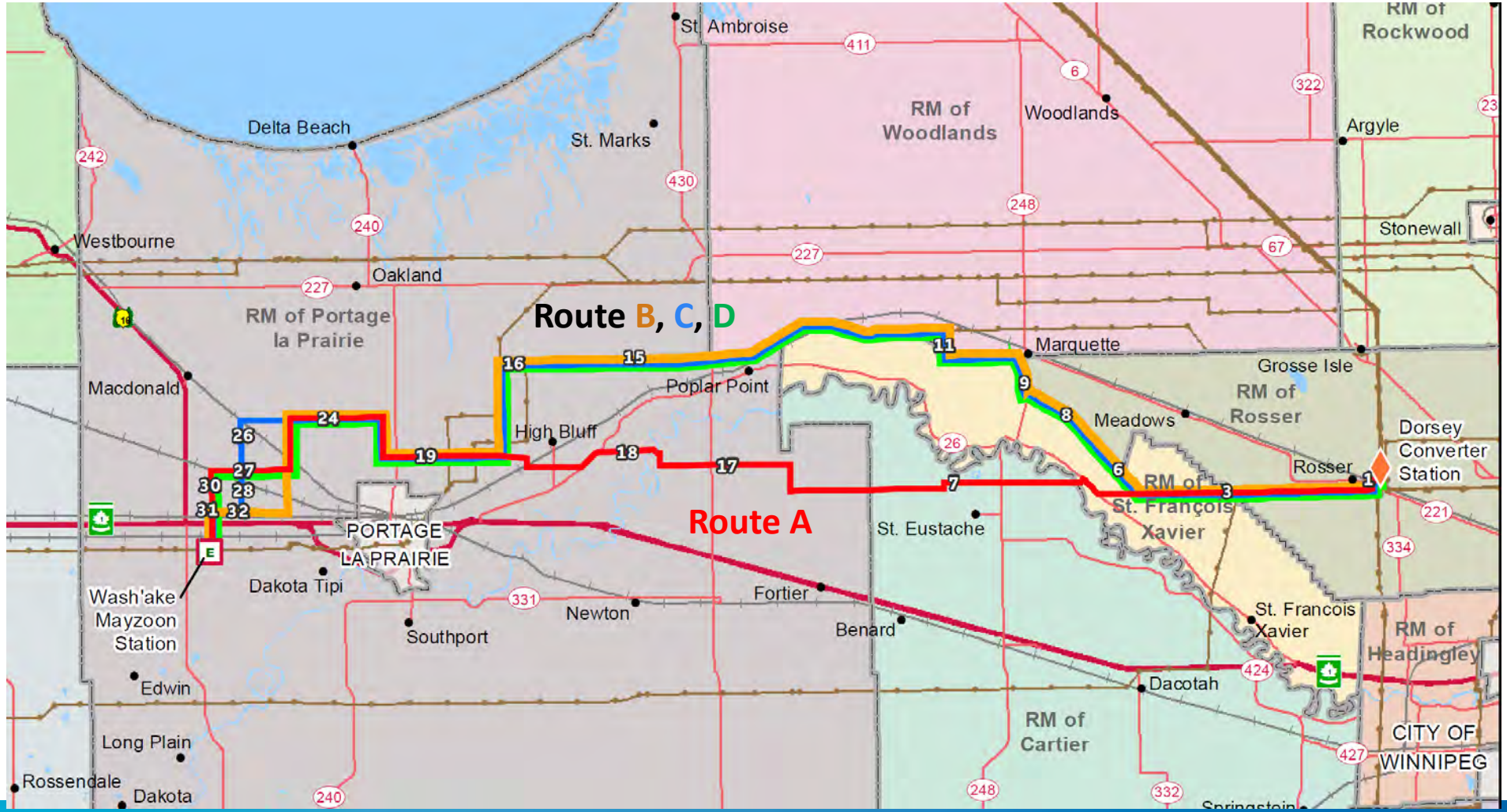

Route B, C, D
Route A
St. Ambroise
Delta Beach
St. Marks
RM of Woodlands
Woodlands
RM of Rockwood
Argyle
Stonewall
Westbourne
Oakland
RM of Portage la Prairie
Macdonald
Poplar Point
High Bluff
Marquette
Grosse Isle
RM of Rosser
Meadows
Rosser
Dorsey Converter Station
RM of St. François Xavier
St. Eustache
PORTAGE LA PRAIRIE
Dakota Tipi
Wash'ake Mayzoon Station
Southport
Newton
Fortier
Benard
St. Francois Xavier
RM of Headingley
Dacotah
Edwin
Long Plain
Rossendale
Dakota
RM of Cartier
CITY OF WINNIPEG
Springstein


Route C
Route D
Route B
Route A
Wash'ake Mayzoon
Dorsey

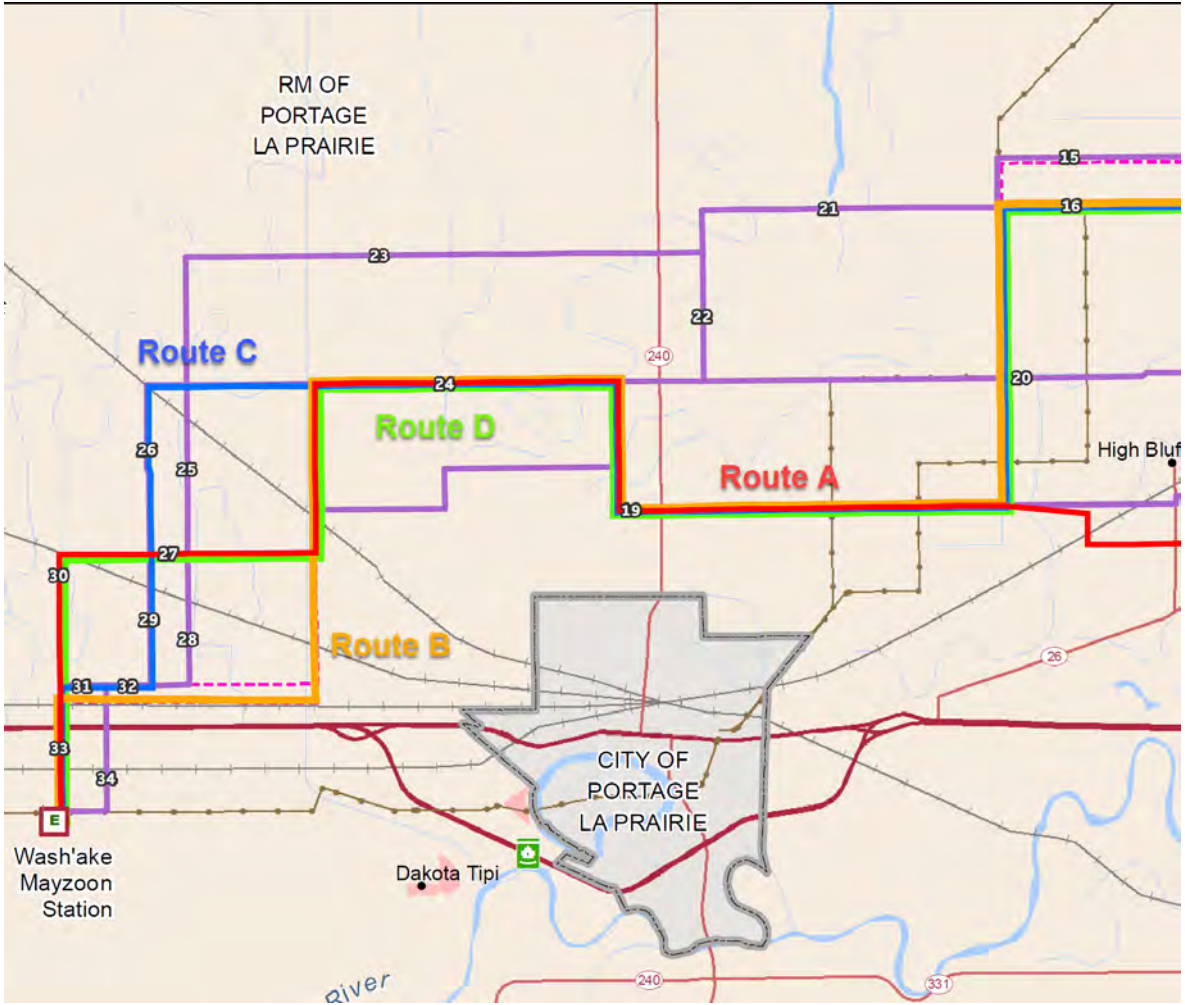
West end of Routes

Route A crosses the Assiniboine twice, shortest route

Route B and D follow the Portage Diversion (D for just a portion of the way)

Route C avoids the Diversion and Crown land

All in RM of Portage la Prairie



Scores

Community	Rank 1	Score	Rank 2	Score	Rank 3	Score	Rank 4	Score
	B	1		2		2	A	3
	D	1	C	1.5	B	2	A	3
	A	1		2		2	C	3
		2		2		2	A	3
	B	1	C	2	D	2.2	A	3
	D	1		3		3		3
		3		3		3		3
	A	1		3		3		3

Comparing routes

D

No's: *'diagonal route impacts more homes';*
Yes's: RM of Portage, DTFN preference, avoids river, avoids traditional sites;

B

No's: ' *'diagonal route impacts more homes';*
Yes's: PFN, RM of Cartier preference, avoids traditional sites

C

No's: '*close proximity to traditional sites'; 'Limits future development North of PTH 1'; 'diagonal route impacts more homes'*
Yes's: no one's preference

A

No's: '*significant environmental and cultural concerns*'; "*biodiversity area; goes through Settlement area; may go through old Metis cemetery/burial grounds"*
Yes's: LPFN & RM of Woodlands preference, avoids trad sites, least cost

Additive Scoring

Caveats:

Math doesn't always reflect the priority or 'mitigability' of issues

Community	A	B	C	D
	3	1	2	2
	3	2	1.5	1
	1	2	3	2
	3	2	2	2
	3	1	2	2.2
	3	3	3	1
	3	3	3	3
	1	3	3	3
TOTAL (least score ranked top route)	**20**	**17**	**19.5**	**16.2**
Average Score (least score ranked top route)	2.5	2.125	2.4375	2.025
Forced to 1 to 3 scale	3	1.43	2.78	1

Transmission Line Engagement

- Learn with each project
- Involving your community on this team based on the assumption that you'd rather be involved with decisions potentially affecting the areas you govern/live/have rights.

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Transmission Line Engagement

- Learn with each project
- Involving your community on this team based on the assumption that you'd rather be involved with decisions potentially affecting the areas you govern/live/have rights.
  - Is that assumption correct?

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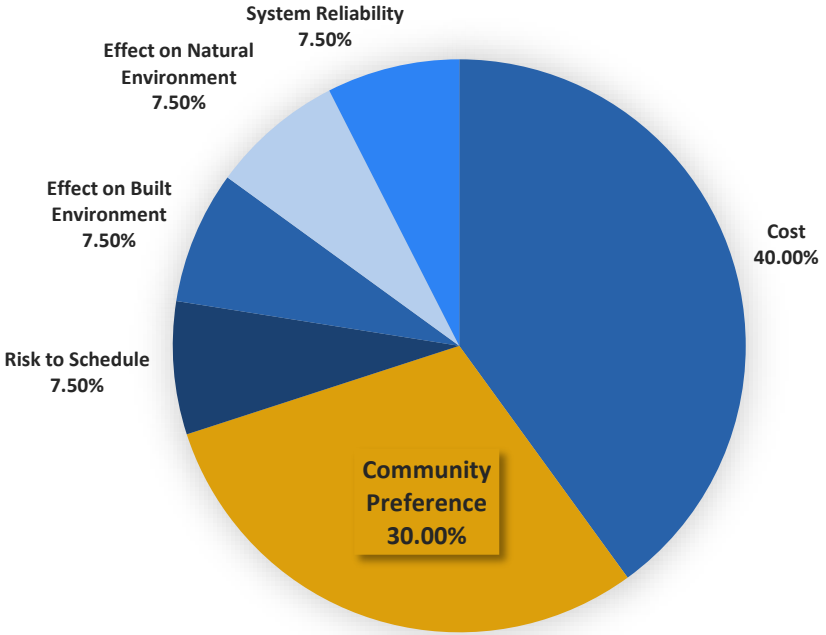
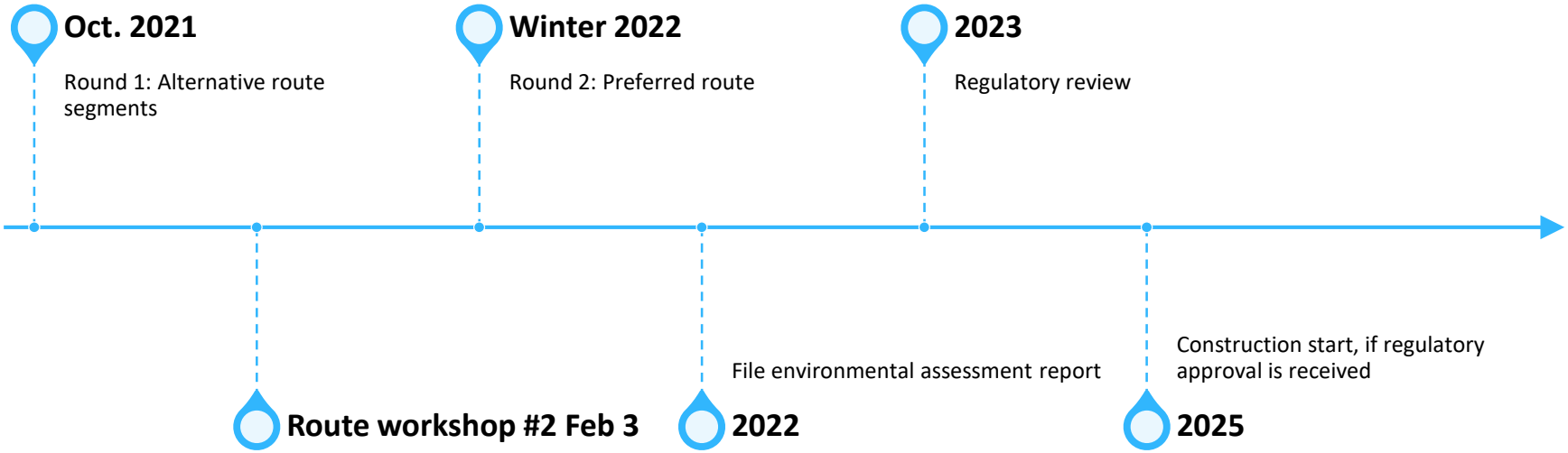
Next Steps: Preferred route picked from set of finalists February 3, 2022

Our scores will **contribute** to decision, not make the decision



Schedule


Oct. 2021
Round 1: Alternative route segments
Route workshop #2 Feb 3
Winter 2022
Round 2: Preferred route
File environmental assessment report
2022
2023
Regulatory review
Construction start, if regulatory approval is received
2025

Thank you

Sarah Coughlin:
scoughlin@hydro.mb.ca

Lindsay Thompson:
lthompson@hydro.mb.ca

Manitoba Hydro

Round 2 FNMEP meetings

Presentation slides from Round 2 meeting with the MMF held March 11, 2022

Dorsey to Wash’ake Mayzoon Transmission Line (D83W)

Seeking Feedback on the Preferred Route

Round 2 Engagement

Manitoba Metis Federation

March 11, 2022

For Today

- Share the preferred route and ask if there are any questions or any additional issues to those provided so far
- How did training go? Are there any outputs that we might learn from?
- Preferred mitigation measures from the MMF
- Other topics preferred by the MMF

For Another Day

- How to enhance project benefits for Metis Citizens
- How to best include Metis-specific interests and concerns into the EA
- Preferences on how to describe cumulative effects WRT Metis-specific interests

Learning as we go: MMF & MH

- MH values MMF's feedback on projects
- Learning from past projects
- Work to improve the process each time to seek a real understanding of concerns

Concerns shared over time and across Projects

- Thank you for providing unconcluded routing preferences and concerns.

Understanding Specific Concerns from Unconcluded Report

- “Métis Citizens living and/or harvesting within the project area have begun to identify serious concerns regarding the negative affects to both the land they use for farming, and the land their families rely on for hunting to feed their family. Their families rely on the ability to access local foods to support traditional values including winter eating habits from hunting and gathering. A Citizen notified us of their hunting practices in the project area and is concerned about the loss of ability to hunt in the area. Specifically, the landowners where he hunts rely on him to manage wild animal populations and control invasive wild boar from destroying their lands. This symbiotic importance to balancing wild animal populations to support the health of the ecosystem was identified as being a significant concern of this project.”

Understanding Specific Concerns from Unconcluded Report

- “Additional impacts to agricultural land have begun to be identified including concerns over the threats to apiary production and pollinator health, as well as an overall reduction in land availability to provide hay or crops for local Métis agriculture producers. The reality of smaller size agricultural operations and available land due to negative historical impacts and cultural values has impacted many Citizens. Citizens with smaller farm sizes experience a greater relative impact to the loss of lands, while imposing tougher personal financial decisions due to having smaller margins and capital than larger agriculture producers in the area”

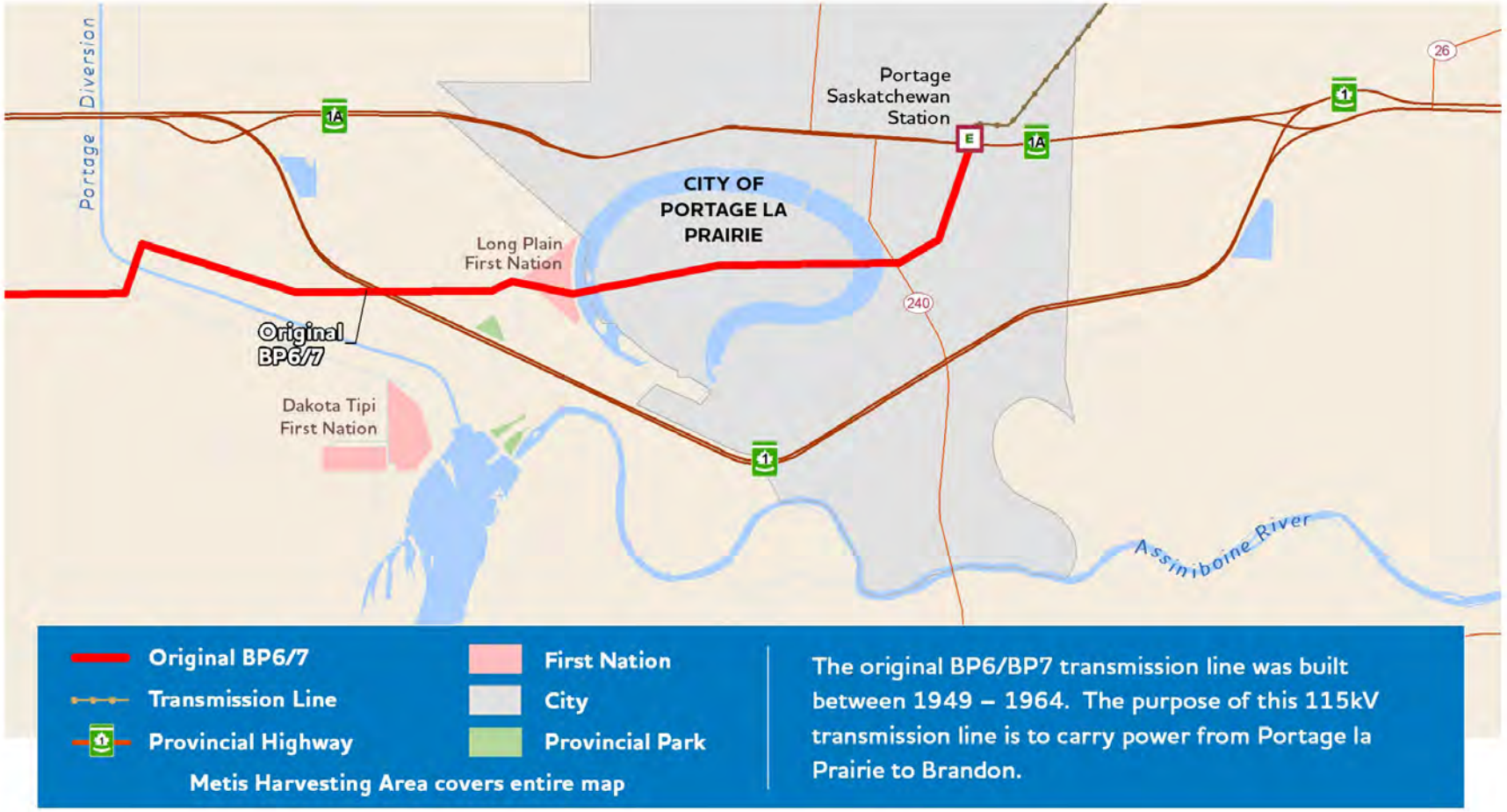
Portage Area Projects: Overview

- Phase 1
  - BP 6/7
- Phase 2
  - Wash'ake Mayzoon Station
  - Dorsey to Wash'ake Mayzoon Transmission Line

Feedback at ALL Stages of the Projects

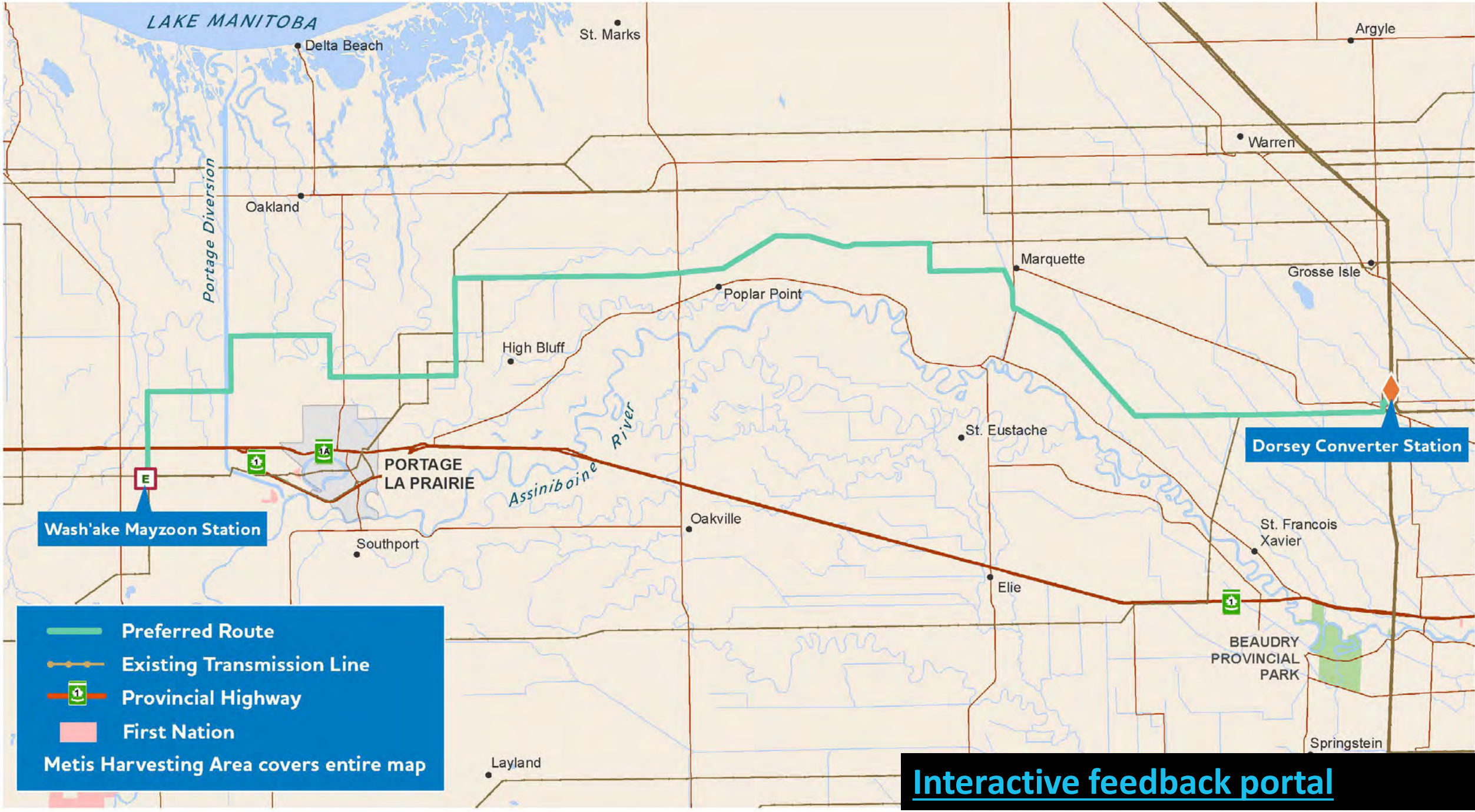
How should we route the project?	Round 1 – feedback on segments Round 2 – feedback on route
What should be studied in assessment report?	Valued components
How can we mitigate concerns?	
How [community's] traditional knowledge can inform the project?	
Review our chapters - did we capture concerns accurately?	
If approved, construct and monitor	

Brandon to Portage (BP 6/7) Line Replacement



Wash’ake Mayzoon Station

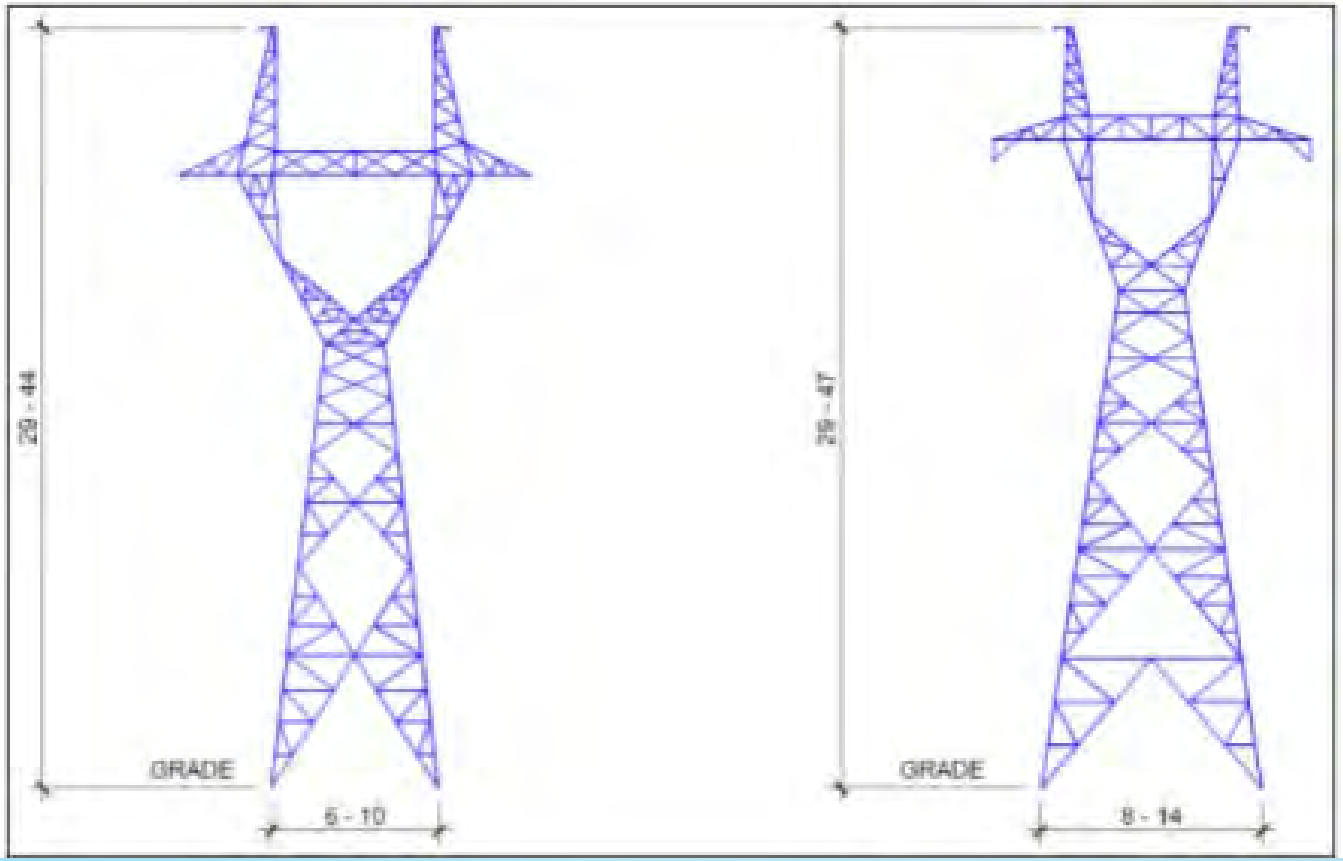
- Environment Act License issued Dec. 24, 2021
- Construction anticipated to start in 2023


LAKE MANITOBA
Delta Beach
St. Marks
Argyle
Warren
Portage Diversion
Oakland
Marquette
Grosse Isle
Poplar Point
High Bluff
Assiniboine River
St. Eustache
Dorsey Converter Station
PORTAGE LA PRAIRIE
Wash'ake Mayzoon Station
Oakville
Southport
St. Francois Xavier
Elie
BEAUDRY PROVINCIAL PARK
Springstein
Layland
Preferred Route
Existing Transmission Line
Provincial Highway
First Nation
Metis Harvesting Area covers entire map
Interactive feedback portal

D83W

Dorsey to Wash’ake Mayzoon Transmission Line

Project description

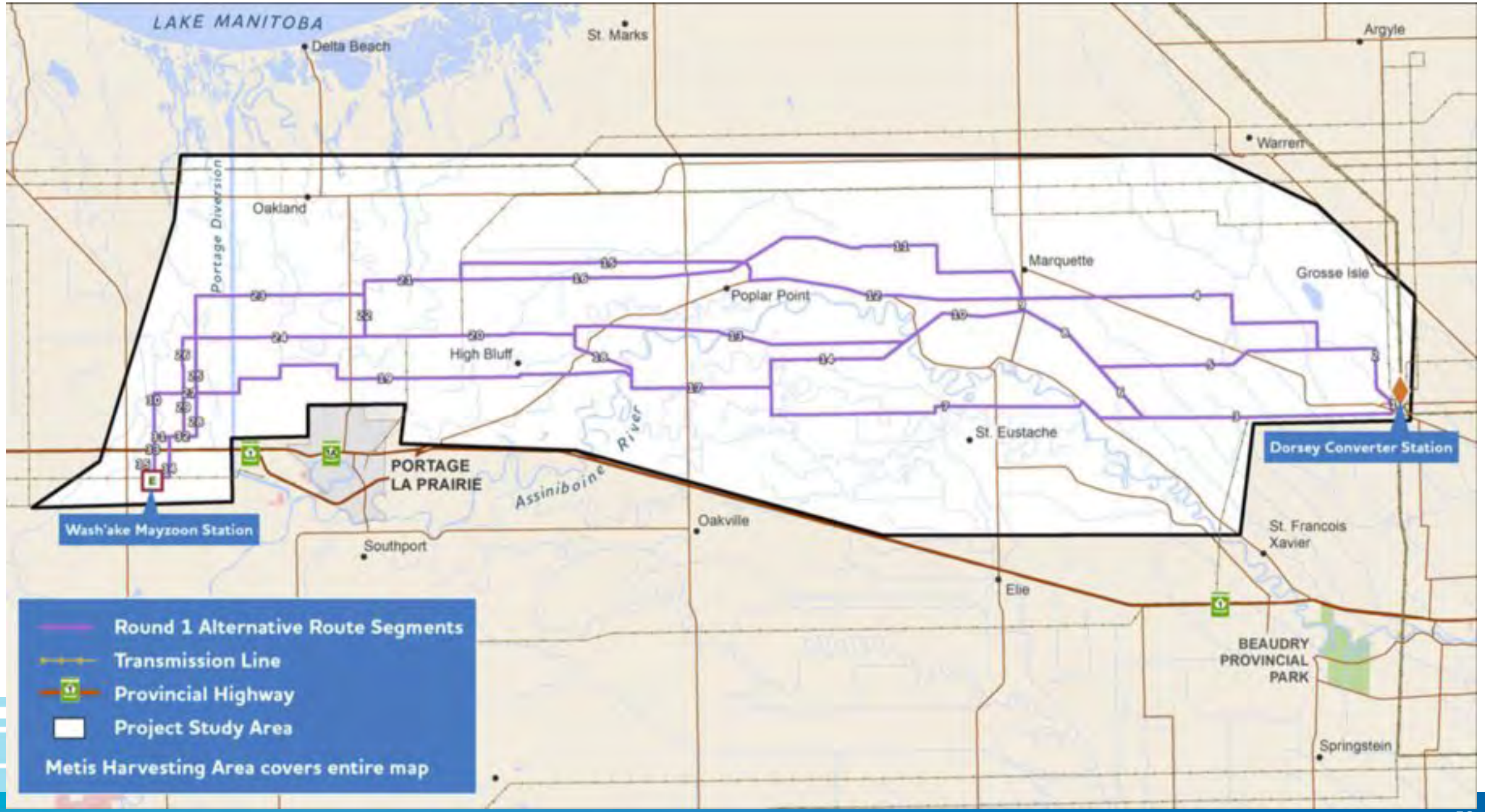


- New 230-kV transmission line from Dorsey converter station to Wash'ake Mayzoon station

Why is this project needed?

Increase system capacity to meet growing electricity needs

Enhance reliability for customers in Portage la Prairie and surrounding areas


LAKE MANITOBA
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St. Eustache
Dorsey Converter Station
PORTAGE LA PRAIRIE
Assiniboine River
Wash'ake Mayzoon Station
Oakville
Southport
St. Francois Xavier
Elie
BEAUDRY PROVINCIAL PARK
Springstein
Round 1 Alternative Route Segments
Transmission Line
Provincial Highway
Project Study Area
Metis Harvesting Area covers entire map

Round one engagement activities

- Sharing project information
- Meetings with communities and interested parties
- Online survey and mapping feedback portal
- Heritage-focused workshop with interested First Nation communities and the MMF
- Knowledge sharing by First Nation communities and the MMF
- 9 virtual information sessions

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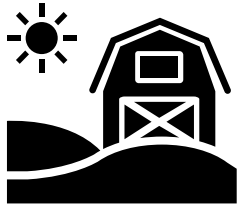
Round 1 engagement – what we heard

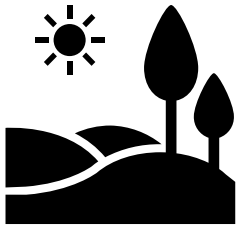
Culture and heritage:

- likelihood of finding cultural and heritage artifacts close to rivers, at old oxbows and in areas north of Portage la Prairie
- importance of a culturally specific approach to understanding project impacts and heritage resources



Agriculture: impacts to agricultural activities, including pivot irrigation, aerial spraying, tile drainage, runways, biosecurity and associated economic impacts

Round 1 engagement – what we heard



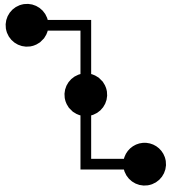
Land and wildlife:

- concerns about impacts to land and wildlife, including the potential removal of trees for the project
- high concentrations of birds and other wildlife near rivers and creeks
- the project area is a Métis harvesting area and Crown land in the project area is used for practicing rights-based activities.

Proximity to homes: concerns about impacts to homes and properties, such as the loss of use of land

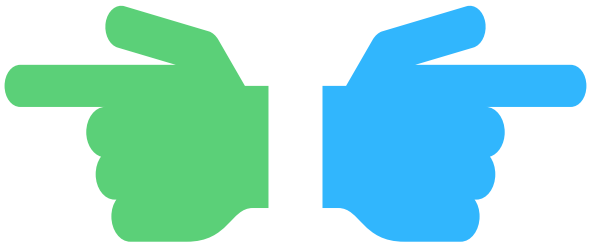
Round 1 engagement – what we heard

Health and safety: concerns about the potential effects of electric and magnetic fields on human and animal health
biosecurity concerns

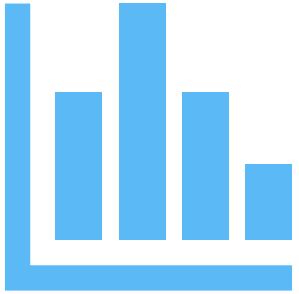


Routing: Participants shared routing preferences and concerns about proposed route segments

How do we consider routing feedback?

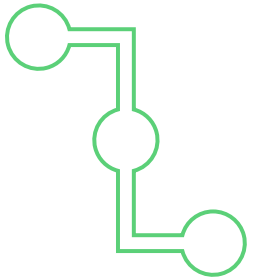


We sometimes hear opposing preferences



Hundreds of routing options are considered by experts with different specialties

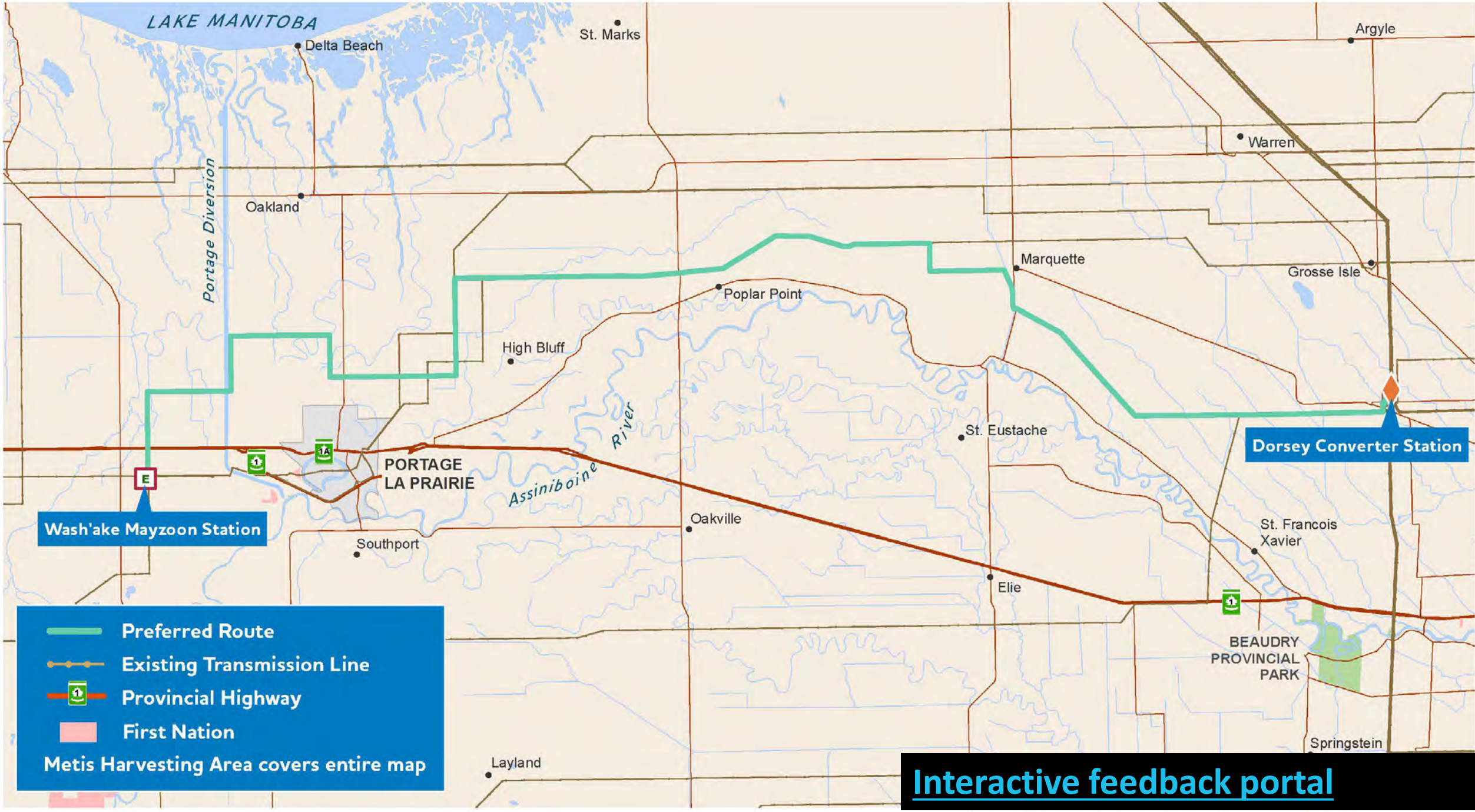
The community ranking was determined by representatives from First Nation communities, the MMF and rural municipalities



The preferred route is routed in a manner that aims to limit overall effects. Those effects are considered in detail

D83W

Preferred Route


LAKE MANITOBA
Delta Beach
St. Marks
Argyle
Warren
Portage Diversion
Oakland
Marquette
Grosse Isle
Poplar Point
High Bluff
Assiniboine River
St. Eustache
Dorsey Converter Station
PORTAGE LA PRAIRIE
Wash'ake Mayzoon Station
Oakville
Southport
St. Francois Xavier
Elie
BEAUDRY PROVINCIAL PARK
Springstein
Layland
Preferred Route
Existing Transmission Line
Provincial Highway
First Nation
Metis Harvesting Area covers entire map
Interactive feedback portal

Overview of the preferred route

- After leaving Dorsey Station, takes a northerly route
- Avoids crossing the Assiniboine River
- Moving west, much of the route parallels roads, but does cut across some agricultural fields closer to Portage La Prairie
- Parallels the Portage Diversion for 2 miles and then cuts west and south again to enter the site of Wash'ake Mayzoon Station

Options for sharing feedback

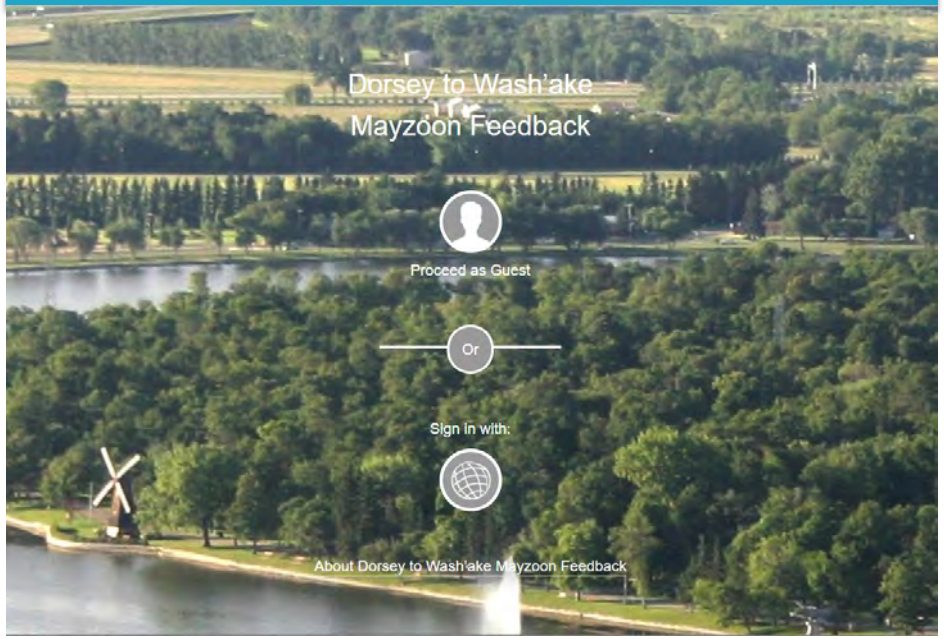
Online feedback portal: Open now

Online survey: Open March 1 – March 25

Virtual meetings

www.hydro.mb.ca/pace

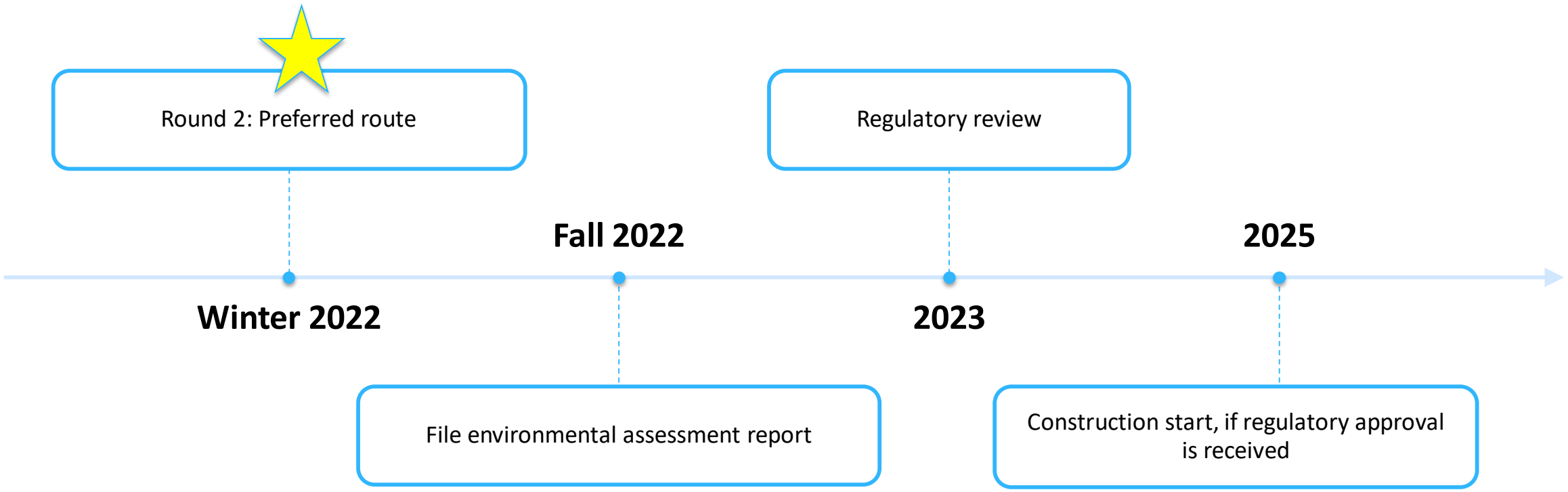
Feedback portal



We want to here from the MMF

- Concerns about the preferred route
- Mitigation suggestions
- Preferences about information sharing and engagement activities

Schedule


Round 2: Preferred route
Regulatory review
Winter 2022
Fall 2022
2023
2025
File environmental assessment report
Construction start, if regulatory approval is received

Thank you for making the time to meet today.

Presentation slides from Round 2 meeting with DTFN held March 31, 2022

Dorsey to Wash’ake Mayzoon Transmission Line (D83W)

Seeking Feedback from Dakota Tipi First Nation on the Preferred Route

Round 2 Engagement

March 31, 2022

Manitoba Hydro

Land acknowledgement

I acknowledge that we are within Treaty 1 territory and that the land on which this project is being planned is the traditional territory of Anishinaabe, Cree, Ojibwe-Cree and Dakota Peoples, and the traditional Homeland of the Red River Métis, and within the Recognized Métis Harvesting Area.

Manitoba Hydro

Presentation Outline

- Update on Portage Area Projects
- Preferred Route for Dorsey to Wash'ake Mayzoon Transmission Line
- Next Steps, questions, and time for discussion

Manitoba Hydro

Purpose of today

Share project information

Answer questions

Listen to feedback

Goals for today's meeting

Manitoba Hydro's:

- Dakota Tipi First Nation leaves the meeting feeling like they have a better understanding of the project and that they've had an opportunity to share feedback and concerns and understand how feedback will influence decision making.
- Manitoba Hydro representatives leave the meeting feeling like they understand concerns, feedback, and preferences.

Dakota Tipi First Nation:

- Do you have goals for this meeting that you want to share?

Manitoba Hydro

Learning from Dakota Tipi First Nation

- MH values your feedback on projects
- Learning from past projects
- Work to improve the process each time to seek a real understanding of concerns

Feedback at ALL Stages of the Projects

- How should we route the project?
  - Round 1 – feedback on segments
  - Round 2 – feedback on route
- What should be studied in assessment report? Valued components
- How can we mitigate concerns?
- How DTFN's traditional knowledge can inform the project?
- Review our chapters - did we capture concerns accurately?
- If approved, construct and monitor

Portage Area Projects Engagement

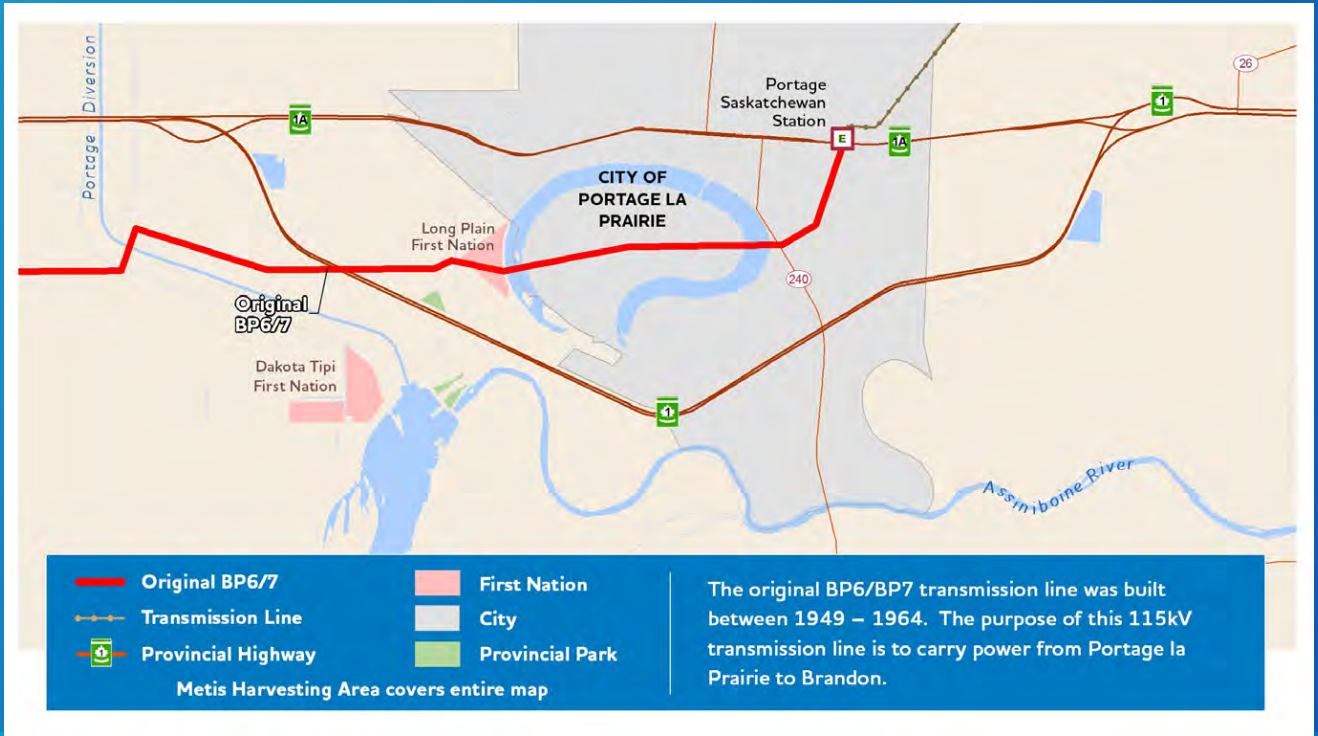
- Engagement on projects began in summer 2020
- Coordinator Agreement signed in January 2021
- Includes funding for:
  - DTFN-led engagement, interviews, tours
  - A coordinator position, part-time for 3 years
  - Indigenous Knowledge Study preparation, mapping
  - Training
- A 'check-in' to see if we're okay to proceed in phase 2 of agreement (June 9, 2021)

Portage Area Projects: Overview

- Phase 1
  - BP 6/7
- Phase 2
  - Wash'ake Mayzoon Station
  - Dorsey to Wash'ake Mayzoon Transmission Line

Manitoba Hydro

Brandon to Portage (BP 6/7) Line Replacement

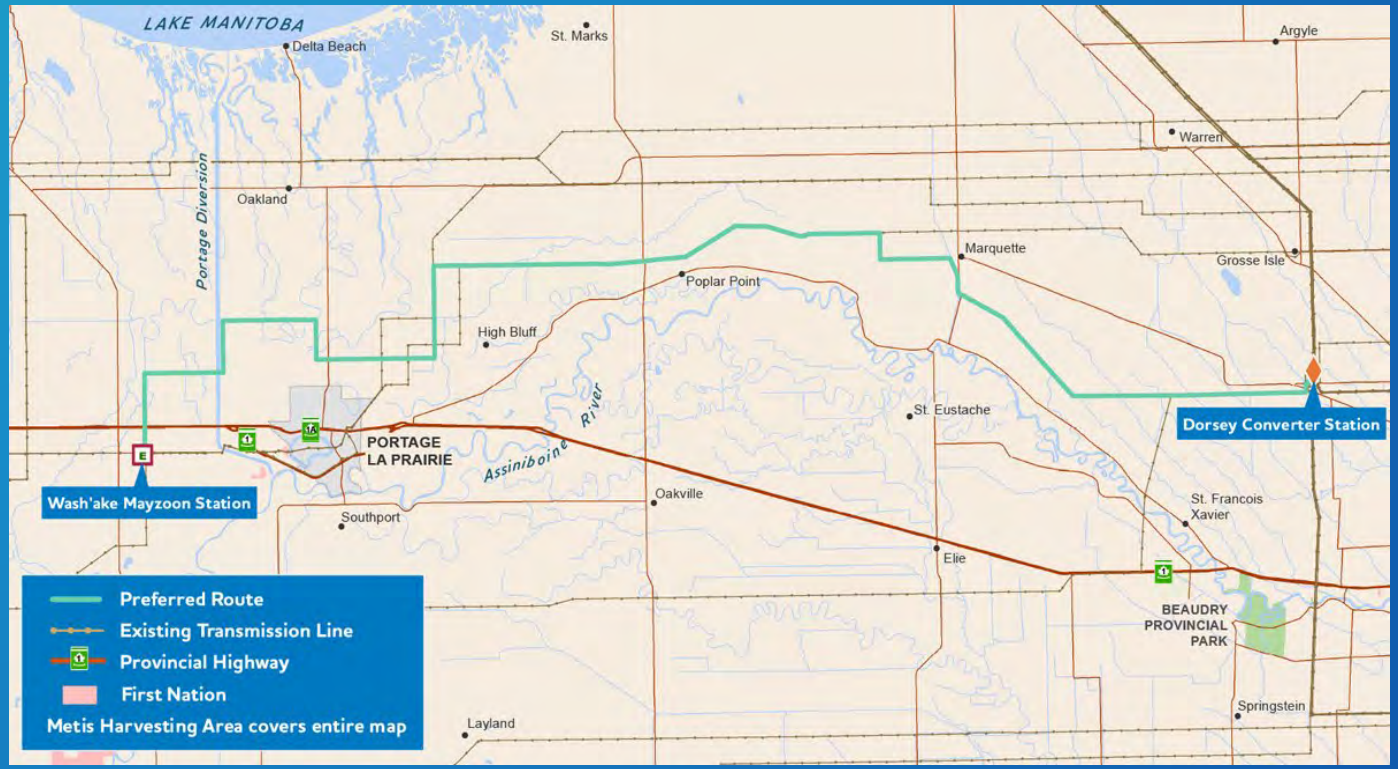


Wash’ake Mayzoon Station

- Environment Act License issued Dec. 24, 2021
- Construction anticipated to start in 2023

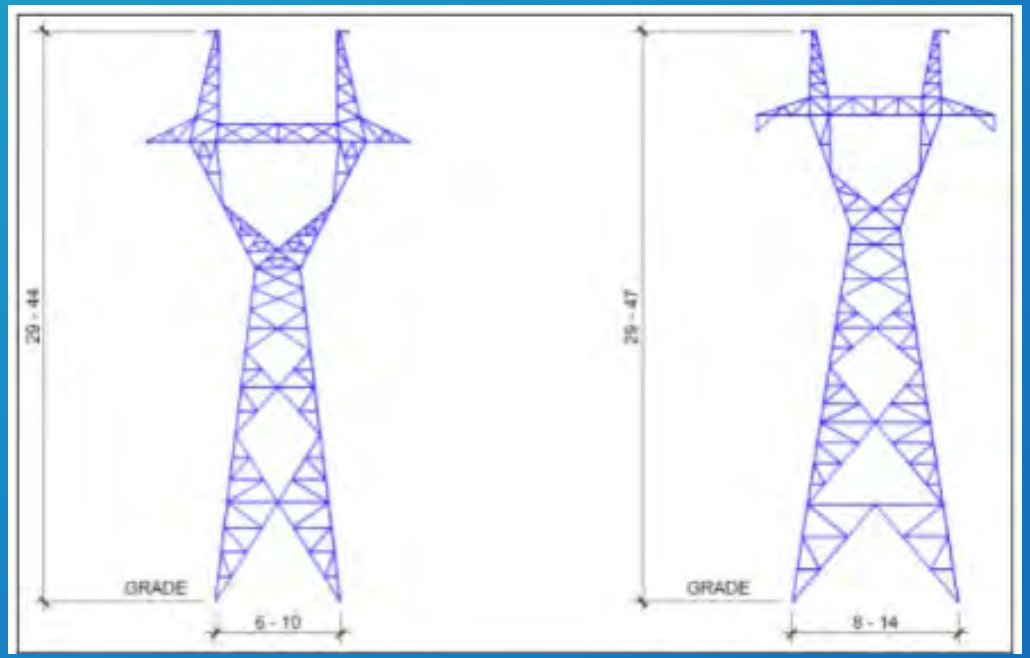
Manitoba Hydro

Dorsey to Wash’ake Mayzoon Transmission Line (D83W)



Manitoba Hydro

Project description



- New 230-kV transmission line from Dorsey converter station to Wash’ake Mayzoon station

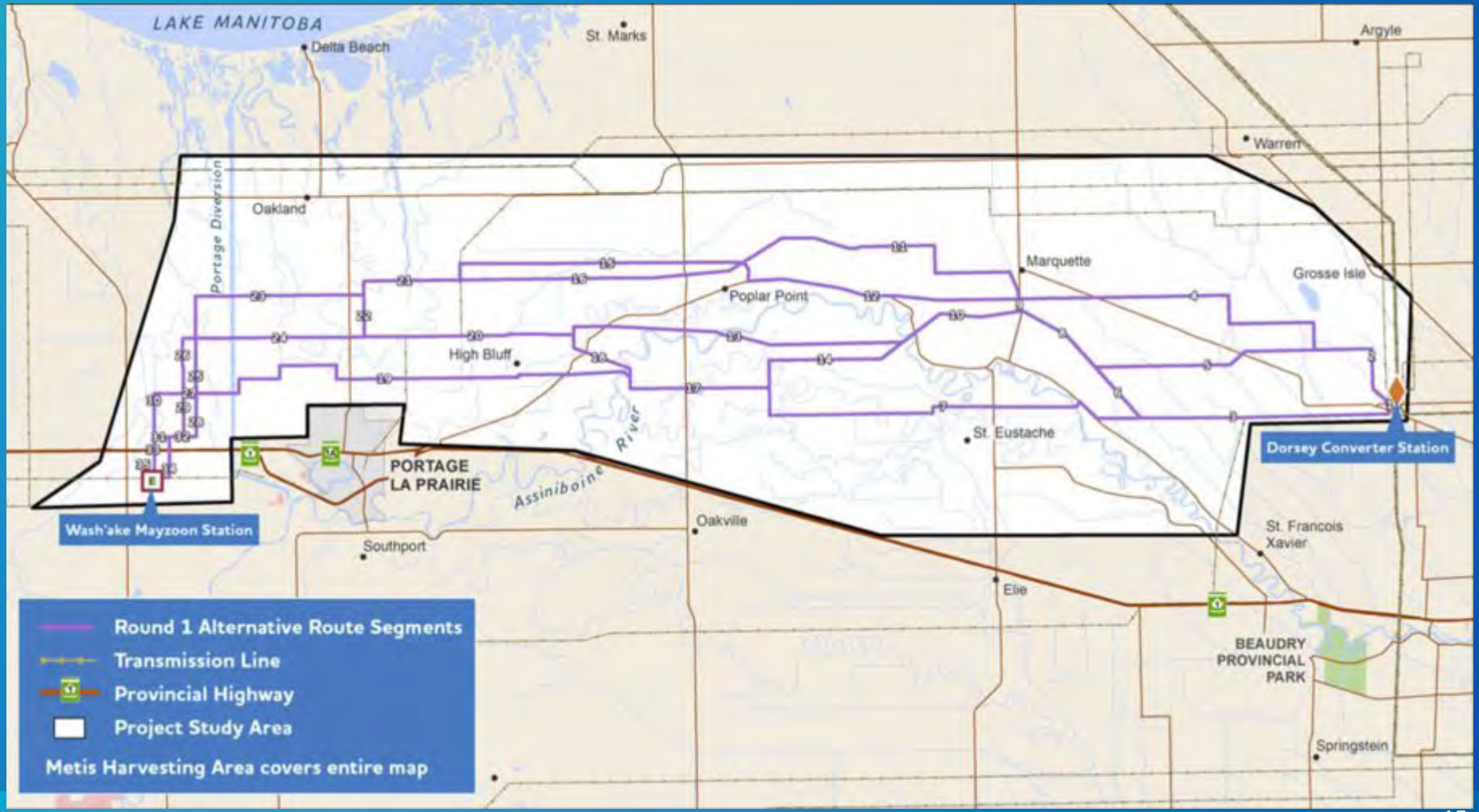
Manitoba Hydro

Why is this project needed?

Increase system capacity to meet growing electricity needs

Enhance reliability for customers in Portage la Prairie and surrounding areas

Manitoba Hydro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St. Eustache
Dorsey Converter Station
PORTAGE
LA PRAIRIE
Assiniboine River
Wash'ake Mayzoon Station
Oakville
Southport
St. Francois
Xavier
Elie
BEAUDRY
PROVINCIAL
PARK
Springstein
Round 1 Alternative Route Segments
Transmission Line
Provincial Highway
Project Study Area
Metis Harvesting Area covers entire map

Round one engagement activities

- Sharing project information
- Meetings with communities and interested parties
- Online survey and mapping feedback portal
- Heritage-focused workshop with interested First Nation communities and the MMF
- Knowledge sharing by First Nation communities and the MMF
- 9 virtual information sessions

Manitoba Hydro

What we Heard from Dakota Tipi First Nation:

- importance of ceremony to acknowledge and respect the land and spirits
- significant heritage concerns throughout the project area
- preference to follow portions of existing lines and pre-disturbed land
- preference to minimize use of Crown land, new disturbance, brush clearing and river and stream crossings
- Identified a preferred route and scored route alternatives

Manitoba Hydro

Round 1 engagement – what we heard

Culture and heritage:

- likelihood of finding cultural and heritage artifacts close to rivers, at old oxbows and in areas north of Portage la Prairie
- importance of a culturally specific approach to understanding project impacts and heritage resources

Agriculture: impacts to agricultural activities, including pivot irrigation, aerial spraying, tile drainage, runways, biosecurity and associated economic impacts

Manitoba Hydro

Round 1 engagement – what we heard

Land and wildlife:

- concerns about impacts to land and wildlife, including the potential removal of trees for the project
- high concentrations of birds and other wildlife near rivers and creeks
- the project area is a Métis harvesting area and Crown land in the project area is used for practicing rights-based activities.

Proximity to homes: concerns about impacts to homes and properties, such as the loss of use of land

Manitoba Hydro

Round 1 engagement – what we heard

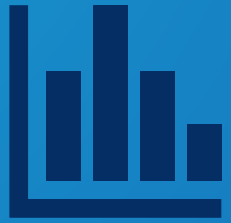
Health and safety: concerns about the potential effects of electric and magnetic fields on human and animal health
biosecurity concerns

Routing: participants shared routing preferences and concerns about proposed route segments

Manitoba Hydro

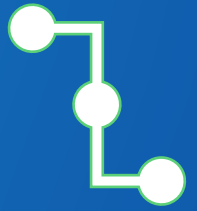
How do we consider routing feedback?

We sometimes hear opposing preferences



Hundreds of routing options are considered by experts with different specialties

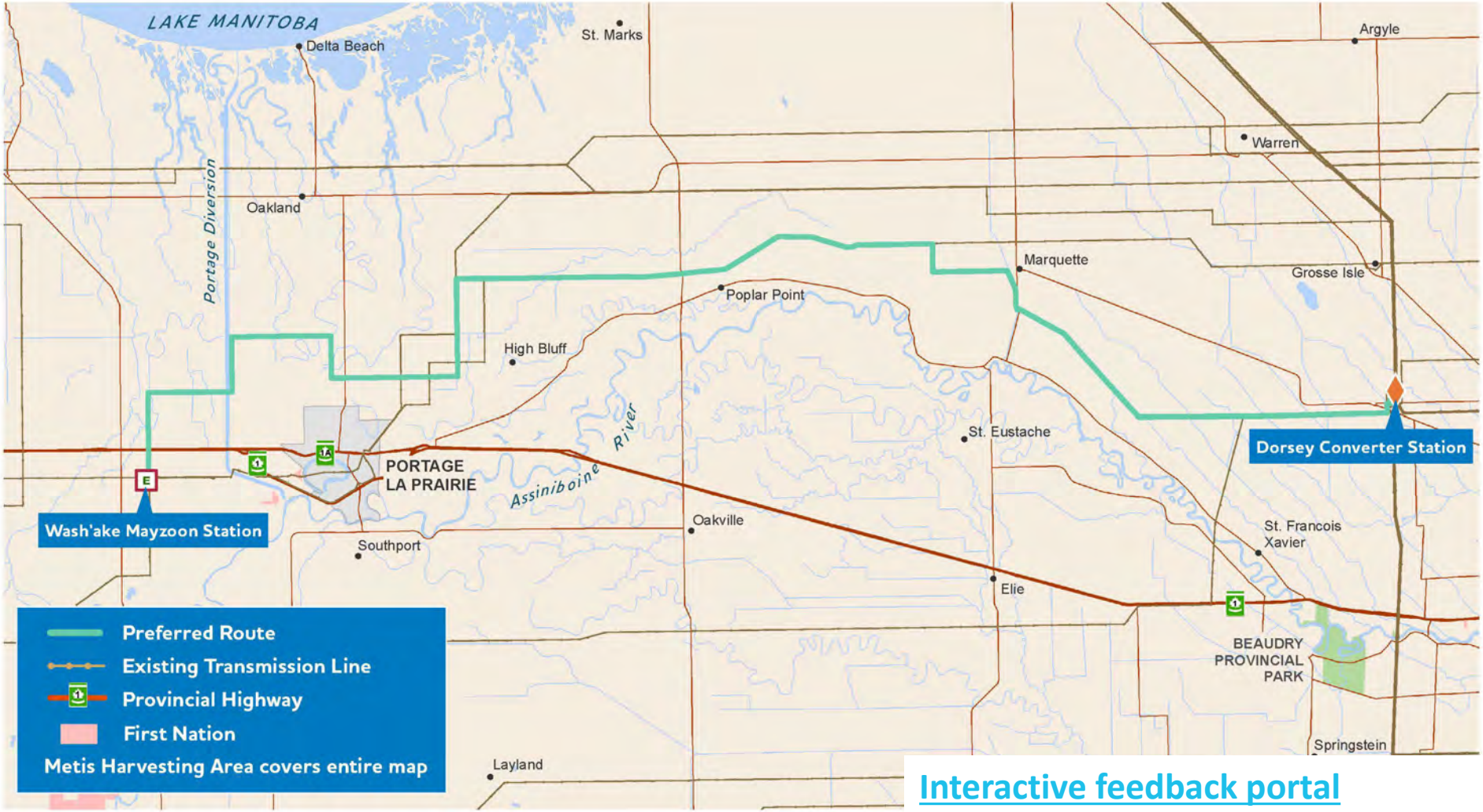
The community ranking was determined by representatives from First Nation communities, the MMF and rural municipalities



The preferred route is routed in a manner that aims to limit overall effects. Those effects are considered in detail

D83W

Preferred Route



[Interactive feedback portal]

Overview of the preferred route

- After leaving Dorsey Station, takes a northerly route
- Avoids crossing the Assiniboine River
- Moving west, much of the route parallels roads, but does cut across some agricultural fields closer to Portage La Prairie
- Parallels the Portage Diversion for 2 miles and then cuts west and south again to enter the site of Wash'ake Mayzoon Station

Manitoba Hydro

Options for sharing feedback

Online feedback portal: Open now

Online survey: Open March 1 – **April 6**

Virtual meetings

www.hydro.mb.ca/pace

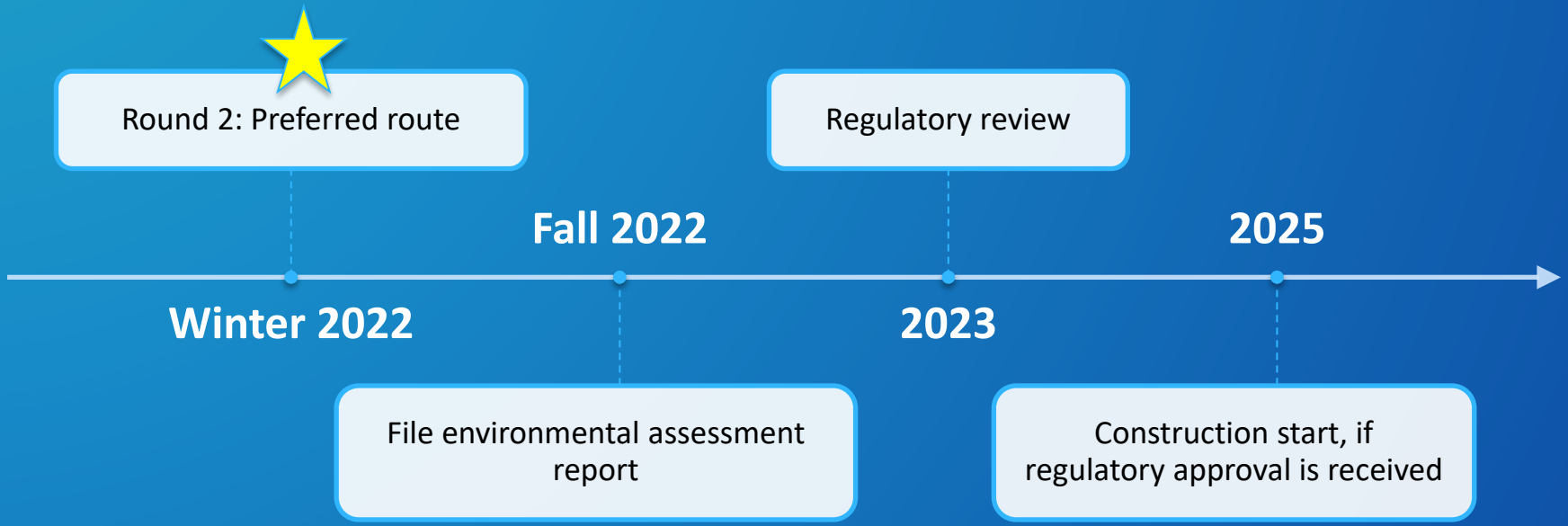
Manitoba Hydro

We want to here from DTFN:

- Concerns about the preferred route
- Mitigation suggestions
- Preferences about information sharing and engagement activities
- Thoughts about the traditional practices, heritage, and culture chapter

Manitoba Hydro

Schedule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Thank you for making the time to meet today.

MMF's Manitoba Métis Specific Concerns (Unconcluded) Report - Dec. 10, 2021

Manitoba Métis Specific Concerns (Unconcluded)

Manitoba Hydro Dorsey to Wash'ake Mayzoon Transmission Line (D83W) Project

Manitoba Métis Federation

December 10, 2021

The Manitoba Metis Federation (MMF)

The MMF, as the democratically-elected self-government representative of the Red River Métis, and the singular federally recognized Indigenous government in Canada – the responsibility to promote and protect the rights, claims, interests, and responsibilities of our Citizens as environmental stewards remains the foundation of our work. As this transmission project spans an area encompassed within the traditional Homeland of the Red River Métis, and within the Recognized Métis Harvesting Area (RMHA), our concerns remain the same as we have always presented such. Due to the nature of the project, the impacts associated with the development of the transmission line reach beyond the project area in question. The rights of our Citizens are collectively held, and constitutionally protected as recognized and affirmed under s. 35 of the Constitution Act, 1982. Specifically, the following concerns are of immense importance

Métis Concerns Identified (unconcluded)

The Manitoba Métis Federation continues to engage with our Citizens and identify concerns together with our Citizens living and/or harvesting in the Dorsey to Wash'ake Mayzoon transmission line project area. However, Métis Citizen concerns with any Manitoba Hydro project go well beyond the project area, as the MMF has previously stressed our concerns.

Métis Citizens living and/or harvesting within the project area have begun to identify serious concerns regarding the negative affects to both the land they use for farming, and the land their families rely on for hunting to feed their family. Their families rely on the ability to access local foods to support traditional values including winter eating habits from hunting and gathering. A Citizen notified us of their hunting practices in the project area and is concerned about the loss of ability to hunt in the area. Specifically, the landowners where he hunts rely on him to manage wild animal populations and control invasive wild boar from destroying their lands. This symbiotic importance to balancing wild animal populations to support the health of the ecosystem was identified as being a significant concern of this project.

Additional impacts to agricultural land have begun to be identified including concerns over the threats to apiary production and pollinator health, as well as an overall reduction in land availability to provide hay or crops for local Métis agriculture producers. The reality of smaller size agricultural operations and available land due to negative historical impacts and cultural values has impacted many Citizens. Citizens with smaller farm sizes experience a greater relative impact to the loss of lands, while imposing tougher personal financial decisions due to having smaller margins and capital than larger agriculture producers in the area.

With the recent drought conditions of 2021 causing significant financial burden to our farmers and ranchers, the MMF has a multitude of concerns that must be further addressed regarding the

impacts of this new transmission line. These concerns go beyond those previously addressed by the MMF and must continue to be identified and monitored to avoid all financial and cultural impediments.

The MMF has previously identified several concerns through previously commissioned studies, reports, and MMF community engagements including:

- **Métis Specific Concerns: Portage Area Capacity Enhancement Project.**
- **Métis Specific Concerns: Brandon-Portage La Prairie (BP6/BP7) Transmission Line Replacement.**
- **Métis Land Use and Occupancy Study as input to the Manitoba to Minnesota Transmission Line Project by Calliou Group in 2017.**
- **Métis Land Use and Occupancy Study as input to the Birtle Transmission Project by MNP in 2017.**
- **Métis Land Occupancy and Use Study as input to the Bipole III Transmission Line Project by SVS in 2015.**

Métis concerns identified through past studies not focused on this project, are evidence of the potential for impact to the Métis way of life due to the cumulative impacts of the proposed D83W project in addition to the PACE and BP6/BP7 project and other development components in the project area. The cumulative effects of these components and others before it, have the potential to significantly impact Métis Citizens' Constitutionally protected rights to harvest, and any further impact on these rights, claims or interests needs to be adequately and appropriately assessed and, if necessary, accommodated and mitigated for.

Wash'ake Mayzoon Station Environmental Assessment Report Prepared by Manitoba Hydro (September 2021)

Previously on August 19th, 2021, the MMF submitted to Manitoba Hydro the Wash'ake Mayzoon Station EA Chapter Review. From discussions and our submission for the Wash'ake Mayzoon Station EA, Manitoba Hydro determined that key concerns (Section 5.3.4) for the MMF include:

• Inadequate time and resources have impeded the ability for full and meaningful consultation with potentially impacted Manitoba Métis Citizens to occur

• Appropriate distinctions-based consultation processes should be advanced separately and labeled as 'Métis Engagement' and 'First Nations Engagement'

• Manitoba Hydro has not accurately captured the project effects that are important to the Manitoba Métis community, therefore it is considered incomplete

• Manitoba Hydro has missed assessing the effects with the Manitoba Métis community in the project area specifically as project effects that are important to the Manitoba Métis community have not been accurately captured

• Concerns about impacts to Métis Rights, Claims and Interests in the area including Change to water quality, Fishing, Hunting, Ecological knowledge, Historic trapping

• Concerns about Métis Valued Components being considered in the process, including 'Harvesting' and 'Available Lands'

• Concerns that contiguous unoccupied Crown Land will not be maintained

• Potential for impact to lands for Métis use

• Potential changes to wildlife habitat and the ability to harvest in the area

• Cumulative effects of Development on the ability to harvest

---

<u>Concerns Identified Through the MMTP Métis Land Use and Occupancy Study:</u>

Concerns about impacts to Métis rights, claims, and interests.

The Manitoba Minnesota transmission project (MMTP) falls on portions of the Métis homeland in southern Manitoba. This report describes the history of the Manitoba Métis community in southern Manitoba, including reference to the Goodon decision where the court found a historic, rights-bearing Métis community to have existed in "all of the area within the present boundaries of southern Manitoba from the present-day City of Winnipeg and extending south to the United States and northwest to the Province of Saskatchewan" (para.48).

Concerns about Métis Valued Components being considered in the process.

Based on our initial review of the Project Scoping Document for the Manitoba Minnesota Transmission Line Project, we felt that it did not adequately describe the valued components (VCs) necessary to fully identify potential environmental effects to Métis rights, claims and interests. The MMF worked with our legal counsel and consultants to define potential Métis Specific Interests (MSIs), including VCs related to Métis rights and interests and then consulted the Manitoba Métis community about the MSIs. We decided that "Harvesting" and "Available Lands" would be measurable, have available information and potentially be affected by the Project. In 2017, Calliou Group examined the potential effects of the MMTP on lands available for Métis use and harvesting using these two Métis Valued Components as a framework to assess the baseline data we collected. They conducted 47 in-person surveys and 121 paper surveys.

Concerns that contiguous Unoccupied Crown Land will not be maintained.

The report goes on to explain how important unoccupied land is to the Manitoba Métis as it represents areas where they have access to exercise their Métis rights that does not require permission. On all other land types, the exercise of Métis rights can be restricted from time to time under certain circumstances. The study pointed out that the Manitoba Minnesota Transmission Project would result in a further reduction of the Manitoba Métis Community's ability to access unoccupied Crown land. The Manitoba Métis Community would have the same concerns with the

potential for loss of access to Unoccupied Crown Land with the BP6/BP7 projects and would request that route selection take in to account the objective to maintain as much contiguous Unoccupied Crown Land as possible.

Potential for impact to Lands for Métis Use.

Through the survey conducted for this study, the Métis respondents reported that they would avoid transmission lines for future harvesting. They also said that they felt their access to lands for their harvesting would be affected. These findings are summarized in more detail on the next two pages. Effective engagement on the BP6/BP7 project would include providing the MMF an opportunity to assess whether the Manitoba Métis Community who use the land near the BP6/BP7 project have similar or different opinions regarding transmission line developments and the potential for adverse effects.

Concerns Identified Through the Birtle Métis Land Use and Occupancy Study:

The Birtle Transmission Project Environmental Assessment Report: Metis Land Use and Occupancy Study submitted on behalf of the MMF and completed by MNP in 2017 includes information related to Métis land use and connection to the Ste. Madeleine site and area, Land Available for Métis Use, and Harvesting in the vicinity of the Birtle Transmission Line Project. This study involved seven interviews with Manitoba Métis citizens and a focus group with 30 Métis citizens and political representatives which included dissemination of surveys, 16 of which were completed and returned.

The report identified several concerns relevant to the D83W transmission line project including but not limited to:

- Cumulative effects to MMF harvester experiences through changes in locations available to those harvesters and changes to the species available for harvest. Specifically, the harvesting experience could be affected by displacement of species of importance, reduction in solitude while harvesting in the area, and reduction in level of success, which would all contribute to changes to MMF harvesters preferred means of harvest
- Contributors also indicated that they would not harvest where they could hear industrial developments. This is an important distinction, that can be understood to cause a greater affect to loss of accessible lands for Métis use beyond the immediate land below and surrounding transmission line infrastructure.
- Contributors also indicated that they would not harvest where they could see industrial development. This is important as the Project has the potential to change the visual quality of the landscape in areas of importance to MMF citizens. A contributor indicated that they have concerns that the Project could "…spoil the landscape, the air around it, the water, hunting, gathering of berries, trees surrounding it" (Section 6.3, Pg 64). As a result, one great concern is the inability to quantify the visual value of a landscape that is lost once developed. However, this should not minimize the importance of this concern.

Concerns Identified Through the Bipole III Métis Land Occupancy and Use Study A Métis Traditional Knowledge and Land Use Study:

The Bipole III Métis Land Occupancy and Use Study: A Métis Traditional Knowledge and Land Use Study (TKLUS) (Larcombe, 2012) was first commissioned and completed by the MMF with funding from Manitoba Hydro to identify Métis rights and interests that would potentially be impacted by the Bipole III transmission line project. The findings of the TLUKS, which were derived from 735 mail-out surveys and 49 in-person map biography and semi-structured interviews, concluded that there was extensive traditional use in the Bipole III study area. Much of this use was concentrated on the Breadbasket Region of Manitoba.

Provided below is a list of Métis Concerns regarding all transmission projects listed above, which includes but is not limited to the following:

- Concerns about impacts to Métis rights, claims, and interests.
- Concerns about Métis Valued Components being considered in the process.
- Concerns that contiguous Unoccupied Crown Land will not be maintained.
- Potential for impact to Lands and waterways for use by Métis Citizens.
- Concerns over habitat fragmentation.
- Concern for bird migration & bird strikes on powerlines. Concerns of how this will impact the routes they have taken and their altered migration route risks.
- This will not only impact the birds and harvesters, also the Métis who work the hunting lodges in this area. Metis people take 1 – 1 ½ months off each year to work at hunting lodges owned by Americans – this is a source of profit that could disappear
- Linear corridors caused by installing transmission lines allowing predator access, increased predation on prey species causing disturbance to predator-prey balance.
- Potential changes to wildlife habitat and the ability to harvest in the area.
- Concerns regarding the migration paths in the area. If chased away, they will develop a new migratory path – this could impede other migrating species, it could push them into areas of higher predators such as wolves, it could also force them to move into areas with higher disease, risking their health.
- Cumulative effects of development on the ability to harvest.
- Concerns with the administration of monitoring programs
- Potential impacts from noise during construction, maintenance, and continual noise during entire lifecycle of the transmission line.
- Numerous concerns related to transmission line project impacts including the following:
    - Aquatic harvesting and water quality
    - Chemical spraying and maintenance disturbances.
    - Human population increases pressures on harvesting
    - Impacts on animal health and sensitive habitat
    - Sensitive Habitat such as wetlands, trees, berries, and medicines

- Access to historic and culturally important harvesting areas and impacts on gathering
- Decreased access to areas used to pass along traditional knowledge and techniques to youth, as altered landscape changes traditional methods.
- Economic impacts
- Effects on commercial trapping
- Wood harvesting impacts
- Challenges presented by needing to change harvesting locations
- Cultural impacts
- Changes to the landscape and foreign objects
- Aesthetic and visual concerns
- Human health impacts and noise concerns
- Safety
- Fears and psycho-social concerns

MMF's Manitoba Métis Knowledge, Land Use and Occupancy Study - Sept. 12, 2022 (submitted Nov. 2, 2022)

MANITOBA MÉTIS KNOWLEDGE, LAND USE AND OCCUPANCY STUDY

MANITOBA HYDRO PORTAGE AREA PROJECTS

Prepared by: Shared Value Solutions

September 12th, 2022

CONTENTS

LIST OF FIGURES

ACKNOWLEDGEMENTS

The research team acknowledges Red River Métis citizens who participated in this study and shared their stories with us. It has been an honour and privilege to meet and work with the Knowledge Holders who participated in the land use and occupancy interviews, and who so generously shared their time with us.

THE RESEARCH TEAM

We thank everyone who made important contributions to this paper:

Jessica Lagimodiere, Métis Land Use Specialist, Manitoba Métis Federation

Keith Kowall, Métis Community Assessment Specialist, Manitoba Métis Federation

Dustin Hoft, Agricultural Coordinator, Manitoba Métis Federation

Leah Culver, Project Director and Senior Social Research Lead, Shared Value Solutions

Joanne Shantz, Project Manager and Social Researcher, Shared Value Solutions

Olivia Shotyk, Project Coordinator and Social Researcher, Shared Value Solutions

Claire Avisar, Social Researcher, Shared Value Solutions

Lynn Wardle, GIS Specialist, Shared Value Solutions

Beate Schwirtlich, Editing and Communications Specialist, Shared Value Solutions

DEFINITION OF TERMS

Land Use: Defined generally as hunting, fishing, trapping, and gathering, and the use of sites and resources for cultural and ceremonial purposes.

Map Biography: The methodology for this land use and occupancy study is based on the best practice map biography technique pioneered by Terry Tobias in his manual Living Proof: The Essential Data-Collection Guide for Indigenous Use and Occupancy Map Surveys (2009). The map biography is the standard data collection method for Land Use and Occupancy studies. A map biography is an interview process where a person provides an account of their life on the land and water, including places they have travelled, stayed, and gathered resources.

Métis Ecological Knowledge: The knowledge and information by which Red River Métis citizens come to understand the ecology of their surrounding environment through years of firsthand experience and inherent cultural understanding of the relationships between humans, animals, lands, and waters. People also come to understand the ecology of their environment through teachings that have been passed down through relations and/or within a community.

Métis Knowledge or Métis Traditional Knowledge: The body of knowledge and information shared by the Métis Nation and held by and transmitted between Métis people, which supports traditional land use for the benefit and well-being of Métis peoples. Métis Traditional Knowledge is considered a distinct type of Traditional Knowledge.

Occupancy: Refers to an area that is known to an Indigenous group by virtue of continued use, habitation, naming, knowledge, and control (Tobias, 2000).

Oral History: For the purpose of this study, Oral History refers to the participants' qualitative land use and occupancy knowledge about a particular area or activity. It could include details about the social, economic, cultural, or environmental importance of a location, species, or land-based activity, as well as legends and stories that have been passed down. Oral History is used to bring depth to land use and occupancy research and increase shared understanding about the values of the participants. It is commonly collected as complementary material to a map biography as it doesn't lend itself as well to being recorded on a map.

1.0 INTRODUCTION

The Manitoba Métis Federation (the MMF) has been asked by Manitoba Hydro to provide information related to Métis Knowledge and land use in proximity to Portage la Prairie, related to the proposed Bipole 6/7 replacement and the Portage Area Capacity Enhancement project including Wash'ake Mayzoon station and the D83W transmission line(the proposed projects).

The MMF has provided submissions to Manitoba Hydro outlining Métis-specific concerns related to the BP6/7 replacement project (MMF, 2021a) and Wash'ake Mayzoon station (MMF, 2021b). Many of the concerns identified through these submissions remain unaddressed by Manitoba Hydro.

To date, there has been a lack of meaningful engagement between Manitoba Hydro and the Red River Métis surrounding the routing decisions for both the BP6/7 replacement and D83W transmission line. Manitoba Hydro has weighted 'Community' as 30% of the criteria contributing to the routing decisions for BP6/7 (Manitoba Hydro, 2021). However, they have not distinguished between community members and Section 35 rights-holders or provided opportunity for the MMF to put forward their own criteria and weighting schemes to account for their distinct rights, claims and interests. Given this fundamental lack of meaningful engagement, the routes chosen by Manitoba Hydro and referred to in this report as 'preferred' do not reflect the routes preferred by the Red River Métis.

The MMF has undertaken this study to better understand and communicate to Manitoba Hydro how the proposed projects may impact Red River Métis citizens and suggest ways to address these outstanding issues of concern.

1.1 BACKGROUND AND CONTEXT

Manitoba Hydro is proposing a combination of repair and replacement work to existing transmission line infrastructure around Portage la Prairie, Manitoba, as well as work to expand the existing transmission system in the same area with a new line and electrical station. These projects are called the Manitoba Hydro Portage Area Projects and include the Brandon-Portage la Prairie (also referred to as BP6/7) transmission line replacement project and the Portage Area Capacity Enhancement (PACE) project, along with some other storm repair work.

1.1.1 BIPOLE 6/7 REPLACEMENT PROJECT

Bipole 6/7 (BP6/7) is a double-circuit transmission line that runs between Brandon and Portage la Prairie. In October of 2019, a storm caused extensive damage to the line and associated infrastructure. To address this damage, Manitoba Hydro is proposing to both repair and in some places, entirely rebuild sections of BP6/7 (Manitoba Hydro, n.d.a).

This project is classified as a Class 2 Project under *The Environment Act* in Manitoba, and as such is subject to a provincial Environmental Assessment through Manitoba Environment, Climate and Parks (Manitoba Hydro, n.d.a).

Since the line originally began operations, there has been additional development around the line and requirements for the width of the right of way have increased (Manitoba Hydro, n.d.a). For these reasons Manitoba Hydro has considered different route alternatives for the areas that need to be rebuilt (Figure 1).

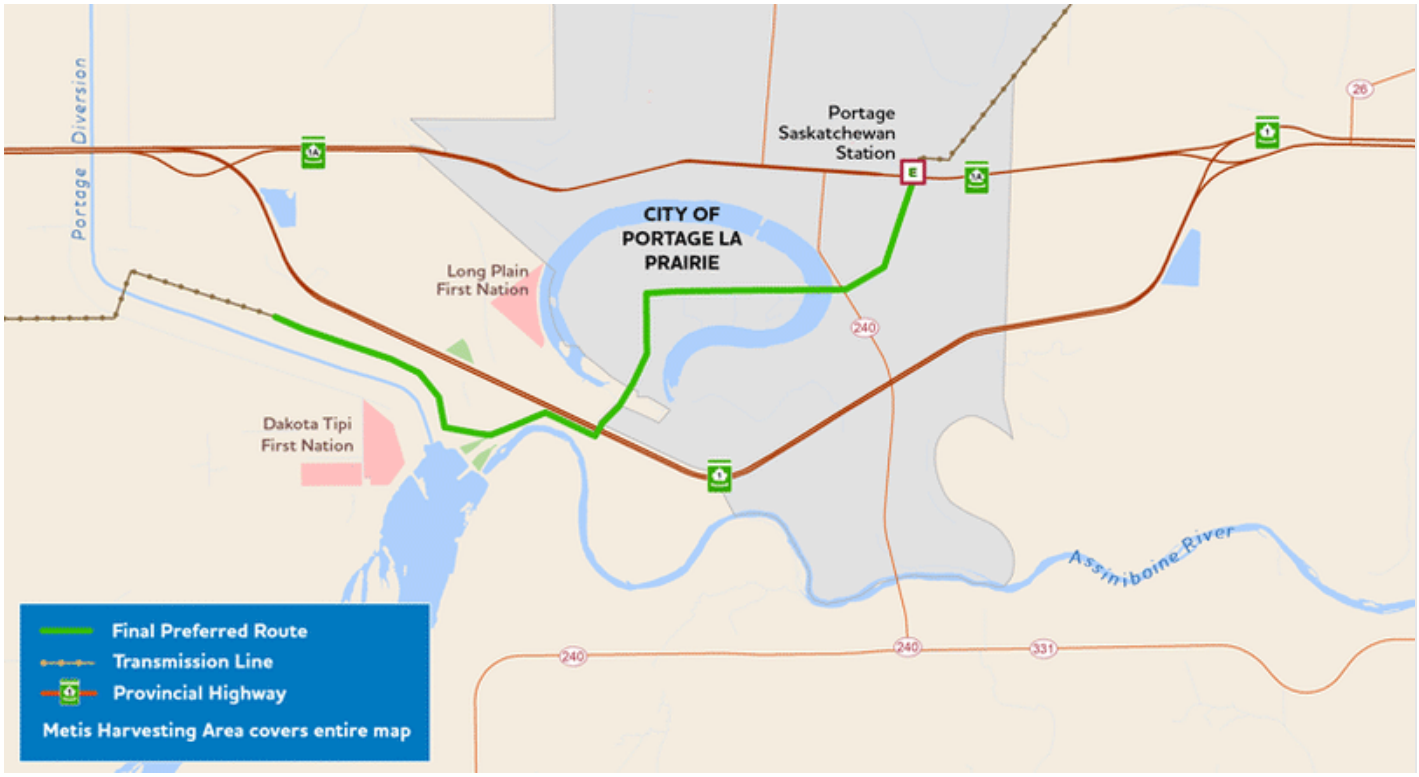


Figure 1: Manitoba Hydro's final preferred route of the BP6/BP7 rebuild (Manitoba Hydro, n.d.a)

1.1.2 PORTAGE AREA CAPACITY ENHANCEMENT PROJECT

In addition to the replacement and repair work required on BP6/BP7, Manitoba Hydro is also proposing an expansion to the current transmission system with a new electrical station (Wash'ake Mayzoon station) and transmission line (D83W). The purpose is to meet growing electrical needs in the area and together, these additions are referred to as the Portage Area Capacity Enhancement (PACE) project (Manitoba Hydro, n.d.b)

For the purpose of this study, PACE refers to all elements of the project and the term D83W is used specifically in discussing the proposed route of the line. Both the D83W transmission line and proposed Wash'ake Mayzoon station are designated as Class 2 projects under The Environment Act

in Manitoba and are subject to a provincial Environmental Assessment through Manitoba Environment, Climate and Parks (Manitoba Hydro, n.d.b)

Wash'ake Mayzoon is a proposed 230 to 66kv electrical station that would connect into an existing transmission line (Manitoba Hydro, n.d.b). If approved, construction would start on the station in 2023. The proposed 230-kv D83W transmission line would run from the Dorsey converter station northwest of Winnipeg to Wash'ake Mayzoon station west of Portage la Prairie (Manitoba Hydro, n.d.b). If approved, construction on the line is anticipated to begin in 2025. Manitoba Hydro evaluated several alternative routes for the transmission line and selected a final preferred route and location for Wash'ake Mayzoon station (Figure 2). It should be noted that the MMF raised concerns with each of the route options provided in their earlier submissions to Manitoba Hydro.

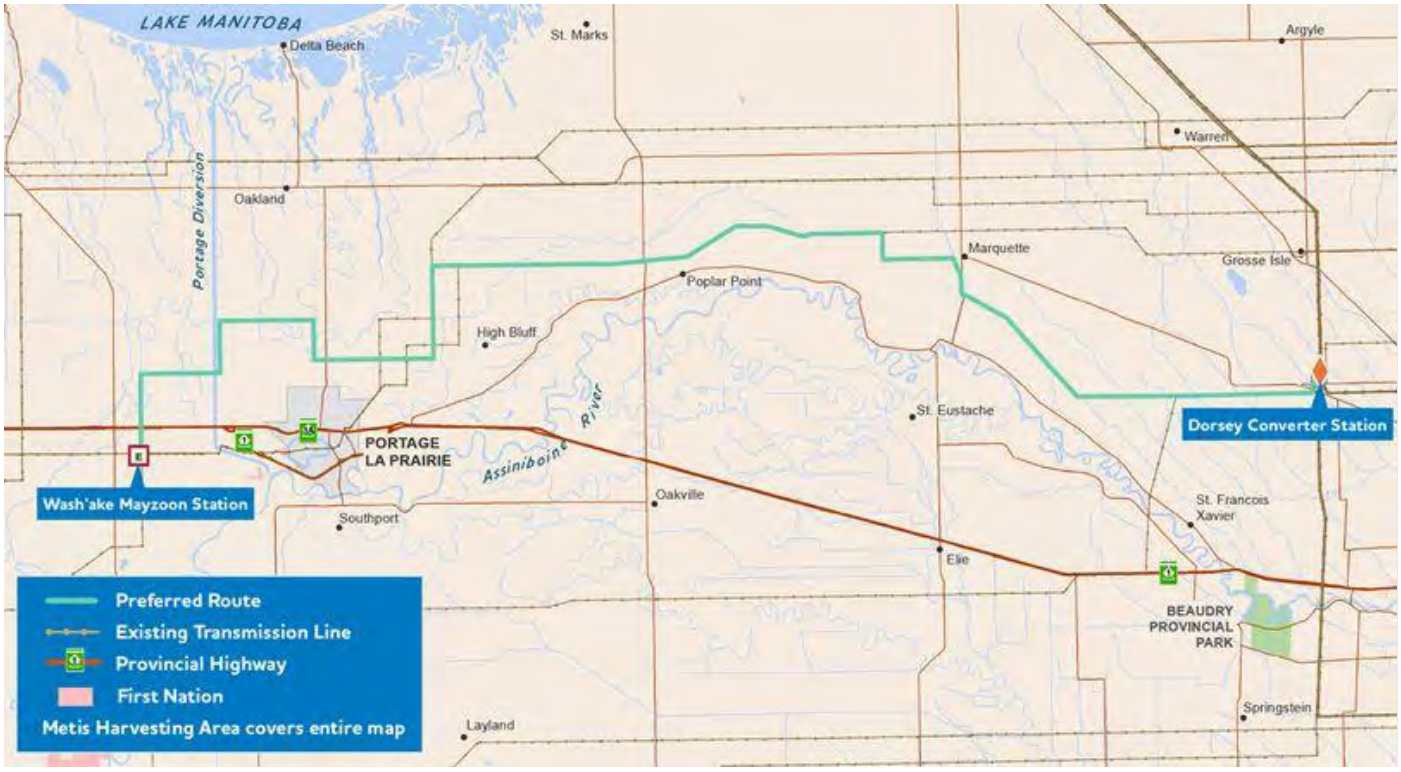


Figure 2: Manitoba Hydro's preferred route for the D83W transmission line and location of Wash'ake Mayzoon station (Manitoba Hydro, n.d.b)

1.2 OBJECTIVES

The Métis Knowledge, land use and occupancy study conducted for the Manitoba Hydro Portage Area projects (referred to throughout this document as "the study" or "this study") documented where and how Red River Métis citizens in Manitoba use the lands and waters around Portage la Prairie, with a focus on those who had previously recorded use and occupancy around the proposed projects. The study objectives were as follows:

- Document where and how Red River Métis citizens use and occupy the lands and waters around Portage la Prairie and the identified study area, including:

- Métis Ecological Knowledge
- Personal harvesting locations
- Commercial harvesting locations
- Cultural and historic sites of significance
- Overnight locations 7
- Routes and trails

- Understand Red River Métis citizen thoughts and perspectives on the proposed projects
- Assess how Red River Métis rights and interests may be impacted by the projects
- Provide recommendations for potential mitigation and accommodation measures to address potential impacts and key issues of concern for Red River Métis citizens

2.0 METHODOLOGY

This section provides an overview of the methods and tools used to complete the Métis Knowledge and Land Use (MKLU) interviews, as well as the study scope and approach researchers took to ensure confidentiality and informed consent.

2.1 GEOGRAPHIC & TEMPORAL SCOPE

Researchers asked participants to focus on the area around and overlapping with the proposed projects but did not limit participants from mapping land use and occupancy in other areas.

Researchers primarily recorded data focused on participants' current use and occupancy, which includes anything that has occurred within their lifetime. Time periods for each activity were differentiated by asking participants whether a site was used within the last 10 years, more than 10 years ago, or if it was ongoing within and prior to the last 10 years.

In some cases, researchers also recorded historic sites that participants hold knowledge of through knowledge transfer from past generations, Oral History or Métis Knowledge sharing relevant to cultural sites and land use practices.

2.1.1 SCOPE OF THE LAND USE AND OCCUPANCY DATA

The land use and occupancy data presented in this report, including the maps and any associated tables, has been collected from two datasets; interviews with Red River Métis citizens specific to the Portage Area Projects, and data that has been collected from other projects or reports undertaken by the MMF that are relevant to this study.

The MMF has conducted land use and occupancy interviews for numerous projects and studies, and the data collected through these interviews is compiled and stored in the MMF Data Catalogue. This dataset includes information surrounding where Red River Métis citizens have identified land use and occupancy sites in Manitoba for other studies, and includes data collected from 2009 onwards. Both datasets contain in-depth attribute data including species, season, activity, and the time period of the activity.

Data collected specific to the Portage Area Projects was combined with relevant data from the MMF Data Catalogue to provide additional context. The majority of the data presented in this report is taken from the interviews conducted specifically for the purpose of this study.

2.2 MÉTIS KNOWLEDGE, LAND USE AND OCCUPANCY INTERVIEWS

Researchers adapted the methodology for the map biography and oral history interviews from Terry Tobias (2009), whose work, Living Proof: The Essential Data-Collection Guide for Indigenous Use and Occupancy Map Surveys, set the Canadian standard for legally defensible data collection. This approach was adapted based on discussions with MMF staff about the specific needs of this study and to ensure its alignment with Red River Métis Knowledge systems and culture.

The methodology developed for this study is consistent with the standard approach that SVS uses for all research conducted with the MMF.

2.2.1 PROCEDURE

For the purpose of this study, MMF researchers were trained by SVS staff on conducting land use and occupancy interviews, including social research and data collection best practices. MMF researchers were trained in interview skills, using ArcGIS online to map features and Survey123 to record attribute data. Upon completion of the training, MMF researchers and SVS staff worked together to conduct the interviews outlined in this study, with MMF researchers leading the majority of them with SVS supporting.

Researchers conducted land use and occupancy interviews in two parts, referred to as a map biography and oral history. During the map biography, individuals provide accounts of their life on the land and water, including places they have used (e.g. hunting, fishing, trapping, gathering etc.) or occupied (e.g. overnight sites, cabins, cultural sites, areas where people hold Métis Ecological Knowledge).

The interviews for this study were conducted using a combination of formats both virtually over Microsoft Teams, and in-person with MMF researchers. When using Teams, the platform allowed the interviewers and participants to see each other, share the screen the map was displayed on, share control of the cursor to identify locations on the map, and record the interview audio and video with the participant's permission. The process for conducting and recording in-person interviews was the same, but with interviewers and participants viewing the same screen and physically sharing control of the map.

At the beginning of each interview, the researchers briefed the participant on the Project, the Study's objectives, and SVS data management processes. The Study team then reviewed the permission form with the participant and, if the participant agreed, invited them to provide their written consent to being recorded on audio and video and to allow their information to be used for the purposes of this Study. For interviews conducted in-person, participants were asked to provide written consent by signing the permission form. For virtual interviews where this was not possible, participants provided verbal consent which was recorded with their permission.

During the map biography, an interviewer marked the locations of features (points, lines, and polygons) identified by participants on the map using a customized Esri ArcGIS Web App (Geographical Information System software). The interviewer then recorded attribute data for each feature (point, line, or polygon) into a Survey123 database developed for this study. The participant was able to view the information as it was recorded on the map and in the survey in real time.

In collecting data, researchers employed Terry Tobias' (2009) concept of the Data Diamond, an approach which ensures the map biography is as accurate as possible. Following this approach, researchers collected information relevant to four use and occupancy "facts":

- **Who:** the participant and/or others
- **What:** engaged in an activity (e.g. hunting, tapping, fishing, gathering, etc.)
- **When:** at some point in time (e.g. within the last 10 years, more than 10 years ago, etc.)
- **Where:** at a specific location(Tobias, 2009, p. 47)

This approach also improves data accuracy by helping participants recall as many details as possible.

During the oral history part of the interview, researchers asked participants questions related to Red River Métis culture and heritage, their relationship to lands and waters, their perspectives on the proposed projects, cumulative effects of development, and changes to the environment and land use activities.

2.2.2 RESEARCH TOOLS

Researchers used a variety of tools to conduct the interviews. To ensure consistency across interviews, researchers used the tools the same way in each interview. These tools included:

- **Project description:** to inform participants about the projects
- **Permission form:** to detail the interview process, data management and confidentiality measures, how and where information would be used
- **Interview guide:** to ensure the same questions were asked in each interview
- **Microsoft Teams:** used to conduct the interviews remotely, which allowed for screen sharing, participant control of the cursor to locate features on the map, and video recording with the participant's permission

- A custom **ArcGIS Online Webapp** to record spatial data and display the map used
- **ArcGIS Survey123:** to collect attribute data connected to each geographic feature (e.g. land use activity, species, time period, etc.)
- **ArcGIS Pro software:** to produce thematic and composite maps of all features
- **Microsoft Excel:** for qualitative and thematic analysis of the data

2.2.3 PARTICIPANTS

Participants for this study were identified by the MMF through outreach to harvesters and Knowledge Holders. To participant in the study, participants were required to:

- Be a Red River Métis citizen based on the current definition in the MMF Constitution
- Have historic and/or current use of or connection to the Portage La Prairie area

Researchers made efforts to interview participants from a variety of age groups and genders. A total of five Red River Métis citizens took part in the land use and occupancy interviews in July of 2022, four of whom identified as male and as one female. None of these participants had completed land use and occupancy interviews for past studies undertaken by the MMF.

2.2.4 CONFIDENTIALITY AND INFORMED CONSENT

Researchers took all reasonable measures to ensure confidentiality and informed consent, including safeguarding personal and confidential information shared by interview participants. Some of these measures included:

- Not disclosing the identity of participants to others outside of the research team for this study
- Using PIN numbers to represent participants instead of their names
- Storing all participant data in a safe and secure location
- Communicating confidentiality measures, and information surrounding where their data will be stored and how it will be used, in writing and verbally through reviewing the permission form with participants before beginning the interviews
- Ensuring participants have reviewed all relevant forms and give their consent, either by signing the permission form or verbally, to participate in the study before beginning
- Allowing participants to choose the extent to which they are comfortable being recorded (e.g. participants may choose to be audio recorded but not video recorded)

- Communicating clearly that participants can choose to stop the interview at any time or skip any questions without having to give a reason
- Removing personal identifiers (e.g. names, family names, and specific personal information) from the data shared in this report

2.3 STUDY LIMITATIONS

In developing the methodology and approach for this study, researchers took all reasonable and appropriate measures to ensure that the procedure was in alignment with industry and qualitative research best practices. As with any study undertaken with a limited scope, this study has several limitations that should be considered in interpreting the data, including:

- **Sample size:** By statistical and qualitative research standards, the number of participants interviewed reflects a very small sample size of Red River Métis citizens and cannot be interpreted as reflecting the entire Red River Métis population that has used and occupied these lands and waters. Rather, given the limited scope of this study, this data provides a snapshot that may indicate Red River Métis patterns of land use and occupancy in the study area.
- **Technological challenges:** In some instances there were minor technological issues that needed to be navigated during the interview (e.g. internet connectivity, lag time on the call, difficulty hearing each other). Researchers worked to prepare for each interview in advance to avoid these issues wherever possible and ensure consistency to the best of their ability, however, in some cases these challenges may have limited the amount of data that could be collected.
- **Biases:** Both researchers and participants have inherent biases that can affect a social research study such as this one. This is true of all studies and interviews conducted regardless of context or circumstance. Biases can stem from things such as the social setting of the interview, perceived power imbalances between the researcher and participant, the comfort levels of the researcher or participant, and the physical location of the interview. SVS and the MMF took all reasonable steps to limit these biases and mitigate their effects on the study, including the intentional use of plain language, limiting leading questions and statements, and taking breaks as needed.
- **Virtual format:** Though virtual interviews have many advantages, some participants may have been hesitant to map online and share information virtually, especially if they were unfamiliar with videoconferencing, screen sharing and taking remote control of the map.

2.4 DATA VERIFICATION

After the interviews were completed, participants were given a copy of their interview transcript, a map of the features they identified, and a table of corresponding attribute data collected for each feature (for example the species, time period, season). Participants were given time to review these materials and identify any inaccuracies before they were integrated in this report.

Aside from several minor changes to the interview transcripts that were identified by participants and then corrected by the research team, all participants verified that the information they shared was reflected accurately.

3.0 RED RIVER MÉTIS (MANITOBA MÉTIS)

This section provides an overview of the Red River Métis including history and identity, the Manitoba Métis Federation, and Red River Métis rights, claims and interests. This context is important in understanding and effectively interpreting the results of this study.

3.1 HISTORY AND IDENTITY

The Red River Métis—as a distinct Indigenous people—evolved out of relations between European men and First Nations women who were brought together as a result of the early fur trade in the Northwest. In the eighteenth century, both the Hudson Bay Company and the Northwest Company created a series of trading posts that stretched across the upper Great Lakes, through the western plains, and into the northern boreal forest. These posts and fur trade activities brought European and Indigenous peoples into contact. Inevitably, unions between European men—explorers, fur traders, and pioneers—and Indigenous women were consummated. The children of these families developed their own collective identity and political community so that "[w]thin a few generations, the descendants of these unions developed a culture distinct from their European and Indian forebears" and the Métis Nation was born—a new people, Indigenous to the western territories (Alberta (Aboriginal Affairs and Northern Development) v. Cunningham, [2011] 2 SCR 670 at para. 5; 2008 MBPC R. v. Goodon, 59 at para. 25; Manitoba Métis Federation Inc. v. Canada (Attorney General), [2013] 1 SCR 623 at para. 2).

The Métis led a mixed way of life. "In early times, the Métis were mostly nomadic. Later, they established permanent settlements centered on hunting, trading and agriculture" (*Alberta v. Cunningham*, at para. 5). The Métis were employed by both of the fur trades' major players, the Hudson's Bay and Northwest companies. By the early 19th century, they had become a major component of both firms' workforces. At the same time, however, the Métis became extensively involved in the buffalo hunt. As a people, their economy was diverse; combining as it did, living off the land in the Aboriginal fashion with wage labour (*MMF v. Canada*, at para. 29).

It was in the Red River, in reaction to a new wave of European immigration, that the Red River Métis first came into its own. Since the early 1800s, the Red River Métis — as a part of the larger Métis Nation—has asserted itself as a distinct Indigenous collective with rights and interests in its Homeland. The Red River Métis share a language (Michif), national symbols (infinity flags), culture (i.e., music, dance, dress, crafts), as well as a special relationship with its territory that is centered in Manitoba and extends beyond the present-day provincial boundaries.

The Red River Métis has been confirmed by the courts as being a distinctive Indigenous community, with rights that are recognized and affirmed in s.35 of the *Constitution Act, 1982*. In *R. v. Goodon*, the Manitoba court held that:

The Métis community of Western Canada has its own distinctive identity [...] the Métis created a large inter-related community that included numerous settlements located in present-day southwestern Manitoba, into Saskatchewan and including the northern Midwest United States. This area was one community [...] The Métis community today in Manitoba is a well-organized and vibrant community (paras. 46-47; 52).

This proud independent Métis population constituted a historic rights-bearing community in present-day Manitoba and beyond, which encompassed "all of the area within the present boundaries of southern Manitoba from the present-day City of Winnipeg and extending south to the United States" (para. 48).

The heart of the historic rights-bearing Métis community in southern Manitoba was the Red River Settlement; however, the Red River Métis also developed other settlements and relied on various locations along strategic fur trade routes. During the early part of the 19th century, these included various posts of varying size and scale spanning the Northwest Company and the Hudson Bay Company collection and distribution networks.

More specifically, in relation to the emergence of the Métis—as a distinct Indigenous Nation in Manitoba—the Supreme Court of Canada wrote the following in the *MMF v. Canada* case:

> *"[21] The story begins with the Aboriginal peoples who inhabited what is now the province of Manitoba—the Cree and other less populous nations. In the late 17th century, European adventurers and explorers passed through. The lands were claimed nominally by England which granted the Hudson's Bay Company, a company of fur traders' operation of out London, control over a vast territory called Rupert's Land, which included modern Manitoba. Aboriginal peoples continued to occupy the territory. In addition to the original First Nations, a new Aboriginal group, the Métis, arose—people descended from early unions between European adventurers and traders, and Aboriginal women. In the early days, the descendants of English-speaking parents were referred to as half-breeds, while those with French roots were called Métis.*
>
> *[22] A large—by the standards of the time—settlement developed at the forks of the Red and Assiniboine Rivers on land granted to Lord Selkirk by the Hudson's Bay Company in 1811. By 1869, the settlement consisted of 12,000 people, under the governance of Hudson's Bay Company.*
>
> *[23] In 1869, the Red River Settlement was a vibrant community, with a free enterprise system and established judicial and civic institutions, centered on the retail stores, hotels, trading undertakings and saloons of what is now downtown Winnipeg. The Métis were the dominant demographic group in the*

Settlement, comprising around 85 percent of the population [approximately 10,000 Métis], and held leadership positions in business, church and government."

The fur trade was vital to the ethnogenesis of the Red River Métis and was active in Manitoba from at least the late 1770s, and numerous posts and outposts were established along cart trails and waterways throughout the province. These trails and waterways were crucial transportation networks for the fur trade (Jones 2014; 2) and were the foundation of the Red River Métis' extensive use of the lands and waters throughout the province. In the early 20th century, the Red River Métis continued to significantly participate in the commercial fisheries and in trapping activities, which is well documented in provincial government records.

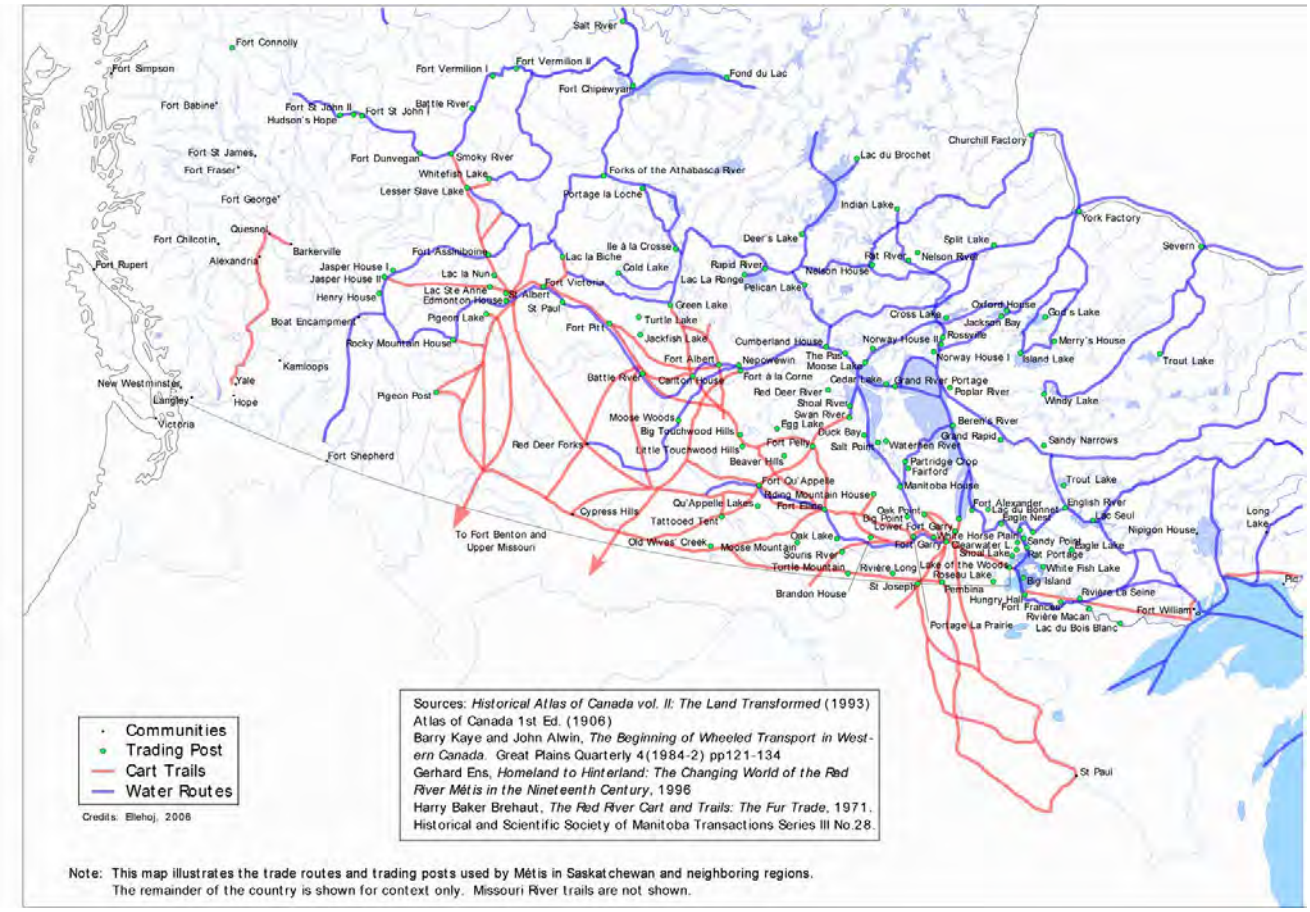


Figure 3: The Fur Trade Network: Routes and Posts Prior to 1870

3.2 MANITOBA MÉTIS FEDERATION

On July 6, 2021, Canada and the MMF signed the Manitoba Métis Self-Government Recognition and Implementation Agreement which is the first agreement to give immediate recognition to an existing Métis government, namely, the Manitoba Métis Federation, which is the existing democratically elected government of the Manitoba Métis – also known as the Red River Métis. This Agreement will be followed by a treaty between the MMF and Canada and ensures that the MMF will continue to provide responsible and accountable self-government.

The MMF is the democratically elected government of the Red River Métis. The MMF is duly authorized by the Citizens of the Red River Métis for the purposes of dealing with their collective Métis rights, claims, and interests, including conducting consultations and negotiating accommodations (as per MMF Resolution No. 8). While the MMF was initially formed in 1967, its origins lie in the 18th century with the birth of the Red River Métis and in the legal and political structures that developed with it. Since the birth of the Métis people in the Red River Valley, the Red River Métis asserted and exercised its inherent right of self-government. For the last 50 years, the MMF has represented the Red River Métis at the provincial and national levels.

During this same period, the MMF has built a sophisticated, democratic, and effective Métis governance structure that represents the Red River Métis internationally. The MMF was created to be the self-government representative of the Red River Métis—as reflected in the Preamble of the MMF's Constitution (also known as the MMF Bylaws):

> *"WHEREAS, the Manitoba Métis Federation has been created to be the democratic and self-governing representative body of the Manitoba Métis Community;"*

In addition, the following is embedded within the MMF's objectives, as set out in the MMF Constitution as follows:

> *"1. To promote the history and culture of the Manitoba Métis, also known as the Red River Métis, and otherwise to promote the cultural pride of its Citizenship.*
> *2. To promote the education of its Citizens respecting their legal, political, social, and other rights.*
> *3. To promote the participation of its Citizens in community, municipal, provincial, federal, Aboriginal, and other organizations.*
> *4. To promote the political, social, and economic interests of its Citizens.*
> *5. To provide responsible and accountable governance on behalf of the Manitoba Métis, also known as the Red River Métis, using the constitutional authorities delegated by its Citizens."*

The MMF is organized and operated based on centralized democratic principles, some key aspects of which are described below.

President: The President is the leader and spokesperson of the MMF. The President is elected in a national Election every four years and is responsible for overseeing the day-to-day operations of the MMF.

Cabinet: The MMF Cabinet leads, manages, and guides the policies, objectives, and strategic direction of the MMF and its subsidiaries. All 23 Cabinet Members are democratically elected by Red River Métis Citizens.

Regions: The MMF is organized into seven regional associations or "Regions" throughout the province (Figure 3): The Southeast Region, the Winnipeg Region, the Southwest Region, the Interlake Region, the Northwest Region, the Pas Region, and the Thompson Region. Each Region is administered by a Vice-President and two Regional Executive Officers, all of whom sit on the MMF Cabinet. Each Region has an office which delivers programs and services to their specific geographic area.

Locals: Within each Region are various area-specific "Locals" which are administered by a chairperson, a vice-chairperson, a secretary, and a treasurer (or a secretary-treasurer, as the case may be). Locals must have at least nine Citizens and meet at least four times a year to remain active. There are approximately 140 MMF Locals across Manitoba.

The MMF has created an effective governance structure to represent the Red River Métis. It is important to bear in mind that there is only one large, geographically dispersed, Red River Métis. Red River Métis Citizens live, work, and exercise their s.35 rights throughout and beyond the province of Manitoba.

3.3 MMF RESOLUTION NO. 8

Among its many responsibilities, the MMF is authorized to protect the Aboriginal rights, claims, and interests of the Red River Métis, including those related to harvesting, traditional culture, and economic development, among others.

In 2007, the MMF Annual General Assembly unanimously adopted Resolution No. 8 that sets out the framework for engagement, consultation, and accommodation to be followed by Federal and Provincial governments, industry, and others when making decisions and developing plans and projects that may impact the Red River Métis. Under MMF

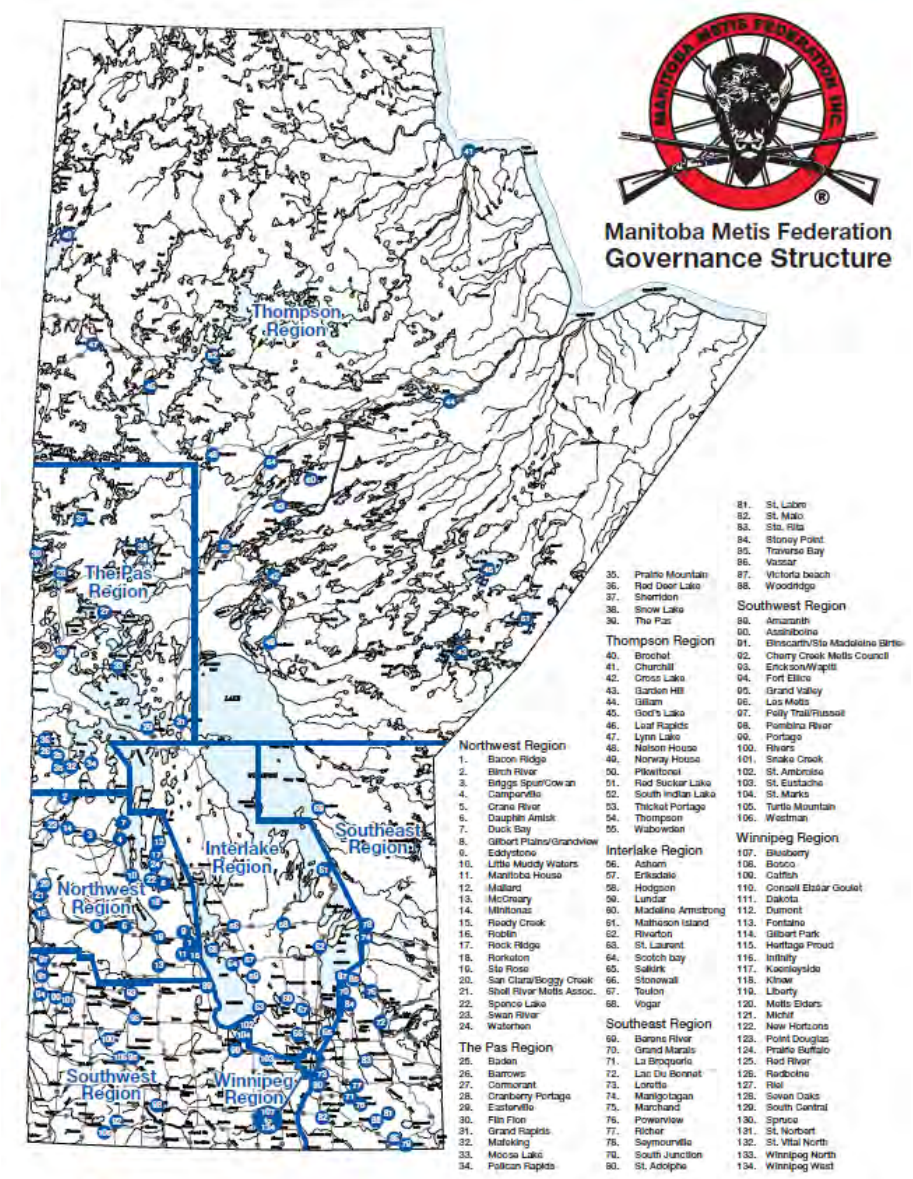


Figure 3. Manitoba Métis Federation (MMF) Regions

Resolution No. 8, direction has been provided by the Red River Métis for the MMF Home Office to take the lead and be the main contact on all consultation undertaken with the Red River Métis. Resolution No. 8 reads, in part that:

...this assembly continue[s] to give the direction to the Provincial Home Office to take the lead and be the main contact on all consultations affecting the Métis community and to work closely with the Regions and Locals to ensure governments and industry abide by environmental and constitutional obligations to the Métis...

The MMF Home Office works closely with the Regions and Locals to ensure the rights, interests, and perspective of the Red River Métis are effectively represented in matters related to consultation and accommodation.

Resolution No. 8 has five phases:

Phase 1: Notice and Response

Phase 2: Funding and Capacity

Phase 3: Engagement or Consultation

Phase 4: Partnership and Accommodation

Phase 5: Implementation

Each phase is an integral part of the Resolution No. 8 framework and proceeds logically through the stages of consultation.

3.4 RED RIVER MÉTIS RIGHTS, CLAIMS, AND INTERESTS

The Red River Métis possess Aboriginal rights, including pre-existing Aboriginal collective rights and interests in lands recognized and affirmed by s.35 of the Constitution Act, 1982, throughout Manitoba. The Manitoba court recognized these pre-existing, collectively held Métis rights in R. v. Goodon (at paras. 58; 72):

> *I conclude that there remains a contemporary community in southwest Manitoba that continues many of the traditional practices and customs of the Métis people. I have determined that the rights-bearing community is an area of southwestern Manitoba that includes the City of Winnipeg south to the U.S. border and west to the Saskatchewan border.*

As affirmed by the Supreme Court of Canada, such rights are "recognize[d] as part of the special aboriginal relationship to the land" (R. v. Powley, 2003 SCC 43, at para. 50) and are grounded on a "communal Aboriginal interest in the land that is integral to the nature of the Métis distinctive community and their relationship to the land" (MMF v. Canada, at para. 5). Importantly, courts have also recognized that Métis harvesting rights may not be limited to Unoccupied Crown Lands (R. v. Kelley, 2007 ABQB 41, para. 65).

The Crown, as represented by the Manitoba government, has recognized some aspects of the Red River Métis' harvesting rights through a negotiated agreement: The MMF-Manitoba Points of Agreement on Métis Harvesting (2012) (the MMF-Manitoba Harvesting Agreement). This Agreement was signed at the MMF's 44th Annual General Assembly and "recognizes that collectively-held Métis Harvesting Rights, within the meaning of s.35 of the Constitution Act, 1982, exist within the [Recognized Métis Harvesting Zone], and that these rights may be exercised by Red River Métis Rights Holders consistent with Métis customs, practices and traditions…" (MMF-Manitoba Harvesting Agreement, section 1). In particular, the MMF-Manitoba Harvesting Agreement recognizes that Métis rights include "hunting, trapping, fishing and gathering for food and domestic use, including for social and ceremonial purposes and for greater certainty, Métis harvesting includes the harvest of timber for domestic purposes" throughout an area spanning approximately 169,584 km² (the "Métis Recognized Harvesting Area") (MMF-Manitoba Harvesting Agreement, section 2; Figure 4). The MMF further asserts rights and interests exist beyond this area, which require consultation and accommodation as well.

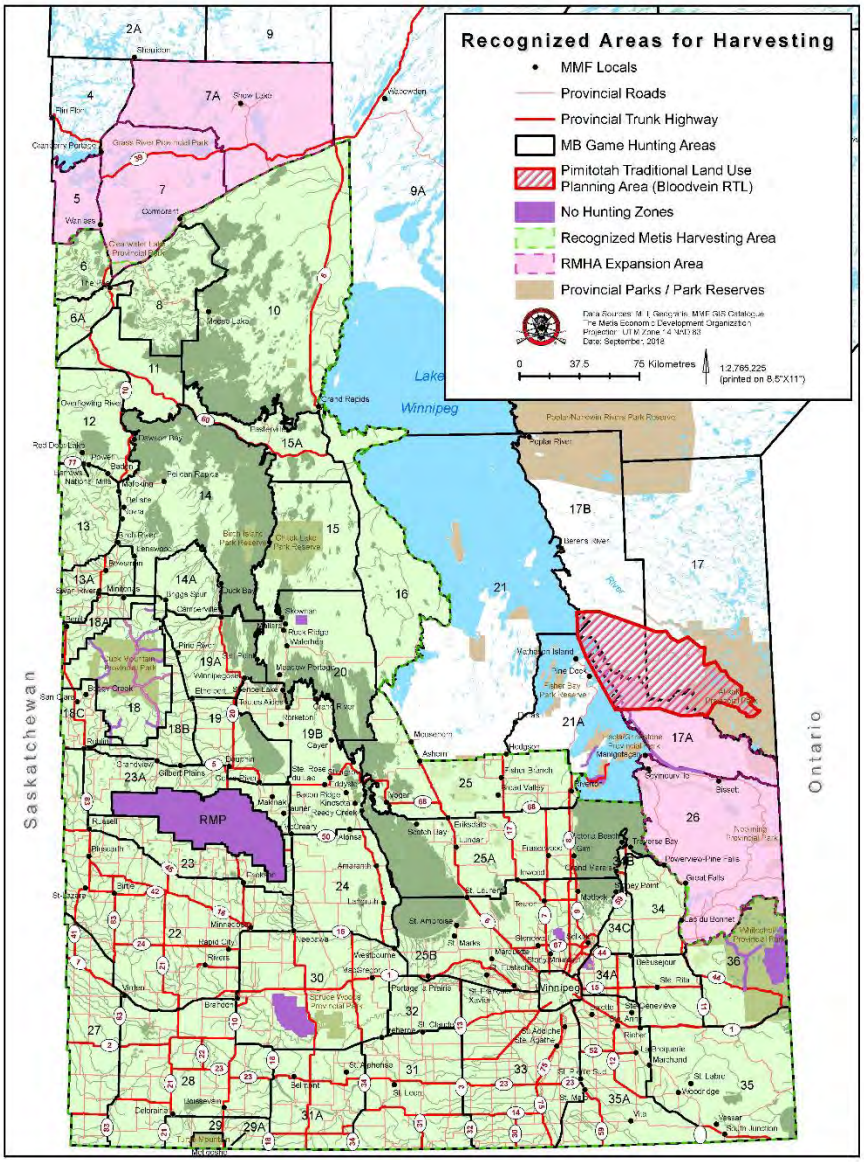


Figure 4: MMF-Manitoba Harvesting Agreement Recognized Manitoba Métis Harvesting Zones

Beyond those rights already established through litigation and recognized by agreements, the Red River Métis claims commercial and trade-related rights. Courts have noted that Métis claims to commercial rights remain outstanding (R. v. Kelley at para. 65). These claims are strong and well-

founded in the historical record and the customs, practices, and traditions of the Red River Métis, and it is incumbent on the Crown and Proponents to take them seriously.

As noted above, the Red River Métis has its roots in the western fur trade (R. v. Blais, 2003 SCC 44 at para. 9 [Blais]; R. v. Goodon at para. 25). The Red River Métis are descendants of early unions between Aboriginal women and European traders (MMF v. Canada at para. 21). As a distinct Métis culture developed, the Métis took up trade as a key aspect of their way of life (R. v. Powley at para. 10). Many Métis became independent traders, acting as middlemen between First Nations and Europeans (R. v. Goodon at para. 30). Others ensured their subsistence and prosperity by trading resources they themselves hunted and gathered (R. v. Goodon at para. 31, 33, & 71). By the mid-19th century, the Red River Métis had developed the collective feeling that "the soil, the trade and the Government of the country [were] their birth rights." (R. v. Goodon at para. 69(f)). Commerce and trade are, and always have been, integral to the distinctive culture of the Red River Métis. Today, the Red River Métis have an Aboriginal, constitutionally protected right to continue this trading tradition in modern ways to ensure that their distinct community will not only survive, but also flourish.

Unlike First Nations in Manitoba, whose commercial rights were converted and modified by treaties and the Natural Resources Transfer Agreement (NRTA) (R. v. Horseman, [1990] 1 SCR 901), the Métis' pre-existing customs, practices, and traditions—including as they relate to commerce and trade—were not affected by the NRTA (R. v. Blais) and continue to exist and be protected as Aboriginal rights. First Nations' treaty rights in Manitoba are, for example, inherently limited by the Crown's power to take up lands (Mikisew Cree First Nation v Canada (Minister of Canadian Heritage), [2005] 3 SCR 388 at para 56). Métis rights, in contrast, are not tempered by the "taking up" clauses found in historic treaties with First Nations. Métis rights must be respected as they are, distinct from First Nations' rights and unmodified by legislation or agreements.

In addition to the abovementioned rights to land use that preserve the Métis culture and way of life, the Red River Métis have other outstanding land related claims and interests with respect to lands. These include claims related to the federal Crown's constitutional promise to all Aboriginal peoples, including the Red River Métis, as set out in the Order of Her Majesty in Council Admitting Rupert's Land and the North-Western Territory into the Union (the "1870 Order") which provides that, upon the transference of the territories in question to the Canadian Government, the claims of the Indian tribes to compensation for lands required for purposes of settlement will be considered and settled in conformity with the equitable principles which have uniformly governed the British Crown in its dealings with the aborigines.

The manner in which the federal Crown implemented this constitutional promise owing to the Red River Métis—through the Dominion Lands Act and the resulting Métis scrip system—effectively defeated the purpose of the commitment. Accordingly, the MMF claims these federal Crown actions constituted a breach of the honour of the Crown, which demand negotiations and just settlement outside of the 'old postage stamp province' within Manitoba as well.

The MMF also claims that the Dominion Lands Act and the resulting Métis scrip system were incapable of extinguishing collectively held Métis title in specific locations where the Red River Métis are able to meet the legal test for Aboriginal title as set out by the Supreme Court of Canada.

These areas in the province, which the Red River Métis exclusively occupied—as an Indigenous people—prior to the assertion of sovereignty, establish a pre-existing Métis ownership interest in these lands.

The Red River Métis also have an outstanding legal claim within what was the 'old postage stamp province' of Manitoba relating to the 1.4 million acres of land promised to the children of the Métis living in the Red River Valley, as enshrined in section 31 of the Manitoba Act, 1870 (MMF v. Canada at para 154).

This land promised was a nation-building, constitutional compact that was meant to secure a "lasting place in the new province [of Manitoba]" for future generations of the Métis people (MMF v. Canada at para 5). This "lasting place" was to have been achieved by providing the Red River Métis a "head start" in securing lands in the heart of the new province (MMF v. Canada at paras 5-6).

Instead, the federal Crown was not diligent in its implementation of section 31, which effectively defeated the purpose of the constitutional compact.

In March 2013, the Supreme Court of Canada found that the federal Crown failed to diligently and purposefully implement the Métis land grand provision set out in section 31 of the Manitoba Act, 1870 (MMF v. Canada at para 154). This constituted a breach of the honour of the Crown. In arriving at this legal conclusion, the court wrote:

> *"What is at issue is a constitutional grievance going back almost a century and a half. So long as the issue remains outstanding, the goal of reconciliation and constitutional harmony, recognized in s.35 of the Constitution Act, 1982 and underlying section 31 of the Manitoba Act, remains unachieved. The ongoing rift in the national fabric that section 31 was adopted to cure remains unremedied. The unfinished business of reconciliation of the Métis people with Canadian sovereignty is a matter of national and constitutional import (MMF v. Canada at para 140)."*

This constitutional breach is an outstanding Métis claim flowing from a judicially recognized common law obligation which burdens the federal Crown (MMF v. Canada at paras 156; 212). It can only be resolved through good faith negotiations and a just settlement with the MMF (see for example: R v Sparrow, [1990] 1 SCR 1075 at paras 51–53; R v Van der Peet, [1996] 2 SCR 507 at paras 229, 253; Haida at para 20; Carrier Sekani at para 32). Lands both within the 'old postage stamp province' as well as in other parts of Manitoba—since little Crown lands remain within the 'old postage stamp province'—may need to be considered as part of any future negotiations and settlement in fulfillment of the promise of 1.4 million acres, together with appropriate compensation.

On November 15, 2016, the MMF and Canada concluded a Framework Agreement for Advancing Reconciliation (the "Framework Agreement"). The Framework Agreement established a negotiation process aimed, among other things, at finding a shared solution regarding the Supreme Court of Canada's decision in MMF v. Canada and advancing the process of reconciliation between the

Crown and the Red River Métis. It provides for negotiations on various topics including, but not limited to, the "quantum, selection and management of potential settlement lands." Negotiations under the Framework Agreement are active and ongoing.

4.0 MÉTIS KNOWLEDGE AND LAND USE STUDY RESULTS

This section provides an overview of results from the Métis Knowledge and land use study, including maps of the spatial data collected and more detailed qualitative information that emerged from the map biography and oral history interview process.

4.1 MAPPED FEATURES IN PROXIMITY TO THE PROPOSED PROJECTS

The maps presented in this report show features mapped within a 10-km radius of the Portage Area Projects. Participants mapped several features within this buffer which included:

- **Access routes** – including boat launch/landings, trails, historic trails, portage routes, and other access routes
- **Changes** – including to access, wildlife, harvesting, water and water quality, the environment, and the shoreline environment
- **Cultural sites** – including burial sites, historical family village sites, historically significant sites, contemporary gathering places, and recreational areas
- **Ecological knowledge** – including fish spawning areas, bird, mammal, reptile/amphibian and insect habitat, mammal migration routes, plant habitat, spring water, and species at risk habitat
- **Overnight locations** – including camping areas and other overnight locations
- **Subsistence and commercial harvesting** – including fishing, hunting, gathering, trapping and snaring, commercial trapping and snaring, other commercial harvesting, and hunting areas

Within the 10km of the proposed projects there were many features that directly overlapped with either the BP6/7 or D83W preferred routes selected by Manitoba Hydro. Further information surrounding these areas of overlap is detailed throughout Section 4.2 of this report.

The presence of these sites, along with the others identified within the 10km buffer, strongly indicate that there may be impacts to Red River Métis rights, claims and interests throughout the lifecycle of these projects as currently proposed.

Figure 5: Composite Map showing all features identified within 10km of the proposed projects

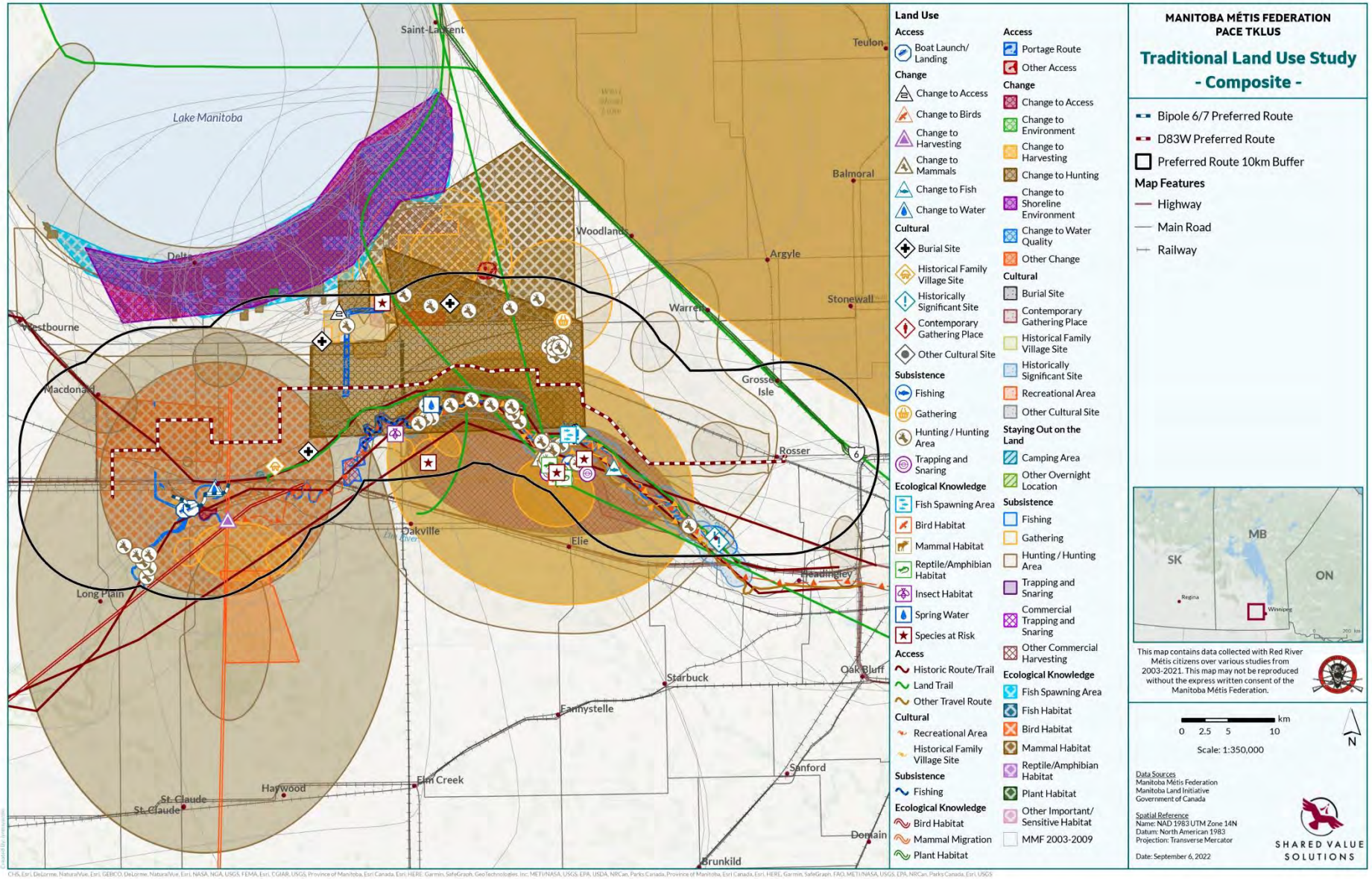


Figure 6: Composite map showing features mapped within 10km of BP6/7 and the western portion of the PACE route around Portage la Prairie.

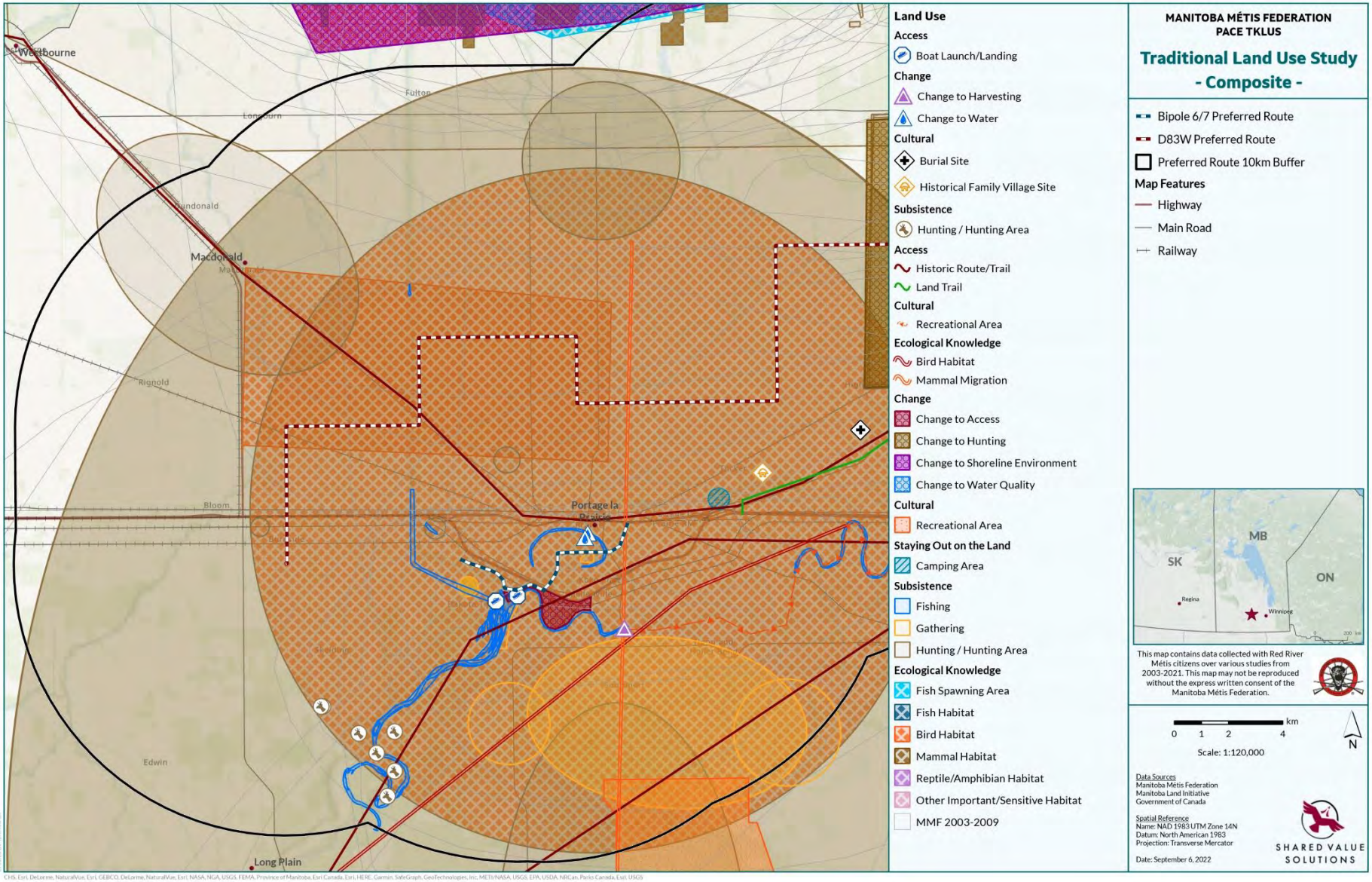


Figure 7: Composite map showing features mapped within 10km of the PACE route north of Oakville and Elie

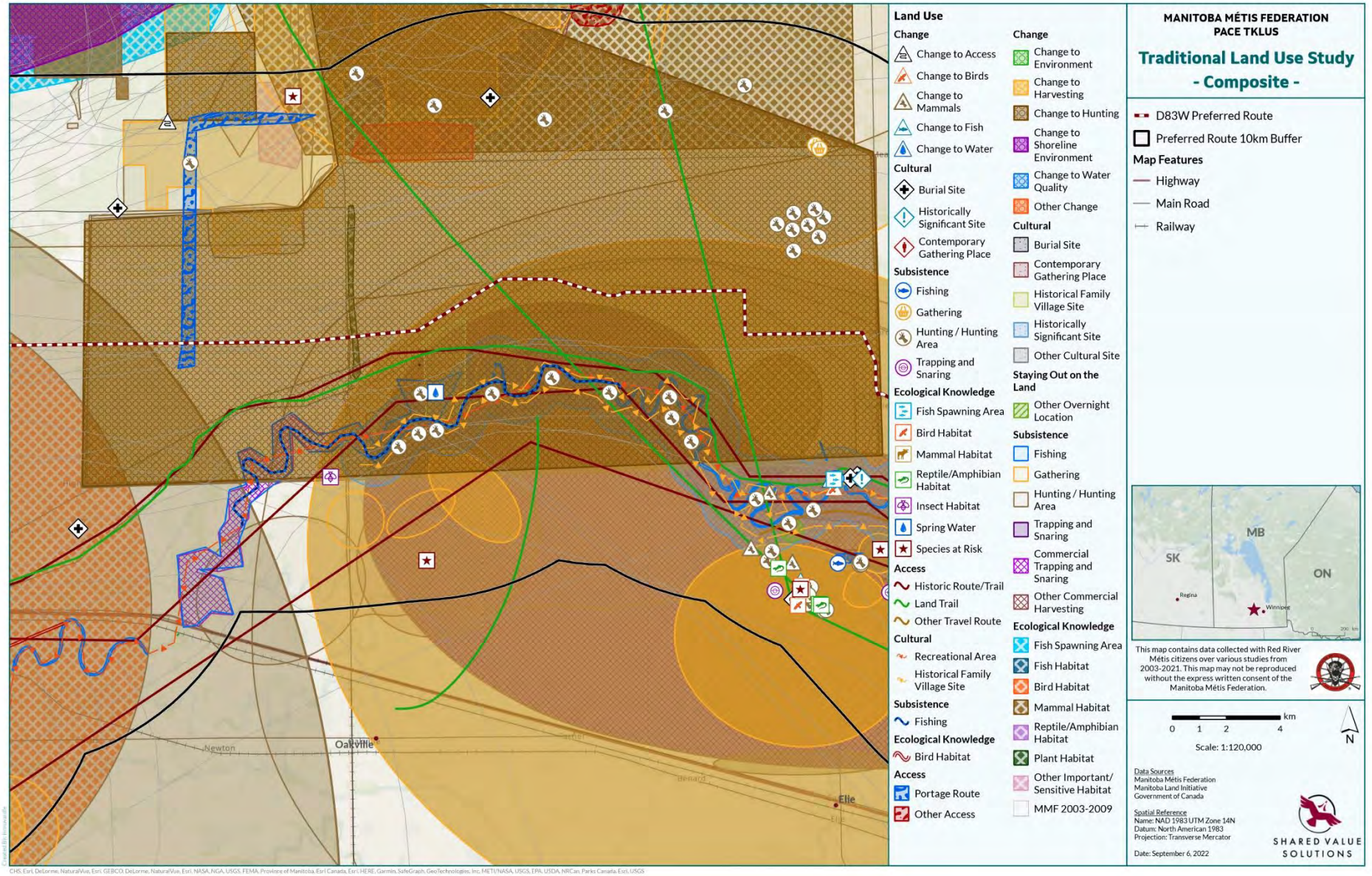
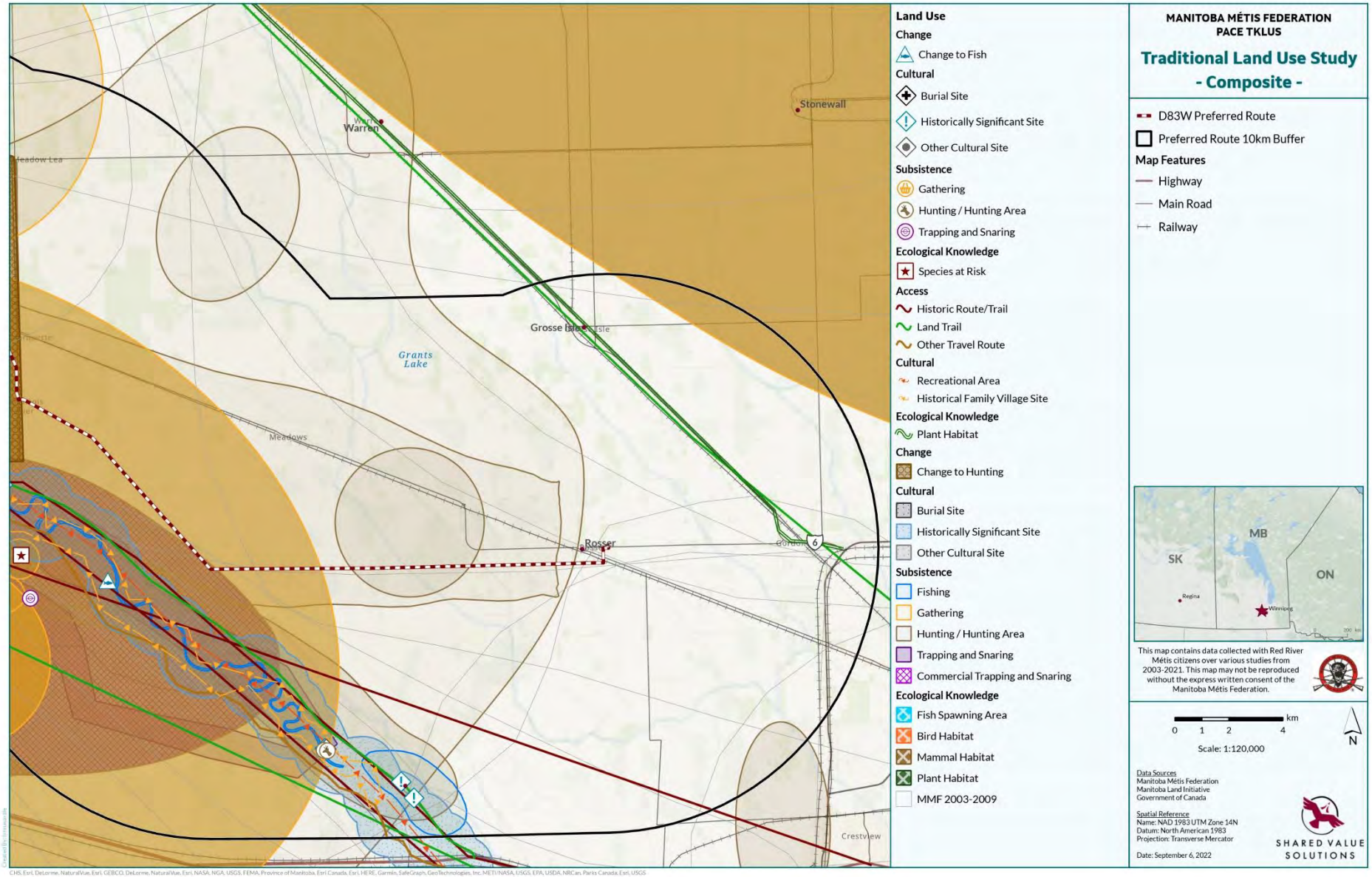


Figure 8: Composite map showing features identified within 10km of the PACE route from Marquette to Rosser



4.2 RED RIVER MÉTIS CONNECTION TO THE PORTAGE AREA

Red River Métis citizens provided evidence of their connections to the area surrounding the proposed projects through identifying locations of land use (e.g. harvesting locations, travel routes, etc.) and occupancy (e.g. ecological knowledge, cultural sites, overnight locations etc.).

These locations are categorized and presented in this study in four sections: Métis Ecological Knowledge (Section 4.2.1), Métis harvesting (Section 4.2.2), Métis cultural sites, overnight locations and access (Section 4.2.3) and observed changes (Section 4.3). Maps showing the identified locations of each feature are available within each of these sections, and the labels for mapped feature indicating a PIN-GISID (e.g. 1302-006) correspond to the attribute tables available in Appendix A, providing further detail surrounding what each feature is.

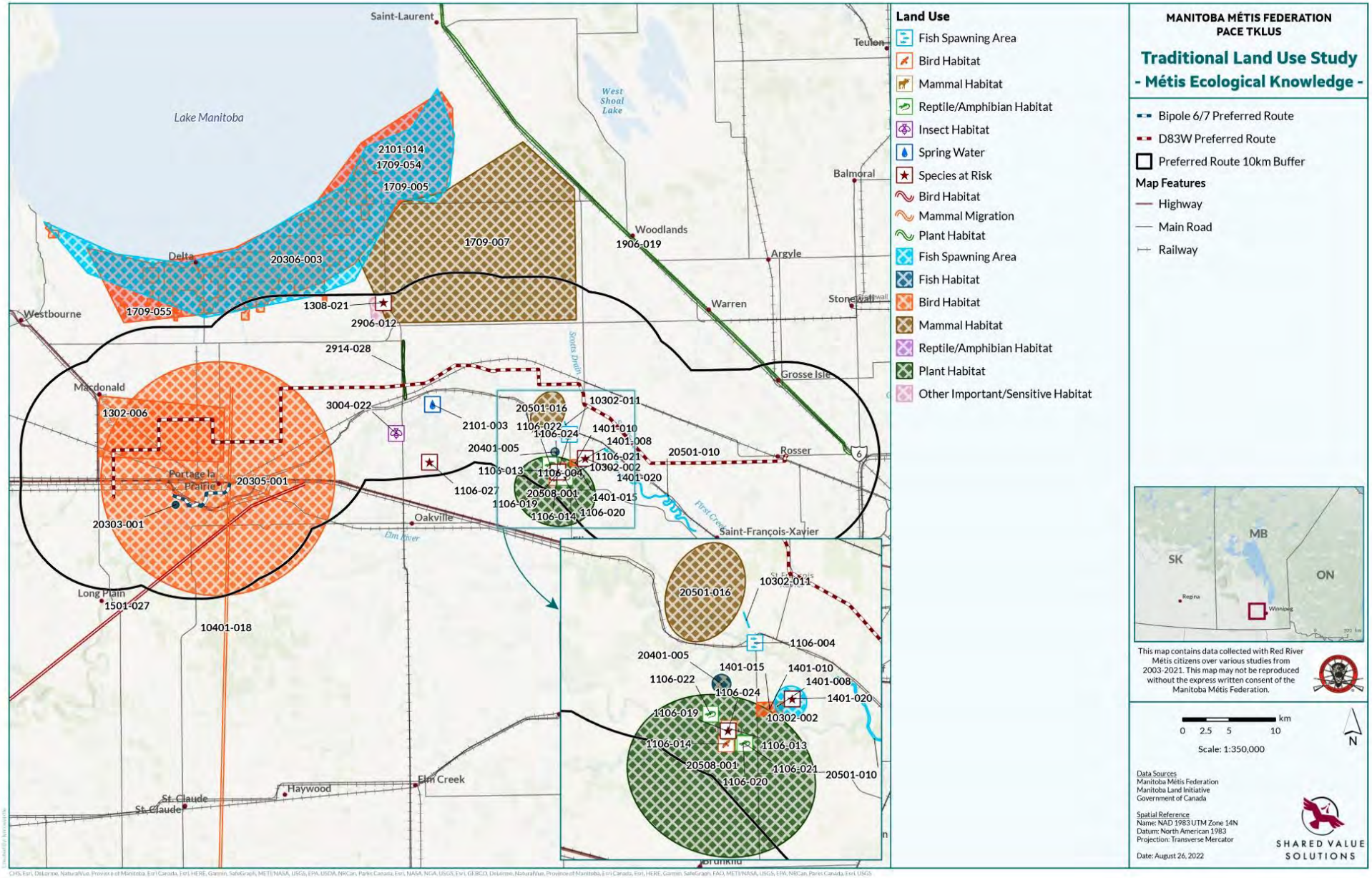
4.2.1 MÉTIS ECOLOGICAL KNOWLEDGE

Métis Ecological Knowledge refers to areas or sites where participants hold unique and specialized knowledge of the land, waters, wildlife and other aspects of the environment, as a result of their distinct Red River Métis culture and relationships to the land throughout the seasons. This knowledge can also be gathered and shared over generations through Red River Métis families, or the community more broadly.

Interview participants mapped locations where they hold knowledge of sensitive or ecologically important areas. The following features were all mapped within a 10-kilometre buffer surrounding the proposed projects proposed routes (**Error! Reference source not found.**; Table 1):

- **Fish spawning areas** *(carp, perch, pickerel/walleye, other)*
- **Bird habitat** *(geese, duck, snow geese, prairie chicken, Canada geese)*
- **Mammal habitat** *(deer, beaver, other)*
- **Reptile/amphibian habitat** *(frogs, other)*
- **Insect habitat** *(dragonflies, fireflies)*
- **Plant habitat** *(small white lady slipper, plum, purple lady slipper)*
- **Other important/sensitive habitat**
- **Spring water sources**

Figure 9: Locations of Métis Ecological Knowledge within 10km of the proposed projects. Attribute data for each mapped feature is available in Appendix A.



The mapped data provides evidence of several of ecologically significant areas within 10 km of the proposed projects, including fish spawning areas, mammal migration routes, bird habitat, reptile and amphibian habitat and other important habitat. These locations are concentrated primarily in two areas. One, including extensive bird habitat around Portage la Prairie encompassing Crescent Lake and part of the Assiniboine River, and the second including plant habitat, mammal habitat, and fish spawning areas around Saint Eustache area north of the Trans Canada highway.

Notably, to the north of both the BP6/7 and PACE preferred routes, participants also identified sensitive and ecologically significant marshlands south of Lake Manitoba where duck and geese live during the summer months. This same area is where pickerel/walleye, carp, and perch spawn, extending from the area west of Delta Beach northeast to St. Ambroise.

Directly overlapping the BP6/7 preferred route, Red River Métis citizens identified bird habitat for prairie chicken[1] and migration routes for geese between Macdonald and Long Plain extending east towards Oakville; they identified these same features plus additional bird habitat for geese and ducks, as well as plant habitat for purple lady slipper overlapping with the D83W preferred route just east of Portage la Prairie .

4.2.2 HARVESTING

Harvesting is a critical piece of Red River Métis culture and way of life, protected under S.35 of *the Constitution Act (1982)*. Harvesting plants, animals, and fish is a means through which Red River Métis citizens sustain themselves, their families, and their community throughout the year.

Participants identified harvesting areas they use in proximity to the proposed projects (Figure 10; **Error! Reference source not found.**). These sites included the following, within 10 km of the BP6/7 a nd PACE projects:

- **Fishing** *(black crappie, sunfish, brown trout, bullhead burbot, carp, channel fish, freshwater drum, goldeye, mariah, mooneye, northern pike/jackfish, perch, rainbow trout, rock bass, sauger, sucker, walleye/pickerel, white bass, sturgeon, channel catfish, chubb, drum bass, other)*
- **Gathering** *(rose hips, rose buds, diamond willow, berries, balsam poplar, bur oak, jack pine, red willow, tamarack, white birch, blue spruce, black ash, green ash, morels, asparagus, black currant, bracken (fiddlehead), chokecherry, cranberry, dandelion, gooseberry, hazelnut, oxeye daisy, pin cherry, pineapple-weed, plum, raspberry, saskatoon berry, wild grapes, wild mint, wild onion, sweet clover, dock, goldenrod, Jerusalem artichoke, wild bergamot, Manitoba maple, trembling aspen, pussy willow, eastern white cedar, red currant, clammy ground cherry, strawberry, American elm, firewood, medicines, other)*
- **Hunting** *(deer, cotton tail rabbit, Canada geese, sharp-tailed grouse, snow geese, mallard duck, pintail, teal, wood ducks, coyote, jack rabbit, red fox, weasel, upland birds, squirrel, grouse, canvasback, prairie chicken, redhead, ruffed grouse, scap/blue bill, widgeon, wolf, raccoon,*

[1] The term prairie chicken may also refer to grouse as this is a colloquial term used for the species.

gopher, fox, wild turkey, gray partridge, snowshoe hare, bufflehead, gadewell, shoveler, mink, muskrat)

- **Trapping and snaring** *(mink, beaver, coyote, muskrat, weasel, jack rabbit, cotton tail rabbit, snowshoe hare, fox, squirrel, badger, raccoon)*
- **Commercial harvesting** *(trapping and snaring, fishing)*

Further detail surrounding these harvesting activities and their significance to Red River Métis rights, claims, and interests is provided in the sections below.

Figure 10: Harvesting locations mapped within 10km of the proposed projects. Attribute data for each feature is available in Appendix A.

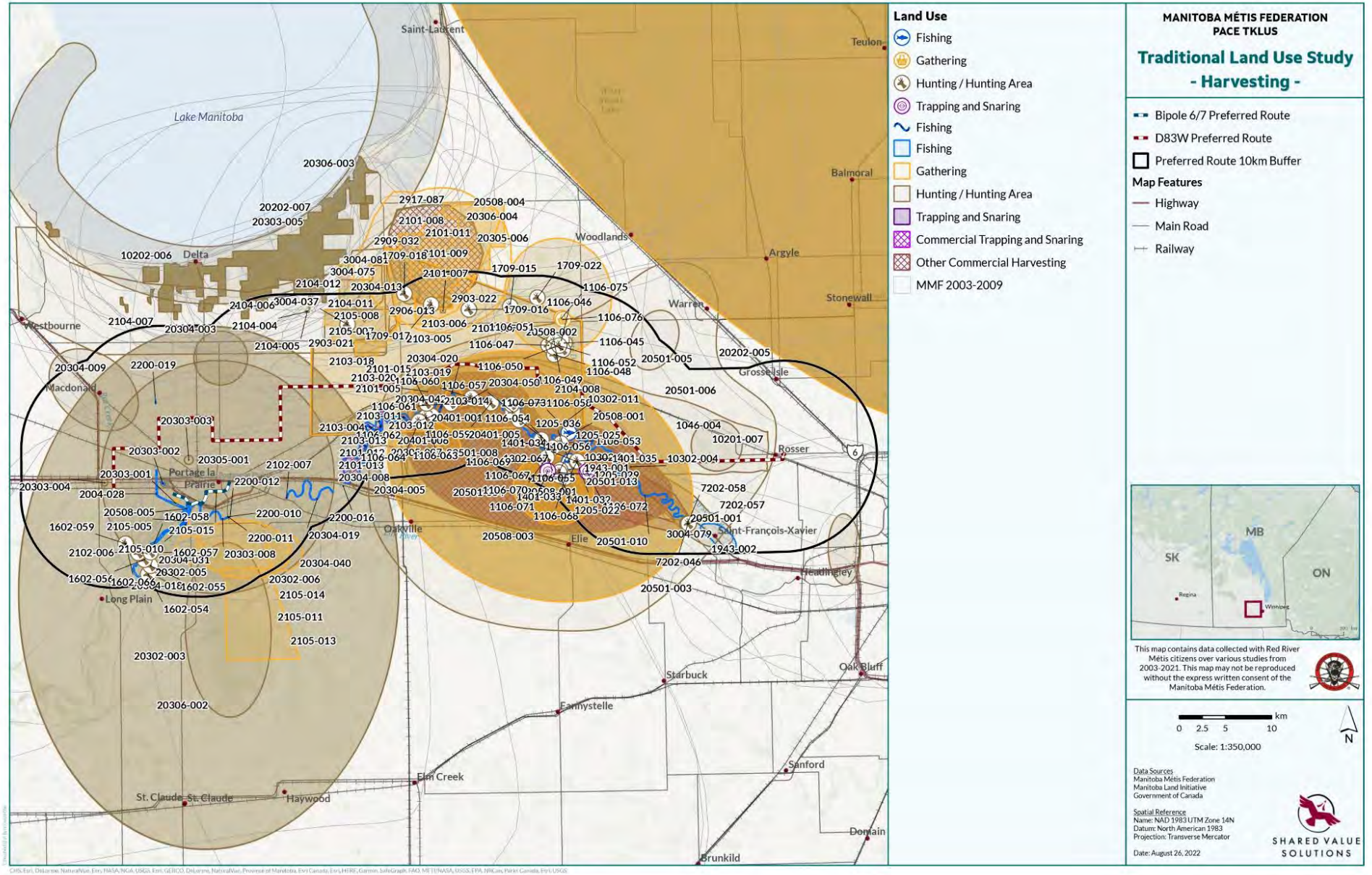


Figure 11: Map of harvesting locations around Portage La Prairie. Attribute data for each feature is available in Appendix A.

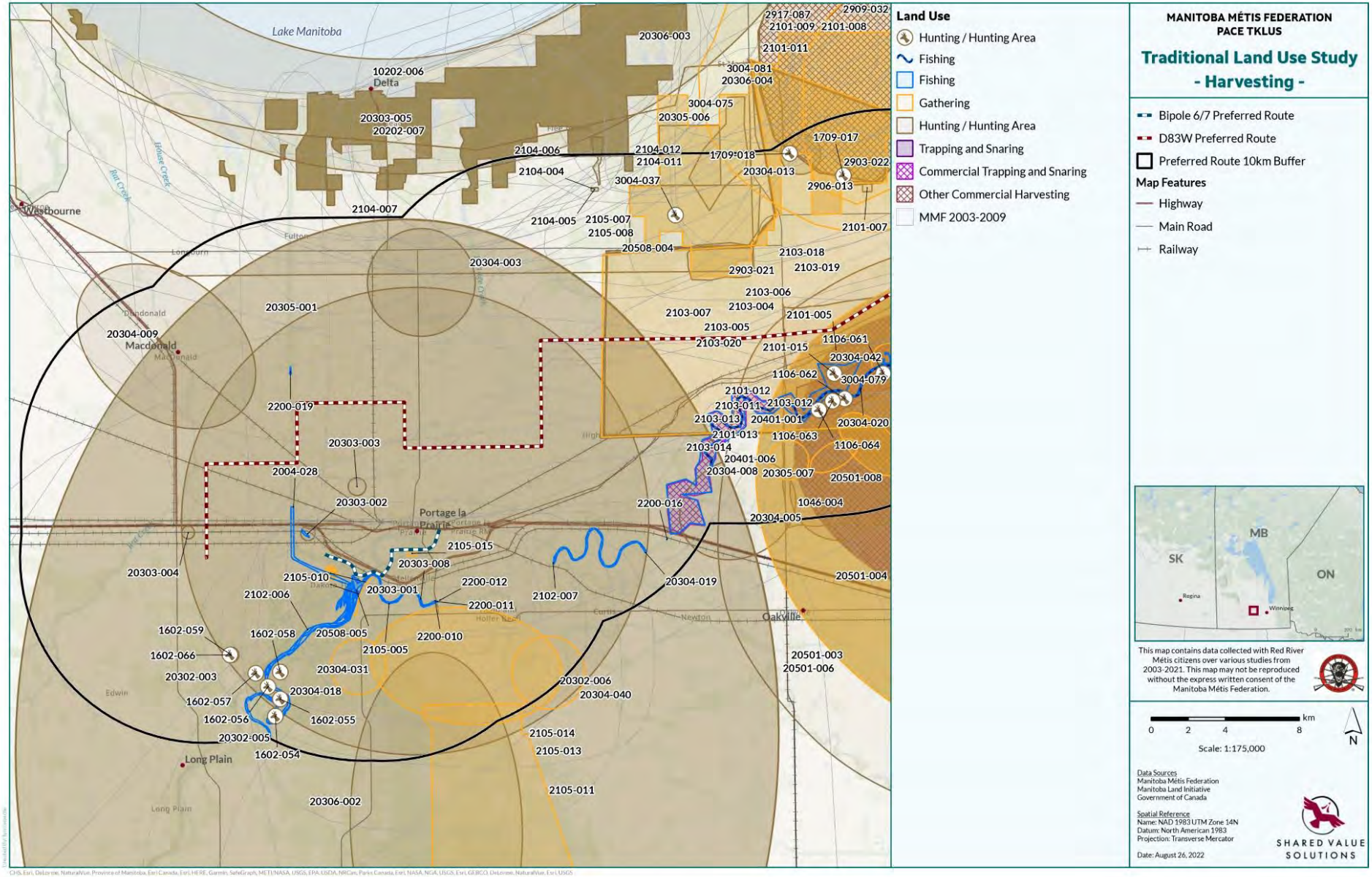
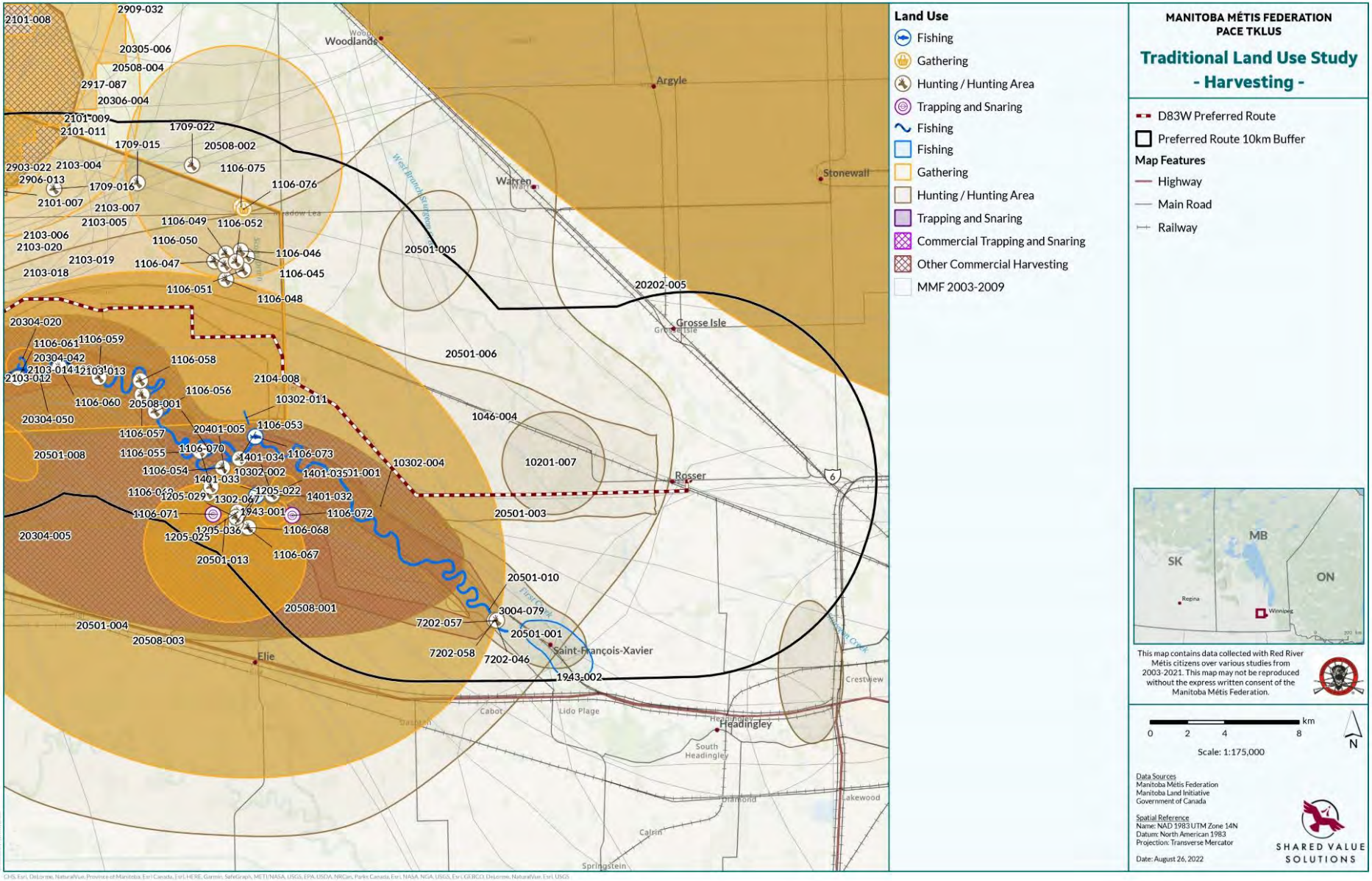


Figure 12: Map of harvesting locations west of Rosser. Attribute data for each feature is available in Appendix A.



Red River Métis citizens identified many harvesting areas within 10 km of the proposed project including locations used for hunting, fishing, trapping, and gathering of natural materials. Generally, these locations are clustered in the same areas where Métis Ecological Knowledge was identified but cover a larger area.

The Assiniboine River was identified as an important area for harvesting activities, as much of the river between Long Plain to St. Francois-Xavier was identified as a fishing location, and the surrounding areas used for hunting and gathering. Hunting areas used by participants are located throughout the 10km buffer around both BP6/7 and D83W, extending from Portage La Prairie east to Rosser. Other harvesting areas used for gathering and commercial harvesting extend through this area to the northwest towards St. Ambroise and Lake Manitoba.

A number of these locations directly overlap with the preferred route for BP 6/7, including fishing areas where Red River Métis citizens target carp, walleye/pickerel, perch, and mariah. Other harvesting activities are also present overlapping with BP6/7, including a gathering area for choke cherries and a grouse and geese hunting area. In the immediate areas surrounding the line, participants reported a high density of natural materials such as cedar, saskatoon berry, wild asparagus, sweet grass, sage, red willow, bear and hazelnuts, which are harvested by citizens year-round.

Red River Métis citizens also identified a high density of harvesting areas in the eastern portion of the preferred route of D83W. The sites identified by individuals directly overlapping the proposed route included locations where participants hunt for bird species such as bufflehead, canvas back, mallard and wood ducks, pintails, teals and shoveler. Harvesting locations for geese, grouse, and teal were also identified north of the D83W route. Red River Métis citizens also reported a number of deer hunting and fishing locations in the immediate areas surrounding the route, as well as a commercial harvesting area.

In addition to being rights protected under S.35 of the *Constitution Act (1982)*, harvesting activities such as those identified here are inextricably linked to Red River Métis culture and way of life. To further illustrate the critical role of these practices, the following excerpts taken from the interviews completed for this study detail Red River Métis citizens' stories about hunting, fishing, trapping and gathering.

Several interview participants described harvesting with their families and the knowledge transfer that would take place, either learning the skills from their parents or passing them on to younger generations.

> *My dad went out and showed me how to set traps for weasels and squirrels…which is something that probably all Métis people did….kind of a little example of like I really was brought up as a Métis kid.*

> *I taught both of my daughters, took them out hunting ducks and one of my nieces, and a couple of other young people…Every day I did that was an enjoyable day.*

Interviewees also described how harvesting is an important method of subsistence and survival, providing food to eat year-round with proper preservation.

> *Well, we grew up very poor… Mom could barely afford food, so we grew up hunting, so we would go out together with Dad, it was probably two days a week I'd have to go down to the creek or shoot rabbits or get ducks and made sure that we got a couple deer for the winter, that's my story. That was survival.*

> *And deer, we used to hunt deer in the marsh. My Dad's uncles would come out from Winnipeg…and they'd come out and help clean deer, and we would can the deer. So, they'd have canned deer meat for the wintertime.*

The harvesting locations mapped within 10km of the proposed projects (Figure 10) show that Red River Métis citizens exercise their S.35 rights in close proximity to, and in some cases directly overlapping with, the proposed projects. The knowledge and stories shared by participants, excerpts of which have been included here, further underscore the importance of such sites to Red River Métis citizens who practice their culture and way of life in the area and the necessity of assessing and mitigating potential impacts to these areas.

4.2.3 CULTURAL SITES, OVERNIGHT LOCATIONS AND ACCESS AREAS

In addition to areas on the land where Red River Métis citizens hold ecological knowledge and exercise their harvesting rights, participants identified a number of cultural sites, overnight locations and routes they use to access important areas on the land.

Along with Métis Ecological Knowledge (Section 4.2.1), cultural and overnight sites are considered to be evidence of occupancy in an area (Tobias, 2000). Generally, this term refers to areas known by an Indigenous group by virtue of continued use, habitation, naming, knowledge, and control (Tobias, 2000). In the context of this study, these include sites identified as being occupied by or identified as culturally, historically, or otherwise significant to the Red River Métis. Cultural sites identified may also include places that Red River Métis citizens hold knowledge of or have been told stories about by others in addition to those they visit or use themselves.

Participants identified cultural sites, overnight areas, and access features they use in proximity to the proposed projects (Figure 13;

Table 2: Harvesting locations mapped within 10km of BP6/7 and PACE. Corresponds to Figure 10.

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
10302-002	Commercial Trapping and Snaring	Mink	WI
20501-004	Commercial Trapping and Snaring	Beaver	SP, WI
20501-004	Commercial Trapping and Snaring	Coyote	WI
20501-004	Commercial Trapping and Snaring	Mink	SP, WI
20501-004	Commercial Trapping and Snaring	Muskrat	SP, WI
20501-004	Commercial Trapping and Snaring	Weasel	FA, WI
2101-011	Other Commercial Harvesting		FA, WI
2101-012	Commercial Trapping and Snaring	Mink	WI
9002-009	Commercial Fishing		
10201-007	Hunting	Deer	FA, WI
10201-007	Hunting	Cotton Tail Rabbit	WI
10202-006	Hunting	Dark Geese/ Canada Geese	FA
10202-006	Hunting	Sharp-tailed Grouse	FA
10202-006	Hunting	White Geese/ Snow Geese	FA
10302-002	Gathering	Wild Rose, Rose Hips & Rose Buds	SU, FA
10302-002	Gathering	Diamond Willow	WI
10302-002	Hunting	Dark Geese/ Canada Geese	FA
10302-002	Hunting	Mallard Duck	FA
10302-002	Hunting	Pintail	FA
10302-002	Hunting	Teal	FA
10302-002	Hunting	Wood Ducks	FA
10302-002	Hunting	Deer	FA
10302-002	Hunting	Coyote	WI
10302-002	Hunting	Jack Rabbit	WI
10302-002	Hunting	Red Fox	WI
10302-002	Hunting	Weasel	WI
10302-004	Hunting	Deer	FA
10302-004	Hunting	Coyote	WI
10302-004	Hunting	Red Fox	WI

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
10302-004	Hunting	Weasel	WI
10302-011	Fishing	Black Crappie/ Sunfish	SU
10302-011	Fishing	Brown Trout	SP
10302-011	Fishing	Bullhead	SP
10302-011	Fishing	Burbot	SU
10302-011	Fishing	Carp	SP
10302-011	Fishing	Channel Catfish	SU
10302-011	Fishing	Freshwater Drum	SU
10302-011	Fishing	Goldeye	SU
10302-011	Fishing	Mariah	SU
10302-011	Fishing	Mooneye	SU
10302-011	Fishing	Northern Pike/ Jackfish	WI
10302-011	Fishing	Perch	FA
10302-011	Fishing	Rainbow Trout	SP
10302-011	Fishing	Rock Bass	FA
10302-011	Fishing	Sauger	WI
10302-011	Fishing	Sucker	SU
10302-011	Fishing	Walleye/ Pickerel	FA
10302-011	Fishing	White Bass	SU
1046-004	Hunting	Deer, Geese, Duck, Upland Birds	WI, FA
1106-045	Hunting	Deer	FA
1106-046	Hunting	Deer	FA
1106-047	Hunting	Deer	FA
1106-048	Hunting	Deer	FA
1106-049	Hunting	Deer	FA
1106-050	Hunting	Deer	FA
1106-051	Hunting	Deer	FA
1106-052	Hunting	Deer	FA
1106-053	Hunting	Deer	FA
1106-054	Hunting	Deer	FA
1106-055	Hunting	Deer	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
1106-056	Hunting	Deer	FA
1106-057	Hunting	Deer	FA
1106-058	Hunting	Deer	FA
1106-059	Hunting	Deer	FA
1106-060	Hunting	Deer	FA
1106-061	Hunting	Deer	FA
1106-062	Hunting	Deer	FA
1106-063	Hunting	Deer	FA
1106-064	Hunting	Deer	FA
1106-067	Hunting	Duck	FA
1106-068	Hunting	Goose	FA
1106-069	Hunting	Squirrel	SP, SU, FA, WI
1106-070	Hunting	Rabbit	SP, SU, FA, WI
1106-071	Trapping and Snaring		WI
1106-072	Trapping and Snaring		WI
1106-073	Fishing	Personal	SP, SU, FA
1106-075	Gathering		SU
1106-076	Gathering		SU
1205-022	Hunting	Deer	SU, FA
1205-025	Hunting	Coyote	WI
1205-029	Hunting	Rabbit	WI
1205-036	Fishing	Personal	SU, FA
1302-067	Trapping and Snaring		
1401-032	Hunting	Duck	FA
1401-033	Hunting	Duck	FA
1401-034	Hunting	Goose	FA
1401-035	Hunting	Goose	FA
1602-054	Hunting	Deer	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
1602-055	Hunting	Deer	FA
1602-056	Hunting	Deer	FA
1602-057	Hunting	Deer	FA
1602-058	Hunting	Deer	FA
1602-059	Hunting	Duck	FA
1602-066	Hunting	Goose	FA
1709-015	Hunting	Deer	FA
1709-016	Hunting	Deer	FA
1709-017	Hunting	Deer	FA
1709-018	Hunting	Grouse	FA
1709-022	Hunting	Grouse	FA
1943-001	Gathering	Berries	SU
1943-002	Fishing	Jackfish, Pickerel, Suckers, Other	SP, SU, FA
1943-002	Gathering	Berries	SP, SU, FA
2004-028	Fishing	Pickerel	
20202-005	Gathering	Balsam Poplar	FA
20202-005	Gathering	Bur Oak	FA
20202-005	Gathering	Jack Pine	FA
20202-005	Gathering	Red Willow	FA
20202-005	Gathering	Tamarack	FA
20202-005	Gathering	White Birch	FA
20202-005	Gathering	Blue Spruce	FA
20202-005	Hunting	Canvasback	FA
20202-005	Hunting	Dark Geese/ Canada Geese	FA
20202-005	Hunting	Mallard Duck	FA
20202-005	Hunting	Pintail	FA
20202-005	Hunting	Prairie Chicken	FA
20202-005	Hunting	Redhead	FA
20202-005	Hunting	Ruffed Grouse	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20202-005	Hunting	Scaup/ Blue Bill	FA
20202-005	Hunting	Sharp-tailed Grouse	FA
20202-005	Hunting	Spruce Grouse	FA
20202-005	Hunting	Teal	FA
20202-005	Hunting	Widgeon	FA
20202-005	Hunting	Wood Ducks	FA
20202-005	Hunting	Deer	FA
20202-005	Hunting	Wolf	FA, WI
20202-005	Hunting	Raccoon	NA
20202-005	Hunting	Gopher	SU
20202-005	Hunting	Coyote	FA, WI
20202-005	Hunting	Fox	SP, SU, FA, WI
20202-007	Hunting	Canvasback	FA
20202-007	Hunting	Dark Geese/ Canada Geese	FA
20202-007	Hunting	Mallard Duck	FA
20202-007	Hunting	Pintail	FA
20202-007	Hunting	Prairie Chicken	FA
20202-007	Hunting	Redhead	FA
20202-007	Hunting	Ruffed Grouse	FA
20202-007	Hunting	Scaup/ Blue Bill	FA
20202-007	Hunting	Sharp-tailed Grouse	FA
20202-007	Hunting	Spruce Grouse	FA
20202-007	Hunting	Teal	FA
20202-007	Hunting	White Geese/ Snow Geese	FA
20202-007	Hunting	Widgeon	FA
20202-007	Hunting	Wood Ducks	FA
20302-003	Hunting	Dark Geese/ Canada Geese	FA
20302-003	Hunting	Mallard Duck	FA
20302-003	Hunting	Sharp-tailed Grouse	FA
20302-003	Hunting	White Geese/ Snow Geese	WI

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20302-003	Hunting	Wild Turkey	FA
20302-003	Hunting	Beaver	SP, SU
20302-003	Hunting	Coyote	FA
20302-003	Hunting	Gopher	SU
20302-003	Hunting	Jack Rabbit	WI
20302-003	Hunting	Snowshoe Hare	FA, WI
20302-005	Fishing	Northern Pike/ Jackfish	SP, SU
20302-005	Fishing	Walleye/ Pickerel	SP, SU
20302-006	Gathering	Balsam Poplar	FA
20302-006	Gathering	Black Ash	FA
20302-006	Gathering	Bur Oak	FA
20302-006	Gathering	Green Ash	FA
20302-006	Gathering	Black Morels/ Morels Mushroom	SP
20303-001	Gathering	Asparagus	SU
20303-001	Gathering	Black Currant	SU
20303-001	Gathering	Bracken (Fiddlehead)	SP
20303-001	Gathering	Chokecherry	SU
20303-001	Gathering	Cranberry	SU
20303-001	Gathering	Dandelion	SP
20303-001	Gathering	Gooseberry	SU
20303-001	Gathering	Hazelnut	FA
20303-001	Gathering	Oxeye Daisy	FA
20303-001	Gathering	Pin Cherry	SU
20303-001	Gathering	Pineapple-weed	SU
20303-001	Gathering	Plum	SU, FA
20303-001	Gathering	Raspberry	SU
20303-001	Gathering	Saskatoon Berry	SU
20303-001	Gathering	Wild Grapes	SU
20303-001	Gathering	Wild Mint	SP, SU, FA, WI
20303-001	Gathering	Wild Onion	SU

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20303-001	Gathering	Wild Rose, Rose Hips & Rose Buds	FA
20303-001	Gathering	Common Sweet Clover	SP
20303-001	Gathering	Dock	FA
20303-001	Gathering	Goldenrod	SU, FA
20303-001	Gathering	Jerusalem Artichoke	SP, SU
20303-001	Gathering	Wild Bergamot	SU
20303-001	Hunting	Gray Partridge	FA
20303-001	Hunting	Ruffed Grouse	FA
20303-001	Hunting	Deer	FA
20303-002	Fishing	Bullhead	SU
20303-002	Hunting	Dark Geese/ Canada Geese	FA
20303-003	Hunting	Dark Geese/ Canada Geese	FA
20303-004	Hunting	Prairie Chicken	FA
20303-005	Hunting	Mallard Duck	FA
20303-005	Hunting	Pintail	FA
20303-005	Hunting	Teal	FA
20303-008	Fishing	Perch	SP, SU, FA, WI
20303-008	Fishing	Walleye/ Pickerel	SP, SU, FA, WI
20304-003	Hunting	Duck	NA
20304-003	Hunting	Mallard Duck	SP, FA
20304-003	Hunting	Teal	FA
20304-003	Hunting	Deer	FA
20304-005	Hunting	Dark Geese/ Canada Geese	FA
20304-005	Hunting	White Geese/ Snow Geese	FA
20304-005	Hunting	Deer	FA
20304-008	Hunting	Deer	FA
20304-009	Hunting	Dark Geese/ Canada Geese	FA
20304-009	Hunting	Duck	FA
20304-009	Hunting	White Geese/ Snow Geese	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20304-013	Hunting	Duck	FA
20304-013	Hunting	Gray Partridge	FA
20304-013	Hunting	Mallard Duck	SP, FA
20304-013	Hunting	Teal	FA
20304-018	Fishing	Sturgeon	SU
20304-018	Fishing	Channel Catfish	SU
20304-018	Fishing	Walleye/ Pickerel	SU, WI
20304-019	Fishing	Freshwater Drum	SU
20304-019	Fishing	Walleye/ Pickerel	SU
20304-019	Fishing	Channel Catfish	SU
20304-019	Fishing	Northern Pike/ Jackfish	WI
20304-019	Fishing	Sucker	WI
20304-020	Fishing	Channel Catfish	SU
20304-020	Fishing	Northern Pike/ Jackfish	WI
20304-020	Fishing	Sucker	WI
20304-020	Fishing	Walleye/ Pickerel	SU, WI
20304-031	Gathering	Cranberry	SU
20304-040	Gathering	Saskatoon Berry	SU
20304-042	Gathering	Asparagus	SP
20304-050	Gathering	Bracken (Fiddlehead)	SP
20305-001	Hunting	Dark Geese/ Canada Geese	FA
20305-001	Hunting	White Geese/ Snow Geese	FA
20305-001	Hunting	Deer	FA
20305-006	Gathering	Balsam Poplar	FA
20305-006	Gathering	Bur Oak	FA
20305-007	Gathering	Green Ash	FA
20306-002	Hunting	Ruffed Grouse	WI
20306-002	Hunting	Snowshoe Hare	WI
20306-003	Hunting	Bufflehead	FA
20306-003	Hunting	Canvasback	FA
20306-003	Hunting	Dark Geese/ Canada Geese	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20306-003	Hunting	Gadwell	FA
20306-003	Hunting	Goldeye	FA
20306-003	Hunting	Mallard Duck	FA
20306-003	Hunting	Pintail	FA
20306-003	Hunting	Redhead	FA
20306-003	Hunting	Scaup/ Blue Bill	FA
20306-003	Hunting	Shoveler	FA
20306-003	Hunting	Teal	FA
20306-003	Hunting	White Geese/ Snow Geese	FA
20306-003	Hunting	Widgeon	FA
20306-003	Hunting	Wood Ducks	FA
20306-004	Hunting	Ruffed Grouse	FA
20306-004	Hunting	Sharp-tailed Grouse	FA
20306-004	Hunting	Deer	FA
20401-001	Fishing	Carp	SU
20401-001	Fishing	Channel Catfish	SU
20401-001	Fishing	Goldeye	SU
20401-005	Gathering	Black Spruce	FA
20401-005	Gathering	Green Ash	FA
20401-005	Gathering	Manitoba Maple	FA
20401-005	Gathering	Trembling Aspen	FA
20401-005	Gathering	White Birch	FA
20401-005	Gathering	Chokecherry	SU
20401-005	Gathering	Pin Cherry	SU
20401-005	Gathering	Raspberry	SU
20401-005	Gathering	Saskatoon Berry	SU
20401-005	Gathering	Pussy Willow	SP
20401-006	Gathering	Saskatoon Berry	SU
20501-001	Hunting	Prairie Chicken	SP, SU, FA, WI

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20501-001	Hunting	Wild Turkey	SP, SU, FA, WI
20501-001	Hunting	Deer	FA
20501-003	Gathering	Black Ash	FA
20501-003	Gathering	Bur Oak	FA
20501-003	Gathering	Eastern White Cedar	FA
20501-003	Gathering	Green Ash	FA
20501-003	Gathering	Manitoba Maple	FA
20501-003	Gathering	Tamarack	FA
20501-003	Hunting	Dark Geese/ Canada Geese	FA
20501-003	Hunting	White Geese/ Snow Geese	FA
20501-003	Hunting	Coyote	FA, WI
20501-003	Hunting	Gopher	SP, SU, FA, WI
20501-003	Hunting	Grey Squirrels	SU, FA
20501-003	Hunting	Jack Rabbit	FA, WI
20501-003	Hunting	Mink	WI
20501-003	Hunting	Muskrat	SP
20501-003	Hunting	Raccoon	FA, WI
20501-003	Hunting	Red Fox	FA, WI
20501-003	Hunting	Red Squirrels	SU, FA
20501-003	Hunting	Weasel	WI
20501-004	Hunting	Mallard Duck	FA
20501-004	Hunting	Beaver	SP, WI
20501-004	Trapping and Snaring	Cotton Tail Rabbit	FA, WI
20501-004	Trapping and Snaring	Jack Rabbit	FA, WI
20501-004	Trapping and Snaring	Snowshoe Hare	FA, WI
20501-005	Hunting	Snowshoe Hare	FA, WI
20501-006	Hunting	Ruffed Grouse	FA
20501-008	Gathering	Black Currant	FA
20501-008	Gathering	Chokecherry	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20501-008	Gathering	Cranberry	FA
20501-008	Gathering	Raspberry	FA
20501-008	Gathering	Red Currant	FA
20501-008	Gathering	Saskatoon Berry	FA
20501-008	Hunting	Gadwell	FA
20501-008	Hunting	Teal	FA
20501-010	Fishing	Bullhead	SU
20501-010	Fishing	Channel Catfish	SU
20501-010	Fishing	Freshwater Drum	SU
20501-010	Fishing	Goldeye	SU
20501-010	Fishing	Northern Pike/ Jackfish	SU
20501-010	Fishing	Sauger	SU
20501-010	Fishing	Walleye/ Pickerel	SU
20501-013	Gathering	Clammy Ground Cherry	FA
20501-013	Gathering	Pin Cherry	FA
20501-013	Gathering	Strawberry	FA
20508-001	Fishing	Burbot	SU
20508-001	Fishing	Carp	SU
20508-001	Fishing	Channel Catfish	SU
20508-001	Fishing	Mariah	SU
20508-001	Fishing	Northern Pike/ Jackfish	SU
20508-001	Fishing	Perch	SU
20508-001	Fishing	Sauger	SU
20508-001	Fishing	Sucker	SU
20508-001	Fishing	Walleye/ Pickerel	SU
20508-001	Gathering	American Elm	SP, SU, FA, WI
20508-001	Gathering	Bur Oak	SP, SU, FA, WI
20508-001	Gathering	Jack Pine	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20508-001	Gathering	White Birch	SP, SU, FA, WI
20508-001	Gathering	Chokecherry	SU
20508-001	Gathering	Raspberry	SU
20508-001	Gathering	Saskatoon Berry	SU
20508-001	Gathering	Strawberry	SU
20508-001	Hunting	Bufflehead	SP
20508-001	Hunting	Canvasback	SP
20508-001	Hunting	Dark Geese/ Canada Geese	FA
20508-001	Hunting	Mallard Duck	SP
20508-001	Hunting	Pintail	SP
20508-001	Hunting	Redhead	SP
20508-001	Hunting	Shoveler	SP
20508-001	Hunting	Teal	SP
20508-001	Hunting	White Geese/ Snow Geese	FA
20508-001	Hunting	Wood Ducks	SP
20508-001	Hunting	Deer	FA
20508-001	Hunting	Jack Rabbit	WI
20508-001	Hunting	Muskrat	NA
20508-002	Gathering	Balsam Poplar	SP, SU, FA, WI
20508-002	Hunting	Prairie Chicken	FA
20508-002	Hunting	Ruffed Grouse	FA
20508-002	Hunting	Sharp-tailed Grouse	FA
20508-003	Hunting	Bufflehead	SP
20508-003	Hunting	Canvasback	SP
20508-003	Hunting	Mallard Duck	SP
20508-003	Hunting	Pintail	WI
20508-003	Hunting	Redhead	WI
20508-003	Hunting	Shoveler	SP
20508-003	Hunting	Teal	SP

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20508-003	Hunting	Wood Ducks	SP
20508-004	Gathering	American Elm	SP, SU, FA, WI
20508-004	Gathering	Balsam Poplar	SP, SU, FA, WI
20508-004	Gathering	Bur Oak	SP, SU, FA, WI
20508-004	Hunting	Deer	FA
20508-005	Fishing	Carp	SU
20508-005	Fishing	Mariah	NA
2101-005	Gathering	Cranberries	SU
2101-007	Hunting	White-tailed Deer	FA
2101-008	Hunting	White-tailed Deer	FA
2101-009	Hunting	Grouse	FA
2101-013	Fishing	Jackfish/Northern Pike, Goldeye, Sucker, Pickerel/Walleye, Carp, Catfish, Mooneye, Chubbs	SP, FA, SU
2101-015	Hunting	White-tailed Deer	FA
2102-006	Fishing	Catfish, Pickerel/Walleye	SU
2102-007	Fishing	Pickerel/Walleye, Mooneye, Sauger, Carp, Sucker	SU
2103-004	Hunting	Deer	FA
2103-005	Hunting	Coyote	WI, FA
2103-006	Hunting	Partridge, Grouse, Duck	FA
2103-007	Hunting	Rabbit	WI
2103-011	Fishing	Pickerel/Walleye	SP, FA, SU
2103-012	Fishing	Jackfish/Northern Pike	SP, SU, FA
2103-013	Fishing	Sucker	SP, SU, FA
2103-014	Fishing	Catfish	SP, SU, FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
2103-018	Gathering	Cranberries	SU, FA
2103-019	Gathering	Choke Cherries	SU, FA
2103-020	Gathering	Cranberries, Poplar	SU, FA
2104-004	Hunting Area	Goose	FA
2104-005	Hunting Area	Duck	FA
2104-006	Hunting Area	Grouse	FA
2104-007	Hunting Area	White-tailed Deer	SU, FA
2104-008	Hunting Area	Duck	FA
2104-011	Hunting	Grouse	FA, WI
2104-012	Hunting Area	Deer	FA
2105-005	Fishing	Catfish, Pickerel/Walleye, Sauger, Bass	SU
2105-007	Hunting	Deer	FA, WI
2105-008	Hunting	Chicken	FA, WI
2105-010	Gathering	Sage	SU
2105-011	Gathering	Sage	SU
2105-013	Gathering	Cherries, Saskatoon Berries, Cedar, Chaga, Mint, Raspberries, Red Willow, Wild Asparagus, Bear Nuts, Hazelnuts	SP, FA, WI, SU
2105-014	Gathering	Chaga, Sweet Grass, Cedar	SP, FA, SU, WI
2105-015	Gathering	Choke Cherries	SU
2200-010	Fishing	Goldeye, Jackfish/Northern Pike, Sucker	SP, SU
2200-011	Fishing	Carp, Goldeye, Jackfish/Northern Pike, Pickerel/Walleye, Sucker, Bass	SU, SP
2200-012	Fishing	Jackfish/Northern Pike, Pickerel/Walleye	SU
2200-016	Fishing	Goldeye, Pickerel/Walleye, Jackfish/Northern Pike	SU
2200-019	Fishing	Bass, Carp, Jackfish/Northern Pike, Pickerel/Walleye, Sucker, Drum Bass, Smallmouth Bass	SU, SP, FA
2903-021	Hunting	Coyotes And Deer	
2903-022	Hunting	Coyotes, Deer	

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
2906-013	Hunting		
2909-032	Gathering	Morrel Mushrooms	
2917-087	Gathering	Berries, Wood	
3004-037	Hunting	Deer	FA
3004-075	Hunting	Rabbit, Deer, Geese, Ducks	
3004-079	Trapping and Snaring	Beaver, Muskrat, Fox, Coyote	
3004-081	Hunting	Rabbit, Deer, Geese, Ducks	
7202-046	Gathering		
7202-057	Hunting		FA
7202-058	Hunting	Other Upland Bird	FA
9002-014	Hunting		
9903-021	Fishing		
9903-026	Hunting	Deer	
9903-029	Trapping and Snaring		
9903-031	Gathering	Wood And Trees	
9904-006	Hunting	Geese, Ducks, Grouse, Other	
9904-024	Trapping and Snaring		
9904-055	Hunting	Deer	
None-001	Hunting	Dark Geese/ Canada Geese	SP, FA
None-001	Hunting	Mallard Duck	SP, FA
None-001	Hunting	White Geese/ Snow Geese	SP, FA
None-004	Hunting	Deer, Ducks, Geese, Cranes, Elk	
None-004	Trapping and Snaring	Muskrat, Mink	
None-005	Fishing		
None-006	Hunting	Deer, Ducks, Geese, Elk	
None-006	Hunting	Ducks, Geese, Deer	
None-007	Trapping and Snaring	Muskrat, Mink, Beaver	
None-008	Fishing		
None-008	Fishing		
None-009	Fishing		

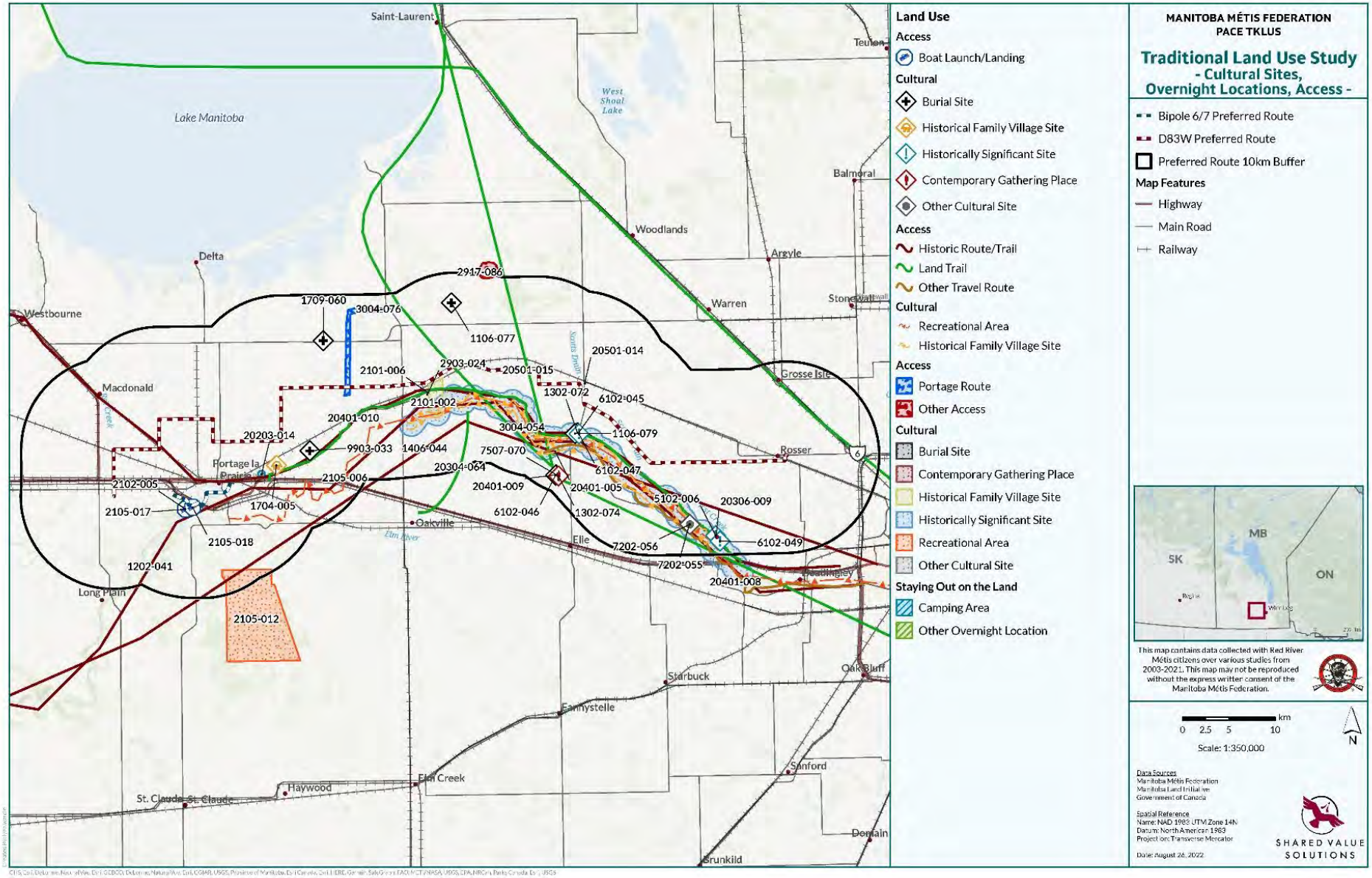
PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
None-009	Gathering	Saskatoon Berries, Cranberries, Chokecherries, Strawberries	
None-010	Trapping and Snaring		
None-011	Fishing		
None-011	Hunting	Duck, Geese	
None-011	Hunting	White-Tailed Deer	
None-012	Trapping and Snaring	Muskrat	
None-013	Hunting	Duck, Geese	
None-013	Hunting	Waterfowl	
None-013	Hunting	Deer, Ducks, Geese	
None-014	Hunting	Deer	
None-014	Hunting	Deer	
None-014	Hunting		
None-015	Gathering	Strawberries, Saskatoon Berries, Chokecherries, Cranberries	
None-015	Hunting	Duck, Geese	
None-016	Fishing		
None-016	Gathering	Wood And Trees	
None-017	Trapping and Snaring	Muskrat, Beaver, Mink, Weasel, Fox, Coyote, Rabbits, Squirrels, Badgers, Racoons	
None-018	Gathering	Mushrooms	
None-019	Gathering	Berries	
None-019	Hunting		
None-020	Gathering	Wood And Trees	
None-020	Hunting		
None-021	Hunting	Large Game	
None-022	Fishing		
None-022	Trapping and Snaring		
None-023	Gathering	Berries, Medicines, Wood and Trees	
None-024	Trapping and Snaring		

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
None-024	Trapping and Snaring		
None-025	Hunting	Duck, Geese	
None-026	Gathering		
None-030	Fishing		
None-030	Hunting		
None-037	Gathering	Mushrooms	

Table 3). These sites included the following, within 10 km of the BP6/7 and PACE projects:

- **Cultural Sites** *(burial site, contemporary gathering place, historical family or village site, historically significant site, other cultural site, recreational area)*
- **Overnight Locations** *(camping area, other overnight location)*
- **Access** *(land trail, boat launch or landing, other access feature, portage route, historic access route)*

Figure 13: Cultural, overnight, and access locations within 10km of the proposed projects. Attribute data for each feature is available in Appendix A.



Data collected from Red River Métis citizens indicates that the area within the 10 km around both of the Manitoba Hydro identified preferred routes was historically, and continues to be, a highly travelled and occupied area used by the Red River Métis. Evidence of this includes the presence of historic trails, contemporary trails, portages, as well areas used by citizens as gathering places and for recreational use. Many of these sites are clustered around the Assiniboine River, especially the section extending from Poplar Point southeast to St. Francois-Xavier, which was identified as a historically significant site and encompasses recreational areas, contemporary gathering places, historical family/village sites and other cultural sites as well as land trails.

Red River Métis citizens identified two boat launch locations that directly overlap with the proposed and preferred route for BP 6/7; there is also a historic trail and contemporary recreational area just south of the route close to Portage la Prairie. Citizens also reported several culturally important sites near the proposed D83W route. Importantly, these include especially sensitive areas such as burial sites, one of which is located just south of the preferred route to the northeast of Portage la Prairie.

The cultural sites, overnight areas and access routes mapped within 10km of the proposed projects (Figure 13) provide evidence of Red River Métis occupancy in close proximity to, and in some cases directly overlapping with, the proposed projects. The presence of these sites, especially those that are sensitive, sacred or ceremonial such as the burial sites identified within the 10km buffer, strongly indicates a need for further assessment of the preferred routes, potential impacts to the Red River Métis and appropriate avoidance and mitigation measures.

4.3 CHANGES AND CUMULATIVE EFFECTS

During the map biography and oral history interviews, participants were asked to identify and, where possible, locate on the map places where they have observed changes within their lifetime. These included changes to the environment, water and wildlife as well as well as changes to their harvesting practices or ability to access areas of importance to the Red River Métis. In some cases, participants provided explanation surrounding what might have caused these changes, for example, if they were related to a specific activity or development in the area.

In discussing observed changes on the land, participants were also asked about cumulative effects they may have experienced around Portage la Prairie including the areas around BP6/7 and PACE. Cumulative effects are defined as:

> *"…changes to the environment, health, social, and economic conditions as a result of the Project's residual environmental, health, social and economic effects combined with the existence of other past, present and reasonably foreseeable physical activities" - (Impact Assessment Agency of Canada [IAAC], 2020).*

In this sense, the observed changes mapped may be indicative of cumulative effects. The IAAC further states that *"the cumulative effects assessment must include consideration of cumulative effects to rights of Indigenous Peoples and cultures"* (IAAC, 2020).

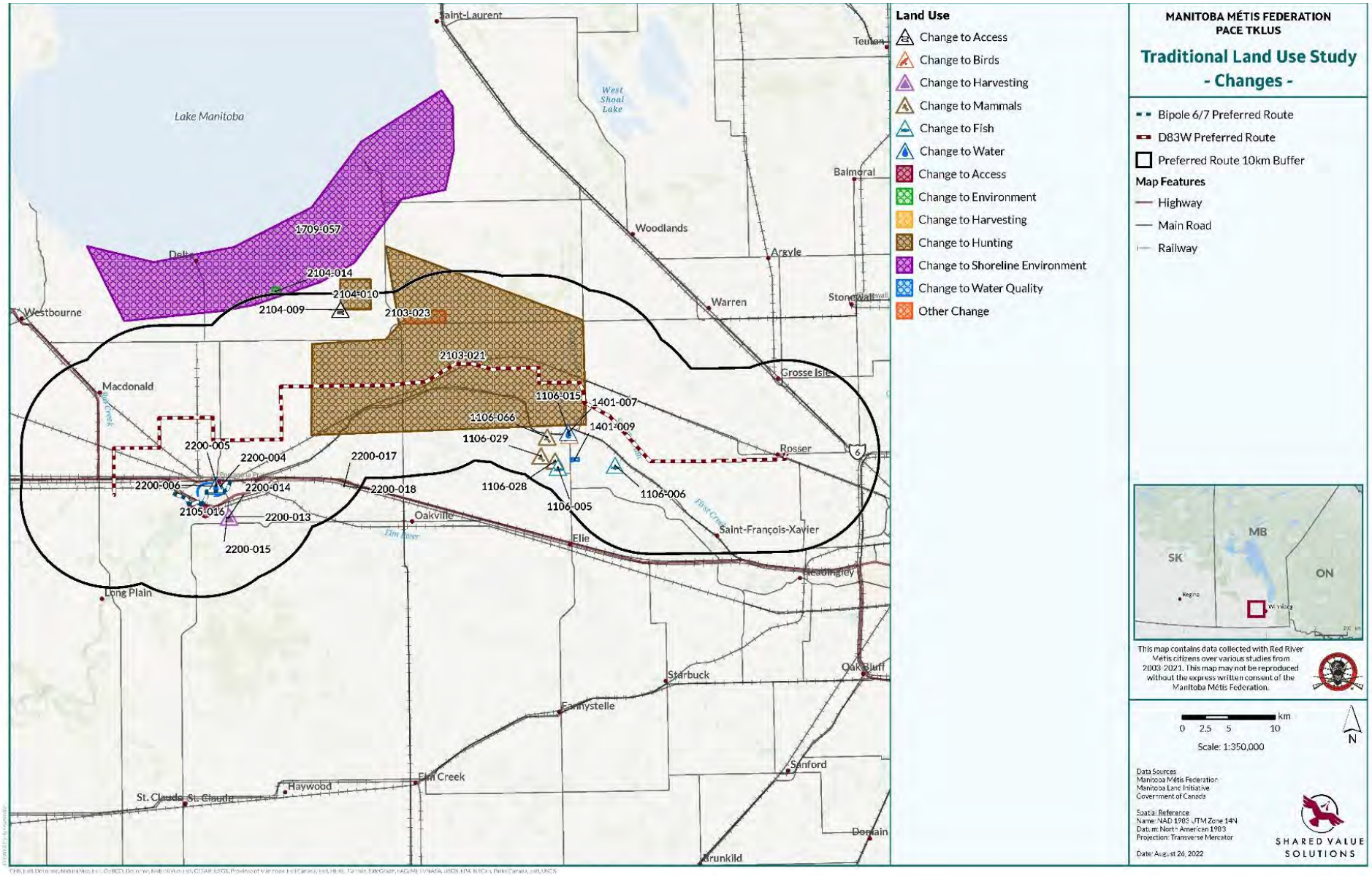
Due to the over-arching nature of changes on the land and cumulative effects, which include other physical activities in addition to the proposed projects, the changes and developments discussed in this section are not limited to those intersecting with the proposed projects. The quotations and maps below (Figure 14; **Table 4**) are intended to tell the larger story of the region in which the projects are proposed and the impacts these activities have had on Red River Métis citizens, to provide additional context in which the proposed projects must be considered.

Changes mapped by participants included changes to:

- **Access** *(barriers to accessing areas)*
- **Birds** *(change to the population)*
- **Harvesting** *(change to frequency or ability to harvest)*
- **Mammals** *(change to the population)*
- **Fish** *(change to the population)*
- **Water** *(change to water levels, changes to water quality, algal blooms)*
- **Plants** *(change to population)*
- **Environment** *(presence of industry)*
- **Hunting** *(change to deer)*
- **Shoreline environment** *(erosion)*
- **Other changes**

Additional details surrounding these changes, and some of the developments identified by participants as contributing to cumulative effects in the Portage la Prairie area, are provided below.

Figure 14: Observed changes mapped in the Portage la Prairie area, not limited to the 10km buffer around the proposed project. Attribute data for each feature is available in Appendix A.



Red River Métis citizens reported changes to access, animal and fish populations, habitats, harvesting, and the general environment in the 10 km surrounding the proposed BP 6/7 and D83W routes. A number of the changes reported directly overlap with the proposed pathway for BP 6/7, including changes to the water quality in the area due to algal blooms and a decrease in water levels. Participants also spoke to and mapped locations intersecting with the route in which they had experienced a change in access due to increased signage.

Citizens identified changes to the fish and animal populations in the area southeast of the preferred route for D83W, citing decreases in snow geese, grouse, fish, small game, as well as the habitats needed to support these species. Participants also noted the extent to which the shoreline along the southside of Lake Manitoba, and established wetland area, has experienced flooding; this increase in the water level has driven out important bird species such as piping plover.

The presence of changes observed in close proximity to, and sometimes overlapping with, the preferred routes for both BP6/7 and D83W may indicate that this area is already being impacted by other activities around Portage La Prairie. Some of the observed changes and effects from other developments are expanded on in further detail below.

4.3.1 THE PORTAGE DIVERSION

One major source of concern described by interview participants is the flooding and damage to the environment caused by the Portage Diversion. The Portage Diversion, in operation since 1970, was designed to protect the City of Winnipeg and other communities from flooding (Government of Manitoba, n.d.). However, in 2011, a large flood event was made even more disastrous to Red River Métis citizens when the Portage Diversion was used to redirect flood waters away from the City of Winnipeg, increasing the severity of flooding along Lake Manitoba (Froese, 2021). Interview participants described how the effects of this event impacted their ability to exercise their s.35 rights, from 2011 and continuing today.

One participant described how the diversion of floodwaters resulted in flooding of marshland that Red River Métis citizens rely on as a hunting area – which are still underwater. Fishing rights have also been impacted as Métis harvesters cannot access the back of the lake due to high water levels, and flooding has impacted fish and other animal species. The lakeshore was washed out into the marsh, introducing the invasive carp into the marsh, damaging the marsh environment for other species, including ducks and muskrat. The participant shared that even today, citizens are still dealing with the carp that swim up into the ditches.

> *Hunting and fishing has been affected in the general area where you can't get back in the marsh or back in the lake because of the high water levels. So, there's no question that traditional Métis hunting areas are underwater. So, I mean, we… When you mess with Mother Nature by pouring billions of gallons in down the Portage Diversion.[…] It's irreparable damage that's done to the Métis hunting areas, and fishing, and all of the above…[2011] was the big change. There [are] sections of the lakeshore that have been removed, that were destroyed, and opened right to the marsh. The marsh filled up with carp, and the carp destroy the bottom of the marsh, and that destroys the feed for the ducks and for the muskrat and for everything else. So, we have invasive species.[…] We're*

still dealing with carp, even in our yard. They come up the ditches. We had… The dog brought a carp up yesterday.

The Portage Diversion has also impacted the environment in general. A participant shared how the drop structures within the Diversion are preventing fish from spawning. The fish that are swimming up the Diversion to spawn are stopped by the drop structures, obstacles they cannot swim over to spawn. The participant explained that the fish are trapped there, and any potential spawn will not be able to survive.

They're flowing to a body of water, and the fish come up the creek and spawn. And the spawn get washed back into the body of water. So, these dead creeks that… That, you know, we'd call dead creek, they're more like a drain; they're not using those. They want a continuous flow of water. And so, they're spawning in the Whitemud River, and they're spawning in all the flowing water that continuously flows into the Lake Manitoba. But the Diversion probably kills lots of spawn because what happens to the Diversion is they're… They've got the gate running, there's fish in the Diversion up to the first structure on 249. There's fish coming from the river, from the drop structure 249. […] But, at that drop structure, you've got fish that came out of the lake and wanted to spawn stopping at the drop structure 'cause they can't get up it. And then you got fish that came out of the…out of the river, up to the drop structure, catfish and what have you, they get trapped in there. And they're trapped in there. If they spawn in there, spawn are going to die. There's nowhere for them to go. There is no fish ladders. There's no… Nothing. They're going to die, so… They're crossing… Where they cross the Diversion, that's in that section that's destined to die. So, it doesn't really matter. Doesn't really matter. Like, you're not destroying any spawn crossing that area because all that spawn that's in there is going to end up dying anyway.

Another participant spoke further about the impacts of the 2011 flood. When asked about potential concerns related to the proposed projects, the participant shared that they are not so much concerned about the hydro lines as they are concerned about the damage that has already occurred due to the management of hydro dams and the Portage Diversion, emphasizing the role that Manitoba Hydro has played in these larger-scale issues already impacting the area and the need for compensation.

We've been affected by the water levels in Lake Manitoba….Our new normal. You know, that's…a part of Manitoba Hydro's plan to keep the water level high in the lake, 'cause if they need the water they can let it out. So, who controls the dams at the Fairford? Is it government, or is it the hydro… Manitoba Hydro? We're not sure. So, that's the question we need to ask is... We don't have a natural water flow through our lake because of the Portage Diversion. They're dumping water into the Lake Manitoba continually, however it's convenient to fill the lake up, and we need to put some form of compensation in place. If they want to use Lake Manitoba for our water tank and flood the farmers that are at the south end of the lake, then we need to be compensated for that, which we haven't been to date. So, the real concern here is not about where the new hydro line is going, it's more

what kind of damages has hydro already done to our farm, and to our property, and to our way of life. I used to have a registered trapline through Island Trappers Association(ph) at the south end of the lake, and the areas that we used to trap muskrat is completely flooded out. Its destroyed. The whole environment of what we used to deal with is completely destroyed. Our levels shouldn't be controlled by Manitoba Hydro. That's probably the biggest part of the problem.

4.3.2 CHANGES TO ACCESS

Participants described how their ability to access some harvesting areas they used previously has been reduced for various reasons. One participant shared how municipal infrastructure, like water pumps, have resulted in more 'restricted area' signs which has prevented them from using these sites.

Just access, yeah, it's just more difficult now, to get in. There's a lot more signage…I think it's just the municipalities, they're setting-up lake water access points for their equipment, and – just concerns about the road, I guess. … That area there, you can't — that's where they access water, I think – the municipality, they have a big pump set-up there — it's a restricted area, you're not supposed to be in there.

Another participant explained how traditional Métis hunting areas have also been overtaken by private property, which often prevents Red River Métis harvesters from exercising their rights in these areas and speculated that the proposed hydro line could pose additional barriers, further exacerbating the issue of Red River Métis access to harvesting areas.

When you've been denied access to an area by private property… You know, there's certain areas in that… In that area where you can't go because people… They don't… They don't like hunters on their property. So, even though it's traditional hunting area, you can't go there anymore because somebody bought the property and doesn't want you to hunt there. So, you're limited by that. And then when you add in the hydro line… Depending on where it runs across, it could take out, you know, 50 percent of your hunting area.

In addition to physical barriers contributing to a decrease in access to harvesting areas, Red River Métis citizens have also experienced regulatory and legal barriers that have impacted their ability to harvest over time.

Prior to the introduction of Métis harvesting cards, Red River Métis citizens were required by the province to buy a hunting licence to exercise their right to hunt. One participant recounted how their ability to hunt in accordance with the Métis Laws of the Harvest increased with the introduction of Métis harvester cards. Instead of being guided by the need to recoup the cost of the licence, this interviewee noted that they began to shoot only what was needed to support their livelihood.

Since I started harvesting under my Métis rights to harvest, I noticed one huge difference in duck and moose hunting. Years ago, I bought a licence, it cost quite a bit of money so I'd try

to shoot, I shot way more ducks and geese to kind of cover the cost of buying the licence, and well I had lots of relatives, like a lot of more older relatives I gave ducks and geese too to have passed on, so I don't need that many. So now if I go out hunting geese, I go out with some friends of mine still every fall, usually towards the beginning of the season although most of my friends are Métis but not all of them, so if we want to hunt together. I noticed I go out before when I would shoot the limit of geese, maybe six or eight or whatever it was, now I'll shoot two. Maybe later in the year, I'll shoot one or two more. No more, before, I'd go out and I'd shoot six, I'd go out the next day and shoot six more. So, I don't do that anymore, I just shoot what I want to eat.

Although Red River Métis citizens have been harvesting off the land for generations, with this Métis Right affirmed in Powley as described in Section 3.4 of this report, harvesters still experience barriers to exercising their rights to be on and hunt the land.

You know…We don't buy a licence, a provincial licence, anymore. We use our Métis Harvester Card. And, at the start…when it was known that we could use our card, instead of having to buy a licence, the provincial government seemed very sour about that. You know, we got stopped on our own property. We shot a deer on our own property and the game warden drove right out in the field and said, "Do you have a licence for that? Are you on private property?" And I said, "No, it's my own property." And I said, "I don't have a licence." "Well, you can't shoot a deer without a licence." I go, "well, I've got a Harvester Card." "Well, that's no good." I was like, "Excuse me?"… We've been stopped since, and had our licences checked on the road…And I said, "I'm hunting to put deer in the freezer." And that's the way it is. And he didn't give me any hassle. Said, "Okay." That was like two years after, so… they're very slow to learn. And they did not want to give us the right. They were fighting it all the way… So, now that their rights have been established… Yeah, it's great. It's wonderful. Happy with it.

The changes observed and described by participants, along with the developments they reported as having had an effect on the environment and their ability to exercise their s.35 rights, provide evidence of cumulative effects already impacting Red River Métis citizens around Portage la Prairie and the proposed projects. Examples of these impacts include reduced access to harvesting areas due to both physical and regulatory barriers, as well as the ongoing effects experienced as a result of the Portage Diversion.

Given the information presented here, it is critical that potential impacts of the proposed projects on Red River Métis rights, claims and interests are appropriately assessed within this context and not separate from other developments, especially those already implemented or managed by Manitoba Hydro.

4.4 SUMMARY AND CONCLUSIONS

Red River Métis citizens identified a number of land use and occupancy sites within 10km of the proposed projects, and in some cases directly overlapping with the preferred routes selected by

Manitoba Hydro. These include places where Red River Métis citizens exercise their s.35 rights including places where they harvest, camp, travel, and otherwise use or hold knowledge of ecologically important or cultural and historic sites.

The presence of these sites overlapping with, or in close proximity to, the selected routes for both BP6/7 and PACE, as well as the associated Wash'ake Mayzoon station, indicated that Red River Métis citizens may be impacted by Manitoba Hydro's proposed projects through both the construction (e.g. disruptions to the environment and wildlife) and operation (e.g. fragmenting wildlife habitat or harvesting areas) of the infrastructure for both BP6/7 and PACE. To this end, participants also described changes and cumulative effects they have experienced in the Portage la Prairie area that provide additional context surrounding how the proposed projects may exacerbate or otherwise interact with these ongoing activities.

Specific issues of concern related to these findings, including potential measures to address these outstanding issues, are discussed in Section 5.0 and Section 6.0 below.

5.0 ISSUES OF CONCERN

Red River Métis citizens have identified a number of issues of concern related to the proposed projects which have been brought to Manitoba Hydro through their communications with the MMF. In February of 2021, the MMF submitted a report outlining Manitoba Métis Specific Concerns related to the BP6/7 Transmission Line replacement (MMF, 2021), and in August of 2021 submitted a Manitoba Métis Specific Concerns report surrounding the Wash'ake Mayzoon Station EA Chapter Review (MMF, 2021b).

Both submissions also outlined a number of concerns related to transmission line project impacts more generally, drawing on information from Métis Knowledge and Land Use studies completed for past projects, including the Manitoba to Minnesota Transmission Line Project (Calliou Group, 2017), Birtle Transmission Project (MNP, 2017), and Bipole III Transmission Line (SVS, 2015).

These concerns have applicability for any transmission line development, including both the BP6/7 replacement and PACE projects, and include (but are not limited to):

- Concerns about impacts to Red River Métis rights, claims and interests
- Concerns about Métis Valued Components being considered in the process
- Concerns about the adequacy of the Indigenous Engagement Process and lack of a distinctions-based approach
- Potential for impacts to Red River Métis Land Use
- Potential changes to wildlife habitat and the ability to harvest in the area

- Concerns about the cumulative effects of development on the ability to harvest
- Concerns with the administration of monitoring programs

Red River Métis citizens interviewed for the purpose of this study also identified a number of the same concerns related specifically to BP6/7 and PACE, further underscoring the importance of understanding and addressing each of these key issues as they relate to the proposed project's potential impacts on the Red River Métis.

5.1.1 ENGAGEMENT WITH THE RED RIVER MÉTIS

One prevalent concern expressed by the MMF, and echoed by Red River Métis citizens, is Manitoba Hydro's lack of fulsome and meaningful consultation and engagement with the Red River Métis. The MMF's previous submissions have detailed a lack of a distinctions-based approach to Red River Métis consultation on the BP6/7 and PACE projects, as well as the challenges associated with working under aggressive timelines and Manitoba Hydro's reliance on e-mail notifications, newsletters, and virtual meetings (MMF, 2021a).

Challenges surrounding appropriate consultation with Manitoba Hydro in particular were echoed by interview participants. One interviewee expressed a lack of engagement with Red River Métis citizens in the Portage la Prairie area, and suggested that Manitoba Hydro engage with the MMF to set up opportunities to engage with them face to face.

> *Consult with our head office and say "look, we want to do this, how do we contact the citizens— how do we set up times and meetings, and places that we can sit and talk with them and have their input?" We have a huge citizenship in Portage and area, it wouldn't be much to set-up that meeting for a Saturday afternoon—especially if you're going to give us lunch, we'll all be there!*

5.1.2 IMPACTS TO RED RIVER MÉTIS CULTURE AND WAY OF LIFE

Interview participants expressed concerns about their ability to continue to practice Métis culture and their way of life in the context of the proposed projects. One interviewee explained how they grew up practising Red River Métis culture including hunting, fishing, gathering plants, and canoeing as well as growing up with family members who spoke Michif.

Given the importance of the land in practising Métis culture, this participant expressed concern surrounding how the proposed projects might impact the lands and resources they, and their family, have used for generations and emphasized the importance of future generations being able to access these areas into the future.

> *We hunt, we fish, and I'm the "gatherer'=" of the family, so I collect medicines and berries, and teach the little ones about the wild edibles, what to stay away from. We go on*

> My interest is in retaining the resources we have in the area, and hopefully Manitoba Hydro takes into consideration the areas that we've been using for generations, so that my grandchildren and children can still access and enjoy what has been accessible.

extensive canoe trips 20 to 30 kilometres into the wilderness, teaching survival and living off the land. We hunt every year. […] I grew up in the culture; my grandparents spoke Michif, and I didn't realize that not everybody had wild rabbit for Sunday dinners or didn't eat wild meat, until we moved to Portage when I was six. My interest is in retaining the resources we have in the area, and hopefully Manitoba Hydro takes into consideration the areas that we've been using for generations, so that my grandchildren and children can still access and enjoy what has been accessible.

5.1.3 IMPACTS TO RED RIVER MÉTIS LAND USE

Red River Métis citizens also expressed concerns surrounding how the proposed projects may directly impact their ability to use the land and exercise their rights. One participant explained that, even though they are hopeful that the projects will enhance energy reliability in the Portage area, it cannot be at the expense of the lands available for Red River Métis citizens and their ability to practice the things they've done for generations.

Well, I mean the fact that they are replacing some of the damaged lines, and hopefully making it a little more stormproof would be beneficial for Portage and the surrounding areas —being without hydro for three days was a nightmare, with the little ones running around the house with snowsuits on. But, on the other hand I want to make sure we are not limiting access any further to the areas and to the activities, and things that I have done almost my whole fifty years in the area.

Another interviewee echoed this point, describing how the land that will be taken away will be "significant" and impact Red River Métis hunters in particular. To address this loss, they suggested that Manitoba Hydro either give land back to the Red River Métis as compensation or compensate Red River Métis citizens through annual payments to the MMF.

Well, it's a tough question because everybody looks at it differently. But, in all reality, I don't believe Manitoba Hydro has land to give you in compensation for the land they're taking away. And the hunting area that they're taking out of the picture by going across the middle of a section and never to be changed, never to be brought back, is significant. And some sort of compensation to the Métis hunters and Métis people would need to be brought into the picture as an annual payment to the [Manitoba] Métis Federation.

One participant shared how a proposed transmission line would cut across the participant's property. The participant shared their concern about the proposed line and mentioned there are

already two transmission lines to the south of their property, which would potentially prevent the third line from being located there.

> *And their transmission line that they want to put across… The new line that they want to put in from Rosser to Portage, one of the lines, the north most one, is actually right across one of my fields. It's on a… It goes right through the section. So, they're going to go another half a mile through my section. I'm like, are you kidding me? So, there's a proposed route, through the middle of my section and to the south side of my section. On the south side of my section, that's fine, because then it's on the road lots. So, we don't want the line going through the middle of the section. That's going to be a real problem if that's the route they choose. And I have a bad feeling about that because on the south side of my property there's already a transmission line on one side of the road, and there's a three-phase line on the other side of the road. So, obviously there's nowhere for a third line. So, that's probably why they picked going out into my field half a mile; to get away from the other two lines. It would be cheaper for them. So, we have to deal with that. I don't know what the magic is there, but… That's a real problem.*

The sentiments expressed by interview participants further support the issues and concerns identified in the MMF's submissions to Manitoba Hydro to date, and are supported by the data presented in the MMF's Land Use and Occupancy Study for the Manitoba to Minnesota Transmission Line Project, which states:

> *73% of identified hunters would avoid transmission lines for hunting, 72% of identified plant, mushroom and medicine gatherers would avoid transmission lines for plant, mushroom and medicine gathering; 64% of identified berry or berry plant gatherers would avoid transmission lines for berry or berry plant gathering….42% of identified trappers would avoid transmission lines for trapping* (Calliou Group, 2017).

5.1.4 SUMMARY AND CONCLUSIONS

It is evident that potentially impacted Red River Métis citizens share many of the concerns already highlighted in the MMF's submissions to Manitoba Hydro, while also providing additional detail surrounding how these concerns may apply to the Portage Area Projects.

Red River Métis citizens expressed concerns related to potential impacts to Red River Métis culture and way of life including the ability for future generations to continue these practices, their ability to continue to access and exercise their rights on the land in the Portage area, and the extent to which Manitoba Hydro has undertaken meaningful consultation with the Red River Métis.

Given these concerns, Red River Métis citizens and the MMF have identified several methods for addressing or compensating the issues identified, including but not limited to compensation for both past and ongoing issues with Manitoba Hydro.

6.0 CONCLUSIONS & RECOMMENDATIONS

Given the Red River Métis Knowledge and land use data presented here, the potential impacts as a result of the Portage Area projects and the key issues and concerns expressed, the MMF would like to put forward the following recommendations for Manitoba Hydro:

- To date, the MMF has developed and communicated to Manitoba Hydro a number of recommendations to address the potential impacts on Red River Métis citizens related to BP6/7, PACE, and Wash'ake Mayzoon as well as the insufficiencies in Manitoba Hydro's approach to consultation with the Red River Métis. Given the MMF's previously identified concerns, especially those related to the route options proposed and preferred route selected for D83W, the MMF request that Manitoba Hydro review these recommendations in full and provide a written response demonstrating how the issues, concerns, and potential impacts identified have been addressed in a way that is satisfactory to the MMF.

- Manitoba Hydro has weighted 'Community' as 30% of the criteria contributing to the routing decisions for BP6/7 (Manitoba Hydro, 2021). The MMF request that Manitoba Hydro both distinguish between the inputs of 'community' members and those of Section 35 rights-holders in their criteria and weighting, and provide the opportunity for rights-holders to contribute to weighting decisions to ensure they reflect their distinct rights, claims and interests.

- Through further engagement with the MMF, Manitoba Hydro should develop appropriate avoidance, mitigation and accommodation measures for Red River Métis land use and occupancy features identified as being potentially impacted by the proposed projects. The presence of these features in the area strongly supports a need for further research and planning prior to construction of the projects, especially those which are particularly sensitive such as the identified burial sites.

- In the spirit of taking a distinctions-based approach to consultation with Indigenous Nations, the MMF request a written response from Manitoba Hydro demonstrating how the Métis Knowledge and land use data presented in this study specifically was integrated and used to inform the Environmental Assessment process for BP6/7, PACE, and Wash'ake Mayzoon

- The MMF requests that Manitoba Hydro work with the MMF to develop an appropriate communications plan or protocol focused on communicating with Red River Métis citizens, including an established process for voicing concerns over the lifecycle of the project. For example, a phone line could be set up for citizens to call with questions, or report concerns or environmental issues. Manitoba Hydro should also provide clear and timely communication and notification to the MMF surrounding project updates, changes, etc. for distribution to Red River Métis citizens

- Manitoba Hydro should continue to consult with the MMF surrounding the concerns and issues expressed by Red River Métis citizens, including harvesters who use the lands and waters in close proximity to the proposed projects. There remain unanswered questions and

concerns to be addressed, for example, how Red River Métis citizens will be compensated if their land use is impacted by the proposed projects

- The Portage Area Projects, as discussed in this study, need to be assessed as a whole due to their interrelation and interdependence. The MMF should be given adequate time and resources to conduct a rigorous analysis of the cumulative impacts of these projects to inform their development. As stated in the MMF's Métis Specific Concerns report for Wash'ake Mayzoon (MMF, 2021a) "splitting of transmission enhancements project phases into multiple EAs despite their interrelation and interdependence, specifically and intentionally excludes an assessment of the cumulative impacts of these projects on the rights, claims and/or interest of the Manitoba Métis."
- The MMF requests that adequate time and funding be provided by Manitoba Hydro to support Red River Métis participation in environmental and cultural monitoring throughout all phases of the project. This may include training, involvement, and employment of MMF environmental and cultural monitors. The specifics of such a monitoring program should be agreed upon by both Manitoba Hydro and the MMF

The MMF appreciates the opportunity to provide this input and look forward to Manitoba Hydro's response.

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APPENDIX A: ATTRIBUTE DATA

Please note that in the following tables seasons are abbreviated as follows: spring (SP), summer (SU), winter (WI), fall (F).

Table 1: Métis Ecological Knowledge (MEK) mapped within 10km of BP6/7 and PACE. Corresponds to Figure 9.

PIN-GISID	Type of Habitat	Description (where provided)	Species	Season
10302-002	Fish Spawning Area			
10302-011	Fish Spawning Area		Carp	
10401-018	Mammal Migration	Migration for Geese	Geese	
1106-004	Fish Spawning Area			SP
1106-013	Bird Habitat			SP, FA
1106-014	Bird Habitat			SP, FA
1106-019	Mammal Habitat	Seasonal Habitat		
1106-020	Reptile/Amphibian Habitat			
1106-021	Reptile/Amphibian Habitat			
1106-022	Reptile/Amphibian Habitat			
1106-024	Species at Risk			SP
1106-027	Species at Risk			
1302-006	Bird Habitat		Geese, Duck	
1308-021	Species at Risk			SP
1401-008	Other Important Habitat	Wetland		
1401-010	Mammal Habitat	Seasonal Habitat	Deer	
1401-015	Bird Habitat	Bird Habitat	Duck, Geese	
1401-020	Species at Risk			SU
1501-027	Bird Habitat		Snow Geese	
1709-005	Other Important Habitat	Wetland	Ducks	
1709-007	Mammal Habitat	Mammal Seasonal Habitat	Deer	
1709-054	Bird Habitat	Bird Habitat	Duck, Geese	
1709-055	Reptile/Amphibian Habitat		Frogs, Fireflies,	

PIN-GISID	Type of Habitat	Description (where provided)	Species	Season
1906-019	Plant Habitat		small white lady slipper	SU
20303-001	Fish Habitat	Feeding Area	Deer	
20303-001	Mammal Habitat	Rearing Area	Deer	
20305-001	Bird Habitat		Prairie Chicken	
20306-003	Bird Habitat		Dark Geese/ Canada Geese	FA
20401-005	Fish Habitat	Feeding Area		
20401-005	Mammal Habitat	Rearing Area		
20401-005	Mammal Habitat		Beaver	
20501-010	Fish Spawning Area			
20501-016	Mammal Habitat		Deer	
20508-001	Plant Habitat		Plum	
2101-003	Spring Water			
2101-014	Fish Spawning Area		Pickerel/Walleye, Carp, Perch	
2906-012	Other Important Habitat	Gravel pit		
2914-028	Plant Habitat		Purple Lady Slipper	
3004-022	Insect Habitat		Dragonflies	SU

Table 2: Harvesting locations mapped within 10km of BP6/7 and PACE. Corresponds to Figure 10.

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
10302-002	Commercial Trapping and Snaring	Mink	WI
20501-004	Commercial Trapping and Snaring	Beaver	SP, WI
20501-004	Commercial Trapping and Snaring	Coyote	WI
20501-004	Commercial Trapping and Snaring	Mink	SP, WI
20501-004	Commercial Trapping and Snaring	Muskrat	SP, WI
20501-004	Commercial Trapping and Snaring	Weasel	FA, WI
2101-011	Other Commercial Harvesting		FA, WI
2101-012	Commercial Trapping and Snaring	Mink	WI
9002-009	Commercial Fishing		
10201-007	Hunting	Deer	FA, WI
10201-007	Hunting	Cotton Tail Rabbit	WI
10202-006	Hunting	Dark Geese/ Canada Geese	FA
10202-006	Hunting	Sharp-tailed Grouse	FA
10202-006	Hunting	White Geese/ Snow Geese	FA
10302-002	Gathering	Wild Rose, Rose Hips & Rose Buds	SU, FA
10302-002	Gathering	Diamond Willow	WI
10302-002	Hunting	Dark Geese/ Canada Geese	FA
10302-002	Hunting	Mallard Duck	FA
10302-002	Hunting	Pintail	FA
10302-002	Hunting	Teal	FA
10302-002	Hunting	Wood Ducks	FA
10302-002	Hunting	Deer	FA
10302-002	Hunting	Coyote	WI
10302-002	Hunting	Jack Rabbit	WI
10302-002	Hunting	Red Fox	WI
10302-002	Hunting	Weasel	WI
10302-004	Hunting	Deer	FA
10302-004	Hunting	Coyote	WI
10302-004	Hunting	Red Fox	WI

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
10302-004	Hunting	Weasel	WI
10302-011	Fishing	Black Crappie/ Sunfish	SU
10302-011	Fishing	Brown Trout	SP
10302-011	Fishing	Bullhead	SP
10302-011	Fishing	Burbot	SU
10302-011	Fishing	Carp	SP
10302-011	Fishing	Channel Catfish	SU
10302-011	Fishing	Freshwater Drum	SU
10302-011	Fishing	Goldeye	SU
10302-011	Fishing	Mariah	SU
10302-011	Fishing	Mooneye	SU
10302-011	Fishing	Northern Pike/ Jackfish	WI
10302-011	Fishing	Perch	FA
10302-011	Fishing	Rainbow Trout	SP
10302-011	Fishing	Rock Bass	FA
10302-011	Fishing	Sauger	WI
10302-011	Fishing	Sucker	SU
10302-011	Fishing	Walleye/ Pickerel	FA
10302-011	Fishing	White Bass	SU
1046-004	Hunting	Deer, Geese, Duck, Upland Birds	WI, FA
1106-045	Hunting	Deer	FA
1106-046	Hunting	Deer	FA
1106-047	Hunting	Deer	FA
1106-048	Hunting	Deer	FA
1106-049	Hunting	Deer	FA
1106-050	Hunting	Deer	FA
1106-051	Hunting	Deer	FA
1106-052	Hunting	Deer	FA
1106-053	Hunting	Deer	FA
1106-054	Hunting	Deer	FA
1106-055	Hunting	Deer	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
1106-056	Hunting	Deer	FA
1106-057	Hunting	Deer	FA
1106-058	Hunting	Deer	FA
1106-059	Hunting	Deer	FA
1106-060	Hunting	Deer	FA
1106-061	Hunting	Deer	FA
1106-062	Hunting	Deer	FA
1106-063	Hunting	Deer	FA
1106-064	Hunting	Deer	FA
1106-067	Hunting	Duck	FA
1106-068	Hunting	Goose	FA
1106-069	Hunting	Squirrel	SP, SU, FA, WI
1106-070	Hunting	Rabbit	SP, SU, FA, WI
1106-071	Trapping and Snaring		WI
1106-072	Trapping and Snaring		WI
1106-073	Fishing	Personal	SP, SU, FA
1106-075	Gathering		SU
1106-076	Gathering		SU
1205-022	Hunting	Deer	SU, FA
1205-025	Hunting	Coyote	WI
1205-029	Hunting	Rabbit	WI
1205-036	Fishing	Personal	SU, FA
1302-067	Trapping and Snaring		
1401-032	Hunting	Duck	FA
1401-033	Hunting	Duck	FA
1401-034	Hunting	Goose	FA
1401-035	Hunting	Goose	FA
1602-054	Hunting	Deer	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
1602-055	Hunting	Deer	FA
1602-056	Hunting	Deer	FA
1602-057	Hunting	Deer	FA
1602-058	Hunting	Deer	FA
1602-059	Hunting	Duck	FA
1602-066	Hunting	Goose	FA
1709-015	Hunting	Deer	FA
1709-016	Hunting	Deer	FA
1709-017	Hunting	Deer	FA
1709-018	Hunting	Grouse	FA
1709-022	Hunting	Grouse	FA
1943-001	Gathering	Berries	SU
1943-002	Fishing	Jackfish, Pickerel, Suckers, Other	SP, SU, FA
1943-002	Gathering	Berries	SP, SU, FA
2004-028	Fishing	Pickerel	
20202-005	Gathering	Balsam Poplar	FA
20202-005	Gathering	Bur Oak	FA
20202-005	Gathering	Jack Pine	FA
20202-005	Gathering	Red Willow	FA
20202-005	Gathering	Tamarack	FA
20202-005	Gathering	White Birch	FA
20202-005	Gathering	Blue Spruce	FA
20202-005	Hunting	Canvasback	FA
20202-005	Hunting	Dark Geese/ Canada Geese	FA
20202-005	Hunting	Mallard Duck	FA
20202-005	Hunting	Pintail	FA
20202-005	Hunting	Prairie Chicken	FA
20202-005	Hunting	Redhead	FA
20202-005	Hunting	Ruffed Grouse	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20202-005	Hunting	Scaup/ Blue Bill	FA
20202-005	Hunting	Sharp-tailed Grouse	FA
20202-005	Hunting	Spruce Grouse	FA
20202-005	Hunting	Teal	FA
20202-005	Hunting	Widgeon	FA
20202-005	Hunting	Wood Ducks	FA
20202-005	Hunting	Deer	FA
20202-005	Hunting	Wolf	FA, WI
20202-005	Hunting	Raccoon	NA
20202-005	Hunting	Gopher	SU
20202-005	Hunting	Coyote	FA, WI
20202-005	Hunting	Fox	SP, SU, FA, WI
20202-007	Hunting	Canvasback	FA
20202-007	Hunting	Dark Geese/ Canada Geese	FA
20202-007	Hunting	Mallard Duck	FA
20202-007	Hunting	Pintail	FA
20202-007	Hunting	Prairie Chicken	FA
20202-007	Hunting	Redhead	FA
20202-007	Hunting	Ruffed Grouse	FA
20202-007	Hunting	Scaup/ Blue Bill	FA
20202-007	Hunting	Sharp-tailed Grouse	FA
20202-007	Hunting	Spruce Grouse	FA
20202-007	Hunting	Teal	FA
20202-007	Hunting	White Geese/ Snow Geese	FA
20202-007	Hunting	Widgeon	FA
20202-007	Hunting	Wood Ducks	FA
20302-003	Hunting	Dark Geese/ Canada Geese	FA
20302-003	Hunting	Mallard Duck	FA
20302-003	Hunting	Sharp-tailed Grouse	FA
20302-003	Hunting	White Geese/ Snow Geese	WI

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20302-003	Hunting	Wild Turkey	FA
20302-003	Hunting	Beaver	SP, SU
20302-003	Hunting	Coyote	FA
20302-003	Hunting	Gopher	SU
20302-003	Hunting	Jack Rabbit	WI
20302-003	Hunting	Snowshoe Hare	FA, WI
20302-005	Fishing	Northern Pike/ Jackfish	SP, SU
20302-005	Fishing	Walleye/ Pickerel	SP, SU
20302-006	Gathering	Balsam Poplar	FA
20302-006	Gathering	Black Ash	FA
20302-006	Gathering	Bur Oak	FA
20302-006	Gathering	Green Ash	FA
20302-006	Gathering	Black Morels/ Morels Mushroom	SP
20303-001	Gathering	Asparagus	SU
20303-001	Gathering	Black Currant	SU
20303-001	Gathering	Bracken (Fiddlehead)	SP
20303-001	Gathering	Chokecherry	SU
20303-001	Gathering	Cranberry	SU
20303-001	Gathering	Dandelion	SP
20303-001	Gathering	Gooseberry	SU
20303-001	Gathering	Hazelnut	FA
20303-001	Gathering	Oxeye Daisy	FA
20303-001	Gathering	Pin Cherry	SU
20303-001	Gathering	Pineapple-weed	SU
20303-001	Gathering	Plum	SU, FA
20303-001	Gathering	Raspberry	SU
20303-001	Gathering	Saskatoon Berry	SU
20303-001	Gathering	Wild Grapes	SU
20303-001	Gathering	Wild Mint	SP, SU, FA, WI
20303-001	Gathering	Wild Onion	SU

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20303-001	Gathering	Wild Rose, Rose Hips & Rose Buds	FA
20303-001	Gathering	Common Sweet Clover	SP
20303-001	Gathering	Dock	FA
20303-001	Gathering	Goldenrod	SU, FA
20303-001	Gathering	Jerusalem Artichoke	SP, SU
20303-001	Gathering	Wild Bergamot	SU
20303-001	Hunting	Gray Partridge	FA
20303-001	Hunting	Ruffed Grouse	FA
20303-001	Hunting	Deer	FA
20303-002	Fishing	Bullhead	SU
20303-002	Hunting	Dark Geese/ Canada Geese	FA
20303-003	Hunting	Dark Geese/ Canada Geese	FA
20303-004	Hunting	Prairie Chicken	FA
20303-005	Hunting	Mallard Duck	FA
20303-005	Hunting	Pintail	FA
20303-005	Hunting	Teal	FA
20303-008	Fishing	Perch	SP, SU, FA, WI
20303-008	Fishing	Walleye/ Pickerel	SP, SU, FA, WI
20304-003	Hunting	Duck	NA
20304-003	Hunting	Mallard Duck	SP, FA
20304-003	Hunting	Teal	FA
20304-003	Hunting	Deer	FA
20304-005	Hunting	Dark Geese/ Canada Geese	FA
20304-005	Hunting	White Geese/ Snow Geese	FA
20304-005	Hunting	Deer	FA
20304-008	Hunting	Deer	FA
20304-009	Hunting	Dark Geese/ Canada Geese	FA
20304-009	Hunting	Duck	FA
20304-009	Hunting	White Geese/ Snow Geese	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20304-013	Hunting	Duck	FA
20304-013	Hunting	Gray Partridge	FA
20304-013	Hunting	Mallard Duck	SP, FA
20304-013	Hunting	Teal	FA
20304-018	Fishing	Sturgeon	SU
20304-018	Fishing	Channel Catfish	SU
20304-018	Fishing	Walleye/ Pickerel	SU, WI
20304-019	Fishing	Freshwater Drum	SU
20304-019	Fishing	Walleye/ Pickerel	SU
20304-019	Fishing	Channel Catfish	SU
20304-019	Fishing	Northern Pike/ Jackfish	WI
20304-019	Fishing	Sucker	WI
20304-020	Fishing	Channel Catfish	SU
20304-020	Fishing	Northern Pike/ Jackfish	WI
20304-020	Fishing	Sucker	WI
20304-020	Fishing	Walleye/ Pickerel	SU, WI
20304-031	Gathering	Cranberry	SU
20304-040	Gathering	Saskatoon Berry	SU
20304-042	Gathering	Asparagus	SP
20304-050	Gathering	Bracken (Fiddlehead)	SP
20305-001	Hunting	Dark Geese/ Canada Geese	FA
20305-001	Hunting	White Geese/ Snow Geese	FA
20305-001	Hunting	Deer	FA
20305-006	Gathering	Balsam Poplar	FA
20305-006	Gathering	Bur Oak	FA
20305-007	Gathering	Green Ash	FA
20306-002	Hunting	Ruffed Grouse	WI
20306-002	Hunting	Snowshoe Hare	WI
20306-003	Hunting	Bufflehead	FA
20306-003	Hunting	Canvasback	FA
20306-003	Hunting	Dark Geese/ Canada Geese	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20306-003	Hunting	Gadwell	FA
20306-003	Hunting	Goldeye	FA
20306-003	Hunting	Mallard Duck	FA
20306-003	Hunting	Pintail	FA
20306-003	Hunting	Redhead	FA
20306-003	Hunting	Scaup/ Blue Bill	FA
20306-003	Hunting	Shoveler	FA
20306-003	Hunting	Teal	FA
20306-003	Hunting	White Geese/ Snow Geese	FA
20306-003	Hunting	Widgeon	FA
20306-003	Hunting	Wood Ducks	FA
20306-004	Hunting	Ruffed Grouse	FA
20306-004	Hunting	Sharp-tailed Grouse	FA
20306-004	Hunting	Deer	FA
20401-001	Fishing	Carp	SU
20401-001	Fishing	Channel Catfish	SU
20401-001	Fishing	Goldeye	SU
20401-005	Gathering	Black Spruce	FA
20401-005	Gathering	Green Ash	FA
20401-005	Gathering	Manitoba Maple	FA
20401-005	Gathering	Trembling Aspen	FA
20401-005	Gathering	White Birch	FA
20401-005	Gathering	Chokecherry	SU
20401-005	Gathering	Pin Cherry	SU
20401-005	Gathering	Raspberry	SU
20401-005	Gathering	Saskatoon Berry	SU
20401-005	Gathering	Pussy Willow	SP
20401-006	Gathering	Saskatoon Berry	SU
20501-001	Hunting	Prairie Chicken	SP, SU, FA, WI

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20501-001	Hunting	Wild Turkey	SP, SU, FA, WI
20501-001	Hunting	Deer	FA
20501-003	Gathering	Black Ash	FA
20501-003	Gathering	Bur Oak	FA
20501-003	Gathering	Eastern White Cedar	FA
20501-003	Gathering	Green Ash	FA
20501-003	Gathering	Manitoba Maple	FA
20501-003	Gathering	Tamarack	FA
20501-003	Hunting	Dark Geese/ Canada Geese	FA
20501-003	Hunting	White Geese/ Snow Geese	FA
20501-003	Hunting	Coyote	FA, WI
20501-003	Hunting	Gopher	SP, SU, FA, WI
20501-003	Hunting	Grey Squirrels	SU, FA
20501-003	Hunting	Jack Rabbit	FA, WI
20501-003	Hunting	Mink	WI
20501-003	Hunting	Muskrat	SP
20501-003	Hunting	Raccoon	FA, WI
20501-003	Hunting	Red Fox	FA, WI
20501-003	Hunting	Red Squirrels	SU, FA
20501-003	Hunting	Weasel	WI
20501-004	Hunting	Mallard Duck	FA
20501-004	Hunting	Beaver	SP, WI
20501-004	Trapping and Snaring	Cotton Tail Rabbit	FA, WI
20501-004	Trapping and Snaring	Jack Rabbit	FA, WI
20501-004	Trapping and Snaring	Snowshoe Hare	FA, WI
20501-005	Hunting	Snowshoe Hare	FA, WI
20501-006	Hunting	Ruffed Grouse	FA
20501-008	Gathering	Black Currant	FA
20501-008	Gathering	Chokecherry	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20501-008	Gathering	Cranberry	FA
20501-008	Gathering	Raspberry	FA
20501-008	Gathering	Red Currant	FA
20501-008	Gathering	Saskatoon Berry	FA
20501-008	Hunting	Gadwell	FA
20501-008	Hunting	Teal	FA
20501-010	Fishing	Bullhead	SU
20501-010	Fishing	Channel Catfish	SU
20501-010	Fishing	Freshwater Drum	SU
20501-010	Fishing	Goldeye	SU
20501-010	Fishing	Northern Pike/ Jackfish	SU
20501-010	Fishing	Sauger	SU
20501-010	Fishing	Walleye/ Pickerel	SU
20501-013	Gathering	Clammy Ground Cherry	FA
20501-013	Gathering	Pin Cherry	FA
20501-013	Gathering	Strawberry	FA
20508-001	Fishing	Burbot	SU
20508-001	Fishing	Carp	SU
20508-001	Fishing	Channel Catfish	SU
20508-001	Fishing	Mariah	SU
20508-001	Fishing	Northern Pike/ Jackfish	SU
20508-001	Fishing	Perch	SU
20508-001	Fishing	Sauger	SU
20508-001	Fishing	Sucker	SU
20508-001	Fishing	Walleye/ Pickerel	SU
20508-001	Gathering	American Elm	SP, SU, FA, WI
20508-001	Gathering	Bur Oak	SP, SU, FA, WI
20508-001	Gathering	Jack Pine	FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20508-001	Gathering	White Birch	SP, SU, FA, WI
20508-001	Gathering	Chokecherry	SU
20508-001	Gathering	Raspberry	SU
20508-001	Gathering	Saskatoon Berry	SU
20508-001	Gathering	Strawberry	SU
20508-001	Hunting	Bufflehead	SP
20508-001	Hunting	Canvasback	SP
20508-001	Hunting	Dark Geese/ Canada Geese	FA
20508-001	Hunting	Mallard Duck	SP
20508-001	Hunting	Pintail	SP
20508-001	Hunting	Redhead	SP
20508-001	Hunting	Shoveler	SP
20508-001	Hunting	Teal	SP
20508-001	Hunting	White Geese/ Snow Geese	FA
20508-001	Hunting	Wood Ducks	SP
20508-001	Hunting	Deer	FA
20508-001	Hunting	Jack Rabbit	WI
20508-001	Hunting	Muskrat	NA
20508-002	Gathering	Balsam Poplar	SP, SU, FA, WI
20508-002	Hunting	Prairie Chicken	FA
20508-002	Hunting	Ruffed Grouse	FA
20508-002	Hunting	Sharp-tailed Grouse	FA
20508-003	Hunting	Bufflehead	SP
20508-003	Hunting	Canvasback	SP
20508-003	Hunting	Mallard Duck	SP
20508-003	Hunting	Pintail	WI
20508-003	Hunting	Redhead	WI
20508-003	Hunting	Shoveler	SP
20508-003	Hunting	Teal	SP

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
20508-003	Hunting	Wood Ducks	SP
20508-004	Gathering	American Elm	SP, SU, FA, WI
20508-004	Gathering	Balsam Poplar	SP, SU, FA, WI
20508-004	Gathering	Bur Oak	SP, SU, FA, WI
20508-004	Hunting	Deer	FA
20508-005	Fishing	Carp	SU
20508-005	Fishing	Mariah	NA
2101-005	Gathering	Cranberries	SU
2101-007	Hunting	White-tailed Deer	FA
2101-008	Hunting	White-tailed Deer	FA
2101-009	Hunting	Grouse	FA
2101-013	Fishing	Jackfish/Northern Pike, Goldeye, Sucker, Pickerel/Walleye, Carp, Catfish, Mooneye, Chubbs	SP, FA, SU
2101-015	Hunting	White-tailed Deer	FA
2102-006	Fishing	Catfish, Pickerel/Walleye	SU
2102-007	Fishing	Pickerel/Walleye, Mooneye, Sauger, Carp, Sucker	SU
2103-004	Hunting	Deer	FA
2103-005	Hunting	Coyote	WI, FA
2103-006	Hunting	Partridge, Grouse, Duck	FA
2103-007	Hunting	Rabbit	WI
2103-011	Fishing	Pickerel/Walleye	SP, FA, SU
2103-012	Fishing	Jackfish/Northern Pike	SP, SU, FA
2103-013	Fishing	Sucker	SP, SU, FA
2103-014	Fishing	Catfish	SP, SU, FA

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
2103-018	Gathering	Cranberries	SU, FA
2103-019	Gathering	Choke Cherries	SU, FA
2103-020	Gathering	Cranberries, Poplar	SU, FA
2104-004	Hunting Area	Goose	FA
2104-005	Hunting Area	Duck	FA
2104-006	Hunting Area	Grouse	FA
2104-007	Hunting Area	White-tailed Deer	SU, FA
2104-008	Hunting Area	Duck	FA
2104-011	Hunting	Grouse	FA, WI
2104-012	Hunting Area	Deer	FA
2105-005	Fishing	Catfish, Pickerel/Walleye, Sauger, Bass	SU
2105-007	Hunting	Deer	FA, WI
2105-008	Hunting	Chicken	FA, WI
2105-010	Gathering	Sage	SU
2105-011	Gathering	Sage	SU
2105-013	Gathering	Cherries, Saskatoon Berries, Cedar, Chaga, Mint, Raspberries, Red Willow, Wild Asparagus, Bear Nuts, Hazelnuts	SP, FA, WI, SU
2105-014	Gathering	Chaga, Sweet Grass, Cedar	SP, FA, SU, WI
2105-015	Gathering	Choke Cherries	SU
2200-010	Fishing	Goldeye, Jackfish/Northern Pike, Sucker	SP, SU
2200-011	Fishing	Carp, Goldeye, Jackfish/Northern Pike, Pickerel/Walleye, Sucker, Bass	SU, SP
2200-012	Fishing	Jackfish/Northern Pike, Pickerel/Walleye	SU
2200-016	Fishing	Goldeye, Pickerel/Walleye, Jackfish/Northern Pike	SU
2200-019	Fishing	Bass, Carp, Jackfish/Northern Pike, Pickerel/Walleye, Sucker, Drum Bass, Smallmouth Bass	SU, SP, FA
2903-021	Hunting	Coyotes And Deer	
2903-022	Hunting	Coyotes, Deer	

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
2906-013	Hunting		
2909-032	Gathering	Morrel Mushrooms	
2917-087	Gathering	Berries, Wood	
3004-037	Hunting	Deer	FA
3004-075	Hunting	Rabbit, Deer, Geese, Ducks	
3004-079	Trapping and Snaring	Beaver, Muskrat, Fox, Coyote	
3004-081	Hunting	Rabbit, Deer, Geese, Ducks	
7202-046	Gathering		
7202-057	Hunting		FA
7202-058	Hunting	Other Upland Bird	FA
9002-014	Hunting		
9903-021	Fishing		
9903-026	Hunting	Deer	
9903-029	Trapping and Snaring		
9903-031	Gathering	Wood And Trees	
9904-006	Hunting	Geese, Ducks, Grouse, Other	
9904-024	Trapping and Snaring		
9904-055	Hunting	Deer	
None-001	Hunting	Dark Geese/ Canada Geese	SP, FA
None-001	Hunting	Mallard Duck	SP, FA
None-001	Hunting	White Geese/ Snow Geese	SP, FA
None-004	Hunting	Deer, Ducks, Geese, Cranes, Elk	
None-004	Trapping and Snaring	Muskrat, Mink	
None-005	Fishing		
None-006	Hunting	Deer, Ducks, Geese, Elk	
None-006	Hunting	Ducks, Geese, Deer	
None-007	Trapping and Snaring	Muskrat, Mink, Beaver	
None-008	Fishing		
None-008	Fishing		
None-009	Fishing		

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
None-009	Gathering	Saskatoon Berries, Cranberries, Chokecherries, Strawberries	
None-010	Trapping and Snaring		
None-011	Fishing		
None-011	Hunting	Duck, Geese	
None-011	Hunting	White-Tailed Deer	
None-012	Trapping and Snaring	Muskrat	
None-013	Hunting	Duck, Geese	
None-013	Hunting	Waterfowl	
None-013	Hunting	Deer, Ducks, Geese	
None-014	Hunting	Deer	
None-014	Hunting	Deer	
None-014	Hunting		
None-015	Gathering	Strawberries, Saskatoon Berries, Chokecherries, Cranberries	
None-015	Hunting	Duck, Geese	
None-016	Fishing		
None-016	Gathering	Wood And Trees	
None-017	Trapping and Snaring	Muskrat, Beaver, Mink, Weasel, Fox, Coyote, Rabbits, Squirrels, Badgers, Racoons	
None-018	Gathering	Mushrooms	
None-019	Gathering	Berries	
None-019	Hunting		
None-020	Gathering	Wood And Trees	
None-020	Hunting		
None-021	Hunting	Large Game	
None-022	Fishing		
None-022	Trapping and Snaring		
None-023	Gathering	Berries, Medicines, Wood and Trees	
None-024	Trapping and Snaring		

PIN-GISID	Type of Harvesting Activity	Species Harvested	Season
None-024	Trapping and Snaring		
None-025	Hunting	Duck, Geese	
None-026	Gathering		
None-030	Fishing		
None-030	Hunting		
None-037	Gathering	Mushrooms	

Table 3: Red River Métis Occupancy Sites: Cultural sites, overnight locations, and access routes mapped within 10km of BP6/7 and PACE. Corresponds to Figure 11.

PIN-GISID	Type of Ref River Métis Occupancy Site	Description (where provided)
20304-064	Land Trail	
20401-010	Land Trail	Old Cart Trail
20501-015	Land Trail	
2102-005	Boat Launch/Landing	
2105-017	Boat Launch/Landing	
2105-018	Boat Launch/Landing	
2917-086	Other Access Feature	
3004-076	Portage Route	
None-015	Historic Access Route	
None-016	Land Trail	
None-021	Other Travel Route	
None-037	Land Trail	
1106-077	Burial Site	
1106-079	Burial Site	
1202-041	Historic Trail	
1302-072	Burial Site	
1302-074	Contemporary Gathering Place	
1406-044	Historic Trail	Métis Historically Significant Sites
1704-005	Historical Family Village Site	Historic Family Site
1709-060	Burial Site	
20306-009	Burial Site	
20401-008	Historically Significant Site	
20401-009	Contemporary Gathering Place	Métis Community
20501-014	Other Cultural Site	
2101-002	Historical Family Village Site	Winterers - Buffalo Hunt Family (old Métis settlement)
2101-006	Other Cultural Site	Found artifacts and historic pieces all over the property
2105-006	Recreational Area	Canoe area along the Assiniboine River
2105-012	Recreational Area	Snowshoeing

PIN-GISID	Type of Ref River Métis Occupancy Site	Description (where provided)
2903-024	Burial Site	Old burial ground
3004-054	Historical Family Village Site	Old trapping line
5102-006	Historically Significant Site	
6102-045	Burial Site	
6102-046	Burial Site	
6102-047	Historically Significant Site	
6102-049	Historically Significant Site	
7202-055	Historically Significant Site	
7202-056	Other Cultural Site	
7507-070	Burial Site	
9903-033	Burial Site	
20203-014	Camping Area	
20401-005	Other Overnight Location	

Table 4: Observed changes mapped around Portage la Prairie. Corresponds to Figure 12.

PIN-GISID	Participant Observed Change to:	Description (where provided)	Species	Season Changed Observed in
1106-005	to Fish			
1106-006	to Fish			
1106-015	to Birds	to Animals		
1106-028	to Mammals	Mammal Population Decrease, Vegetation Population Decrease, Change in Water Levels		
1106-029	to Mammals	Mammal Population Decrease		
1106-066	to Mammals	Mammal Population Decrease		
1401-007	to Water	Change to Water Levels		
1401-009	to Water Quality	Change in Water Levels		
1709-057	to Shoreline Environment	Mammal Population Decrease, Change in Water Levels,		
2103-021	to Hunting			
2103-023	Other Change	Noticed steel rings in the ground with caps and locks on them		
2104-009	to Access			
2104-010	to Hunting		White-tailed Deer	
2104-014	to Environment			
2105-016	to Access	More difficult to get in - more signage		
2200-004	to Water Quality			SP, SU, WI, FA
2200-005	to Water		Algal Bloom	SP, FA, WI, SU
2200-006	to Water		Algal Bloom	SP, SU, FA, WI
2200-013	to Harvesting	Harvesting less in this area		SU, SP
2200-014	to Water Quality			SU, SP
2200-015	to Water Quality			SP, SU
2200-017	to Environment			
2200-018	to Harvesting			SU

Heritage workshops

Presentation slides from first heritage meeting held October 7, 2022

Heritage Workshop

October 7, 2021

Learning what Manitoba Hydro can do to build sensitively, respectfully and with all feeling informed.

Manitoba Hydro

Agenda

Goal: to discuss how to proactively design a heritage program sensitive to culturally-specific needs for upcoming projects in the Portage la Prairie area.

- Opening prayer and introductions
- MH to review upcoming projects and current plan for protecting heritage sites
- HRB to share their role and goals
- MH share key communication components of a typical Cultural and Heritage Resources Protection Plan
- Overview of routing and assessment process
- How intangible heritage concerns are considered and our current plans for monitoring of cultural and heritage resources during project construction.
- What have we missed?
- Set date for next meeting
- Adjourn

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Land Acknowledgement

Maria?

Let’s Meet Each Other

- Name, community you’re representing
- What you hope we discuss today

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Sarah Coughlin, M.Sc, Senior Environmental Specialist, Manitoba Hydro– knows nothing about heritage

Upcoming Projects

What is Indigenous Heritage?

From Dr. Supernant's Birtle Presentation:

Indigenous Heritage is complex and dynamic. Indigenous Heritage encompasses ideas, experiences, belongings, artistic expressions, practices, knowledge, and places that are valued because they are culturally meaningful and connected to shared memory. Indigenous Heritage cannot be separated from either Indigenous identity or Indigenous life. It can be inherited from ancestors or created by people today as a legacy for future generations.

Heritage can be impacted in many ways that are not only material

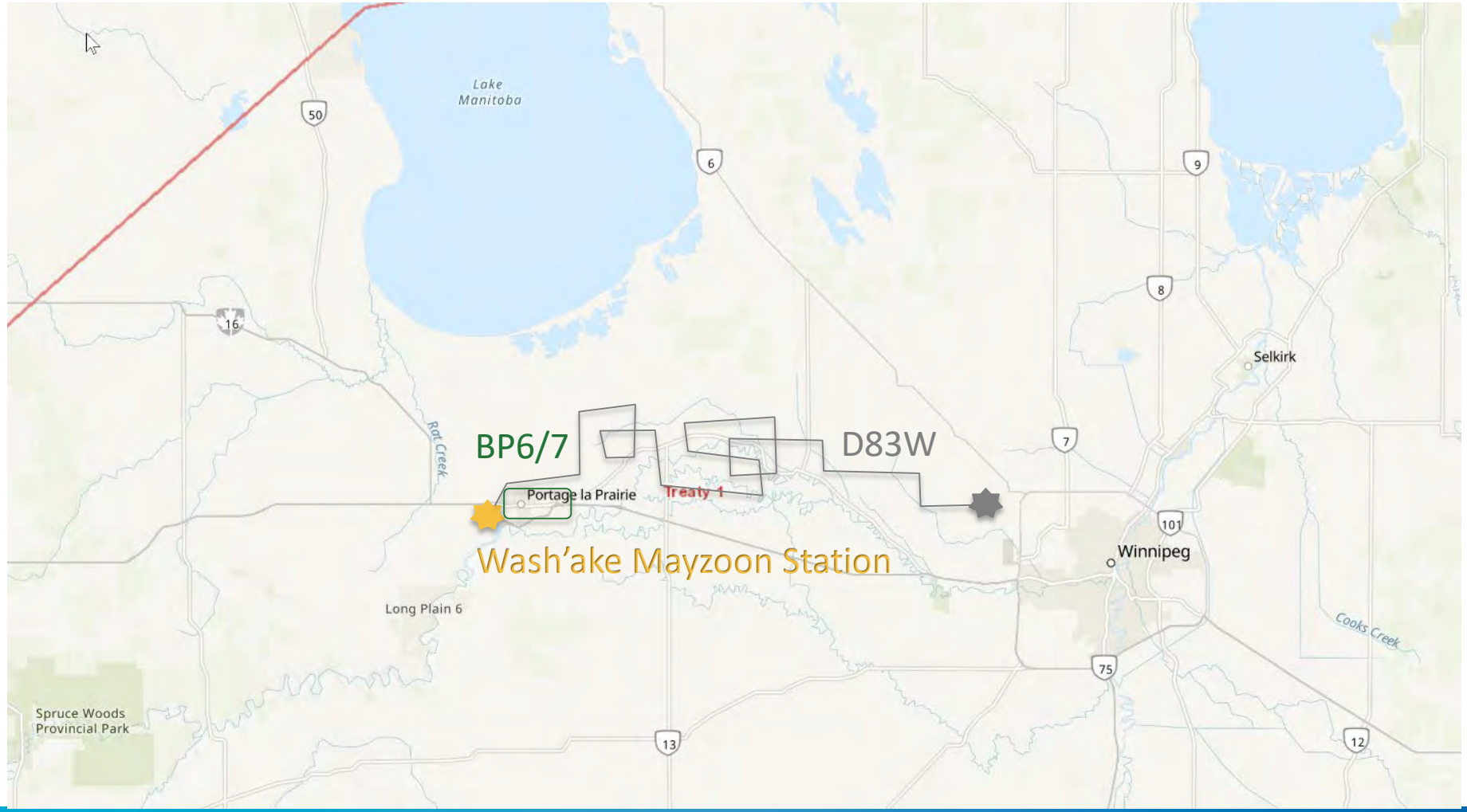
Is unique between cultures

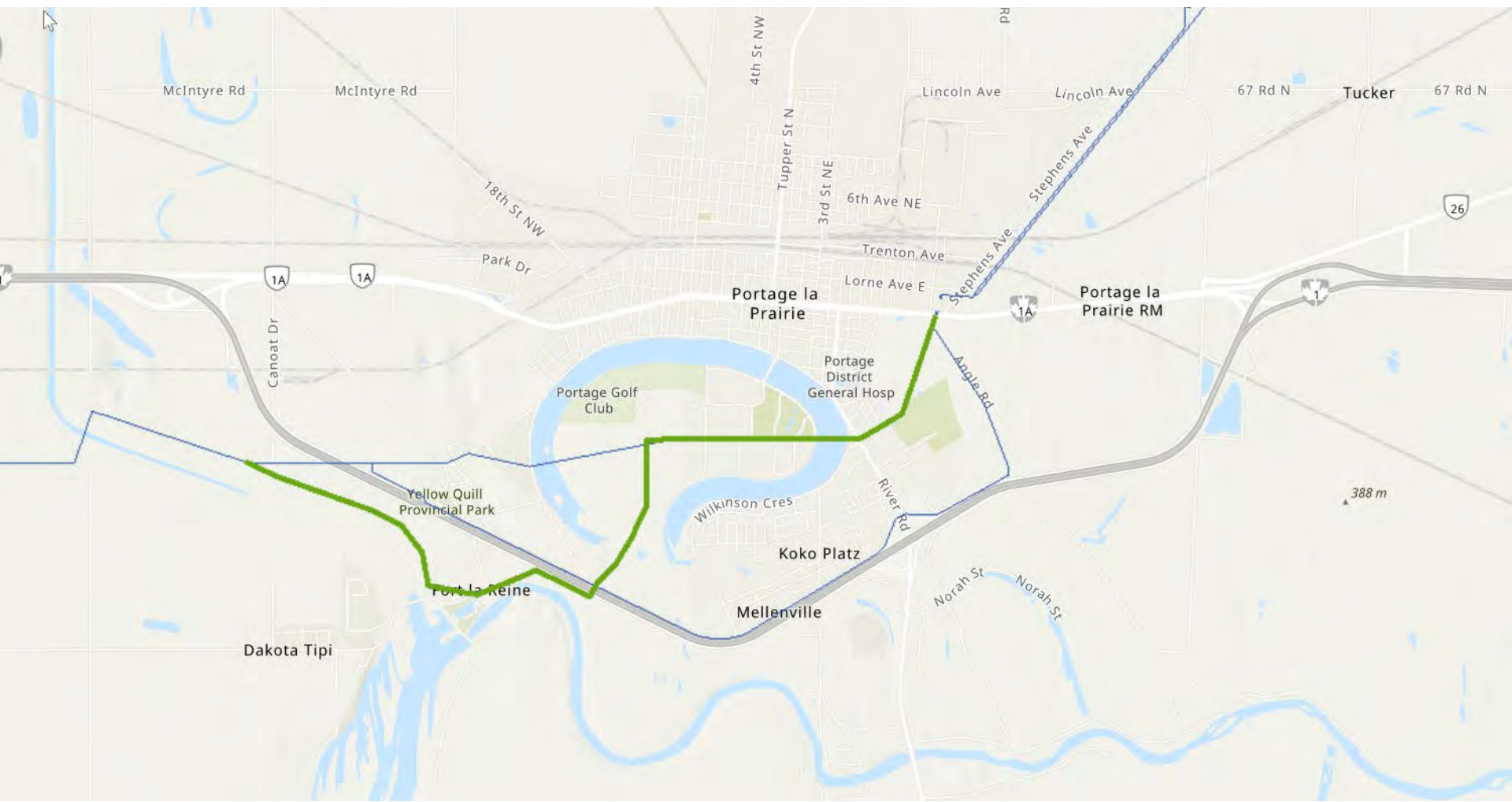
Material/Non-Material Heritage

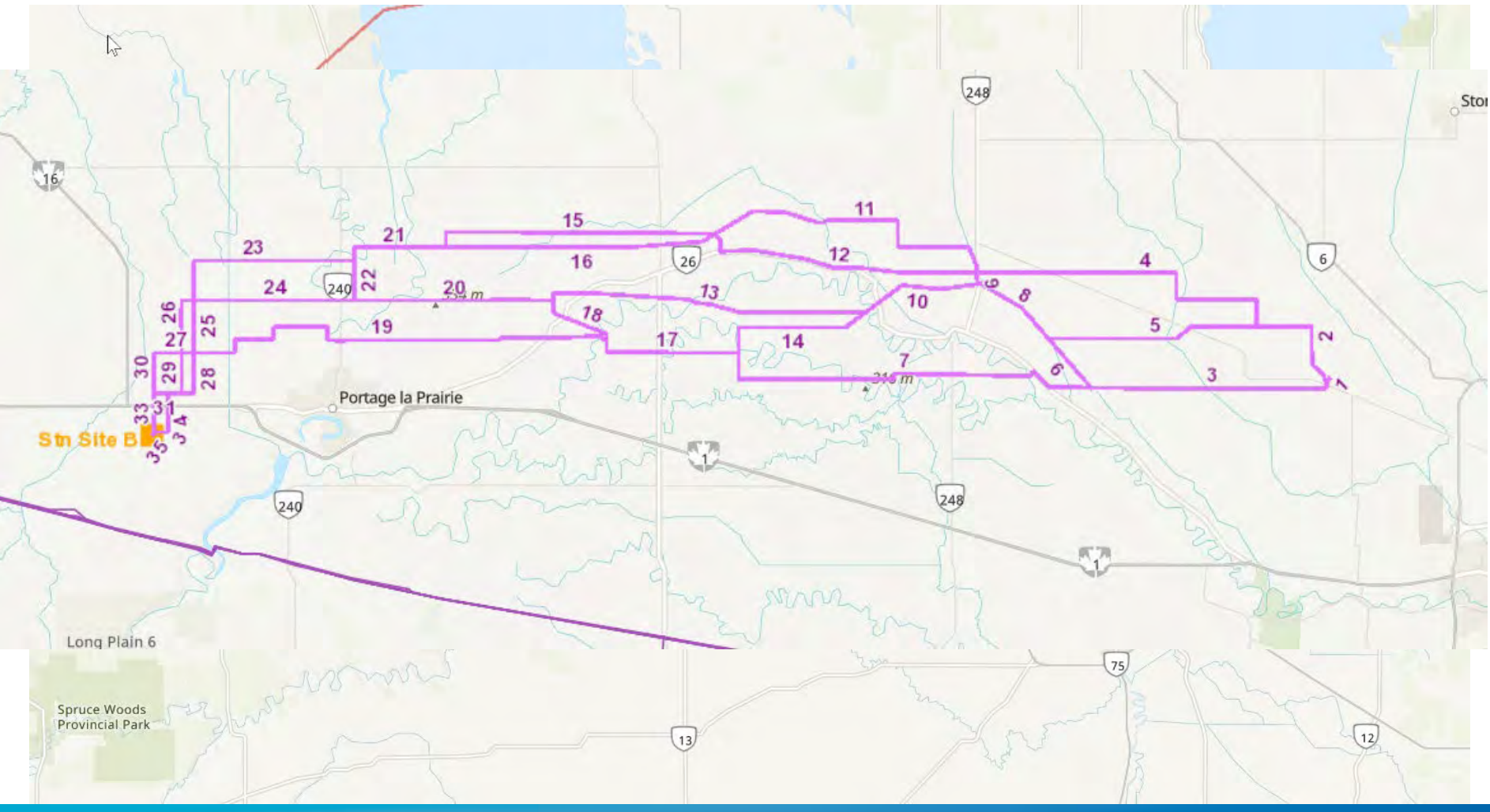
- Material heritage – reflects a society's technology and the knowledge people apply to the task of living in their surrounding (tangible cultural objects such as pottery, beads, flints)
- Non-material heritage – reflects the beliefs, values, concepts, customs (intangible culture such as language, ceremony, passing down between generations the knowledge of where to hunt)

Upcoming Projects

- BP 6/7 (a rebuild project)
- Wash’ake Mayzoon Station (a new station)
- D83W Transmission line (new 75 km–ish tline)


Lake Manitoba
50
6
9
16
8
Selkirk
BP6/7
D83W
7
Rat Creek
Portage la Prairie
Treaty 1
101
Wash'ake Mayzoon Station
Winnipeg
Long Plain 6
Cooks Creek
75
Spruce Woods Provincial Park
13
12


McIntyre Rd
McIntyre Rd
4th St NW
Lincoln Ave
Lincoln Ave
67 Rd N
Tucker
67 Rd N
Tupper St N
3rd St NE
6th Ave NE
Stephens Ave
Stephens Ave
18th St NW
Park Dr
Trenton Ave
Lorne Ave E
26
1A
1A
1A
1
Canoat Dr
Portage la Prairie
Portage la Prairie RM
Portage District General Hosp
Angle Rd
Portage Golf Club
Yellow Quill Provincial Park
Wilkinson Cres
River Rd
388 m
Koko Platz
Fort la Reine
Mellenville
Norah St
Norah St
Dakota Tipi


Portage la Prairie
Stn Site B
Long Plain 6
Spruce Woods
Provincial Park
248
16
26
240
1
75
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27
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31
33
34
35

Photo credit: Keith Kowall

Photo credit: Keith Kowall

Photo credit: David Block

Potential Impacts:

Construction:

- Potential disturbance of known and unknown sites
- impacts on First Nation and Metis cultural heritage through changes to the land

Operation:

- Greater access = more disturbance
- Less connection to cultural heritage

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Lisa Bobbie, title, letters

What happens before a project begins?

Thoughts? Questions?

- Is this reasonable, respectful and clear?

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Suyoko Tsukamoto, title, letters

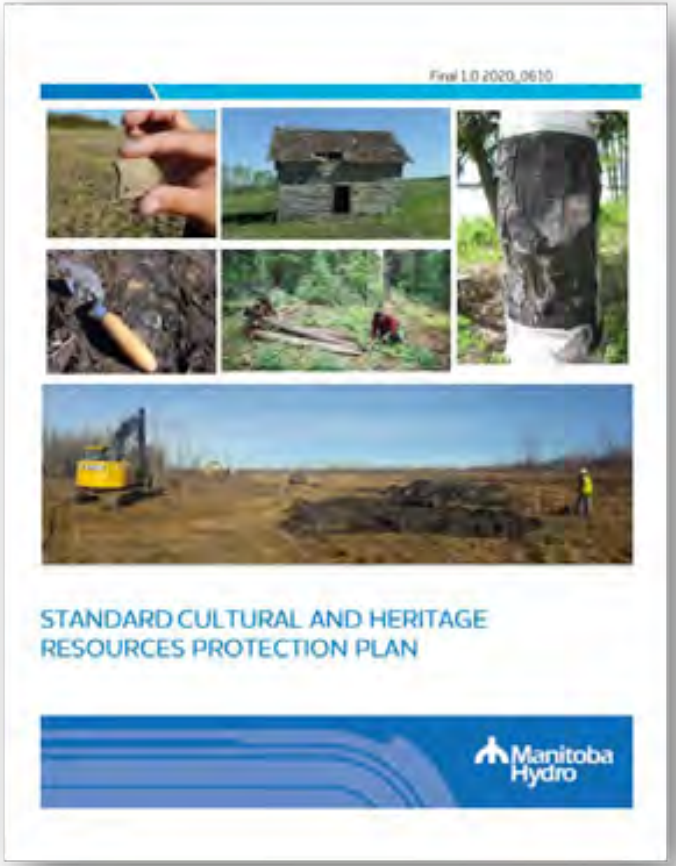
Roles and Goals of the Historic Resource Branch, Government of Manitoba

Thoughts? Questions?

Manitoba Hydro

Lindsay Thompson, title, super fancy initials

Culture and Heritage Resources Protection Plan (CHRPP)



What is CHRPP?

- A plan that outlines instructions and ongoing protection measures if cultural and heritage resources are discovered or disturbed.

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Key Point!

We ask that any heritage or cultural discoveries are reported immediately to the Manitoba Hydro on-site supervisor and environmental inspector.

Surface recovery of quartz projectile point tip

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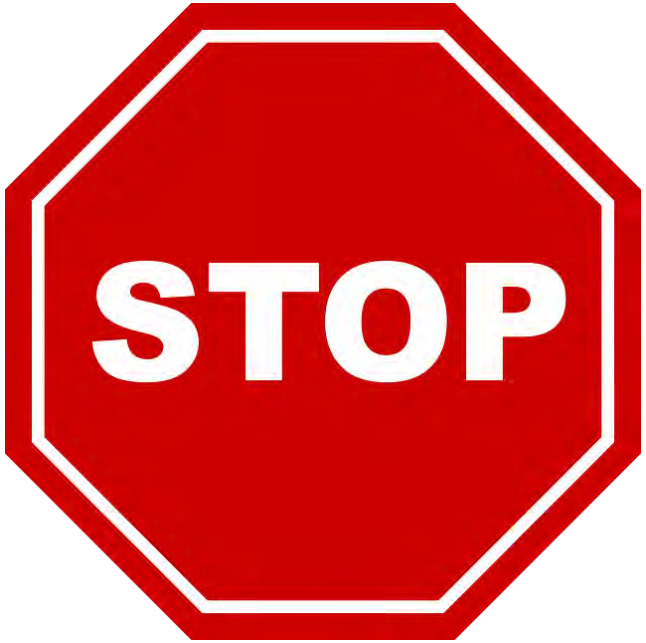
What is the next step if human remains or cultural or heritage resources are found?

All work stops at that location



Onsite supervisor / environmental inspector

Licensing and Environmental Assessment

Project archaeologist

What happens after work stops?

- HRB community notification

What are the fines for not following *The Heritage Resources Act*?

- Any person who violates or fails to follow the Act, can be charged up to $5,000/day or $50,000/day for a corporation

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Thoughts? Questions?

- Is this reasonable, respectful and clear?

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Lindsay Thompson and Sarah Coughlin

Routing and Assessment

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How heritage values are considered during routing

- Desktop studies, request data from HRB (site inventory), reveal known heritage sites
- Can model areas of potential or sites/zone of concern but sometimes there are unknown sites
- Information from communities can inform us on potential for intangible heritage impacts
- Areas of least preference/built perspective
- Invite participation in routing meetings from Indigenous representatives

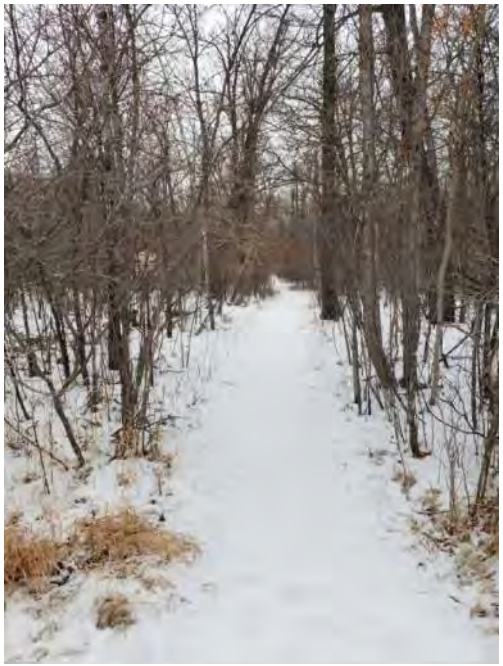

Photo credit: Darryl Taylor

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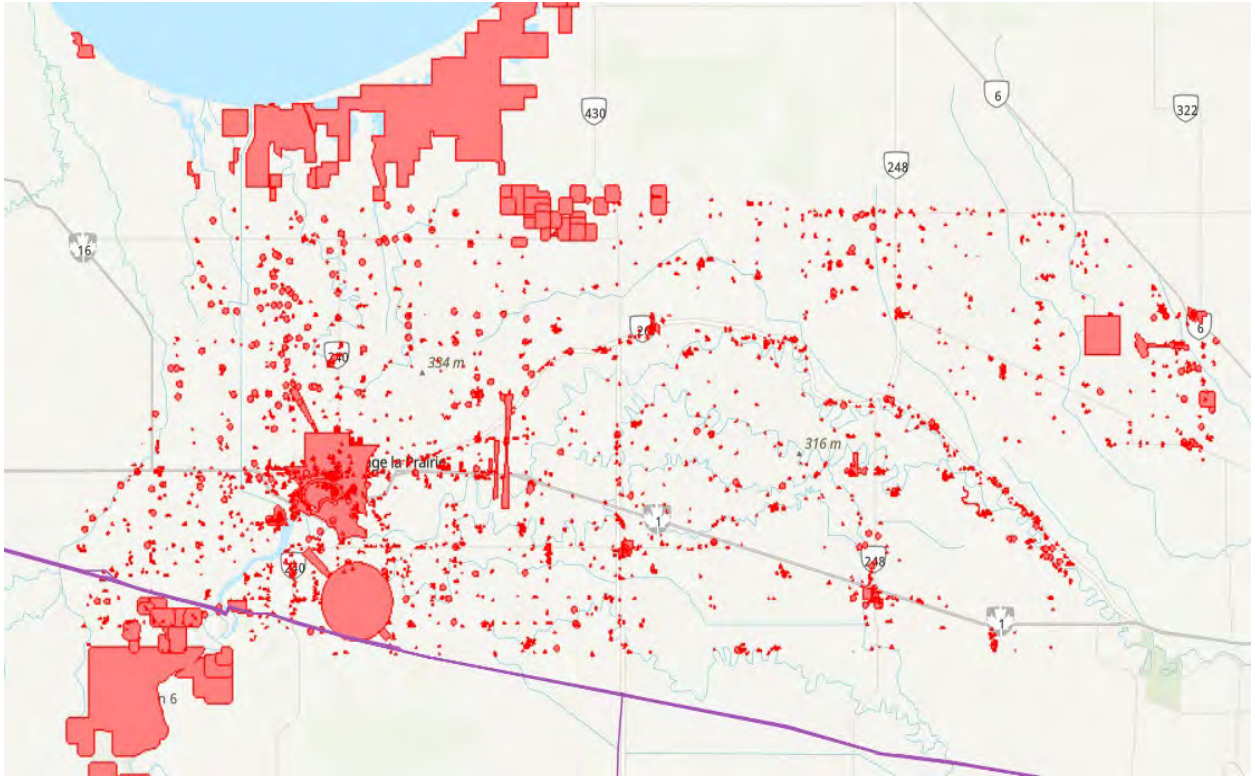

Areas of Least Preference

Can we share?

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Thoughts? Questions?

- Is this reasonable, respectful and clear?

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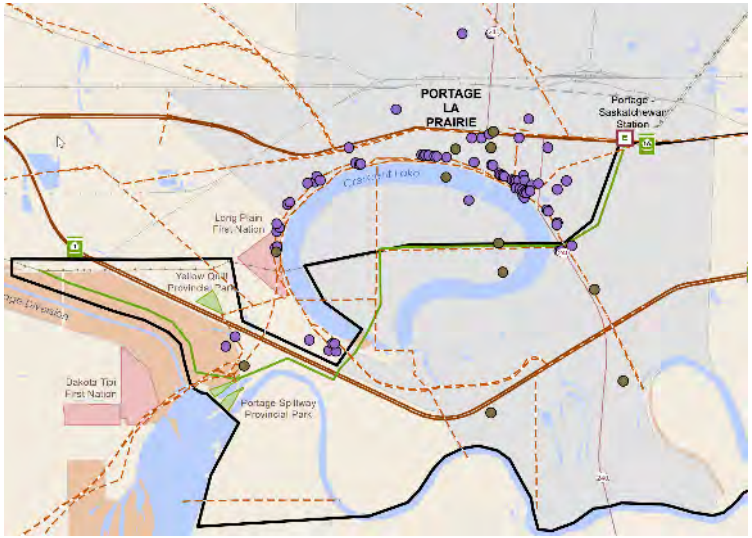
Assessing impacts to heritage values



- Understand experience from communities
- Seek information from knowledge holders, technical experts
- Assess impacts in a chapter called Traditional Practices, Culture and Heritage

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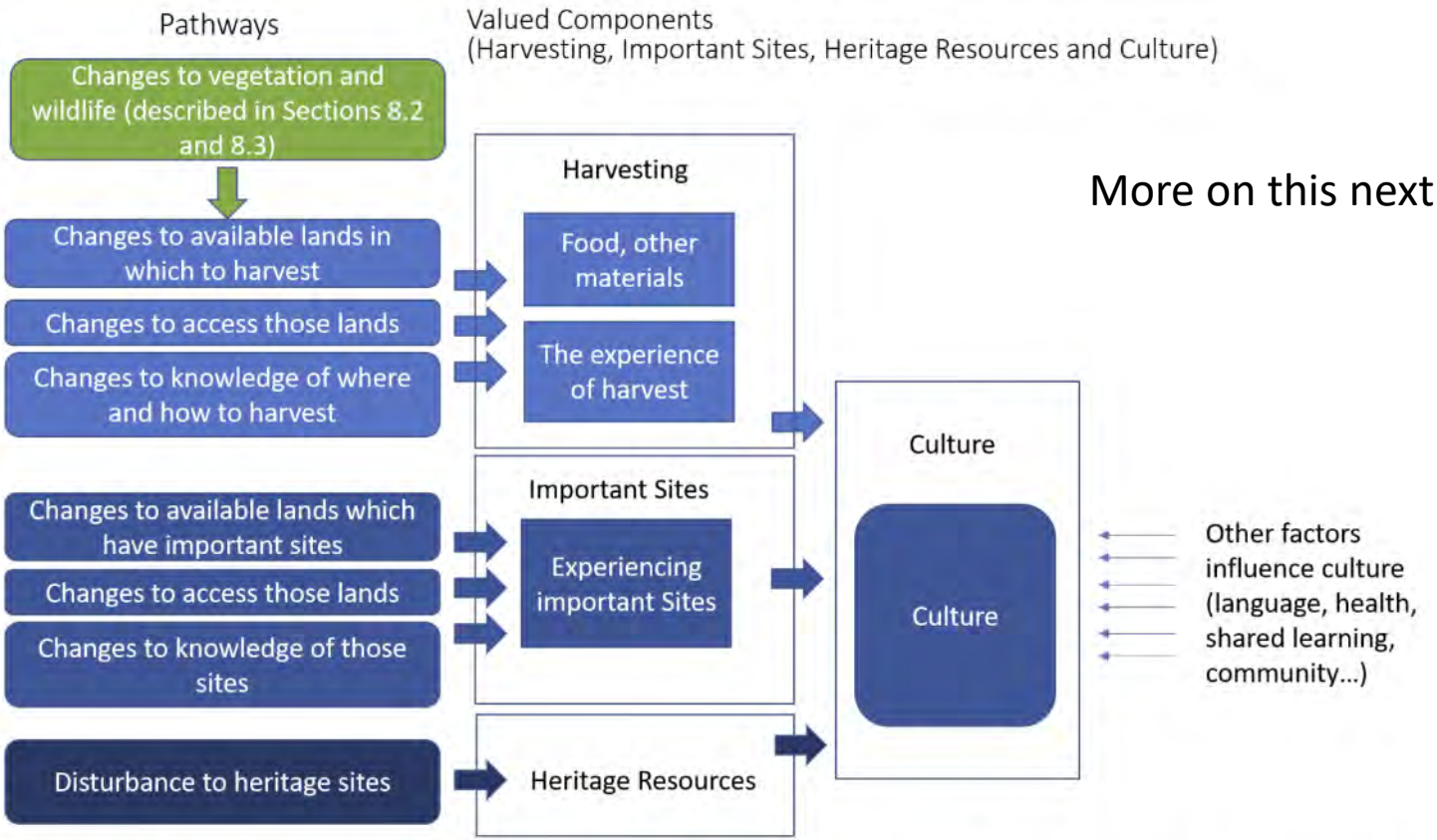

More on this next time!

Figure 8-5: Pathways of effects to valued components of importance to Indigenous communities

Maria M’Lot, MNRM, Community Relations Advisor, Indigenous Relations, Manitoba Hydro and Sarah Coughlin

Protecting Intangible Heritage

Photo credit: Darryl Taylor

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Sharing

- We want to route the tline in a respectful manner, but need your feedback.

Schedule

High-Level Milestones new Tline	Target Dates
Round 1	until November 15, 2021
Understand route preferences from MMF and First Nations	Before NOVEMBER 15, 2021
Round 1 Route Evaluation and Workshops	Before December 31, 2021
Round 2	New year - February 28, 2022
Understand route preferences/mitigative segments from MMF and First Nations	JANUARY-FEBRUARY
Final Preferred Route	March 3, 2022
Receive submission from MMF and First Nations regarding effects	MAY, 2022
MMF and First Nation review of MH assessment chapter	JULY 2022
EA Report submission	late summer, 2022
Licensing decision	?
Construction start (if approved)	August 25, 2025
In Service Date (proposed)	February 26, 2027

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All of Us

‘Take aways’ from today and what have we missed?

Actions from today

- CHRPP Addendum
- Send out materials to all
- Next meeting

When should we meet again?

Presentation slides from second heritage meeting held November 9, 2022

Heritage workshop #2

November 9, 2022

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Photo credit: Darryl Taylor

Agenda

Goal:

We’re here because we want to protect sensitive sites and talk about the best way to do that

Agenda

Goal:

We’re here because we want to protect sensitive sites and talk about the best way to do that

- Introductions
- Summary of discussion from first workshop
- The feedback we received and how we’ve responded
- Discussion
- Next steps
- Adjourn

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Let’s meet each other

Name, who you’re representing

What you hope we discuss today

Maria M’Lot

Summary of discussion from first heritage workshop – October 7/21

Three key topics:

More input

- Tools and methodologies to use
- Indigenous knowledge
- Oral histories

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Three key topics:

Data limitations

- Need to balance protecting sites and sharing data
- Formal report and a general one to share
- Communication plan as part of CHRPP

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Three key topics:

CHRPP

- Outline MH's process
- Reporting of finds in a way that is respectful
- Include medicine communities in the process

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Three key topics:

More input

- Tools and methodologies to use
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CHRPP

- Outline MH's process
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- Include medicine communities in the process

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How we have responded to feedback

Culture and Heritage Resource Protection Plan (CHRPP) updates

- New goal:
  - Protecting and preserving cultural and heritage sites potentially affected by MH infrastructure and meeting regulatory requirements while advancing reconciliation and collaboration.

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Additional project steps

Developing summaries of annual reports for D83W that can be shared with interested nations

Discussing communication plan for D83W CHRPP for heritage finds

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Process of hiring an archaeologist

Three-year framework agreement

Mini bids

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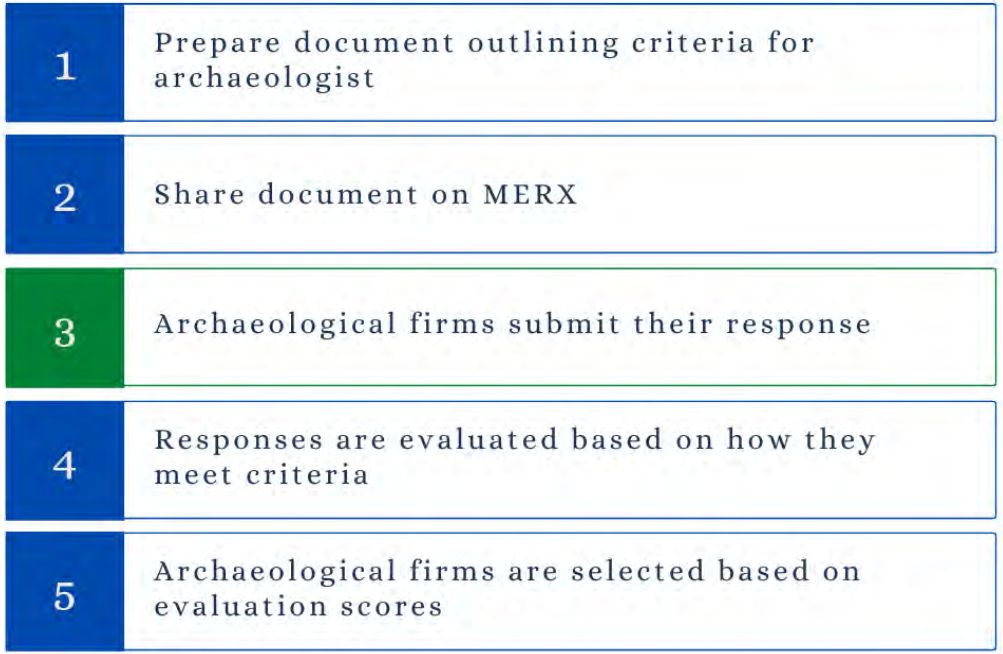
Process of hiring an archaeologist

Three-year framework agreement

Three-Year Framework Agreement

Identifies archaeological firms to be sent work opportunities over the three-year agreement period.



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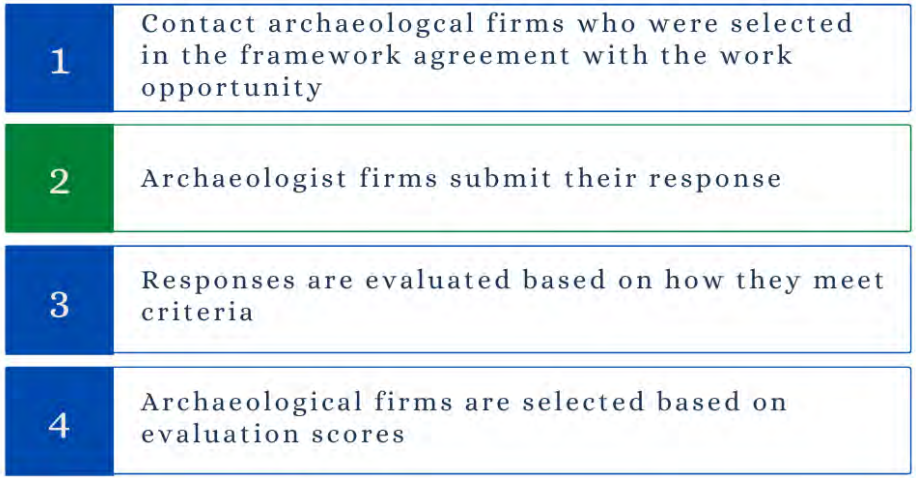
Process of hiring an archaeologist

Mini bids

Mini bids

The archaeological firms who were selected in the framework agreement bid on a work opportunity.



Heritage process overview

1	Archaeologist submits permit application to HRB
2	HRB reviews methodology
3	MH provides input on scheduling and coordinates participant involvement in HRIA fieldwork
4	HRIA completed by Project archaeologist

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Updates to heritage chapter

D83W next steps

Filing Environmental Assessment report

Conducting heritage field investigations as part of the heritage resources impact assessment

Lindsay Thompson and Amy Stevenson

Discussion

Action items from today and what have we missed?

Appendix C: Wildlife field reports

To:	*Jonathan Wiens* *Licensing & Environmental Dept.* *Manitoba Hydro*	From:	*Karin Newman* *Szwaluk Environmental Consulting*
File:	*PACE_EA_WILDLIFE_EA_9*	Date:	*May 31, 2022*

Reference: Field Survey Report –Portage Area Capacity Enhancement Transmission Project: Bird Migration Survey 2022

Objectives

This field report summarizes the results of migration surveys conducted in the Portage Area Capacity Expansion Transmission Project study area on April 26, 27 and 29, 2022. The objective of the Migration Surveys is to supplement existing avian occurrence data with additional information on presence and abundance of spring migrating species using any stopover habitat on or in vicinity of the PACE Preferred Route (PR).

Methods

Migration Surveys were located with the aim to record any incidence of critical bird habitat (e.g., migratory stopover sites); habitat use by high wing loading, high aspect ratio, or heavy bodied-fast flying species (e.g. cranes, herons, pelicans, waterfowl, rails, shorebirds, grouse, and grebes); presence of any avian species-at-risk; and high numbers of migratory species. Migration site locations were chosen along the PACE PR using digital ortho-rectified imagery. Pre-selected migration sites were located on the PR between known regional stopover and breeding hotspots (e.g., Delta Marsh and Crescent Lake), near the Portage Diversion, and near an area of perennial cover (pasture) south of the Delta Marsh IBA. Additional sites were selected in the field where high numbers of migratory birds were observed.

Each site consists of a passive roadside survey conducted for a minimum of 20 minutes, with multiple consecutive observation periods surveyed until all identifiable species using the site are recorded. The entire survey area (unlimited distance) and the indefinite column of air space above is scanned for all birds. Surveys took place between approximately 8:30 am and 1:30 pm on days with good visibility, little or no precipitation, and light winds. All sites were roadside access. Photographs are taken at each site (see–Photos).

Results

Migration Surveys

Five roadside stopover surveys were conducted during spring migration on April 26, 27 and 29, 2022 along the PACE RoW (Map 1). Surveys took place between approximately 8:30 am and 1:30 pm on days with good visibility, little or no precipitation, and light winds. Survey duration was between 40 to 120 minutes depending on presence/ abundance of birds. Three sites were pre-selected and located on the RoW, while two additional migration sites

were selected in the field as both suitable habitat, which included large expanse of open water in flooded stubble fields, and relatively abundant presence of birds were observed, Table 1. The centroid of stopover habitat at field-selected sites PTP-M01 and -M02 was located adjacent to the RoW, with edge stopover habitat located both on (PTP-M02) and adjacent (PTP-M01) to the RoW.

At least 33 bird species and 1165 individuals were observed/ heard from five migration sites, Table 2. The average diversity was 13.2 (3-18) species per site, with an average abundance of 233 (7-486) birds per site. One survey (PTP-M04) yielded very few birds, with no additional suitable alternate site nearby.

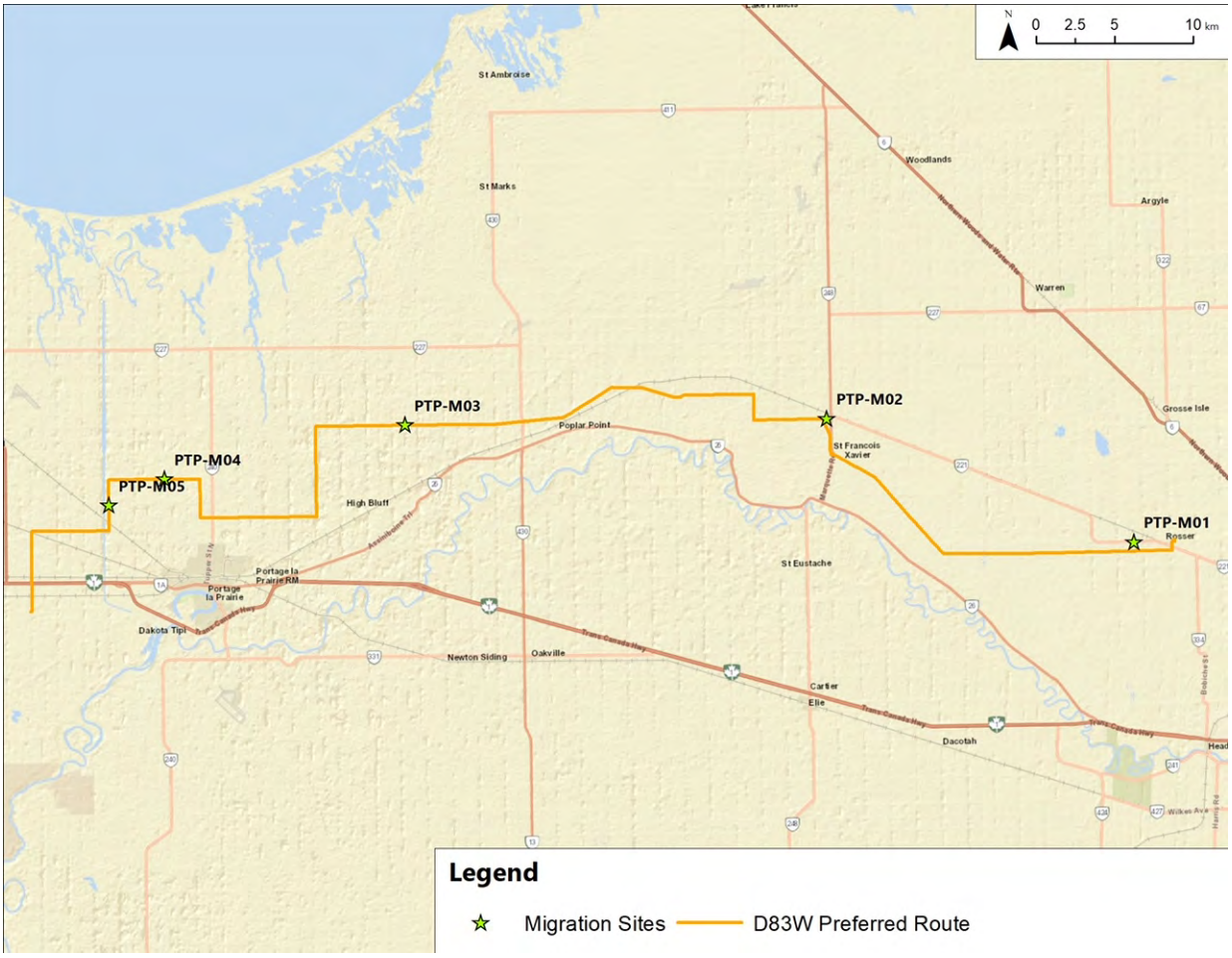
Waterfowl and aquatic birds accounted for most of the observations and at least 18 species recorded. The most abundant bird species observed were Canada Goose (699 birds), Tundra Swan (138) and Mallards (36). Passerines were the next most abundant form with eight species recorded. Most frequent passerines were Red-winged Blackbirds (45), Common Grackles (30) and American Crow (16). Five raptor species and two upland birds (grouse and allies) were also observed.

Notable Information and Recommendations

The dominant land use on the PR is primarily cultivated agricultural habitats, interspersed with occasional water features (drains, creek, lagoons, and ephemeral wetlands) and perennial habitats (woodlots, shelterbelts or pastures). The most significant stopover habitat observed was seasonally flooded agricultural fields, with areas of peripheral emergent vegetation (stubble). Stopover habitat supported relatively large congregations of waterfowl and aquatic bird species. Regular use of this habitat is not expected by these primarily migratory birds, outside of the current period of seasonally high-water levels in fields. No evidence of nesting was observed (e.g., nest structures, breeding behaviour). No avian species-at-risk were observed during migration surveys. Several observed species are important prairie birds that rely on grasslands for breeding, including Brewer's Blackbird (S4B), Marbled Godwit (S3S4), Sharp-tailed Grouse (S5) and Western Meadowlark (S3S4).

Maps - PACE Migration Surveys

Map 1. PACE Preferred Route and Locations of Five Migration Survey Sites



Tables – PACE Migration Surveys

Table 1. PACE Migration Survey: Summary of species diversity, bird abundance and land use at five migration sites.

Site, Locality (E to W)	Diversity	Abundance	Land Use, Condition	Distance to RoW
PTP-M01, Rosser	18	485	N: Stubble field and flooded stubble. S: Perennial grass and flooded field.	600 m
PTP-M02, Marquette	17	102	N: Flooded agricultural field peripheral stubble; Development. S: Agricultural stubble field, minimally flooded; Perch tree.	280 m
PTP-M03, High Bluff	14	481	N: Agricultural stubble field, minimally flooded; Perch tree. S: Flooded agricultural field, peripheral stubble.	On RoW
PTP-M04, Oakland	3	7	N: Agricultural stubble field, minimally flooded. S: Hay field; Woodlot; Fallow field no flooding.	On RoW
PTP-M05, Portage Diversion	14	94	NE: Pasture; drainage ditch. NW: Perennial grass; Woodlot; Portage Diversion. SE: Fallow field, minimal flooding. SW: Perennial grass; Portage Diversion.	On RoW

Table 2. PACE Migration surveys: Bird species and abundance recorded, by Site.

Form	Species	P-M01	P-M02	P-M03	P-M04	P-M05	Total
Grebes	Pied-billed Grebe	2					2
Pelicans	American White Pelican		11			10	21
Duck, swans, geese	Bufflehead	1					1
Duck, swans, geese	Canada Goose	357	4	294	2	42	699
Duck, swans, geese	Canvasback	12					12
Duck, swans, geese	Lesser/Greater Scuap	4					4
Duck, swans, geese	Mallard	6	2	18	2	8	36
Duck, swans, geese	Northern Pintail	4	2	10			16
Duck, swans, geese	Northern Shoveller		8				8
Duck, swans, geese	Ring-necked Duck	6					6
Duck, swans, geese	Tundra Swan	27		111			138
Duck, swans, geese	Ducks, unidentified	8		18			26
Raptor	Bald Eagle	1*		1			2
Raptor	Northern Harrier		1	1		1	3
Raptor	Red-tailed Hawk			1			1
Raptor	Rough-legged Hawk	1	1	3		1	6
Raptor	Turkey Vulture					1	1
Grouse, Allies	Sharp-tailed Grouse					3	3
Grouse, Allies	Wild Turkey					5	5
Coots, Cranes	Sandhill Crane			8		7	15
Shorebirds, Gulls	Franklin's Gull	4	1	2			7
Shorebirds, Gulls	Killdeer	6	11				17
Shorebirds, Gulls	Marbled Godwit		5				5
Shorebirds, Gulls	Ring-billed Gull	12		7		1	20
Shorebirds, Gulls	Wilson's Snipe		1				1
Passerines	American Crow	4		3	3	6	16
Passerines	Brewer's Blackbird					3	3
Passerines	Common Grackle		25			5	30
Passerines	Red-winged Blackbird	27	18				45
Passerines	Rock Pigeon		1				1
Passerines	Western Meadowlark	4	1	4		1	10
Passerines	White-crowned Sparrow		4*				4
Passerines	Northern Flicker		1*				1
	SPECIES DIVERSITY	**18**	**17**	**14**	**3**	**14**	**33**
	ABUNDANCE	**486**	**97**	**481**	**7**	**94**	**1165**

* Incidental sightings

Photos - PACE Migration Surveys

Site PTP-M01 (North, South); 220429

Photo: PTP_M01_North

Photo: PTP_M01_South

Site PTP-M02 (North, Southeast); 220429

Photo: PTP_M02_North

Photo: PTP_M02_SouthEast

Site PTP-M03 (North, South); 220426

Photo: PTP_M03_North

Photo: PTP_M03_South

Site PTP-M04 (North, South), 220427

Photo: PTP_M04_North

Photo: PTP_M04_South

Site PTP-M05 (North, South, East), 220427

Photo: PTP_M05_North

Photo: PTP_M05_South

Photo: PTP_M05_East

To:	*Jonathan Wiens* *Licensing & Environmental Dept.* *Manitoba Hydro*	From:	*Karin Newman* *Szwaluk Environmental Consulting*
File:	DWMTP_2022_Wildlife_SEC	Date:	*August 22, 2022*

Reference: Field Survey Report –Dorsey to Wash'ake Mayzoon (D83W) Transmission Project; Point Count Surveys June-July 2022

Objectives

This field report summarizes the results of breeding bird point count surveys conducted in the Dorsey to Wash'ake Mayzoon (D83W) Transmission Project study area between June 9 and July 5, 2022. The objective of the Breeding Bird Surveys is to supplement existing avian occurrence data with additional information on presence and abundance of birds, both breeding and non-breeding, using natural and developed habitats on or in vicinity of the Dorsey to Wash'ake Mayzoon Preferred Route (PR).

Methods

Study Design

Breeding bird survey point counts (points) were situated to cover different land uses and habitat types present along the length of the PR. Sites were pre-selected using digital imagery, focusing on areas of natural habitat (trees, water courses and wetlands, perennial grasslands), agricultural areas (annual crops) and developed spaces (yard sites). Some points were shifted or added in the field due to site accessibility or actual habitat type present. Sites were situated at least 400 m apart to avoid double counting birds. Because of the timing of the surveys, many locally nesting bird species observed may be assumed to be breeding, although non-breeding and migrating birds were also recorded.

Each site consists of a roadside point count survey conducted for 5 minutes. While an unlimited distance radius was used, (entire survey area and the indefinite column of air space above was scanned for all birds), this amounted to a functional radius of <400m. Incidental species were sighted before or after surveys (outside of 5 min span) or recorded between surveys along the PR. All surveys began half hour before sunrise and were completed five hours after sunrise, on days with good visibility, little or no precipitation, and light winds. Site notes and photographs were taken at each site.

Results, Breeding Bird Surveys

Fifty-nine roadside point counts (points) were conducted during the breeding season on June 9, 10, 15 and July 1 and 5, 2022, see Map 1. For the purposes of this reporting, points are categorized by land use/ habitat type.

Primary land use along the preferred route is cultivation (annual crops), with natural habitats interspersed within the agricultural matrix. Perennial grass is present as pasture, hay or uncultivated areas of idle grass. Treed areas were surveyed generally around yard sites, shelterbelts or small bluffs surrounded by agriculture. Woody sites are those with a mix of tree and/or tall shrubs, willows around water. Water features include creeks, drains, and ephemeral or semi-permanent wetlands. The roadside right-of-way also provides additional habitat at certain sites, e.g., a verge of dense brome grass, or open water or aquatic emergent plants in the ditches. Most points were influenced by a combination of cultivation and other natural habitats.

At least 58 bird species and 1,020 individuals were recorded from 59 points. Incidental bird sightings were recorded at sites before or after start of surveys or observed on the RoW between points. Although incidental, these sightings are included in the reporting as they add to the diversity and abundance of birds within habitat along the PR and within the project area. For summary reporting, bird observations are presented from points summarized by their land use categories. The main land use at points surveyed, and the average bird diversity and abundance detected is shown in Table 1.

About a third (27%) of all points are solely annually cropped, with no other habitat type present. At the time of survey, many crops were still sparse and emerging, these points showed on average the lowest bird diversity (4.8 species/point). Most points surveyed (57.6%) were dominated by cultivation with a combination of one or more other natural habitat types present (e.g., perennial grass, trees/shrubs, or water). The mean diversity in these combination cultivated/ natural habitat sites was slightly higher (6.6 – 8.6 species/point). The greatest bird diversity was found in sites dominated by natural (or perennial) habitats such as pasture, idle grass, tree cover and/or the presence of water or wetlands (11-15 species/point). Cultivated land was also a peripheral influence in these sites.

Similarly, the mean bird abundance was lowest (ca 13 birds) at points with cultivation as the sole land use. More birds were detected at points where natural habitats are present along with cultivation (ca 14-23 birds), or where natural habitats are predominant (ca 15- 30 birds). Greatest mean abundance was detected in sites with an aquatic influence (creek, drain, wetland), and foremost in sites with primarily natural habitat (water with a component of trees and/or shrubs), followed by cultivated sites with an aquatic influence, as well as other sites with natural habitats (grass and trees), Table 1.

Table 1. Land use category and mean diversity and abundance of breeding birds from point counts in the Dorsey to Wash'ake Mayzoon Transmission Project area.

Land use	Points (#)	Land use (%)	Mean Diversity	Mean Abundance
Crop (annual)	16	27.1	4.8	12.7
Crop, grass	10	16.9	6.6	14.5
Crop, trees	11	18.6	6.9	17.3
Crop, water	6	10.2	8.5	23.0
Crop, water, woody	7	11.9	8.6	17.6
Grass, trees	5	8.5	12.2	22.8
Treed	1	1.7	11.0	15.0
Water, woody	3	5.1	15.0	30.7
Total	59	100	58 species	1,020 birds

Passerines accounted for the greatest diversity and number of observations, with 790 individuals from 40 species recorded. The most abundant passerines were Red-winged (182) and Brewer's (176) Blackbirds, which were most abundant in the Cropped land use. Next most abundant passerines were Western Meadowlark (61), Mourning Dove (45), Savannah Sparrow (38) and Barn Swallow (36).

Waterfowl was the next most abundant type of bird, primarily Mallard (70), Canada Goose (26) and Blue-winged Teal (8). The Canada Goose were foraging in fields or water and generally seen in pairs or very small groups. Sora (8) and Virginia Rail (1) were restricted to wet sites. Shorebirds and Gulls were also abundant, most frequent were Franklin's Gull (43), Wilson's Snipe (16) and Killdeer (12). Raptors were not particularly abundant during morning surveys, with Northern Harrier (5) the most frequent, see Table 2. No raptor nests were observed.

Four federally listed species were recorded, highlighted in Table 2 below. Barn Swallow (Threatened) was recorded 36 times at nine points, generally near creeks, drains, or buildings (e.g., abandoned barns, grain bins). Thirteen observations of Bobolink (Threatened) were taken from six points with idle grass or crop, five of the points were situated between Reaburn and Poplar Point localities. A single juvenile Red-headed Woodpecker (Threatened) was observed incidentally in small grove of trees in otherwise grassy site (point B13). The Eastern-wood Pewee (Special Concern) was recorded in an uncultivated wet area with trees and willows (point B14). Several other species observed in the project area are ranked as Vulnerable by the Manitoba Conservation Data Center and are important prairie birds that rely on grasslands for breeding, including Horned Lark (S3B), Northern Rough-winged Swallow (S3S4B), Western Kingbird (S3S4B, Western Meadowlark (S3S4B) and Willet (S3S4B).

Late season migrating waterfowl were also observed flying overhead during breeding surveys. Fourteen of 43 points surveyed in June had one or more flocks observed. Canada Goose migrants were observed in 19 flocks varying in size from 14 to 125 geese, between June 9 and 15, for a total of ca 1,462 migrating geese recorded. A single incidence of approximately 165 ducks was observed on June 15, ducks were not identified to species. The counts for these late season migrants are added to total bird abundance in Table 2, below. The geese were observed flying northwards and not using stopover habitat. The migrant ducks appeared to be making use of stopover habitat, circling overhead, and then settling in a large wet depression within hay near the portage diversion and point B45. Flocking geese or ducks were not observed during July surveys.

Table 2. Species list and abundance of birds detected in points counts in the Dorsey to Wash'ake Mayzoon Transmission Project area. Federally listed species are highlighted.

Birds Observed	Crop	Crop/ Grass	Crop/ Tree	Crop/ Water	Crop/ Tree/ Water	Grass/ Tree	Tree	Water/ Tree/ Shrub	Total # birds
Pelicans									
American White Pelican	7		5						12
Duck, swans, geese									
Blue-winged Teal			1	5				2	8
Canada Goose	3	2	5	12	1	3			26
Gadwall	2			4					6
Mallard	11		38	9	1	9		2	70
Northern Shoveler		2	1	2					5
Unidentified Duck			2						2
Wood Duck			1						1
Raptors									
Bald Eagle			1	1		1			3
Northern Harrier	1	2	1			1			5
Red-tailed Hawk	2		1					1	4
Turkey Vulture				2	1				3
Coots, Cranes, Rails									
Sora				4				4	8
Virginia Rail					1				1
Shorebirds, Gulls									
Franklin's Gull	18	1	15	9					43
Killdeer	6			4				2	12
Ring-billed Gull			1						1
Willet		3		1					4
Wilson's Snipe	1	8	2	1	1	1	1	1	16
Passerines									
American Crow	5	6	6	3	5	4		1	30
American Goldfinch		1	4		2	1	1	1	10
American Redstart								1	1
American Robin			5		4	4		1	14
Baltimore Oriole			1		1		1		3
Barn Swallow	6		2	4	19	1		4	36
Black-billed Magpie					2	4			6
Blue Jay						3			3
Bobolink	3	5	3			2			13
Brewer's Blackbird	58	39	26	21	18	10		4	176

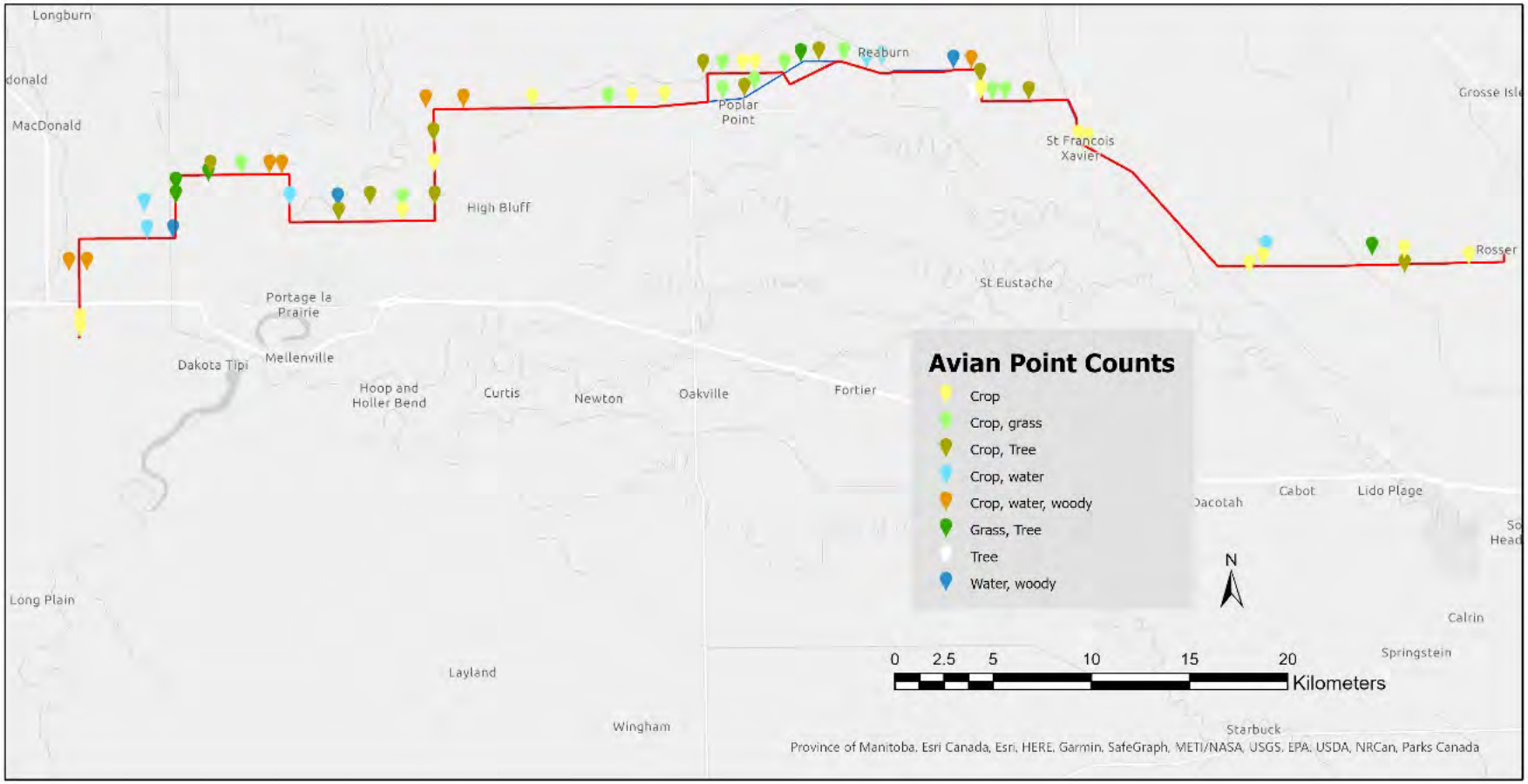
Brown-headed Cowbird			3		1			2	6
Clay-colored Sparrow		1		2	1	9	1	2	16
Cliff Swallow								8	8
Common Grackle	6	1	1					1	9
Common Yellowthroat		1			2	2		2	7
Eastern Kingbird		1	4		8	7		2	22
Eastern Wood-pewee								1	1
Gray Catbird					2			1	3
Great Crested Flycatcher					1			1	2
Horned Lark	4	2	1		1				8
House Wren			1			1			2
Least Flycatcher			3		1	2	1	2	9
Marsh Wren								2	2
Mourning Dove	1	2	9	5	6	10	2	10	45
Northern Flicker	1		2						3
Northern Rough-wing Swallow								6	6
Red-eyed Vireo			1		1		1		3
Red-headed Woodpecker					1				1
Red-winged Blackbird	40	34	19	35	26	10	4	14	182
Rock Pigeon					3			1	4
Savannah Sparrow	12	13	5	3	1	4			38
Sedge Wren		2		1		1			4
Song Sparrow		1	2		1	5	1	4	14
Tree Swallow					1			1	2
Unidentified Sparrow		2							2
Vesper Sparrow	2	1	3		3	3			12
Warbling Vireo			1			1		1	3
Western Kingbird						3			3
Western Meadowlark	14	14	12	5	4	9	1	2	61
Yellow Warbler		1	2		3	3	1	5	15
Yellow-headed Blackbird				5					5
Total Breeding Birds	**203**	**145**	**190**	**138**	**123**	**114**	**15**	**92**	**1020**
Migrant Canada Goose	769	116	94	36	290	157	-	-	1462
Migrant Duck spp	-	-	-	-	-	165	-	-	165
Total Bird Abundance	**972**	**145**	**284**	**174**	**413**	**436**	**15**	**92**	**2647**

Notable Information and Recommendations

Based on abundance and diversity of birds detected, the most significant habitats were areas with trees, shrubs and water, or wetland areas. Trees and shrubs are generally small bluffs within agricultural matrix, yard sites, or trees and shrubs around wetlands or in the roadside ditch. The presence of trees shrubs and wetlands generally was accompanied by an increase in bird diversity and abundance. Despite the small size of these wetland or woody habitats, they are clearly providing cover, forage and breeding opportunities for the birds noted in the region, particularly passerines, ducks, geese and rails.

Four species of conservation concern were recorded including Barn Swallow, Bobolink and Red-headed Woodpecker (Threatened, SARA) and the Eastern Wood-pewee (Special Concern, SARA). An additional six species recorded from the Dorsey to Wash'ake Mayzoon RoW are ranked Vulnerable by the Manitoba Conservation Data Center (S3B to S3S4B) including Horned Lark (S3B), Northern Rough-winged Swallow (S3S4B), Western Kingbird (S3S4B, Western Meadowlark (S3S4B), Willet (S3S4B) and Baltimore Oriole (S3S4B). All but the oriole are important prairie birds that rely on southern grassland habitats for breeding.

Map 1 - Dorsey to Wash’ake Mayzoon Breeding Bird Surveys



Map 1. Dorsey to Wash’ake Mayzoon Transmission Project Preferred Route (in red; previous routing in blue) and breeding bird point count locations by land use at each point.

Photos - Dorsey to Wash'ake Mayzoon Transmission Project Breeding Bird Surveys

Sample photos of points from each land use/ habitat type, June and July 2022. Land use categories (by dominant land use at each point) included Crop; Crop and perennial grass; Crop and Tree; Crop and Water; Crop, tree and Water; Grass and Tree; Tree; Water and Woody (Tree and Shrub)

Crop Habitat

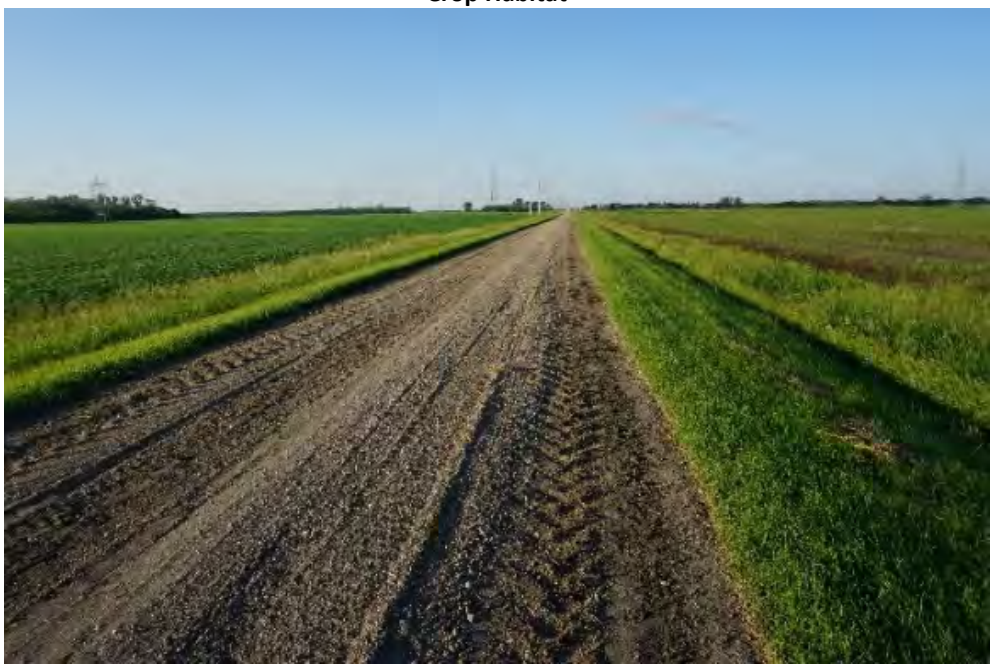


Photo 1. Cultivation on either side of road at Point B50. Photo ID: DSC04847_B50

Photo 2. Point B24, emerging crop with wide verge of smooth brome. Photo ID: DSCN1541_B01

Crop and Grass Habitat

Photo 3. Cultivation with very wide grass verge at point B17a. Photo ID: DSCN1521_B17a

Photo 4 (*l, r*). Perennial grass habitat (*left*) and cultivated field (*right*) on either side of road at point B34a. Photo ID: DSC04727_B34a (*left*), DSC04728_B34a (*right*)

Photo 5. A cultivated field and uncultivated grass habitat on either side of road at point B21. Photo ID: DSCN1535_B21 (left), DSCN1536_B21 (right)

Crop and Tree Habitat

Photo 5. Cultivation with adjacent trees and shrub cover at point B12. Photo ID: DSCN1502_B12

Photo 6. Cultivation with shelterbelts at point B34. Photo ID: DSC04722_B34

Crop and Water Habitat

Photo 7. Open water drain through intensive cultivation (both sides of road), point B05. Photo ID: DSC0481_ B05

Photo 8. Creek surrounded by cultivation at Point B39. Photo ID: DSC04737_B39

Crop, Tree and Water Habitat

Photo 9 (*l, r*). Cultivation surrounded by trees (*left*) and small water course (*right*) to north and south, at point B41.
Photo ID: DSC04743_B41 (*left*), DSC04744_B41 (*right*).

Photo 10. Pond at drain, near brush piles and shelterbelt (not pictured), surrounded by cultivation at Point B48a.
Photo ID: DSC04837_B48a

Grass and Tree Habitat

Photo 11 (*l, r*). Pasture and grass, with trees and shelterbelts at point B04.
Photo ID: DSCN1478_B04 (*left*), DSCN1480_B04 (*right*)

Photo 12. Point B41a, Hay field and trees south of road. Cultivation north of road, although all birds were detected in habitat pictured. Photo ID: DSC04754_B41a

Tree Habitat

Photo 13: Lane surrounded by mature trees, shrubs and mature shelterbelt at point B11b. Photo ID: DSCN1499_B11b

Water and Woody (tree and shrub) Habitat

Photo 14 (*l,r*) Point B14 has cattail marsh with willows to the north (*left*), and wetland dominated by willows and lone trees south of road (*right*). Photo ID: (a) DSCN1511_B14 (left), DSCN1513_B14 (right).

Photo 15. Point B37a has open water to the east and west of road, west wetland joins with creek, northwest.
Photo ID: DSC04732_B37a

Appendix 1. Dorsey to Wash'ake Mayzoon Transmission Project Breeding Bird Point Count locations (UTM) and land use at each point.

Point	Land Use	UTM E	UTM N
B01	Crop	610444	5537950
B02	Crop	607153	5538289
B03	Crop, Tree	607172	5537549
B04	Grass, Tree	605515	5538437
B05	Crop, Water	600125	5538507
B06	Crop	599261	5537532
B06a	Crop	599962	5537911
B09	Crop	591061	5544040
B10	Crop	590562	5544186
B10a	Crop, Grass	586186	5546421
B11	Crop, Tree	588037	5546440
B11a	Crop, Grass	586835	5546433
B11b	Tree	585197	5546396
B12	Crop, Tree	585564	5547371
B12a	Crop	585606	5546505
B13	Crop, Tree, Water	585112	5548041
B14	Water, Woody	584200	5548054
B15a	Crop, Water	580587	5548256
B16	Crop, Water	579792	5548109
B17a	Crop, Grass	578631	5548441
B18a	Crop, Tree	577351	5548474
B19	Grass, Tree	576428	5548380
B20a	Crop, Grass	575599	5547872
B21	Crop, Grass	574076	5546945
B21a	Crop	574087	5547871
B22	Crop, Tree	573556	5546617
B22a	Crop	573460	5547857
B23	Crop, Grass	572452	5546465
B23a	Crop, Grass	572438	5547853
B23b	Crop, Tree	571457	5547832

Point	Land Use	UTM E	UTM N
B24	Crop	569493	5546217
B25	Crop	567834	5546153
B26	Crop, Grass	566624	5546138
B28	Crop	562770	5546082
B29a	Crop, Tree, Water	559255	5546043
B30a	Crop, Tree, Water	557338	5546023
B31	Crop, Tree	557733	5544313
B32a	Crop	557763	5542732
B34	Crop, Tree	557790	5541058
B34a	Crop, Grass	556137	5540938
B35	Crop	556147	5540239
B36a	Crop, Tree	554501	5541050
B37	Crop, Tree	552908	5540222
B37a	Water, Woody	552860	5540958
B39	Crop, Water	550417	5541019
B40	Crop, Tree, Water	550016	5542660
B41	Crop, Tree, Water	549385	5542660
B41a	Crop, Grass	547938	5542640
B42	Crop, Tree	546384	5542638
B43	Grass, Tree	546274	5542235
B44	Grass, Tree	544618	5541777
B45	Grass, Tree	544620	5541109
B46	Water, Woody	544475	5539333
B47	Crop, Water	543146	5539311
B47a	Crop, Water	543000	5540701
B48a	Crop, Tree, Water	540087	5537657
B49a	Crop, Tree, Water	539169	5537651
B50	Crop	539754	5534745
B51	Crop	539749	5534254

Proposed Diverter Placement, 2022
Avian Surveys: Dorsey to Wash'ake Mayzoon (D83W)

Introduction

The following are suggested placements for avian diverter installation areas, recommended based on results of five Migration and 59 Breeding Bird Surveys, with consideration of the following factors:

a) High use of aquatic or terrestrial stopover habitat by migrants, as noted in April 2022
b) Use of sensitive habitat noted during breeding surveys, June-July 2022
c) Presence or abundance of bird species with risk of power line collision, from all surveys
d) Presence of species at risk during all surveys
e) Environment or habitat situated in proximity with the Preferred Route, that may be attractive to birds (e.g., wetlands, water treatment lagoons, WMAs, landfills, natural perennial habitat).

Species-specific factors that can influence avian collision risk with power lines include high wing loading (high weight to wing area ratio), high aspect ratio (wingspan squared: wing area), or generally heavy bodied-fast flying species. Examples of species with higher risk of collision that were detected migrating through and /or breeding in the project area include pelicans, cranes, rails, waterfowl, shorebirds, grouse, and grebes.

Species at risk recorded within the project area were Barn Swallows, Bobolinks, Eastern-wood Pewee and the Red-headed Woodpecker. All swallows and the Eastern Wood-pewee are aerial insectivores; insect producing habitats (wetlands, peatlands) over each species' range continue to be lost. Bobolinks are edge sensitive grassland birds that require wide open habitat. The Red-headed Woodpecker requires large diameter standing dead trees for nesting. While listed provincially as Uncommon (S3B to S3S4B) to Apparently Secure (S4B) in Manitoba, the nesting and/or insect producing habitats required by these birds over their ranges are under pressure from habitat losses.

A summary of all diverter installation sites is shown in Table 1. Detailed descriptions of the seven proposed diverter installation sites, follow below. The diverter installation site is identified by paired start and stop point (D#) to denote each installation area. The approximate distance (m) and the associated bird survey points from the April migration (M) and June- July breeding season (B) are indicated.

Table 1. Summary of Proposed Bird Diverter Installation Areas (Site, D#-D#)					
Site	**Start**	**Stop**	**Meters**	**Sensitive Area Description**	**Bird Survey**
D1-D2	E-610784 N-5538098	E-609625 N-5538070	1154	Stopover habitat use by migrants	M01, B01
D3-D4	E-590475 N-5545303	E-589834 N-5546455	1664	Stopover habitat use by migrants	M02
D5-D6	E-585213 N-5548021	E-583941 N-5547951	915	Sensitive wetland area	B13, B14
D7-D8	E-577923 N-5548269	E-575325 N-5547865	2370	Habitat use during breeding season by SAR	B18a, B19, B20a
D9-D10	E-564471 N-5546054	E-562570 N-5546042	1900	Stopover habitat use by migrants	M03
D11-D12	E-550414 N-5540800	E-550402 N-5541919	1050	Sensitive habitat use by migrants	B39
D13-D14	E-546514 N-5542603	E-544055 N-5539353	5656	Sensitive habitat use by migrants	B42; B44; B45; B46; M05

Additional Notes

Significant regional and local bird congregation areas in or near the Regional Assessment Area include the Delta Marsh WMA (ca 10 kms from center line); Grants Lake WMA (ca 7 kms from center line); local landfill (ca 5 kms from center line, on PR 227). At this time diverter installations related specifically to these features are not suggested. Major riparian areas are not crossed by the RoW. No other significant wetland areas are known from the RoW.

See associated field report for avian migration and breeding bird point counts, for additional details of avian survey results.

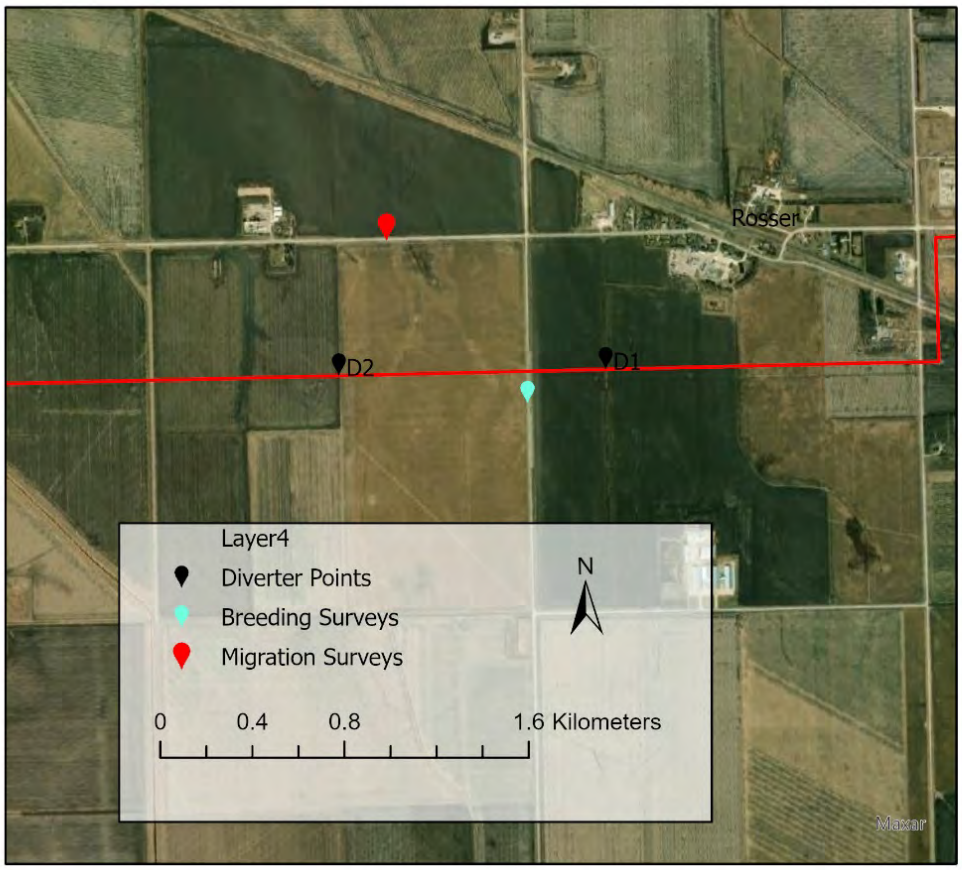
Descriptions of Suggested Diverter Installation Areas

Site D1-D2, Rosser

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
D1-D2	E-610784 N-5538098	E-609625 N-5538070	1154	Stopover habitat use by migrants	M01, B01

Start (D1) and stop (D2) points span an area of high use of stopover habitat by migrants, observed in seasonally flooded cultivated field north of the RoW. Southern extent of flooded area was >100 m north of existing parallel transmission line and extended north to rail line (and continued north of rail line), north of Rosser Road (PR221). This spring, water extended east of Meridian Road, and south towards the Preferred Route center line. Total area covered by seasonal flooding this year is estimated at ca >50 ha over three fields, as of April 2022, a high-water year.

Results of migration survey M01 showed habitat use by an abundance of migrant geese, swans, grebes, ducks and shorebirds (449 birds), as well as additional raptors and passerines (37 birds). Birds occurred on both sides of the Rosser Road, and primarily west of Meridian Rd. Point B01 is located on Meridian Rd. See Map 1.



Map 1. Site D1-D2, Rosser

Site D3-D4, Marquette

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
D3-D4	E-590475 N-5545303	E-589834 N-5546455	1664	Stopover habitat use by migrants	M02

The suggested diverter installation site starts (D3) on south side of (Scott's) drain, where RoW parallels PR 248, RoW crosses drain and runs parallel with PR 221 (Jubliee Rd) to stop point (D4). This high-water year, 17 species and 92 birds recorded in April migration survey M02 were observed making use of flooded field with an area of ca 8 ha north of PR 221. Migrants included 16 waterfowl (Canada Goose, Mallard, Northern Pintail, Northern Shoveler) and 18 shorebirds (Franklin Gulls, Killdeer, Marbled Godwit, Wilson's Snipe). American White Pelican were seen flying overhead. Flocks of Common Grackles (25) and Red-winged Blackbirds (18) were also observed at this site, with additional passerines and raptors also present. Because of the location of the RoW along an existing drain, this area may be prone to annual spring flooding, and possible regular migrant waterfowl use of this stopover habitat. See Map 2.

Site D5-D6, near Marquette

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
D5-D6	E-585213 N-5548021	E-583941 N-5547951	915	Sensitive wetland area	B13, B14

At the eastern start point (D5, near B13) an ephemeral drainage creek (grassy and moist in June) crosses the RoW. Small, treed bluffs on RoW, and a patch of treed habitat north of RoW. Span includes a wetland with woody cover predominantly willows and very sparse trees, and some open water (B14). Surrounding area is cultivated. Although the overall area of habitat is small, 54 birds and 23 species were observed collectively during two breeding bird surveys at this site. See Map 2.

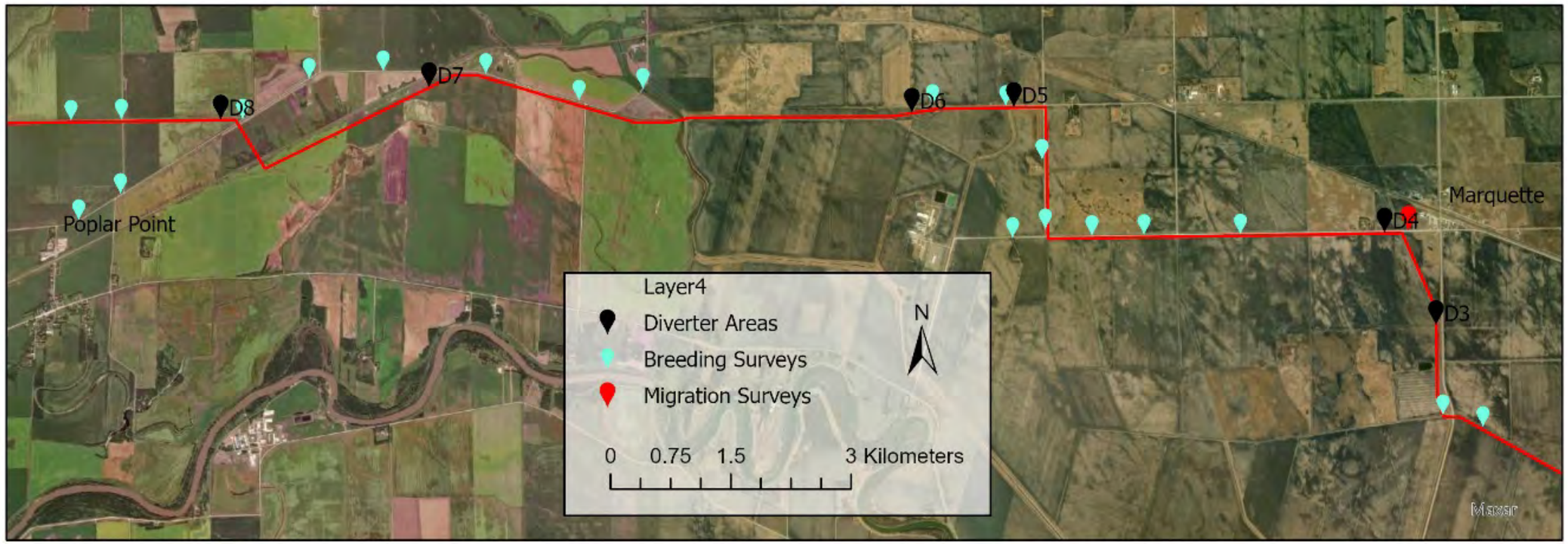
SAR present: Barn Swallow; Eastern Wood-Pewee; Red-headed Woodpecker. Breeding area for Sora Rail.

Site D7-D8, Poplar Point

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
D7-D8	E-577923 N-5548269	E-575325 N-5547865	2370	Habitat use during breeding season by SAR	B18a, B19, B20a

The RoW at this site crosses an area of uncultivated moist grassland (possibly hayed) and wet willow habitat along the railway right-of-way. The three breeding bird surveys here were noted collectively for a high abundance (84 birds) and diversity (22 species) present, relative to other surveys where land use is more intensely cultivated. See Map 2.

SAR present: Barn Swallow; Bobolink.

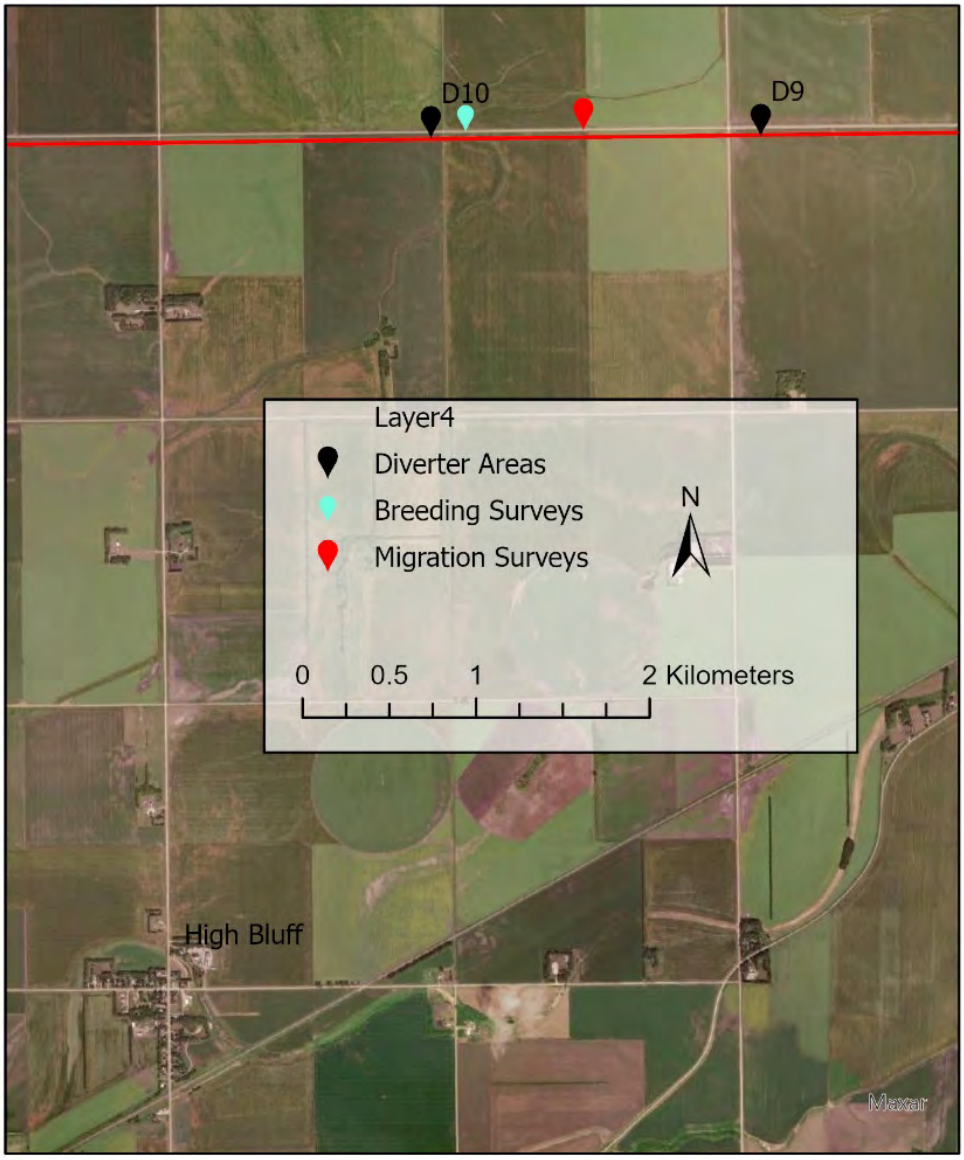


Map 2. Site D3-4; D5-6; D7-8, Marquette to Poplar Point

Site D9-D10

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
	E-564471	E-562570			
D9-D10	N-5546054	N-5546042	1900	Stopover habitat use by migrants	M03

This site includes high use of stopover habitat by migrants near a drain and a creek area. Start point (D9) is ca 200 m east of eastern corner of a flooded field (April 2022), stop point (D10) is ca 220 m west of creek bed. High use of stopover habitat was observed by migrant geese, cranes, swans, ducks (468 birds), in addition to raptors and passerines.



Map 3. Site D9-D10, High Bluff

Site D11-D12, Portage La Prairie

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
D11-D12	E-550414 N-5540800	E-550402 N-5541919	1050	Breeding habitat use by waterbirds	B39

This site crosses a small wetland/ drainage creek and points align with the south (start, D11) and north (stop, D12) edge of creek habitat. Diverse water birds including geese, ducks, rails and shorebirds, were observed using this habitat during breeding season point count, including Canada Goose, Blue-winged Teal, Gadwall, Northern Shoveler, Sora, Willet and Killdeer. See Map 4.

Site D13-D14, Portage Diversion

Site	Start	Stop	Meters	Sensitive Area Description	Bird Survey
D13-D14	E-546514 N-5542603	E-544055 N-5539353	5656	Stopover habitat use by migrants; waterbird movement corridors	B42; B44; B45; B46; M05

This site spans aquatic and terrestrial habitat, and a waterbird movement corridor. Start point (D13) is near agricultural field (B42; 32 mallards observed foraging in field), then RoW crosses treed area, then a low spot in agricultural field, ca. 800 m east of Portage diversion, where 165 ducks were observed circling overhead, then landing. RoW continues to run parallel to diversion (B45, B44, M05), and crosses diversion near small wetland on east side (B46). The stop point (D14) is ca 230 m west of the Portage diversion crossing. This site covers several habitat types, including idle grassland (crown pieces near the diversion), treed bluffs, open pasture, cultivation, and water courses (diversion, and some culverted ditches). See Map 4. At this site, one migration survey and four point counts yielded 38 species and 215 birds, passerines accounted for 21 species.

Map 4. Site D11-D12; D13-D14, Portage la Prairie to the Portage Diversion

To:	*Jonathan Wiens* *Licensing & Environmental Dept.* *Manitoba Hydro*	From:	*Brad Kennedy* *Szwaluk Environmental Consulting*
File:	*PACE_EA_Wildlife_EA_25*	Date:	*August 22, 2022*

Reference: Field Program Summary – Dorsey to *Wash'ake Mayzoon Transmission Project - Environmental Assessment/ Summer 2022/Mammals Survey*

OBJECTIVE

The objective of this survey was to visit various sites in the project study area and along the preferred route to identify the presence of mammal species for the Dorsey to Wash'ake Mayzoon (D83W) Transmission Project.

METHODS

STUDY DESIGN AND DATA COLLECTION

Initially, the study involved the review of species of conservation concern (SCC) previously known to occur in the project area (Manitoba Conservation Data Centre Database), as well as other relevant literature for the surrounding area (Tetratech 2012). There are 55 mammal species expected to occur within the project study area. Currently, there are four mammal species identified as at risk, listed with either the federal *Species at Risk Act*, the Committee on the Status of Endangered Wildlife in Canada, or the *Endangered Species and Ecosystems Act* of Manitoba, that are known to occur in the project study area.

Manitoba Hydro's Environmental Protection Information Management System (EPIMS) map viewer and satellite imagery were used to identify potential mammal habitats within the project study area and preferred route for the transmission line. Areas with suitable habitats, such as patches of forest, shelter belts, riparian areas, watercourses, and wetlands were identified as potential survey locations. All fieldwork was conducted roadside, along existing Manitoba Hydro RoW, or on Crown lands. Manitoba Hydro study area maps (1:90,000) were used in the field. At each survey location, all mammal species observations were recorded, as well as all signs of mammal activity, including tracks, dens, browsing, and other signs of habitat utilization. Photographs were taken at sites visited and where evidence of mammal activity were observed. Incidental observations of mammal species, and signs of mammal activity, were also recorded while traveling between sites along the preferred route.

Ten sites were visited in the field on August 4, 2022. All sites were accessible by road and foot. Data was recorded in field notebooks. Field visits were conducted by Bradley Kennedy. Incidental mammal observations were also recorded during vegetation surveys conducted by Kevin Szwaluk, and during bird surveys conducted by Karin Newman.

PRELIMINARY RESULTS

The preferred route was driven by road where accessible. The route occurs primarily along agricultural land, the vast majority of which, is in annual crop production. Mammals or signs of mammal habitat utilization were observed at 21 locations in the study area (See Table 1 and Map 1 (attached)). Eight different mammal species were recorded, including one SCC: American Badger (*Taxidea taxus* – SARA schedule 1 – Special Concern).

Table 1: Mammals observed in the Project Study Area

Common Name	Scientific Name	Easting	Northing	SARA Schedule 1 Status
American Badger	*Taxidea taxus*	546092	5542629	Special Concern
Coyote	*Canis latrans*	585112	5548041	Not at Risk
Coyote	*Canis latrans*	544394	5539328	Not at Risk
Long-tailed Weasel	*Mustela frenata*	573460	5547857	Not at Risk
Racoon	*Procyon lotor*	544394	5539328	Not at Risk
Red Fox	*Vulpes vulpes*	539726	5537206	Not at Risk
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	567834	5546153	Not at Risk
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	562770	5546082	Not at Risk
Thirteen-lined Ground Squirrel	*Spermophilus tridecemlineatus*	544475	5539333	Not at Risk
White-tailed Deer	*Odocoileus virginianus*	599962	5537911	Not at Risk
White-tailed Deer	*Odocoileus virginianus*	544618	5541777	Not at Risk
White-tailed Deer	*Odocoileus virginianus*	553631	552611	Not at Risk
White-tailed Deer	*Odocoileus virginianus*	583936	5548030	Not at Risk
White-tailed Deer	*Odocoileus virginianus*	544581	5542540	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	586835	5546433	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	573556	5546617	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	566624	5546138	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	552908	5540222	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	550016	5542660	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	549385	5542660	Not at Risk
White-tailed Jackrabbit	*Lepus townsendii*	539707	5539007	Not at Risk

Occurrences of Wild pigs, an invasive mammal species, have been recorded in the project study area (Brook 2021). Wild pigs pose a risk to both livestock and wildlife and have the potential to cause extensive damage to native vegetation communities and crops (Manitoba Fish and Wildlife 2022). No evidence of Wild pigs was observed during field surveys. However, targeted surveys for Wild pigs were not conducted.

NOTABLE INFORMATION AND RECOMMENDATIONS

- The mammals survey was carried out as planned and no concerns or issues were identified in the field.

- One SCC was observed during the survey, American Badger (*Taxidea taxus*) American Badger is listed as Special Concern under Schedule 1 of the Species at Risk Act. The American Badger and its den were observed approximately 60m north of the preferred RoW (see photos 1 & 2) and are not likely to be affected by the project.

- Many of the mammal species that were observed in the study area during surveys (American Badger, Coyote, Long-tailed Weasel, Racoon, Red Fox) occupy dens, as do other mammal species that are known to occur in the project study area. August 2022 surveys were restricted to roadsides, RoW, and Crown Lands, therefore most of the RoW was not surveyed for mammal dens.

- No evidence of Wild Pigs was observed during field surveys, however, Wild Pigs are elusive and targeted surveys would be required to confirm their presence. Corn and other cereal crops, which are common within the project study area, are a potential source of food for Wild Pigs. Grain storage silos, which were also observed at several locations on or near the preferred route, are often a source of food for Wild Pigs enabling them to survive Manitoba winters. However, preferred nesting habitat for Wild Pigs (marshes, forests, riparian areas) is limited within the project study area. No specific mitigation measures are recommended for Wild Pigs, however, any observations should be reported to provincial authorities.

REFERENCES

Brook, R. 2021. Wild Pig Occurrences in Manitoba (Nov,27 2021, update). University of Saskatchewan. https://www.facebook.com/WildPigResearch/photos/a.149338522332411/943435456256043

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Tetratech. 2012. Dorsey- Portage South Transmission Line Project. Wildlife Technical Report. Prepared for Manitoba Hydro

Photograph 1. American Badger and its den just north of the preferred route.

Photograph 2. Racoon tracks observed next to the preferred route.

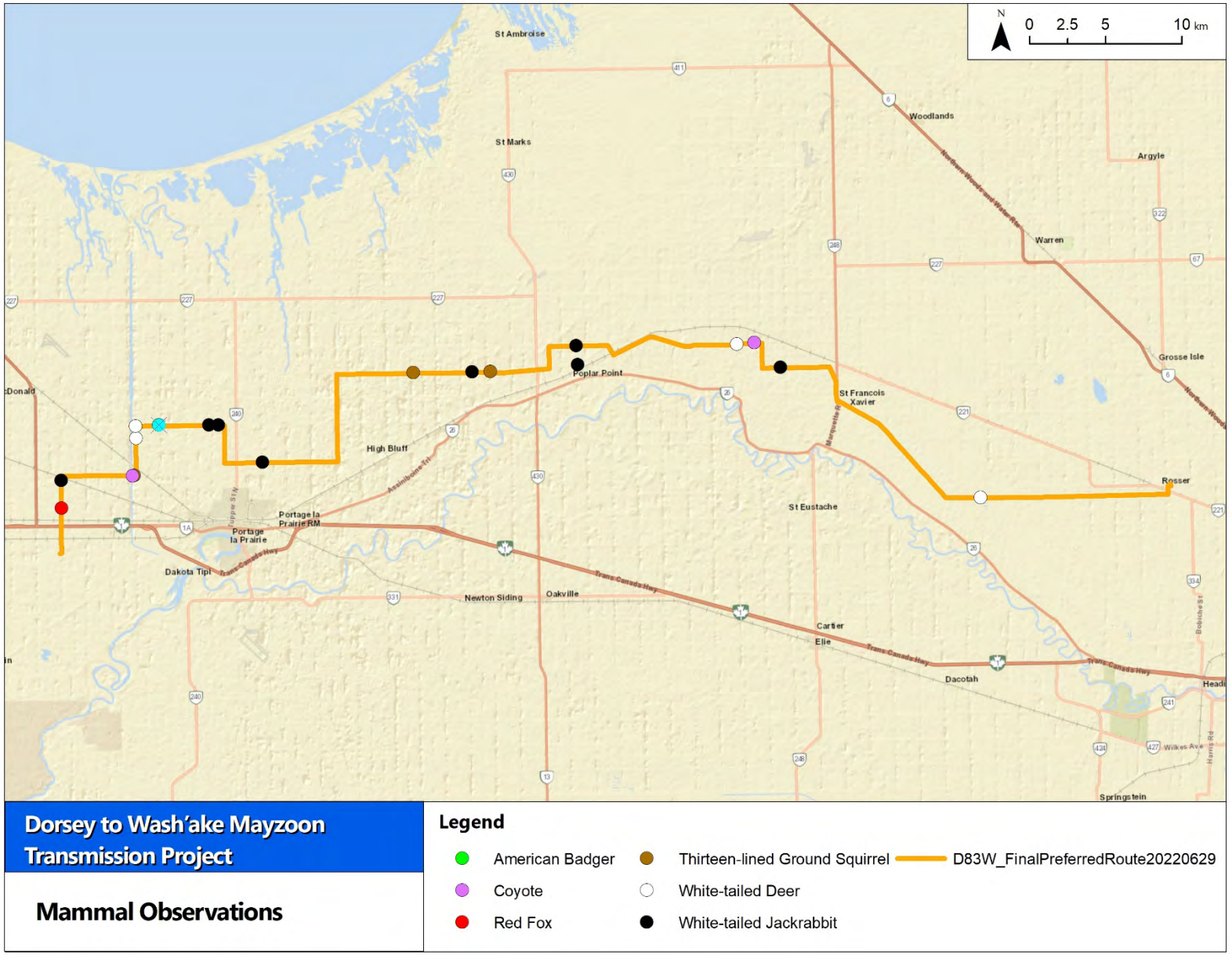
Photograph 3. Coyote tracks next to the preferred route.

Photograph 4. Red fox tracks next to the preferred route.

Photograph 5. White-tailed deer tracks next to the preferred route.

Photograph 6. Grain storage silos, that could be a food source for Wild Pigs on the preferred route.

Photograph 7. Small tree stands along the preferred route that provide potential mammal habitat.



Map 1: Mammal Observations in the Project Study Area

Appendix D: Manitoba Conservation Data Centre correspondence

From:	Murray, Colin (ARD)
To:	Kellough, James
Subject:	DLA 2020 MBHydro PACE study PortlaPrair 03252020
Date:	Thursday, April 9, 2020 4:07:00 PM
Attachments:	MBCDC_SF_EOrep_20200409_MBHydro_PACESTUDY.zip MBCDC Data Use Guide May2016 Manual v2.pdf Appendix A_title plus reporting form.pdf

Hi James

I'm providing species occurrences from the Manitoba Conservation Centre's biodiversity database which are within the project study area outlined in the data license agreement. These are current to 2020 April 09. I've included the CDC Data Use manual which explains data structure and data sensitivity, and Appendix A for reporting rare species during any field surveys.

The data provided is considered stale after six months and so we ask that you request an updated copy of the dataset at that time.

If you have any questions please feel free to ask.

Colin

From: Kellough, James <jkellough@hydro.mb.ca>
Sent: March-23-20 9:11 AM
To: +WPG1212 - Sustainable Development (CC) sd@gov.mb.ca>
Subject: MB Hydro Data Request

To Whom it Concerns,

Manitoba Hydro is planning some new and restorative transmission line work this spring/summer and we were wondering if we could get updated GIS data for rare and endangered species habitat for use in our corridor analysis and planning models? Our most recent version of this data received from CDC dates back to July 2016. A shapefile of our AOI is included.

Cheers,

Manitoba Hydro

James Kellough (GIS Data Specialist)

Appendix E: Wildlife timing windows, setbacks and buffers

Timing windows

Project Wildlife Reduced Risk Timing Windows

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

Reduced Risk to Wildlife

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

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

Buffers and setbacks

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

[1]All measurements are from edge of feature

[2]No Work Allowed without Manitoba Hydro Licensing and Environmental Assessment Department review and approval, which may be subject to regulatory approval.

[3]Shrub and Herbaceous Vegetation Retained)

[4]Bear/Mammal den sites are highly variable and may be found in caves, crevasses, overturned trees, open ground nests, and low-sweeping branches of a coniferous tree.

[5]Do not plan to carry out construction activities within this area between March 15 to June 1st. l If construction activity is required within this area between April 15 to June 1st, contact Manitoba Hydro Environmental Officer to discuss potential mitigation options.

Appendix F: Vegetation technical report

DORSEY TO WASH'AKE MAYZOON (D83W) TRANSMISSION PROJECT

VEGETATION TECHNICAL REPORT

Prepared for:

Manitoba Hydro

Prepared by:

Szwaluk Environmental Consulting Ltd.

September 2022

SUMMARY

The proposed transmission project occurs within the Lake Manitoba Plain Ecoregion, overlying five ecodistricts including the Winnipeg, Portage, Lundar, MacGregor and Gladstone. The ecoregion historically was comprised of prairie grasslands and stands of deciduous forest, however agricultural development has now replaced much of the natural vegetation, occupying the majority of the landscape in the regional assessment area.

Fifty-six sites were visited in the field, where plant species composition was recorded along the preferred route and study, with a total of 125 plant taxa recorded. The vegetation was grouped into three broad types including deciduous forest, wetland and herbaceous. To further characterize the local vegetation, stands were classed into eight community types based on field data collected at each site, including vegetation composition and structure.

Eight species of conservation concern were observed during surveys. Among these, two are ranked Imperilled species (S2) and six are ranked Vulnerable species (S3S4 to S3S5) by the Manitoba Conservation Data Centre. Black ash (*Fraxinus nigra*), listed under the Committee on the Status of Endangered Wildlife in Canada, was the only Threatened species observed.

Forty plant species recorded are considered non-native or invasive in the study area. Of these species, two are Tier 2 noxious weeds (leafy spurge - *Euphorbia virgata*; and oxeye daisy - *Leucanthemum vulgare*). Invasive species are abundant and widespread in the study area.

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1.0 INTRODUCTION

1.1 Background

The purpose of this study was to assess the vegetation for the proposed Dorsey to Wash'ake Mayzoon (D83W) Transmission Project. Manitoba Hydro is planning to build a new 230-kilovolt transmission line starting at Dorsey Converter Station (northwest of Winnipeg) and ending at the new, yet to be built, Wash'ake Mayzoon Station (west of Portage la Prairie) to meet the area's increasing electricity needs and enhance reliability for customers in Portage la Prairie and surrounding areas. The Project also involves protection changes at the existing Cornwallis, Portage South and Customer's Roquette Station. The Project is considered a Class 2 Development in Manitoba and will require the preparation of an environmental assessment and regulatory approval under *The Environment Act* (Manitoba). The Project in-service date is anticipated to be 2025.

The objective of this study is to provide information on vegetation that will be used to develop the existing environment portion of the environmental assessment for the Project. The specific tasks established for this study were as follows:

- Compile existing ecological, vegetation and botanical information for the study area;
- Visit various sites in the field to describe the terrestrial vegetation communities along the preferred route and study area;
- Survey for potential rare plants;
- Document invasive and noxious plant species observed during site visits; and
- Develop a technical report that provides existing environment information on vegetation.

1.2 Study Area

The study area (regional assessment area) for the proposed Project lies within the Interlake Plain and Central Plains Regions. The study area begins near the Dorsey Converter Station in the east and extends westward to the proposed location for the Wash'ake Mayzoon Station, shown in Map 1-2 (Appendix II). The northern extent of the study area approximately follows Provincial Road 227, west of Warren, and the Provincial Trunk Highway 1 to the south. The regional assessment area (RAA) encompasses 138,418.2 hectares. The local assessment area (LAA) occupies 9,823.0 hectares (500 m buffer centered on the RoW), while the project assessment area (PAA) covers 589.8 hectares (30 m RoW). While largely agricultural, this area supports deciduous forest intermixed with prairie elements where conditions are suitable.

2.0 METHODS

2.1 Data Sources

Existing biophysical information was used to describe the environment, regionally for the transmission Project (e.g., Rowe 1959; Smith et al. 1998). Rowe (1959) provides a geographic description of regions that includes distinctive patterning of vegetation and information on plant major species. The existing ecological land classification was identified and described from Smith et al. (1998). Here, ecological regions are delineated that are relatively homogeneous in overlapping patterns of climate, as expressed in vegetation, and geology, physiography and soil development.

Botanical and vegetation information was reviewed and described from available sources including Smith et al. (1998) who identifies vegetation at all levels of classification (ecozone to ecodistrict), and other studies in the vicinity of the Project (Manitoba Hydro 2012; Shay 1999; Szwaluk Environmental Consulting et al. 2015 and 2016; Szwaluk Environmental Consulting 2020 and 2021). The Manitoba Conservation Data Centre (Manitoba Government 2022a) provides information on species of conservation concern known in the area.

2.2 Field Site Selection

Manitoba Hydro's Environmental Protection Information Management System (EPIMS) Map Viewer was used to view the study area and project footprint imagery (digital ortho-rectified imagery). EPIMS Map Viewer provides information on land use and vegetation cover from the Manitoba Land Cover Classification. EPIMS Map Viewer and Google Earth satellite imagery were used to select potential sites to survey in the field. Suitable sites were selected based on a stratification of vegetation types (e.g., deciduous forest, grassland and wetland), importance of vegetation types (greater potential to support species of conservation concern), accessibility and disturbance. Thirty-nine sites were originally considered for surveys and sampling. All fieldwork was conducted roadside, along existing Manitoba Hydro RoW's, or on Crown lands (e.g., The Portage Diversion, Portage Community Pasture, Grant's Lake Wildlife Management Area). A study area map generated by Manitoba Hydro, identifying the preferred route was used in the field. Field visits were conducted June 1 to 2 and July 4 to 7, 2022.

2.3 Vegetation Survey

The vegetation survey consisted of recording species composition and structure. Qualitative surveys were used to characterize vegetation communities occurring along the preferred transmission line route and within the study area. All vascular plant species observed, including noxious weeds, were recorded.

To characterize the local vegetation, community type descriptions are presented where sampling occurred. Naming of vegetation community types was based on their structure and species dominance by stratum. Species separated by a slash (/) indicates a change in stratum, while co-dominant species are separated by a dash (-) indicating similar abundance within the stratum.

Where surveys occurred in the forest community, tree canopy cover is defined as closed (>60%), open (>25-60%) and sparse (10-25%) (Strong et al. 1990). For selected trees, descriptions included tree height (measured at 20 m) and tree diameter measured at breast height (dbh). GPS coordinates and photographs were taken at each site visited.

2.4 Rare Plant Survey

Species of conservation concern are imperilled and vulnerable plants tracked by the Manitoba Conservation Data Centre (Manitoba Government 2022a), including those plants listed under *The Endangered Species and Ecosystems Act* of Manitoba (Manitoba Government 2022b), the federal *Species at Risk Act* (Government of Canada 2022a), or listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2022).

The standardized ranking of species used by Conservation Data Centres and Natural Heritage Programs throughout North America includes a series of ranks on a five-point scale from critically imperilled to secure. Listed below are definitions for interpreting conservation status ranks at the subnational or provincial (S) level. Ranks may also be intermediary between levels.

CRITICALLY IMPERILLED (S1): At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

IMPERILLED (S2): At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

VULNERABLE (S3): At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

APPARENTLY SECURE (S4): At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

SECURE (S5): At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

Under ESEA, SARA and COSEWIC, species are designated into the following categories: Endangered, Threatened, Extirpated, and Special Concern (see Appendix I).

Searches for species of conservation concern began with the review of provincially tracked species previously known to occur in the study area (provincial database). Biological information on species flowering times and preferred habitat were also reviewed.

In the field, rare plant searches occurred along the final preferred route and in selected habitats where access was permitted, and follow methods outlined by the Alberta Native Plant Council (2012). Rare plant locations were recorded using GPS, individuals counted, phenology recorded and population extent estimated. Photographs were captured in the field.

2.5 Collection Guidelines and Plant Identification

All vascular plants were recorded and only those unidentifiable in the field were collected as voucher specimens, where the population size permits. Identification of vascular plants followed published volumes of Flora of North America (1993+). Plant nomenclature followed the Manitoba Conservation Data Centre provincial species list.

3.0 RESULTS

3.1 Ecological Land Classification

The proposed Project lies within the Aspen-Oak Section of the Boreal Forest Region (Rowe 1959). This is a transition zone between forest and prairie vegetation of west-central Canada. The deciduous element of the boreal forest forms groveland where elements of prairie were once intermixed.

Within the Prairies Ecozone of the ecological landscape stratification lies the Lake Manitoba Plain Ecoregion, extending northwestward from the International Boundary to Lake Dauphin, with the Manitoba escarpment marking its western boundary (Smith et al. 1998). The proposed Project occurs mainly within the Winnipeg and Portage Ecodistricts, in the central portion of the ecoregion (Map 3-1, Appendix II). Other ecodistricts the Project overlaps include Lundar, MacGregor and Gladstone. Table 3-1 shows the area of land that each ecodistrict occupies.

Table 3-1. Ecodistrict area (ha) and percent (%) coverage of the study area, within the Lake Manitoba Plain Ecoregion.

Ecodistrict	RAA		LAA (500 m Buffer)		PAA (30 m RoW)	
	Ha	%	Ha	%	Ha	%
Winnipeg	65,138.6	47.1	6,144.6	62.6	369.3	62.6
Portage	63,274.1	45.7	2,992.8	30.5	181.2	30.7
Lundar	4,897.7	3.5	0	0	0	0
MacGregor	2,698.9	1.9	177.4	1.8	8.5	1.4
Gladstone	2,408.9	1.7	508.2	5.2	30.8	5.2
Total	138,418.2	100	9,823.0	100	589.8	100

Note: Regional assessment area (RAA), Local Assessment area (LAA), and Project assessment area (PAA).

The regional landscape is characterized by level to rolling or gently undulating terrain. Soils are dominantly Black Chernozems developed on till, glaciolacustrine and alluvial materials. Humic Vertisolic and Gleysolic soils also are present and are developed on glaciolacustrine sediments. The regional climate consists of long, cold winters and short, warm summers. The mean annual precipitation ranges from 485 to 540 mm.

The Lake Manitoba Plain Ecoregion historically was comprised of prairie grasslands and stands of trembling aspen (*Populus tremuloides*) and bur oak (*Quercus macrocarpa*); however domestic crops and pastureland have now replaced much of the natural vegetation. Some groves remain along with deciduous forest remnants of trembling aspen, balsam poplar (*Populus balsamifera*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*) and Manitoba maple (*Acer negundo*) on moist sites. Bur oak and grassland communities dominate drier sites. Stands of trees could also be intermixed with shrub species such as willows (*Salix* spp.), Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*) and snowberry (*Symphoricarpos occidentalis*), and various herbs in the understory. Grasses in the region include fescue (*Festuca* spp.), wheat grass (*Elymus* spp.), June grass (*Koeleria macrantha*) and Kentucky bluegrass (*Poa pratensis*). Poorly drained areas support slough grasses (*Beckmannia syzigachne*), marsh reed grass (*Calamagrostis canadensis*), sedges (*Carex* spp.), cattails (*Typha* spp.) and willows. Further descriptions of the ecological landscape, including each ecodistrict, are provided in Appendix III.

3.2 Land Cover Classification

Within the study area (regional assessment area), 10 land use/land cover classes are identified from the Manitoba Land Cover Classification. Table 3-2 shows the broad land use/land cover types determined for the assessment areas. These classes include native vegetation of range and grassland, deciduous forest, and marsh wetland. The water class includes rivers and streams. Agricultural forage crops and fields, cultural features, and roads and rail lines are also identified.

Agriculture represents the dominant land cover, occupying more than 80% of the land in the regional assessment area. Range and grassland comprise 10% of the regional assessment area, while less than 5% consists of forested stands. Wetlands and waterbodies make up less than 1% of the regional assessment area. Map 3-2 (Appendix II) illustrates the distribution of the land cover classes for the study area.

Table 3-2. Land use/land cover class area (ha) and percent (%) coverage in the study area.

Land Use/ Land Cover Class	RAA		LAA		PAA	
	Ha	%	Ha	%	Ha	%
Agricultural Field	108,799.8	78.6	8,462.8	86.2	475.7	80.7
Range and Grassland	14,468.2	10.5	620.0	6.3	32.7	5.5
Deciduous Forest	5,482.3	4.0	50.0	0.5	1.9	0.3
Roads, Trails and Rail Lines	4,707.3	3.4	404.6	4.1	73.1	12.4
Agricultural Forage Crops	3,261.7	2.4	225.0	2.3	5.8	1.0
Water Body	877.8	0.6	15.8	0.2	0.3	0.05
Wetland Marsh	410.0	0.3	1.1	0.01	0	0
Cultural Features	308.5	0.2	43.3	0.4	0.3	0.05
Sand and Gravel	61.6	0.04	0	0	0	0
Open Deciduous Forest	41.1	0.03	0.7	0.007	0	0

Note: Regional assessment area (RAA), Local Assessment area (LAA), and Project assessment area (PAA).

The study area overlaps a minor portion of the Portage Community Pasture, although the preferred route does not intersect this area. Today, community pastures across western Canada provide an opportunity to help conserve habitats such as grasslands, forests and wetlands.

Grassland ecosystems once existed over large areas across North America (Sampson and Knopf 1994), yet few undisturbed natural areas remain today, as losses to grasslands have exceeded those of other major biomes (Hoekstra et al. 2005). Grasslands losses still continue in some areas, although at a slower pace. The health and persistence of native grasslands is threatened by a combination of agricultural expansion, energy development, fire suppression, trembling aspen encroachment, invasion of exotic species, and fragmentation. According to Hamilton (2019), grazing of grasslands by cattle is not a natural process to the native flora and fauna of the prairie ecozone; the presence of cattle in the Portage Community Pasture has resulted in the loss of some native prairie species, like small flowering plants. Long-term mining and gravel extraction in these areas creates sloughs in its place and encourages the growth of weeds (Hamilton 2019). Despite these pressures, remnant grasslands remain important habitats for threatened species, and their preservation is vital to conserve biodiversity. The study area also overlaps the Grant's Lake Wildlife Management Area, although the preferred route does not intersect this area.

3.3 Vegetation and Botanical Resources

3.3.1 Vegetation Community Types

Twenty-eight sites were sampled in the study area to describe the vegetation communities. The distribution of all sites visited is shown in Map 3-3 (Appendix II). The vegetation was grouped into three broad types including deciduous forest, wetland and herbaceous. To further characterize the local vegetation, stands were classed into eight community types based on field data collected at each site, including vegetation composition and structure. Vegetation communities are summarized in Table 3-3a. Descriptions are presented for all strata present (i.e., tree canopy, tall shrub layer, and herb and low shrub understory). A single description is presented for each community type, although they can occur in more than one location in the study area. Existing classification systems were used to support community types were applicable (e.g., Zoladeski et al. 1995; National Wetlands Working Group 1997). All species are referenced with common and scientific names. For species recorded in field surveys, refer to the flora list in Appendix IV.

Table 3-3a. Vegetation community types surveyed in the study area.

Vegetation Community	Site	Number of Sites	Total Species	Mean Species
Deciduous Forest				
Bur Oak-Black Ash/Wild Sarsaparilla	13	1	23	23
Trembling Aspen/Tall Shrub	10, 11	2	28	19.5
Green Ash-Manitoba Maple/Tall Shrub	1, 6	2	18	10
Riparian Forest	12, 14, 15, 16, 17	5	32	12
Wetland				
Marsh Wetland	3, 4, 8, 19, 46	5	21	7.6
Meadow Wetland	58, 60	2	16	9
Herbaceous				
Prairie Grassland	9, 20	2	27	16.5
Disturbed Ground	2, 32, 35, 36, 38, 42, 43, 44, 45	9	32	9.4

Bur Oak-Black Ash/Wild Sarsaparilla

This community type was a closed-canopied (>60%) deciduous forest composed of bur oak (*Quercus macrocarpa*) and black ash (*Fraxinus nigra*), with a presence of basswood (*Tilia americana*) in the tree layer (Photograph 3-3a). The tall shrub stratum (1 to 3 m in height) was poorly developed with only highbush-cranberry (*Viburnum opulus*) observed. The herb and low shrub stratum (<1 m height) consisted of 19 species, dominated by open cover (>25-60%) of wild sarsaparilla (*Aralia nudicaulis*). Low shrubs recorded included red baneberry (*Actaea rubra*), bur oak, green ash (*Fraxinus pennsylvanica*), prickly rose (*Rosa acicularis*), dewberry (*Rubus pubescens*) and western snowberry (*Symphoricarpos occidentalis*). One

Imperilled species (S2) was recorded in this community type (black ash), and three Vulnerable species (S3S4): basswood, crested shield fern (*Dryopteris cristata*), and riverbank grape (*Vitis riparia*).

Photograph 3-3a. Bur Oak-Black Ash/Wild Sarsaparilla community type.

Trembling Aspen/Tall Shrub

The Trembling Aspen/Tall Shrub community type had an open-canopy (>25-60%) of trembling aspen (*Populus tremuloides*) with a minor presence of bur oak (*Quercus macrocarpa*). In total, 28 species were recorded in this vegetation type, over two sites. Three species were recorded in the tall shrub stratum, with moderate cover (25%) of Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*), and trembling aspen. Twenty-three species were recorded in the herb and low shrub stratum, including three grasses, 15 forbs and five low shrubs. Species constant over both sites were prickly rose (*Rosa acicularis*), western snowberry (*Symphoricarpos occidentalis*), Kentucky bluegrass (*Poa pratensis*), northern bedstraw (*Galium boreale*), snakeroot (*Sanicula marilandica*), common dandelion (*Taraxacum officinale*), veiny meadow-rue (*Thalictrum venulosum*), poison-ivy (*Toxicodendron rydbergii*) and American purple vetch (*Vicia americana*). Abundant leaf litter, with deadfall and mosses accounted for the ground layer. Similar vegetation has been classified by others (e.g., Zoladeski et al. 1995).

One Imperilled species (S2) was observed in this vegetation type, large enchanter's-nightshade (*Circaea canadensis* ssp. *canadensis*). This plant community was found in the northern portion of the study area, along the Portage Community Pasture. Photograph 3-3b shows the Trembling Aspen/Tall Shrub community type.

Photograph 3-3b. Trembling Aspen/Tall Shrub community type.

Green Ash-Manitoba Maple/Tall Shrub

This deciduous tall shrub community type consisted primarily of open-canopied hardwoods dominated by green ash (*Fraxinus pennsylvanica*) and Manitoba maple (*Acer negundo*). Other tree species recorded in the canopy included American elm (*Ulmus americana*) and cottonwood (*Populus deltoides*). The tall shrub layer (>1 m) consisted of closed cover (>60%) dominated by red-osier dogwood (*Cornus sericea*) and wild black currant (*Ribes americanum*). Other species recorded in this stratum included common caragana (*Caragana arborescens*) and willows (*Salix* spp.). The low shrub and forb layer was poorly developed, with nine species recorded. Graminoids were dominated by non-native grasses of smooth brome (*Bromus inermis*), quackgrass (*Elymus repens*) and meadow timothy (*Phleum pratense*). One Vulnerable species was recorded in this vegetation type (cottonwood, S3S5). This community type was surveyed in two locations along the preferred route (Photograph 3-3c).

Photograph 3-3c. Green Ash-Manitoba Maple/Tall Shrub community type.

Riparian Forest

The Riparian Forest vegetation consisted of open to close-canopied deciduous cover occurring along existing waterways in the study area (Photograph 3-3d). In total, 32 plant species were recorded in this community type across five sites surveyed. Manitoba maple (*Acer negundo*) was constant across sites, with other trees including American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*) and cottonwood (*Populus deltoides*). Cottonwoods measured at the Assiniboine River were 31.5 m in height. Eleven species were recorded in the tall shrub stratum that consisted mainly of highbush-cranberry (*Viburnum opulus*), Manitoba maple, sandbar willow (*Salix exigua*) and other willows (*Salix* spp.). A well-developed low shrub and herb stratum (<1 m height) was composed of several species. Species with high constancy (occurred in at least 60% of sites) included wild cucumber (*Echinocystis lobata*), common milkweed (*Asclepias syriaca*), reed canarygrass (*Phalaris arundinacea*) and lesser duckweed (*Lemna minor*). Similar vegetation was recorded in another study in the region (Szwaluk Environmental Consulting 2020). Vulnerable species recorded in this community type included cottonwood (S3S5) and common milkweed (S3S4) along the roadside.

Photograph 3-3d. Riparian Forest community type.

Marsh Wetland

This community type was a low to intermediate height (approximately 1 m), closed-canopied (>60% cover) marsh wetland (National Wetlands Working Group 1997) dominated by common cat-tail (*Typha latifolia*). Sandbar willow (*Salix exigua*) with other willow species (*Salix* spp.) were the only tall shrubs observed at these sites. Characteristic graminoid species were bluejoint reedgrass (*Calamagrostis canadensis*), reed canarygrass (*Phalaris arundinacea*), tall mannagrass (*Glyceria grandis*), common reedgrass (*Phragmites australis*), and sedges (*Carex* spp.). Forb species (12 plants) made up a minor component of the total vegetation cover. This vegetation was associated with areas of standing or slow-moving water that was permanently or seasonally flooded. Marsh wetlands may experience water level drawdowns which will result in portions drying up and exposing the sediments (National Wetlands Working Group 1997). Five surveys were completed throughout the study area of this vegetation type. Photograph 3-3e shows the Marsh Wetland community type. Similar wetlands were also described in the region by Szwaluk Environmental Consulting (2020).

Photograph 3-3e. Marsh Wetland community type.

Meadow Wetland

The Meadow Wetland community typically consisted of bluejoint reedgrass (*Calamagrostis canadensis*) with a mixture of native and non-native herb species. Other graminoids included smooth brome (*Bromus inermis*), quackgrass (*Elymus repens*), wild barley (*Hordeum jubatum*), reed canarygrass (*Phalaris arundinacea*), and meadow timothy (*Phleum pratense*).

In total, 16 species were recorded over two sites, eight of which included forbs. The tall shrub stratum was poorly developed with only few species encountered, trembling aspen (*Populus tremuloides*) and willows (*Salix* spp.). The water regime is semi-permanently to seasonally flooded in areas. Trees were absent from this community type, located near the Portage Diversion. Photograph 3-3f shows the Meadow Wetland community type.

Photograph 3-3f. Meadow Wetland community type.

Prairie Grassland

The Prairie Grassland vegetation was a low-growing community type dominated by a mixture of grasses, forbs and low shrubs (Photograph 3-3g). The prairie grasslands surveyed showed evidence of cattle grazing. Remnant areas of prairie interspersed among trembling aspen are typical of the landscape in the region (Shay 1999). In total, 27 species were recorded in two sites during surveys along the Portage Community pasture, in the northern portion of the study area. Graminoids were dominated by a mixture of creeping bent grass (*Agrostis stolonifera*), big bluestem (*Andropogon gerardii*), bluejoint reedgrass (*Calamagrostis canadensis*), creeping spikerush (*Eleocharis palustris*), and Kentucky bluegrass (*Poa pratensis*). Low shrub (<1 m) and forb species, common to both surveys, included shrubby cinquefoil (*Dasiphora fruticosa*), prickly rose (*Rosa acicularis*), common yarrow (*Achillea millefolium*), harebell (*Campanula rotundifolia*), and common dandelion (Taraxacum officinale). Other prairie grassland species recorded were silverberry (*Elaeagnus commutata*), western snowberry (*Symphoricarpos occidentalis*), streamside fleabane (*Erigeron glabellus*), smooth wild strawberry (*Fragaria virginiana*), great blanketflower (*Gaillardia aristata*), northern bedstraw (*Galium boreale*), wild licorice (*Glycyrrhiza lepidota*), black-eyed Susan (*Rudbeckia hirta*), Canada goldenrod (*Solidago*

canadensis) and smooth aster (*Symphyotrichum laeve*). Common milkweed (S3S4) is a Vulnerable species recorded along the roadside.

Species typical of these grasslands in the region have also been recorded by Shay (1999) and included little bluestem (*Schizachyrium scoparium*), sand dropseed (*Sporobolus cryptandrus*), wood lily (*Lilium philadelphicum*), white camas (*Anticlea elegans*), three-flowered avens (*Geum triflorum*), thimbleweed (*Anemone cylindrica*), wild bergamot (*Monarda fistulosa*), silvery scurfpea (*Pediomelum argophyllum*), meadow blazingstar (*Liatris ligulistylis*), Canada milkvetch (*Astragalus canadensis*), purple prairie clover (*Dalea purpurea*), white prairie-clover (*Dalea candida*), stiff goldenrod (*Solidago rigida*), many-flowered aster (*Symphyotrichum ericoides*) and fragrant false indigo (*Amorpha nana*). The grassland remnants in the region have been impacted by cattle grazing and haying (Shay 1999).

Photograph 3g. Prairie Grassland community type.

Disturbed Ground

Disturbed ground consisted of roadside ditches and ground that has been previously altered (Photograph 3-3h). Nine sites surveyed were grouped together to represent disturbed ground vegetation. The Portage Diversion is Crown land intersected by the Project where vegetation has been previously altered. These sites typically support plants of low to intermediate height (<1 m), dominated by non-native species. Thirty-two plant species were

recorded in these sites, with seven graminoids including smooth brome, barnyard grass (*Echinochloa crus-galli*), quackgrass (*Elymus repens*), slender wildrye (*Elymus trachycaulus*), wild barley (*Hordeum jubatum*), reed canarygrass (*Phalaris arundinacea*), and Kentucky bluegrass (*Poa pratensis*). Widespread forbs (species occurring in greater than four surveys) were Canada anemone (*Anemone canadensis*), Canada thistle (*Cirsium arvense*), sweet clover (*Melilotus* sp.) and common dandelion (*Taraxacum officinale*). Eighteen other forbs were recorded in the disturbed ground vegetation. Low shrubs included shrubby cinquefoil (*Dasiphora fruticosa*), prickly rose (*Rosa acicularis*), and western snowberry (*Symphoricarpos occidentalis*). Disturbed ground was surveyed roadside adjacent to agricultural land use and at the Portage Diversion, at two locations.

Photograph 3-3h. Disturbed ground vegetation.

3.3.2 Plants and Distribution of Species

Fifty-six sites (including vegetation and rare plant surveys) were visited in the field, where plant species composition was recorded along the preferred route and study area (see Map 3-3, Appendix II). A total of 125 plant taxa were recorded with 119 plants identified to the species level (Appendix IV). All plants were grouped by primitive vasculars (e.g., ferns and horsetails), gymnosperms (conifers) and angiosperms (flowering plants), with angiosperms being the largest (Table 3-3b). There were 122 angiosperms recorded (28 monocotyledons and 94 dicotyledons), two primitive vasculars, and one gymnosperm.

Table 3-3b. Botanical resources in the study area.		
Plant Group	**Number of Species**	**Percent**
Primitive Vasculars	2	1.6
Gymnosperms	1	0.8
Angiosperms		
Monocots	28	22.4
Dicots	94	75.2
Total	125	100

Vascular plants were distributed among 46 families, with the angiosperms representing 43 of these. The Aster family (Asteraceae) was the largest with 22 plant taxa, followed by the Grass (Poaceae), and Pea (Fabaceae) families, with 15 and 12 taxa, respectively. Four or more species were observed in each of the Rose (Rosaceae), Willow (Salicaceae), Brassicaceae (Mustard), Liliaceae (Lily) and Ranunculaceae (Crowfoot) families. The primitive vasculars are distributed among two families, the Horsetail (Equisetaceae) and Wood Fern (Dryopteridaceae). The Pine family (Pinaceae) was the only gymnosperm.

3.3.3 Species of Conservation Concern

According to provincial sources, there are 105 plant species of conservation concern that can be expected to range within the Lake Manitoba Plain Ecoregion (Manitoba Government 2022a). Currently, there are 10 species listed at risk in the ecoregion, with either ESEA, SARA, or COSEWIC, see Table 3-3c.

Table 3-3c. Plant species listed at risk in the Lake Manitoba Plain Ecoregion.				
Scientific Name	**Common Name**	**ESEA**	**SARA**	**COSEWIC**
Agalinis aspera	Rough Agalinis	Endangered	Endangered	Endangered
Agalinis gattingeri	Gattinger's Agalinis	Endangered	Endangered	Endangered
Celtis occidentalis	Hackberry	Threatened	-	-
Cypripedium candidum	Small White Lady's-slipper	Endangered	Threatened	Threatened
Dalea villosa	Hairy Prairie-clover	Threatened	Special Concern	Special Concern
Fraxinus nigra	Black Ash	-	-	Threatened
Solidago riddellii	Riddell's Goldenrod	Threatened	Special Concern	Special Concern
Symphyotrichum sericeum	Western Silvery Aster	Threatened	Threatened	Threatened
Vernonia fasciculata	Western Ironweed	Endangered	Endangered	Endangered
Veronicastrum virginicum	Culver's-root	Threatened	-	-

Based on provincial records (Manitoba Conservation Data Centre), 20 species of conservation concern and two natural plant communities of conservation concern occur within the regional assessment area. Ten species are ranked Critically Imperilled (S1S2) or Imperilled (S2 to S2S3), eight species are ranked Vulnerable (S3 to S3S4), and two species

are currently without ranks. Rough agalinis (*Agalinis aspera*) is listed as Endangered under ESEA, SARA and COSEWIC. Both natural plant communities are ranked Vulnerable (S3? to S3S4), see Table 3-3d.

- Rough agalinis (*Agalinis aspera*) is a slender annual herb with narrow linear leaves that are opposite. Plants grow to 35 cm tall with showy pink flowers. The species ranges through the central plains with its Canadian range restricted to southern Manitoba. The plant is found in low wet meadows where vegetation is sparse and the soil is alkaline, in remnant prairie habitats and along roadsides (COSEWIC 2006).

Table 3-3d. Plant species and communities of conservation concern occurring within the study area.

Scientific Name	Common Name	MBCDC Rank
Acmispon americanus var. *americanus*	Prairie Trefoil	S2S3
Agalinis aspera	Rough Agalinis	S2S3
Agalinis tenuifolia	Narrow-leaved Agalinis	S2S3
Asclepias verticillata	Whorled Milkweed	S3
Boltonia asteroides var. *recognita*	White Doll's-daisy	S2S3
Bouteloua curtipendula	Side-oats Grama	S2
Carex echinodes	Quill Sedge	SNR
Carex tetanica	Rigid Sedge	S3
Circaea canadensis ssp. *canadensis*	Large Enchanter's-nightshade	S2
Corispermum americanum var. *americanum*	American Bugseed	S3
Corispermum villosum	Hairy Bugseed	S1S2
Cornus alternifolia	Alternate-leaved Dogwood	S3
Cyperus schweinitzii	Schweinitz's Flatsedge	S2
Helianthus pauciflorus ssp. *Pauciflorus*	Stiff Sunflower	SU
Hudsonia tomentosa	False Heather	S3
Hypoxis hirsuta	Yellow Stargrass	S3S4
Nassella viridula	Green Needlegrass	S3S4
Phryma leptostachya	American Lopseed	S3
Polygala verticillata	Whorled Milkwort	S2
Polygala verticillata var. *isocycla*	Whorled Milkwort	S2
Natural Plant Communities		
Quercus macrocarpa/Amelanchier alnifolia/Aralia nudicaulis-Carex assiniboinensis Forest	Bur Oak/Saskatoon Serviceberry/Sarsaparilla-Assiniboia Sedge Forest	S3?
Salix exigua Shrubland	Sandbar Willow Shrubland	S3S4

Eight species of conservation concern were recorded during the 2022 surveys, summarized in Table 3-3e. Among these, two are ranked Imperilled species (S2) and six are ranked Vulnerable species (S3S4 to S3S5) by the Manitoba Conservation Data Centre. Imperilled species include black ash (*Fraxinus nigra*) and large enchanter's-nightshade (*Circaea canadensis* ssp. *canadensis*). Black ash was observed at one site occurring in the tree layer of a deciduous stand mixed with bur oak and basswood. Under COSEWIC, black ash is listed as a threatened species. Large enchanter's-nightshade was also recorded at one location in a trembling aspen stand, with 10 plants observed. Elsewhere in the study area, the vulnerable species were observed in both forest and roadside ditch vegetation. These species included common milkweed (*Asclepia syriaca*), crested shield fern (*Dryopteris cristata*), cottonwood (*Populus deltoides*), basswood (*Tilia americana*), narrow-leaved cat-tail (*Typha angustifolia*) and riverbank grape (*Vitis riparia*). Measured cottonwood height ranged from 17.5 to 31.5 m (mean 25.8 m) with a diameter at breast height ranging from 18 to 87 cm (mean 44.8 cm).

Table 3-3e. Species of conservation concern recorded in the study area.

Scientific Name	Common Name	Rank	Site	Vegetation
Imperilled Species (S2)				
Circaea canadensis ssp. *canadensis*	Large Enchanter's-Nightshade	S2	11	Deciduous forest
Fraxinus nigra	Black Ash	S2	13	Deciduous forest
Vulnerable Species (S3S4 to S3S5)				
Asclepia syriaca	Common Milkweed	S3S4	12, 14, 15, 17, 20, 31, 62	Roadside Herbaceous
Dryopteris cristata	Crested Shield Fern	S3S4	13	Deciduous forest
Populus deltoides	Cottonwood	S3S5	1, 12, 14, 56, 57, 65, 66, 70, 71	Deciduous forest, Roadside Herbaceous
Tilia americana	Basswood	S3S4	13, 71	Deciduous forest
Typha angustifolia	Narrow-leaved Cat-tail	S3S4	8	Wetland
Vitis riparia	Riverbank Grape	S3S4	13	Deciduous forest

Note: Ranking (Manitoba Government 2022a).

No other species at risk listed under ESEA, SARA, or COSEWIC were observed during surveys. According to Friesen and Murray (2011), rough agalinis (*Agalinis aspera*) is known to occur in the northern portion of the regional study area (not including the preferred route), and is listed as Endangered by ESEA, SARA and COSEWIC. See Recommendations (Section 4.0). No natural plant communities of conservation concern were observed within the study area. Photographs 3-3i and 3-3j show black ash and large enchanter's-nightshade, respectively.

Photograph 3-3i. Black ash observed in the field at Site 13.

Photograph 3-3j. Large enchanter's-nightshade observed in the field at Site 11.

3.3.4 Invasive Species

Across all surveys, 40 species are considered non-native or invasive (see Table 3-3f). Thirty-five species are ranked SNA (conservation status rank not applicable), four species have conservation ranks (S3S4 to S5), and one species is ranked SU or unrankable (Manitoba Government 2022a). Of these species, two are Tier 2 Noxious weeds (leafy spurge - *Euphorbia virgata*; and oxeye daisy - *Leucanthemum vulgare*) while 14 are considered Tier 3 Noxious weeds (Manitoba Government 2022c). In Manitoba, the Noxious Weeds Regulation lists approximately 90 plant species as noxious under the Noxious Weeds Act, with Tier I noxious weeds as the most threatening species. Nineteen species are considered invasive plants with the Canadian Food Inspection Agency (2008), while the Invasive Species Council of Manitoba (2022) lists seven species as invasive. Photograph 3-3k and 3-3l show leafy spurge and oxeye daisy, respectively.

Photograph 3-3k. Leafy spurge observed along the preferred route.

Photograph 3-3l. Oxeye daisy observed in the study area.

Milkweeds (*Asclepias* spp.) are noxious species that may be harmful to livestock if ingested. Milkweeds are an ecologically important species for the monarch butterfly (*Danaus plexippus*) and were observed in many roadside ditches. COSEWIC has designated the monarch butterfly as Endangered. In July of 2022, the monarch butterfly was added to the International Union for the Conservation of Nature's "Red List" of Threatened species and categorized as Endangered — two steps from extinct. Milkweed occurrences along the preferred route are identified above in Table 3-3e.

Most prominently represented families of noxious, invasive and non-native species together are Asteraceae (10 species), Fabaceae (nine species), Poaceae (seven species), and Brassicaeae (three species). Most non-native or invasive species were recorded in roadside ditches and land that has been altered (The Portage Diversion).

Table 3-3f. Invasive, noxious and non-native species observed in the study area.

Species	Common Name	MBCDC Rank[1]	Authority[2]
Achillea millefolium	Common Yarrow	SNA	MBCDC
Agrostis stolonifera	Creeping Bent Grass	SNA	MBCDC
Amaranthus blitoides	Prostrate Pigweed	SNA	MBCDC
Amaranthus retroflexus	Redroot Pigweed	SNA	CFIA
Ambrosia artemisiifolia	Common Ragweed	S5	NWA
Arctium minus	Common Burdock	SNA	NWA, ISCM

Artemisia absinthium	Wormwood	SNA	NWA, CFIA
Asclepias syriaca	Common Milkweed	S3S4	NWA
Bromus inermis	Smooth Brome	SNA	CFIA
Capsella bursa-pastoris	Shepherd's Purse	SNA	CFIA
Caragana arborescens	Common Caragana	SNA	MBCDC
Chenopodium album	Lamb's-quarters	SNA	NWA, CFIA
Cirsium arvense	Canada Thistle	SNA	NWA, CFIA, ISCM
Cirsium vulgare	Bull Thistle	SNA	NWA, ISCM
Cyclachaena xanthiifolia	Marsh-elder	SNA	NWA
Descurainia sophia	Flixweed	SNA	NWA, CFIA
Echinochloa crus-galli	Barnyard Grass	SNA	MBCDC
Elymus repens	Quackgrass	SNA	CFIA
Euphorbia virgata	Leafy Spurge	SNA	NWA, CFIA, ISCM
Hordeum jubatum	Wild Barley	S5	NWA
Kochia scoparia	Kochia	SNA	NWA
Lemna minor	Lesser Duckweed	SNA	MBCDC
Leucanthemum vulgare	Oxeye Daisy	SNA	NWA, CFIA, ISCM
Lotus corniculatus	Bird's-foot Trefoil	SNA	CFIA
Medicago lupulina	Black Medic	SNA	MBCDC
Medicago sativa	Alfalfa	SNA	CFIA
Melilotus officinalis	Yellow Sweet Clover	SNA	CFIA
Melilotus sp.	Sweet Clover	SNA	CFIA
Phalaris arundinacea	Reed Canary Grass	S5	CFIA
Phleum pratense	Meadow Timothy	SNA	MBCDC
Plantago major	Common Plantain	SNA	MBCDC
Polygonum aviculare	Prostrate Knotweed	SU	MBCDC
Ranunculus acris	Common Buttercup	SNA	CFIA, ISCM
Rumex crispus	Curled Dock	SNA	MBCDC
Sonchus arvensis	Field Sow-thistle	SNA	NWA, CFIA, ISCM
Taraxacum officinale	Common Dandelion	SNA	NWA
Thlaspi arvense	Field Pennycress	SNA	NWA, CFIA
Trifolium hybridum	Alsike Clover	SNA	MBCDC
Trifolium pratense	Red Clover	SNA	CFIA
Trifolium repens	White Clover	SNA	MBCDC

1 (Rank): S3 – Vulnerable; S4 – Apparently Secure; S5 – Secure; SNA – Rank Not Applicable; SU – Unrankable.
2 (Authority): Manitoba Conservation Data Centre (MBCDC), Canadian Food Inspection Agency (CFIA), Noxious Weeds Act (NWA), Invasive Species Council of Manitoba (ISCM).

3.3.4 Traditional Use Plant Species

Aboriginal traditional knowledge can be considered a dynamic process of learning from elders and observing from nature, while adapting this knowledge to enhance the quality of

life (Marles et al. 2000). A great deal of Aboriginal traditional knowledge concerns plants and their use as food, medicines, for handicrafts, and technology. Information on vegetation species important to Indigenous peoples was received through the Indigenous engagement process and public engagement documents for the Project (Manitoba Hydro 2022). This information highlighted the value of sensitive habitats such as wetlands, trees, berries and medicines; concerns on the ability to gather and harvest local foods; the importance of ceremonies to acknowledge and respect the land; concerns over ecosystem health and minimizing the use of Crown land, river and stream crossings, brush clearing, and new disturbance; and concerns for apiary production and pollinator health. The study area falls entirely within the Metis Natural Resource Harvesting Zone.

4.0 RECOMMENDATIONS

1. It is recommended that only danger trees on the right-of-way be removed, to allow for the safe and reliable operation of the transmission line, as identified by Manitoba Hydro. Retaining trees in this agricultural dominated landscape is important for conservation.

2. Where trees are required to be cleared, it is recommended that trees be hand cut to minimize ground disturbance. Care should be taken in any clearing of shelterbelts and forest stands.

3. Attempt to minimize surface disturbance around the sites of species of conservation concern recorded, to the extent possible. Three vulnerable species were observed to occur on or adjacent to the preferred route (common milkweed, cottonwood and basswood). Milkweeds are an ecologically important species for the Endangered monarch butterfly.

4. It is recommended that the Tier 2 noxious weed leafy spurge be managed at the two sites along the preferred route, prior to construction activities. The location of oxeye daisy (*Leucanthemum vulgare*), also a Tier 2 noxious weed, occurs approximately 800 m north of the preferred route.

5. Shelterbelts were occasionally observed along the preferred route. Where possible, it is recommended to span these shelterbelts or reduce clearing in these areas.

6. Rough agalinis (*Agalinis aspera*) is a prairie species found in low wet meadows with sparse vegetation and alkaline soils (COSEWIC 2006). Rough agalinis is known to historically occur in the northern portion of the study area and is listed as Endangered under ESEA, SARA and COSEWIC. Although this plant is inconspicuous when not in bloom, rough agalinis was not observed during surveys in 2022. As a result of no historical locations of this plant along the preferred route and specific habitat requirements, a follow-up survey for rough agalinis is not required.

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APPENDIX I. Definitions of selected technical terms.

Abundance-Dominance – This term expresses the number of individuals of a plant species and their coverage in a phytosociological survey; it is based on the coverage of individuals for classes with a coverage higher than 5% and on the abundance for classes with a lower percentage (Cauboue et al. 1996).

Angiosperm – A seed borne in a vessel (carpel); thus one of a group of plants whose seeds are borne within a mature ovary or fruit (Raven et al. 1992).

Boreal – Pertaining to the north; a climatic and ecological zone that occurs south of the subarctic, but north of the temperate hardwood forests of eastern North America, the parkland of the Great Plains region, and the montane forests of the Canadian cordillera (Cauboue et al. 1996).

Canopy – The more or less continuous cover of branches and foliage formed by the crowns of trees (Cauboue et al. 1996).

Canopy Closure – The degree of canopy cover relative to openings (Cauboue et al. 1996).

Classification – The systematic grouping and organization of objects, usually in a hierarchical manner (Cauboue et al. 1996).

Community-Type – A group of vegetation stands that share common characteristics, an abstract plant community (Cauboue et al. 1996).

Cover – The area of ground covered with plants of one or more species, usually expressed as a percentage (Cauboue et al. 1996).

Deciduous – Refers to perennial plants from which the leaves abscise and fall off at the end of the growing season (Cauboue et al. 1996).

Dicotyledon – One of the two divisions of the Angiosperms; the embryo has two cotyledons, the leaves are usually net-veined, the stems have open bundles, and the flower parts are usually in fours or fives (Usher 1996).

Ecoregion – An area characterized by a distinctive regional climate as expressed by vegetation (Cauboue et al. 1996).

Endangered Species - A species that is facing imminent extirpation or extinction (Government of Canada 2022b).

Extirpated Species - A species that no longer exists in the wild in Canada, but exists elsewhere in the wild (Government of Canada 2022b).

Flora – A list of the plant species present in an area (Cauboue et al. 1996).

Forb – A broad-leaved, non-woody plant that dies back to the ground after each growing season (Johnson et al. 1995).

Forest – A relatively large assemblage of tree-dominated stands (Cauboue et al. 1996).

Graminoid – A narrow-leaved plant that is grass-like; the term refers to grasses and plants that look like grasses (Cauboue et al. 1996).

Grassland – Vegetation consisting primarily of grass species occurring on sites that are arid or at least well drained (Cauboue et al. 1996).

Gymnosperm – A seed plant with seeds not enclosed in the ovary; the conifers are the most familiar group (Raven et al. 1992).

Habitat – The place in which an animal or plant lives; the sum of environmental circumstances in the place inhabited by an organism, population or community (Cauboue et al. 1996).

Herb (Herbaceous) – A plant without woody above-ground parts, the stems dying back to the ground each year (Johnson et al. 1995).

Invasive – Invasive species are plants that are growing outside of their country or region of origin and are out-competing or even replacing native plants (Invasive Species Council of Manitoba 2022).

Monocotyledon – A class of the Angiosperms; the seeds have a single cotyledon, the floral parts are in three or multiples of three, and the leaves have parallel veins (Usher 1996).

Noxious Weed – A plant that is designated as a tier 1, tier 2 or tier 3 noxious weed in the regulations and includes the seed of a noxious weed, whether it is still attached to the noxious weed or is separate from it (Manitoba Government 2022c).

Pteridophyte – A division of the plant kingdom including ferns and their allies (horsetails and clubmosses).

Rare Species – Any indigenous species of flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reasons, exists in low

numbers or in very restricted areas of Canada but is not a threatened species (Cauboue et al. 1996).

Shrub – A perennial plant usually with a woody stem, shorter than a tree, often with a multi-stemmed base (Cauboue et al. 1996).

Site – The place or category of places, considered from an environmental perspective, that determines the type and quality of plants that can grow there (Cauboue et al. 1996).

Species – A group of organisms having a common ancestry that are able to reproduce only among themselves; a general definition that does not account for hybridization (Cauboue et al. 1996).

Species of Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats (Government of Canada 2022b).

Stand – A collection of plants having a relatively uniform composition and structure, and age in the case of forests (Cauboue et al. 1996).

Stratum – A distinct layer within a plant community, a component of structure (Cauboue et al. 1996).

Terrestrial – Pertaining to land as opposed to water (Cauboue et al. 1996).

Threatened Species - A species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction (Government of Canada 2022b).

Understory – Vegetation growing beneath taller plants such as trees or tall shrubs (Cauboue et al. 1996).

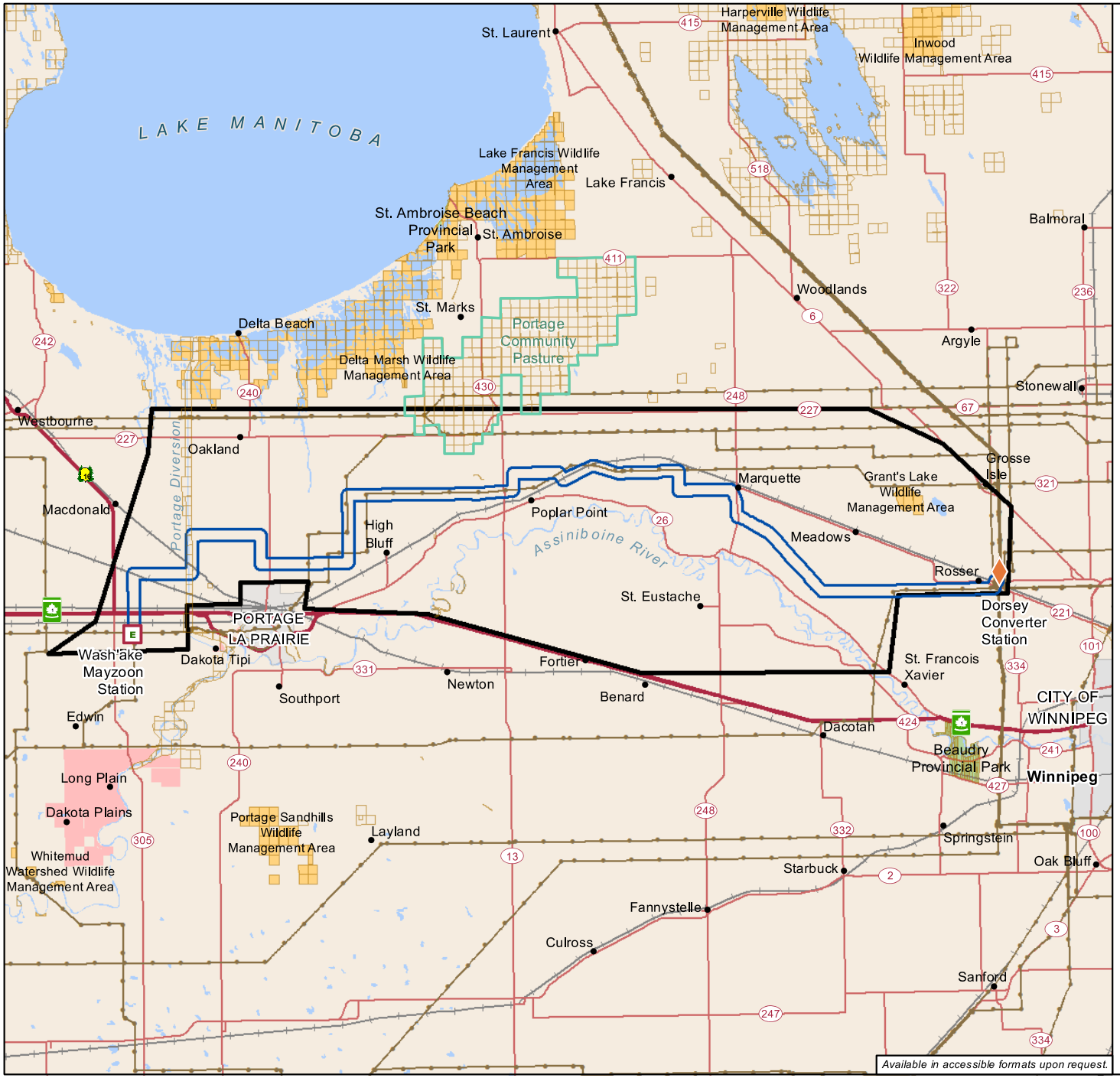
Vascular Plant – A plant having a vascular system (Usher 1996).

Vegetation – The general cover of plants growing on a landscape (Cauboue et al. 1996).

Vegetation Type – In phytosociology, the lowest possible level to be described (Cauboue et al. 1996).

Wetland – Land that is saturated with water long enough to promote hydric soils or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to wet environments (Cauboue et al. 1996).

APPENDIX II. Report maps.

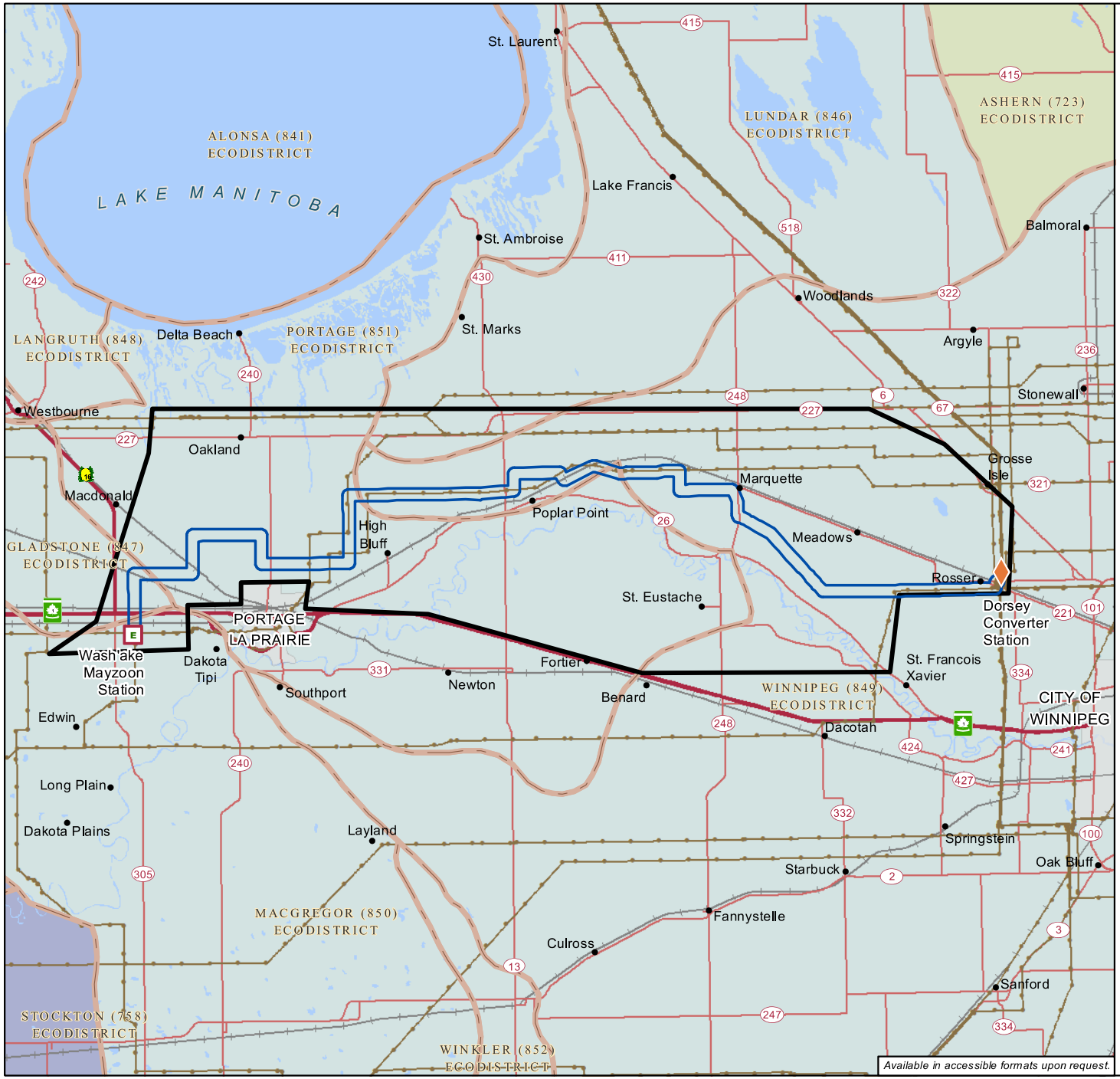


Dorsey to Wash'ake Mayzoon Transmission Line

nt Area

Available in accessible formats upon request.

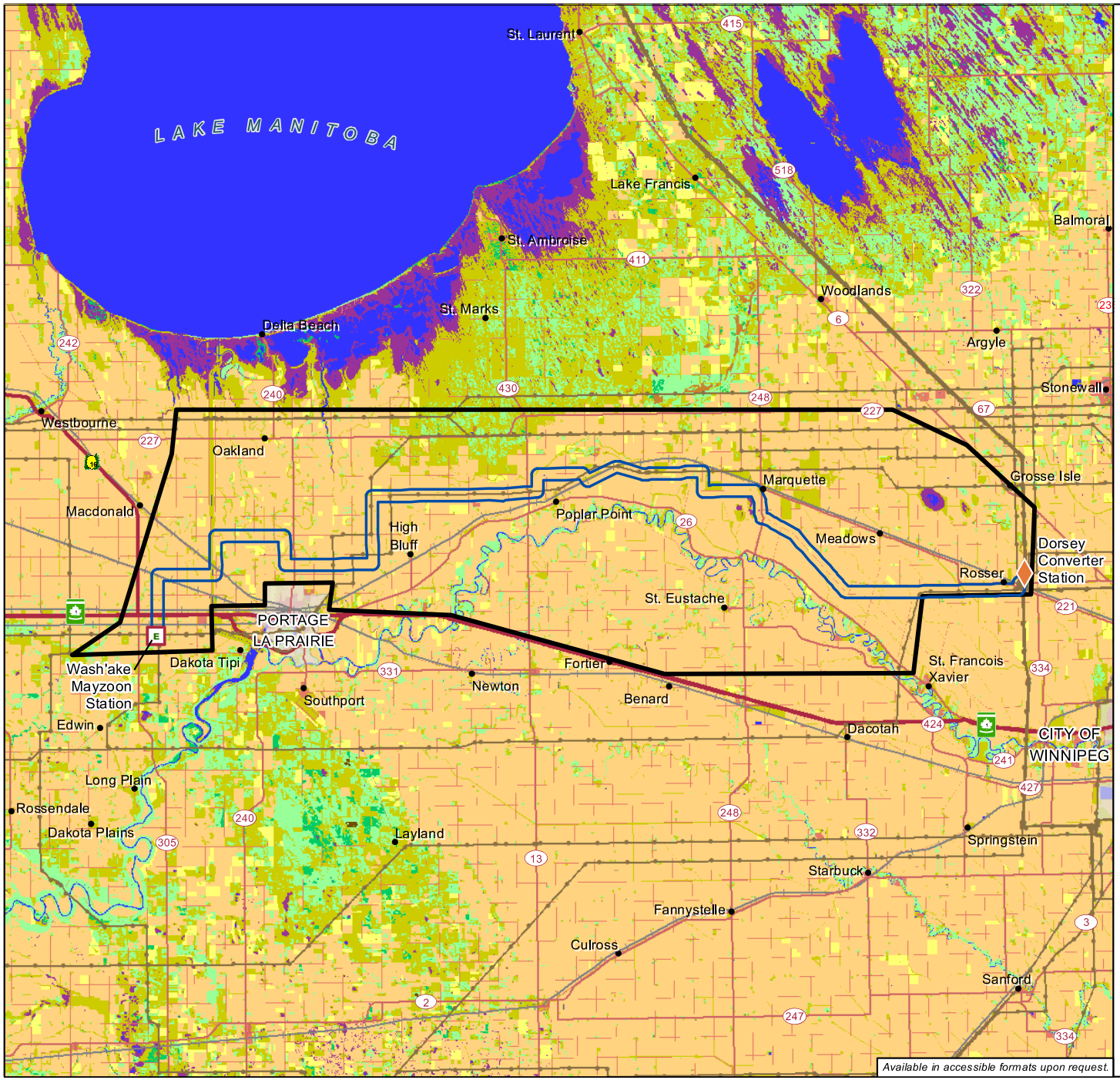
Map 1-2



Dorsey to Wash'ake Mayzoon Transmission Line

ssment Area (500m)
Regional Assessment Area

Map 3-1



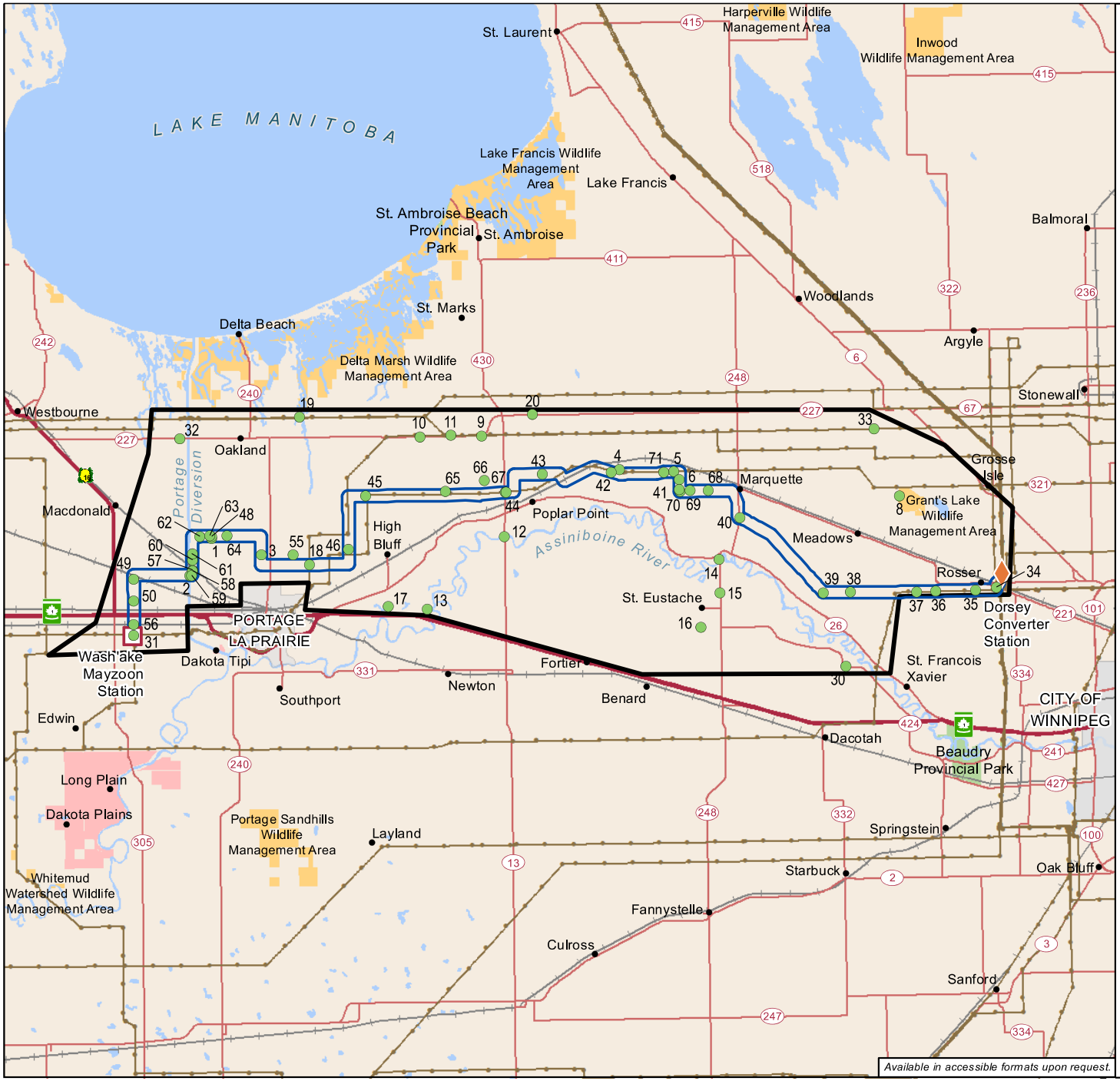
Dorsey to Wash'ake Mayzoon Transmission Line

ment Area (500m)

Regional Assessment Area

Available in accessible formats upon request.

Map 3-2


LAKE MANITOBA
St. Laurent
Harperville Wildlife Management Area
Inwood Wildlife Management Area
Lake Francis Wildlife Management Area
Lake Francis
St. Ambroise Beach Provincial Park
St. Ambroise
Balmoral
Woodlands
St. Marks
Delta Beach
Delta Marsh Wildlife Management Area
Argyle
Stonewall
Westbourne
Oakland
Portage Diversion
Macdonald
High Bluff
Poplar Point
Assiniboine River
Marquette
Grosse Isle
Grant's Lake Wildlife Management Area
Meadows
Rosser
Dorsey Converter Station
St. Eustache
PORTAGE LA PRAIRIE
Dakota Tipi
Wash'ake Mayzoon Station
Southport
Newton
Fortier
Benard
St. Francois Xavier
CITY OF WINNIPEG
Dacotah
Beaudry Provincial Park
Edwin
Long Plain
Dakota Plains
Portage Sandhills Wildlife Management Area
Layland
Springstein
Starbuck
Oak Bluff
Whitemud Watershed Wildlife Management Area
Fannystelle
Culross
Sanford
Dorsey to Wash'ake Mayzoon Transmission Line
t Area
Local Assessment Area (500m)
Regional Assessment Area
Available in accessible formats upon request.
Map 3-3

APPENDIX III. Ecological landscape classification descriptions of the study area (regional assessment area), obtained from Smith et al. (1998).

Prairies Ecozone

The Prairies Ecozone extends north from the Canada-United States border and ranges from the western edge of Alberta to eastern Manitoba. This ecozone comprises the northern extension of the former open grasslands of the Great Plains of North America. The ecozone has a landscape characterized by level to rolling or gently undulating terrain. Agricultural crops dominantly represent the vegetation. Groves of trembling aspen, balsam poplar and bur oak are represented in the prairies. Nearly all the tall grass and mixed grass prairie have been modified by human activity.

Lake Manitoba Plain Ecoregion

The lake Manitoba Plain Ecoregion occurs within the Prairies Ecozone. Extending north from the International Boundary to Lake Dauphin, the Manitoba Escarpment marks its western extent. Agricultural crops and pastureland have changed the landscape from much of the natural vegetation. Stands of trembling aspen, bur oak and grassland communities occur in the ecoregion.

Portage Ecodistrict

The Portage Ecodistrict is located in the central portion of the Lake Manitoba Plain Ecoregion and extends to the south shore of Lake Manitoba. The land in this ecodistrict consists largely of cultivated fields. Agriculture has replaced almost all of the native tall grass prairie. Some aspen groves remain along with deciduous forest remnants of elm, green ash, Manitoba maple and basswood along waterways. Bur oak occurs in the upper dry terraces. The Delta Marsh supports cattails, reed grass, and willows. The beach ridges around the marsh support Manitoba maple, aspen and balsam poplar.

Winnipeg Ecodistrict

The Winnipeg Ecodistrict lies in the southeastern portion of the Lake Manitoba Plain Ecoregion. This ecodistrict encompasses the City of Winnipeg and subsequent development and drainage associated with the city and the surrounding agricultural land. Originally tall grass prairie, only small remnants of this native vegetation remain. Tree cover along the flood plains of the waterways contain Manitoba maple, green ash, cottonwood, basswood and American elm. A mixture of aspen and bur oak can be found on the upper terraces with an understory of hazelnut, red-osier dogwood and snowberry.

Lundar Ecodistrict

The Lundar Ecodistrict is situated on the northeastern part of the Lake Manitoba Plain Ecoregion. Only limited portions of the ecodistrict are cultivated for the production of spring wheat, other cereal grains, oil seeds and hay crops; much of the land is public land and leased out for native pasture and hay. Many stands of trembling aspen and bur oak have been impoverished by cattle grazing and shrub fires. The environment provides important wildlife and waterfowl breeding habitat.

Gladstone Ecodistrict

The Gladstone Ecodistrict occupies a small area of the west-central portion of the larger Ecoregion. Agriculture has modified much of the natural vegetation. Trembling aspen groves, areas of shrubs, and grasslands were once the native vegetation in the area. Cattails, sedges and reed grasses dominate the marsh wetlands found in this ecodistrict.

MacGregor Ecodistrict

The MacGregor Ecodistrict occurs on the west side of the Lake Manitoba Plain Ecoregion. Agriculture has significantly modified the natural vegetation in this ecodistrict. The native vegetation originally was comprised of tall prairie grasses and sedges dotted with groves of trembling aspen and balsam poplar. Shrubs associated with these stands included Saskatoon, willows, red-osier dogwood, and snowberry.

APPENDIX IV. List of flora recorded from surveys.

Family/Species	Common Name	MB Rank
VASCULAR SPECIES		
Pteridophytes – Ferns and Allies		
EQUISETACEAE	HORSETAIL FAMILY	
Equisetum arvense	Field Horsetail	S5
DRYOPTERIDACEAE	WOOD FERN FAMILY	
Dryopteris cristata	Crested Shield Fern	S3S4
Gymnosperms		
PINACEAE	PINE FAMILY	
Picea glauca	White Spruce	S5
Angiosperms - Monocotyledons		
ALISMATACEAE	ARROWHEAD FAMILY	
Sagittaria cuneata	Northern Arrowhead	S5
CYPERACEAE	SEDGE FAMILY	
Carex sp.	Sedge	
Eleocharis palustris	Creeping Spikerush	S5
LEMNACEAE	DUCKWEED FAMILY	
Lemna minor	Lesser Duckweed	SNA
JUNCAGINACEAE	ARROWGRASS FAMILY	
Triglochin maritima	Seaside Arrowgrass	S5
LILIACEAE	LILY FAMILY	
Maianthemum canadense	Two-leaved Solomon's-seal	S5
Maianthemum stellatum	Star-flowered Solomon's-seal	S5
Prosartes trachycarpa	Rough-fruited Fairybells	S4
Trillium cernuum	Nodding Trillium	S4S5
POACEAE	GRASS FAMILY	
Agrostis stolonifera	Creeping Bent Grass	SNA
Andropogon gerardii	Big Bluestem	S5
Beckmannia syzigachne	American Sloughgrass	S5
Bromus inermis	Smooth Brome	SNA
Calamagrostis canadensis	Bluejoint Reedgrass	S5
Echinochloa crus-galli	Barnyard Grass	SNA

Elymus repens	Quackgrass	SNA
Grass sp.	Grass	
Elymus trachycaulus	Slender Wildrye	S5
Glyceria grandis	Tall Mannagrass	S5
Hordeum jubatum	Wild Barley	S5
Phalaris arundinacea	Reed Canarygrass	S5
Phleum pratense	Meadow Timothy	SNA
Phragmites australis	Common Reedgrass	S5
Poa pratensis	Kentucky Bluegrass	S5
POTAMOGETONACEAE	PONDWEED FAMILY	
Potamogeton sp.	Pondweed	
SMILACACEAE	GREENBRIER FAMILY	
Smilax lasioneura	Carrion Flower	S4S5
TYPHACEAE	CAT-TAIL FAMILY	
Typha angustifolia	Narrow-leaved Cat-tail	S3S4
Typha latifolia	Common Cat-tail	S4S5
Angiosperms – Dicotyledons		
ACERACEAE	MAPLE FAMILY	
Acer negundo	Manitoba Maple	S5
AMARANTHACEAE	AMARANTH FAMILY	
Amaranthus blitoides	Prostrate Pigweed	SNA
Amaranthus retroflexus	Redroot Pigweed	SNA
ANACARDIACEAE	SUMAC FAMILY	
Toxicodendron rydbergii	Poison-ivy	S5
APOCYNACEAE	DOGBANE FAMILY	
Apocynum androsaemifolium	Spreading Dogbane	S5
Asclepias syriaca	Common Milkweed	S3S4
ARALIACEAE	GINSENG FAMILY	
Aralia nudicaulis	Wild Sarsaparilla	S5
ASTERACEAE	ASTER FAMILY	
Achillea millefolium	Common Yarrow	SNA
Ambrosia artemisiifolia	Common Ragweed	S5
Arctium minus	Common Burdock	SNA
Artemisia absinthium	Wormwood	SNA

Artemisia ludoviciana	Prairie Sage	S5
Cirsium arvense	Canada Thistle	SNA
Cirsium vulgare	Bull Thistle	SNA
Cyclachaena xanthiifolia	Marsh-elder	SNA
Erigeron glabellus	Streamside Fleabane	S5
Euthamia graminifolia	Flat-topped Goldenrod	S5
Gaillardia aristata	Great Blanketflower	S5
Leucanthemum vulgare	Oxeye Daisy	SNA
Petasites frigidus var. *sagittatus*	Arrow-leaved Colt's-foot	S5
Rudbeckia hirta	Black-eyed Susan	S5
Senecio eremophilus	Dryland Groundsel	S4
Solidago canadensis	Canada Goldenrod	S5
Solidago rigida	Stiff Goldenrod	S5
Sonchus arvensis	Field Sow-thistle	SNA
Symphyotrichum ciliolatum	Lindley's Aster	S5
Symphyotrichum ericoides	Many-flowered Aster	S4
Symphyotrichum laeve	Smooth Aster	S5
Taraxacum officinale	Common Dandelion	SNA
BALSAMINACEAE	TOUCH-ME-NOT FAMILY	
Impatiens capensis	Spotted Touch-me-not	S5
BRASSICACEAE	MUSTARD FAMILY	
Capsella bursa-pastoris	Shepherd's Purse	SNA
Descurainia sophia	Flixweed	SNA
Lepidium densiflorum	Common Pepper-grass	S5
Thlaspi arvense	Field Pennycress	SNA
CAMPANULACEAE	BELLFLOWER FAMILY	
Campanula rotundifolia	Harebell	S5
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY	
Symphoricarpos occidentalis	Western Snowberry	S5
Viburnum opulus	Highbush-cranberry	S5
CHENOPODIACEAE	GOOSEFOOT FAMILY	
Chenopodium album	Lamb's-quarters	SNA
Kochia scoparia	Kochia	SNA
CORNACEAE	DOGWOOD FAMILY	
Cornus sericea	Red-osier Dogwood	S5
CUCURBITACEAE	GOURD FAMILY	

Echinocystis lobata	Wild Cucumber	S4S5
ELAEAGNACEAE	OLEASTER FAMILY	
Elaeagnus commutata	Silverberry	S4S5
EUPHORBIACEAE	SPURGE FAMILY	
Euphorbia virgata	Leafy Spurge	SNA
FABACEAE	PEA FAMILY	
Caragana arborescens	Common Caragana	SNA
Astragalus agrestis	Field Milkvetch	S5
Glycyrrhiza lepidota	Wild Licorice	S4S5
Lotus corniculatus	Bird's-foot Trefoil	SNA
Medicago lupulina	Black Medick	SNA
Medicago sativa	Alfalfa	SNA
Melilotus officinalis	Yellow Sweet Clover	SNA
Melilotus sp.	Sweet Clover	SNA
Trifolium hybridum	Alsike Clover	SNA
Trifolium pratense	Red Clover	SNA
Trifolium repens	White Clover	SNA
Vicia americana	American Purple Vetch	S5
FAGACEAE	BEECH FAMILY	
Quercus macrocarpa	Bur Oak	S5
GROSSULARIACEAE	CURRENT FAMILY	
Ribes americanum	Wild Black Currant	S5
LAMIACEAE	MINT FAMILY	
Mentha canadensis	Canada Mint	S5
Scutellaria galericulata	Hooded Skullcap	S5
LENTIBULARIACEAE	BLADDERWORT FAMILY	
Utricularia vulgaris	Common Bladderwort	S5?
OLEACEAE	OLIVE FAMILY	
Fraxinus nigra	Black Ash	S2
Fraxinus pennsylvanica	Green Ash	S4S5
ONAGRACEAE	WILLOWHERB FAMILY	
Circaea canadensis ssp. *canadensis*	Large Enchanter's-nightshade	S2
PLANTAGINACEAE	PLANTAIN FAMILY	

Plantago major	Common Plantain	SNA
POLYGONACEAE	SMARTWEED FAMILY	
Polygonum amphibium	Water Smartweed	S5
Polygonum aviculare	Prostrate Knotweed	SU
Rumex crispus	Curled Dock	SNA
PRIMULACEAE	PRIMROSE FAMILY	
Lysimachia thyrsiflora	Tufted Loosestrife	S5
RANUNCULACEAE	CROWFOOT FAMILY	
Actaea rubra	Red Baneberry	S5
Anemone canadensis	Canada Anemone	S5
Ranunculus acris	Common Buttercup	SNA
Thalictrum venulosum	Veiny Meadow-rue	S5
ROSACEAE	ROSE FAMILY	
Amelanchier alnifolia	Saskatoon	S5
Fragaria virginiana	Smooth Wild Strawberry	S5
Geum triflorum	Three-flowered Avens	S4S5
Potentilla anserina	Silverweed	S5
Prunus virginiana	Chokecherry	S5
Rosa acicularis	Prickly Rose	S5
Rubus idaeus	Wild Red Raspberry	S5
Rubus pubescens	Dewberry	S5
Spiraea alba	White Meadowsweet	S5
RUBIACEAE	MADDER FAMILY	
Galium boreale	Northern Bedstraw	S5
SALICACEAE	WILLOW FAMILY	
Populus balsamifera	Balsam Poplar	S5
Populus deltoides	Cottonwood	S3S5
Populus tremuloides	Trembling Aspen	S5
Salix amygdaloides	Peach-leaved Willow	S4
Salix discolor	Pussy Willow	S5
Salix exigua	Sandbar Willow	S5
Salix spp.	Willow	
TILIACEAE	LINDEN FAMILY	
Tilia americana	Basswood	S3S4
ULMACEAE	ELM FAMILY	

Ulmus americana	American Elm	S4S5
URTICACEAE	NETTLE FAMILY	
Urtica dioica	Stinging Nettle	S5
VIOLACEAE	VIOLET FAMILY	
Viola sp.	Violet	
VITACEAE	GRAPE FAMILY	
Vitis riparia	Riverbank Grape	S3S4

APPENDIX V. Plant species observed by site visited.

Form	Species	Common	1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20	30	31	32	33	34	35	36	37	38
TR	*Acer negundo*	Manitoba Maple	x					x					x		x	x	x	x	x											
TR	*Fraxinus nigra*	Black Ash												x																
TR	*Fraxinus pennsylvanica*	Green Ash	x					x					x			x		x	x											
TR	*Picea glauca*	White Spruce																												
TR	*Populus balsamifera*	Balsam Poplar																												
TR	*Populus deltoides*	Cottonwood	x										x		x															
TR	*Populus balsamifera*	Balsam Poplar																												
TR	*Populus tremuloides*	Trembling Aspen							x		x	x																		
TR	*Quercus macrocarpa*	Bur Oak										x		x																
TR	*Salix amygdaloides*	Peach-leaved Willow																												
TR	*Tilia americana*	Basswood												x																
TR	*Ulmus americana*	American Elm	x														x	x												
SH	*Acer negundo*	Manitoba Maple											x		x															
SH	*Actaea rubra*	Red Baneberry												x																
SH	*Amelanchier alnifolia*	Saskatoon									x	x																		
SH	*Apocynum androsaemifolium*	Spreading Dogbane															x													
SH	*Caragana arborescens*	Common Caragana						x											x											
SH	*Cornus sericea*	Red-osier Dogwood	x				x				x				x			x												
SH	*Dasiphora fruticosa*	Shrubby Cinquefoil								x											x			x						
SH	*Elaeagnus commutata*	Silverberry																			x									
SH	*Fraxinus pennsylvanica*	Green Ash												x																
SH	*Populus balsamifera*	Balsam Poplar					x																							
SH	*Populus tremuloides*	Trembling Aspen									x							x												
SH	*Prunus virginiana*	Chokecherry										x																		
SH	*Quercus macrocarpa*	Bur Oak										x		x																
SH	*Ribes americanum*	Wild Black Currant	x																											

SH	*Rosa acicularis*	Prickly Rose		x				x	x	x		x			x				x					x		x	x	x
SH	*Rubus idaeus*	Wild Red Raspberry													x														
SH	*Rubus pubescens*	Dewberry										x																	
SH	*Salix discolor*	Pussy Willow				x					x		x																
SH	*Salix exigua*	Sandbar Willow	x				x				x		x	x		x													
SH	*Salix* spp.	Willow	x			x		x			x																		
SH	*Spiraea alba*	White Meadowsweet							x																				
SH	*Symphoricarpos occidentalis*	Western Snowberry							x	x		x			x				x										
SH	*Viburnum opulus*	Highbush-cranberry										x	x	x	x														
SH	*Vitis riparia*	Riverbank Grape										x																	
GR	*Agrostis stolonifera*	Creeping Bent Grass																	x										
GR	*Andropogon gerardii*	Big Bluestem																	x										
GR	*Beckmannia syzigachne*	American Sloughgrass																											
GR	*Bromus inermis*	Smooth Brome	x	x	x	x			x			x				x	x			x	x		x	x	x	x	x	x	
GR	*Calamagrostis canadensis*	Bluejoint Reedgrass																x	x										
GR	*Carex* sp.	Sedge							x									x											
GR	*Echinochloa crus-galli*	Barnyard Grass																											
GR	*Eleocharis palustris*	Creeping Spikerush						x																					
GR	*Elymus repens*	Quackgrass	x	x												x	x								x	x		x	
GR	*Elymus trachycaulus*	Slender Wildrye																			x	x							
GR	*Glyceria grandis*	Tall Mannagrass					x											x											
GR	*Hordeum jubatum*	Wild Barley						x																	x				
GR	*Phalaris arundinacea*	Reed Canarygrass	x		x	x	x		x			x		x	x		x	x	x			x	x						
GR	*Phleum pratense*	Meadow Timothy	x																										
GR	*Phragmites australis*	Common Reedgrass													x			x											
GR	*Poa pratensis*	Kentucky Bluegrass						x	x	x									x		x	x							
GR	Unknown grass	Grass																	x										
FO	*Achillea millefolium*	Common Yarrow						x											x										
FO	*Amaranthus blitoides*	Prostrate Pigweed			x												x				x							x	
FO	*Amaranthus retroflexus*	Redroot Pigweed																											
FO	*Ambrosia artemisiifolia*	Common Ragweed																											

FO	*Anemone canadensis*	Canada Anemone	x	x		x			x							x						x			
FO	*Aralia nudicaulis*	Wild Sarsaparilla										x													
FO	*Arctium minus*	Common Burdock																							
FO	*Artemisia absinthium*	Wormwood		x												x				x		x			
FO	*Artemisia ludoviciana*	Prairie Sage																							
FO	*Asclepias syriaca*	Common Milkweed								x		x	x		x			x		x					
FO	*Astragalus agrestis*	Field Milkvetch																	x						x
FO	*Campanula rotundifolia*	Harebell						x										x							
FO	*Capsella bursa-pastoris*	Shepherd's Purse																							
FO	*Chenopodium album*	Lamb's-quarters														x									
FO	*Circaea canadensis* ssp. *canadensis*	Large Enchanter's-nightshade								x															
FO	*Cirsium arvense*	Canada Thistle	x	x					x		x											x		x	x
FO	*Cirsium vulgare*	Bull Thistle									x							x							
FO	*Cyclachaena xanthiifolia*	Marsh-elder																							
FO	*Descurainia sophia*	Flixweed																							
FO	*Dryopteris cristata*	Crested Shield Fern										x													
FO	*Echinocystis lobata*	Wild Cucumber											x	x	x		x								
FO	*Equisetum arvense*	Field Horsetail										x				x									
FO	*Erigeron glabellus*	Streamside Fleabane	x															x							
FO	*Euphorbia virgata*	Leafy Spurge																							
FO	*Euthamia graminifolia*	Flat-topped Goldenrod																							
FO	*Fragaria virginiana*	Smooth Wild Strawberry																x		x					
FO	*Gaillardia aristata*	Great Blanketflower																x							
FO	*Galium boreale*	Northern Bedstraw	x						x	x								x							x
FO	*Geum triflorum*	Three-flowered Avens							x																
FO	*Glycyrrhiza lepidota*	Wild Licorice																x							
FO	*Impatiens capensis*	Spotted Touch-me-not									x														
FO	*Kochia scoparia*	Kochia																							
FO	*Lemna minor*	Lesser Duckweed					x						x	x	x										
FO	*Lepidium densiflorum*	Common Pepper-grass														x									

FO	*Leucanthemum vulgare*	Oxeye Daisy																											
FO	*Lotus corniculatus*	Bird's-foot Trefoil																					x						
FO	*Lysimachia thyrsiflora*	Tufted Loosestrife																											
FO	*Maianthemum canadense*	Two-leaved Solomon's-seal											x																
FO	*Maianthemum stellatum*	Star-flowered Solomon's-seal																											
FO	*Medicago lupulina*	Black Medick							x																				
FO	*Medicago sativa*	Alfalfa	x						x														x						
FO	*Melilotus officinalis*	Yellow Sweet Clover																											
FO	*Melilotus* sp.	Sweet Clover																			x		x	x	x	x	x	x	
FO	*Mentha canadensis*	Canada Mint										x							x										
FO	*Petasites frigidus* var. *sagittatus*	Arrow-leaved Colt's-foot								x																			
FO	*Plantago major*	Common Plantain																											
FO	*Polygonum amphibium*	Water Smartweed		x		x											x												
FO	*Polygonum aviculare*	Prostrate Knotweed																											
FO	*Potamogeton* sp.	Pondweed		x	x																								
FO	*Potentilla anserina*	Silverweed																											
FO	*Prosartes trachycarpa*	Rough-fruited Fairybells								x																			
FO	*Ranunculus acris*	Common Buttercup				x																							
FO	*Rudbeckia hirta*	Black-eyed Susan																		x									
FO	*Rumex crispus*	Curled Dock								x												x							x
FO	*Sagittaria cuneata*	Northern Arrowhead			x																								
FO	*Sanicula marilandica*	Snakeroot								x	x		x																
FO	*Scutellaria galericulata*	Hooded Skullcap																	x										
FO	*Senecio eremophilus*	Dryland Groundsel							x																				
FO	*Smilax lasioneura*	Carrion Flower											x																
FO	*Solidago canadensis*	Canada Goldenrod	x					x	x				x																
FO	*Solidago rigida*	Stiff Goldenrod																											
FO	*Sonchus arvensis*	Field Sow-thistle																x					x			x			
FO	*Symphyotrichum ciliolatum*	Lindley's Aster									x																		
FO	*Symphyotrichum ericoides*	Many-flowered Aster																											

FO	*Symphyotrichum laeve*	Smooth Aster																		x										
FO	*Taraxacum officinale*	Common Dandelion	x	x						x	x	x		x					x		x			x		x	x	x		x
FO	*Thalictrum venulosum*	Veiny Meadow-rue									x	x		x				x				x	x							
FO	*Thlaspi arvense*	Field Pennycress																						x				x	x	
FO	*Toxicodendron rydbergii*	Poison-ivy									x	x		x																
FO	*Trifolium hybridum*	Alsike Clover																												
FO	*Trifolium pratense*	Red Clover																												
FO	*Trifolium repens*	White Clover																												
FO	*Triglochin maritima*	Seaside Arrowgrass																												
FO	*Trillium cernuum*	Nodding Trillium												x																
FO	*Typha angustifolia*	Narrow-leaved Cat-tail							x																					
FO	*Typha latifolia*	Common Cat-tail			x	x	x		x							x	x			x										
FO	*Urtica dioica*	Stinging Nettle			x													x					x							
FO	*Utricularia vulgaris*	Common Bladderwort							x																					
FO	*Vicia americana*	American Purple Vetch									x	x	x					x						x						
FO	*Viola* sp.	Violet										x																		

Form	Species	Common	39	40	41	42	43	44	45	46	48	49	50	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
TR	*Acer negundo*	Manitoba Maple																		x										x
TR	*Fraxinus nigra*	Black Ash																												
TR	*Fraxinus pennsylvanica*	Green Ash										x											x							
TR	*Picea glauca*	White Spruce																												
TR	*Populus balsamifera*	Balsam Poplar																												x
TR	*Populus deltoides*	Cottonwood													x	x								x	x				x	x
TR	*Populus balsamifera*	Balsam Poplar																												x
TR	*Populus tremuloides*	Trembling Aspen																									x			x
TR	*Quercus macrocarpa*	Bur Oak																												
TR	*Salix amygdaloides*	Peach-leaved Willow																					x							
TR	*Tilia americana*	Basswood																												x
TR	*Ulmus americana*	American Elm																												
SH	*Acer negundo*	Manitoba Maple										x																		
SH	*Actaea rubra*	Red Baneberry																												
SH	*Amelanchier alnifolia*	Saskatoon																												
SH	*Apocynum androsaemifolium*	Spreading Dogbane																												
SH	*Caragana arborescens*	Common Caragana																												
SH	*Cornus sericea*	Red-osier Dogwood										x																		x
SH	*Dasiphora fruticosa*	Shrubby Cinquefoil																												
SH	*Elaeagnus commutata*	Silverberry																												
SH	*Fraxinus pennsylvanica*	Green Ash																												
SH	*Populus balsamifera*	Balsam Poplar																												
SH	*Populus tremuloides*	Trembling Aspen															x													
SH	*Prunus virginiana*	Chokecherry																												
SH	*Quercus macrocarpa*	Bur Oak																												
SH	*Ribes americanum*	Wild Black Currant																												
SH	*Rosa acicularis*	Prickly Rose		x			x	x	x	x		x	x															x		

SH	*Rubus idaeus*	Wild Red Raspberry																
SH	*Rubus pubescens*	Dewberry																
SH	*Salix discolor*	Pussy Willow																x
SH	*Salix exigua*	Sandbar Willow																x
SH	*Salix* spp.	Willow											x		x	x		x
SH	*Spiraea alba*	White Meadowsweet																
SH	*Symphoricarpos occidentalis*	Western Snowberry		x			x				x	x					x	
SH	*Viburnum opulus*	Highbush-cranberry																
SH	*Vitis riparia*	Riverbank Grape																
GR	*Agrostis stolonifera*	Creeping Bent Grass																
GR	*Andropogon gerardii*	Big Bluestem																
GR	*Beckmannia syzigachne*	American Sloughgrass																
GR	*Bromus inermis*	Smooth Brome	x	x	x	x	x	x	x	x	x	x		x			x	
GR	*Calamagrostis canadensis*	Bluejoint Reedgrass											x					
GR	*Carex* sp.	Sedge																
GR	*Echinochloa crus-galli*	Barnyard Grass						x										
GR	*Eleocharis palustris*	Creeping Spikerush																
GR	*Elymus repens*	Quackgrass	x	x	x	x	x	x						x			x	
GR	*Elymus trachycaulus*	Slender Wildrye																
GR	*Glyceria grandis*	Tall Mannagrass	x															
GR	*Hordeum jubatum*	Wild Barley		x	x		x						x				x	
GR	*Phalaris arundinacea*	Reed Canarygrass	x	x	x	x	x	x	x				x	x				
GR	*Phleum pratense*	Meadow Timothy												x				
GR	*Phragmites australis*	Common Reedgrass		x														
GR	*Poa pratensis*	Kentucky Bluegrass		x													x	
GR	Unknown grass	Grass															x	
FO	*Achillea millefolium*	Common Yarrow															x	
FO	*Amaranthus blitoides*	Prostrate Pigweed							x									
FO	*Amaranthus retroflexus*	Redroot Pigweed						x										
FO	*Ambrosia artemisiifolia*	Common Ragweed																

FO	*Anemone canadensis*	Canada Anemone		x	x			x		x																
FO	*Aralia nudicaulis*	Wild Sarsaparilla																								
FO	*Arctium minus*	Common Burdock																								
FO	*Artemisia absinthium*	Wormwood																								
FO	*Artemisia ludoviciana*	Prairie Sage								x																
FO	*Asclepias syriaca*	Common Milkweed																	x							
FO	*Astragalus agrestis*	Field Milkvetch	x																							
FO	*Campanula rotundifolia*	Harebell																								
FO	*Capsella bursa-pastoris*	Shepherd's Purse																								
FO	*Chenopodium album*	Lamb's-quarters		x			x																			
FO	*Circaea canadensis* ssp. *canadensis*	Large Enchanter's-nightshade																								
FO	*Cirsium arvense*	Canada Thistle	x		x		x								x											
FO	*Cirsium vulgare*	Bull Thistle																								
FO	*Cyclachaena xanthiifolia*	Marsh-elder																								
FO	*Descurainia sophia*	Flixweed																								
FO	*Dryopteris cristata*	Crested Shield Fern																								
FO	*Echinocystis lobata*	Wild Cucumber																								
FO	*Equisetum arvense*	Field Horsetail					x		x																	
FO	*Erigeron glabellus*	Streamside Fleabane													x		x									x
FO	*Euphorbia virgata*	Leafy Spurge														x								x		
FO	*Euthamia graminifolia*	Flat-topped Goldenrod																								
FO	*Fragaria virginiana*	Smooth Wild Strawberry																								
FO	*Gaillardia aristata*	Great Blanketflower																								x
FO	*Galium boreale*	Northern Bedstraw				x				x	x															x
FO	*Geum triflorum*	Three-flowered Avens																								
FO	*Glycyrrhiza lepidota*	Wild Licorice																								x
FO	*Impatiens capensis*	Spotted Touch-me-not																								
FO	*Kochia scoparia*	Kochia																								
FO	*Lemna minor*	Lesser Duckweed																								
FO	*Lepidium densiflorum*	Common Pepper-grass																								

FO	*Leucanthemum vulgare*	Oxeye Daisy											x														
FO	*Lotus corniculatus*	Bird's-foot Trefoil																x									
FO	*Lysimachia thyrsiflora*	Tufted Loosestrife			x																						
FO	*Maianthemum canadense*	Two-leaved Solomon's-seal																									
FO	*Maianthemum stellatum*	Star-flowered Solomon's-seal									x																
FO	*Medicago lupulina*	Black Medick																									
FO	*Medicago sativa*	Alfalfa	x	x					x									x									
FO	*Melilotus officinalis*	Yellow Sweet Clover			x																						x
FO	*Melilotus* sp.	Sweet Clover		x	x											x											
FO	*Mentha canadensis*	Canada Mint																									
FO	*Petasites frigidus* var. *sagittatus*	Arrow-leaved Colt's-foot																									
FO	*Plantago major*	Common Plantain																									
FO	*Polygonum amphibium*	Water Smartweed						x	x	x																	
FO	*Polygonum aviculare*	Prostrate Knotweed						x				x															
FO	*Potamogeton* sp.	Pondweed																									
FO	*Potentilla anserina*	Silverweed		x																							
FO	*Prosartes trachycarpa*	Rough-fruited Fairybells																									
FO	*Ranunculus acris*	Common Buttercup																									
FO	*Rudbeckia hirta*	Black-eyed Susan																									
FO	*Rumex crispus*	Curled Dock	x	x		x																					
FO	*Sagittaria cuneata*	Northern Arrowhead																									
FO	*Sanicula marilandica*	Snakeroot																									
FO	*Scutellaria galericulata*	Hooded Skullcap																									
FO	*Senecio eremophilus*	Dryland Groundsel																									
FO	*Smilax lasioneura*	Carrion Flower																									
FO	*Solidago canadensis*	Canada Goldenrod			x		x									x											
FO	*Solidago rigida*	Stiff Goldenrod																									
FO	*Sonchus arvensis*	Field Sow-thistle								x																	

FO	*Symphyotrichum ciliolatum*	Lindley's Aster																	
FO	*Symphyotrichum ericoides*	Many-flowered Aster																	x
FO	*Symphyotrichum laeve*	Smooth Aster																	
FO	*Taraxacum officinale*	Common Dandelion	x	x		x	x	x		x				x					x
FO	*Thalictrum venulosum*	Veiny Meadow-rue									x								
FO	*Thlaspi arvense*	Field Pennycress						x											
FO	*Toxicodendron rydbergii*	Poison-ivy																	
FO	*Trifolium hybridum*	Alsike Clover																	x
FO	*Trifolium pratense*	Red Clover																	x
FO	*Trifolium repens*	White Clover																	
FO	*Triglochin maritima*	Seaside Arrowgrass			x														
FO	*Trillium cernuum*	Nodding Trillium																	
FO	*Typha angustifolia*	Narrow-leaved Cat-tail																	
FO	*Typha latifolia*	Common Cat-tail	x	x	x						x			x					
FO	*Urtica dioica*	Stinging Nettle																	
FO	*Utricularia vulgaris*	Common Bladderwort																	
FO	*Vicia americana*	American Purple Vetch	x																
FO	*Viola* sp.	Violet																	

Appendix G: Greenhouse gas mitigation assessment

PORTAGE AREA CAPACITY ENHANCEMENT PROJECT – GREENHOUSE GAS MITIGATION ASSESSMENT

Energy Supply Planning Department
Integrated Resource Planning

PREPARED BY:

K. M. SHAW, P. ENG.

REVIEWED BY:

K. TOEWS, P. ENG. _____

B. BAGEN, P. ENG. _____

A.M. WRUTH, P. ENG. _____

APPROVED BY: _____

NOTED BY: _____

DATE: SEPTEMBER 2021

REPORT: **IRPD 21_04**

Manitoba Hydro

Final Version

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1 ATTESTATION OF COMPLETENESS

I the undersigned attest that this Greenhouse Gas Mitigation Assessment was undertaken using recognized assessment tools and approaches (e.g., World Resources Institute's Electricity Project Guidelines and ISO Standard 14064-2), conducted by a qualified professional, and complies with the Climate Lens and any relevant sector-specific technical guidance issued by Infrastructure Canada for use under the Climate Lens.

Prepared by: _____ September 21, 2021

Kevin Michael Shaw, P.Eng. September 21, 2021

Validated by: _____ September 21, 2021

Kevin Michael Shaw, P.Eng. September 21, 2021

2 EXECUTIVE SUMMARY

The Portage Area Capacity Enhancement Project ("PACE Project") involves the enhancement of the Manitoba Hydro electrical transmission ("transmission") system through the construction of a new 230-66 kV transmission station west of Portage la Prairie, the construction of a new 230 kV transmission line from the Dorsey Convertor Station to the new transmission station, and other, less substantial, system modifications.

The PACE Project will address multiple transmission issues affecting the reliability of the transmission grid in southwestern Manitoba. These issues must be addressed as without the PACE Project, or a comparable project, Manitoba's Electrical System will become unable to provide the required level of reliability to Manitobans. Gross capital investments required to move forward with the PACE Project are estimated to be approximately $161.6M[1] (2020 Canadian dollars).

As the Manitoba government is seeking federal funding under the Investing in Canada Infrastructure Program, a greenhouse gas ("GHG") mitigation assessment was undertaken to fulfill the requirements of Infrastructure Canada's Climate Lens. ISO 14064-2 is the required standard under the Climate Lens; this standard was followed along with other recognized resources, with emphasis appropriately placed on the World Resources Institute's *Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects*.

As the PACE Project, or a comparable project, has been determined to be necessary, this assessment compares a "Project Scenario" where the PACE Project in-service date ("ISD") is prior to March 2027 with a "Baseline Scenario" where the PACE Project ISD is undesirably delayed 44 months until November 2030. The 44-month delay was considered the maximum plausible delay: analysis indicated that without the PACE Project being in-service, Manitoba Hydro would be required to shed Manitoba load during the Winter Peak Period from 2030/31 onwards. While the 44-month delay is plausible, it is considered undesirable due to several ongoing reliability concerns, and Manitobans would be best served by the Project Scenario where the ISD is in early 2027.

Since the "GHG effects" of the PACE Project are identical in both the Baseline and Project Scenarios after October 2030, this assessment focuses on estimating the net GHG emission ("emission") reductions occurring during the March 2027 through October 2030 Effective

[1] Note: Cost estimates presented herein is the best available as of the date of this assessment. Detailed cost information is available in other documentation submitted as part of the Investing in Canada Infrastructure Program application.

Assessment Period. The boundaries of this assessment incorporate all significant "GHG effects" of the PACE Project; assessment boundaries are not restricted by the physical boundaries of the PACE Project, Manitoba's Electrical System, or Canada's borders; however, results segregate Canadian impacts from non-Canadian impacts as per Climate Lens requirements.

This assessment relied on the use of the PSS/E modelling tool and planning models prepared by a Multiregional Modeling Working Group. Assumptions and modelling methodology are consistent with other Manitoba Hydro transmission planning analyses. This assessment demonstrated that the most appropriate methods for evaluating the GHG effects of Manitoba Hydro Transmission System enhancements in Manitoba consider the Manitoba's entire Electrical System, including its interactions with neighbouring power markets.

Emissions due to Manitoba's grid connected fossil-fuel generating units are very low and there is limited opportunity to reduce them further as they are typically mostly relied upon during hydrologic droughts; however, without the PACE Project being in-service, combustion turbines at the Brandon Generating Station will be operated with increased frequency to support Manitoba Hydro's Transmission System. This provides the opportunity for the PACE Project to have a significant impact on Manitoba's electricity sector emissions.

Table 1 presents the emission benefits of the PACE Project. Emission values are presented in kilotonnes ("kt") of carbon dioxide equivalent ("CO_2e"). The projected 49 kt CO_2e of emission reductions represents a 37% decrease in emissions at Manitoba's last remaining operational grid-connected fossil-fuel generating station.

To demonstrate how the PACE Project aligns with Canada's GHG reduction commitment under the Paris Agreement, and to fulfill Climate Lens requirements, specific 2030 data has been presented in Table 1, Table 2, and Table 4; however, these emission impacts assume average weather conditions and actual reductions in 2030, or any given year, will depend on outside air temperatures during the period, as well as other system loading considerations.

Table 1 Manitoba's Grid-Connected Electricity Generation Emissions (kt CO_2e)

	2027-2030	**2030**
Baseline Scenario Emissions	130	31
Project Scenario Emissions	82	19
Net Change in Emissions	**-49**	**-12**

Manitoba Hydro's electricity sector is practically non-emitting and is forecast to continue producing over 99.8% of all its electricity from renewable sources (average of all hydrologic "flow-cases") in both the Baseline and Project Scenarios. As Manitoba Hydro must plan for "low-flow" conditions, during most "flows" the system's hydroelectric generating stations produce more non-emitting electricity annually than is required by Manitobans. Manitoba Hydro therefore exports a substantial quantity of electricity to neighbouring provinces and states, displacing emissions in their electricity sectors. In addition to reducing Brandon Generating Station's emissions, the PACE Project will build modestly on this environmentally beneficial system characteristic.

Baseline Scenario emission values shown in Table 2 represent the impact of net exports from Manitoba on surrounding electricity markets (average of all hydrologic flow-cases); they are not a projection of total future sectoral emissions in the U.S. and Canada (this is outside the scope of this assessment). In addition to the 49 kt in reductions projected to occur at the Brandon Generating Station, a further 5.4 kt in reductions is projected outside of the province. This reduction is relatively modest because it is the net of two counteracting GHG effects of the PACE Project: Firstly, since less power is produced by Brandon Generating Station (resulting in less net Manitoba electricity exports), the resulting reduction in emissions at Brandon Generating Station is partially offset by an increase in emissions outside of Manitoba. Secondly, however, the PACE Project will also improve the efficiency of the Manitoba Hydro's Transmission System (resulting in more net Manitoba electricity exports), thereby decreasing emissions outside of the province.

Table 2 Emission Reductions Resulting from Net Manitoba Electricity Exports (kt CO_2e)

	Canada	**U.S.**	**Global**
Baseline Scenario (2027 to 2030)	2,021	18,034	20,055
Project Scenario (2027 to 2030)	2,021	18,039	20,060
Net Increase in Reductions (Mar 2027 to Oct 2030)	**0.2**	**5.1**	**5.4**
Baseline Scenario (2030 only)	436	3,808	4,245
Project Scenario (2030 only)	436	3,809	4,246
Net Increase in Reductions (2030 only)	**0.0**	**0.8**	**0.8**

It is assumed that there will be no net change in construction related emissions between the Baseline and Project Scenarios as the PACE Project is eventually constructed in both scenarios; however, this assessment did incorporate an estimate of gross construction emissions: Over the construction and O&M phases the PACE Project is estimated to produce 29.4 kt CO_2e of gross construction-related emissions globally. But, when allocated over the infrastructures' assumed 75-year life, combined gross construction related emissions for the PACE Project are estimated

to average only 0.39 kt CO_2e per year. For comparison, over the Effective Assessment Period cumulative net PACE Project emissions reductions (presented in Table 3) average 15 to 19 kt CO_2e per year; PACE Project infrastructure, in both the Baseline and Project Scenarios, would be expected to reduce emissions beyond October 2030 (i.e., after the Effective Assessment Period), throughout the remainder of their assumed 75-year lives.

Upstream fossil-fuel emissions due to the production, processing, and transportation of fossil-fuels and referred to as "indirect generation effects". These "indirect generation effects" are indirectly related to the consumption of fossil-fuels in electric generating stations to generate power, but were not incorporated into the Baseline Scenario totals in Table 1 or Table 2; however, the incremental impact of incorporating these secondary effects are presented as the upper limit of net emission reductions resulting from the PACE Project in Table 3 and Table 4 . Totals are rounded to give a better representation of the level of accuracy of the results. Line item A in Table 3 and Table 4 presents all "generation effects", including both emission reductions resulting from incremental changes in net Manitoba electricity exports (Table 2) and the reduction of electricity generation emissions in Manitoba (Table 1).

Table 3 Cumulative Net PACE Project Emission Reductions –2027 to 2030 (kt CO_2e)

	Canada	Global
(A) Net Reductions - Generation Effects	48.9	54.0
(B) Construction Related Emissions	0.0	0.0
(C) Net Reductions - Indirect Generation Effects	14.7	15.4
Overall Net Reductions (range is from (A-B) to (A-B+C))	**49 to 64**	**54 to 69**

Table 4 Net PACE Project Emission Reductions in 2030 (kt CO_2e)

	Canada	Global
(A) Net Reductions - Generation Effects	11.7	12.5
(B) Construction Related Emissions	0.0	0.0
(C) Net Reductions - Indirect Generation Effects	3.5	3.6
Overall Net Reductions (range is from (A-B) to (A-B+C))	**12 to 15**	**13 to 16**

To fulfill Climate Lens requirements, Table 5 provides the total PACE Project cost-per-tonne, based on the gross capital investments required to move forward with the PACE Project and net emission reduction values, during the 44-month Effective Assessment Period, from Table 3 (not gross emission reduction values over the 75-year life of PACE Project infrastructure).

Table 5 Cost-per-Tonne of Emission Reductions – Gross Capital Investment Costs (2020 Canadian dollars)

Canadian Emission Reductions Only	$2,500 to $3,300 (per t CO_2e)
Global Emission Reductions	$2,300 to $3,000 (per t CO_2e)

Key take-aways from this GHG assessment are as follows:

- The PACE Project will result in significant reductions in Manitoba's Electricity System emissions: emissions from grid-connected fossil-fuel generating stations are estimated to be reduced by 37% over the Effective Assessment Period.
- Over the Effective Assessment Period the PACE Project will reduce emissions in Manitoba, Canada, and globally: cumulative net PACE Project emission reductions over the 44-month period are estimated to range from 54 to 69 kt globally. PACE Project infrastructure, in both the Baseline and Project Scenarios, will continue to reduce global emissions throughout their assumed 75-year lives.
- The GHG reductions resulting from the PACE project will mostly occur within Manitoba, which is atypical for a Manitoba Hydro project as there is typically limited opportunity to reduce Manitoba's Electricity system emissions. The PACE Project will contribute in a small way to Canada's Paris Agreement commitment.

3 INTRODUCTION

This report summarizes the Greenhouse Gas ("GHG") Mitigation Assessment performed for the Portage Area Capacity Enhancement Project ("PACE Project"). The Manitoba ("MB") government, as the PACE Project proponent, is requesting federal funding on behalf of Manitoba Hydro ("MH"); to appropriately support this request this report has been prepared in accordance with Infrastructure Canada's Climate Lens requirements.

3.1 PURPOSE OF THE ASSESSMENT

Table 1 of the Climate Lens[2] (i.e., Infrastructure Canada (2019)) directs that a GHG Mitigation Assessment must be submitted along with an application to the Investing in Canada Infrastructure Program. The main purpose of this assessment is to fulfill that requirement. A GHG Mitigation Assessment estimates the "GHG effects", primary and secondary, of climate change mitigation projects ("GHG projects").[3] The primary purpose of a GHG Mitigation Assessment is to both quantify a project's GHG effects and determine whether those GHG effects are a net benefit compared to a relative Baseline Scenario.

The identification of GHG mitigation opportunities is optional [Infrastructure Canada, 2019][4] and will not be included in this assessment due to negligible relevance; MH does not intend to implement a monitoring plan for all GHG emissions ("emissions") related to the PACE Project were it to move forward, but will continue to monitor the use of Brandon Generating Station ("Brandon") as a MH Transmission System asset (Section 3.7). MH is also not seeking to turn emission reductions resulting from the PACE Project into a saleable commodity (e.g., generate emission reduction credits) based on the results of this assessment. At a corporate level, MH will continue to report direct emissions from its operations and estimate the corporation's overall impact on global emission reductions (refer to Manitoba Hydro (2021c)).

3.2 NOMENCLATURE

The following is a list of report specific nomenclature. Some terms are adopted from various reference documents. All terms in the Climate Lens Annex I Glossary apply, except where indicated otherwise, and some are repeated here for clarity. MB Electrical System infrastructure relevant to this assessment is also described in Sections 3.6, 3.7, and 3.8, and the names of some facilities may not be repeated in this section.

[2] Climate Lens – Subsection 1.3 (*Applicable Programs and Submission*)

[3] Note: The Climate Lens requires a GHG mitigation assessment for many projects that are not GHG projects as well.

[4] Climate Lens – Subsection 2.5.v (*Optional identification of GHG mitigation opportunities*)

A/C means alternating current.

Annual Peak means the highest loading level (in MW) the MB Electrical System experiences in any given Fiscal Year. It occurs during the Winter Peak Period, typically for a brief period of time (e.g., 15 minutes). The load duration curve shown in Figure 7 uses the Annual Peak as a reference.

Assessment Period means the construction and O&M phases of the PACE Project. As per the Climate Lens, the Assessment Period incorporates both the assumed construction and O&M phases. The lifespan of Wash'ake Mayzoon is assumed to be indefinite and a 75-year period has been identified as the temporal boundary for O&M activities. Therefore, the PACE Project's Assessment Period is from the start of Wash'ake Mayzoon construction (i.e., 2023) until 75 years after its ISD (i.e., 2100); however, this assessment focuses on the 44-month Effective Assessment Period (i.e., the March 1, 2027 to November 1, 2030 temporal period) where net GHG effects are non-zero.

B_4 means a 85 km long route being considered for D83W (Section 4.7.1).

B_37661 means a 98 km long route being considered for D83W (Section 4.7.1).

B71T means the 230 kV tie-line between the Birtle South Transmission Station (located northwest of the City of Brandon) and SPC's Tantallon Transmission Station (Section 3.8). The portion of the line in MB was constructed as part of the BTP.

Barrier means ***"…****anything that would discourage a decision to try to implement the project activity or baseline candidates."* [WRI & WBCSD, 2005][5]

Baseline Scenario means "*the reference case for the project activity*" [WRI & WBCSD, 2005][6]. It is a hypothetical description of what would occur in the absence of the Project Scenario. For the purposes of this assessment it involves a 44-month delay of the PACE Project (Section 4.1.2).

BTP means the Birtle Transmission Project. This recently completed project included the MB portion of the newest tie-line (i.e., B71T) between the MH Transmission System and SPC Transmission System (Section 3.8).

build margin means "*the incremental new capacity displaced by a project activity, and its associated generation…Build margin emissions are estimated from the GHG emission rates of recent capacity additions, or in some cases, planned and under-construction capacity*" [WRI,

[5] Project Protocol – Chapter 8.1.1 (*Identifying Barriers to the Project Activity and Baseline Candidates)*, p.51

[6] Project Protocol – Chapter 2.8 (*Baseline Scenario*), p.12

2007][7]. Refer to Section 4.1.5.

Brandon means the Brandon Generating Station (Section 3.7).

Brandon Area means the transmission area in and around the city of Brandon, MB (shown on Figure 18). Some of the largest industrial loads in MB are in the Brandon Area. Capacity issues in the Brandon Area are related to capacity issues in the Portage Area.

Brandon CT refers to one of two operational combustion turbines (Section 3.7) at Brandon (i.e., Unit 6 and Unit 7). Either Unit 6 or Unit 7 can provide Voltage Support. For the purposes of this assessment, Unit 6 is typically assumed to be the Brandon CT in question, as Unit 7 is assumed to be unavailable for the a critical P3 Planning Event (Section 4.2.4); but this is an arbitrary choice.

Calendar Year means the 12-month period starting January 1st and ending December 31st.

capacity means electrical capacity.

Capacity Criterion means that "*Manitoba Hydro will plan to carry a minimum reserve against breakdown of plant and increase in demand above forecast of 12% of the Manitoba forecast peak demand each year plus the reserve required by any export contract in effect at the time"* [Manitoba Hydro, 2020c].

Capacity Enhancement means increasing the capacity of a transmission system to transmit energy. For the purpose of this assessment it specifically refers to the Capacity Enhancement of the MH Transmission System (it can often refer to expanding generation capacity as well, but for the purposes of this assessment the scope has been narrowed).

Climate Change Report means the document entitled *MH's Climate Change Report,* published March 2020 by MH (i.e., Manitoba Hydro (2020a)).

Climate Lens means the evergreen document entitled *Climate Lens - General Guidance* published by Infrastructure Canada [i.e., Infrastructure Canada, 2019].

CO_2e means carbon dioxide equivalent. The universal unit of measurement used to indicate the global warming potential of GHGs. CO_2e is used to evaluate the impacts of releasing (or avoiding the release of) different GHGs. (As listed in Table 10, **CO_2** means carbon dioxide, **CH_4** means methane, **N_2O** means nitrous oxide, **CF_4** means carbon tetrafluoride, and **SF_6** means sulphur hexafluoride.)

contingency means a potential future event or transmission system disturbance that MH plans for, but cannot predict. For the purposes of this assessment a contingency typically involves asset

[7] Electricity Project Guidelines – Chapter 2.4 (*The Build Margin (BM)*), p.13

outages (e.g., the outage of a transmission line or transformer) within the MB Electrical System. **Pre-contingency** means the period during which a contingency has not yet occurred but, for MH Transmission System planning purposes, is assumed will imminently occur. **Post-contingency** refers to the period following a contingency, with a focus on the initial 30 minutes post-contingency. Refer to Sections 4.2.3 and 4.2.4.

Contingency Voltage Criterion means that MH must plan/operate (as per the MH TSIR and MH-TPL-001-4 Standard) to ensure post-contingency voltage variations along the MH Transmission System are maintained within +/- 10% of the rated voltage. The Contingency Voltage Criterion is described in Section 4.2.3 and is the typical reason a Brandon CT is activated pre-contingency for Voltage Support.

Copper Leaf C55 means Copper Leaf Technologies Incorporated's C55^{TM} analytics software solution. MH currently uses Copper Leaf as a component of its capital investment planning for its generation, transmission, distribution, and information technology assets.

Corporate Accounting Standard means the document entitled *A Corporate Accounting and Reporting Standard,* Revised Edition, published March 2004 by the WRI and WBCSD [i.e., WRI & WBCSD, 2004]. It is one of two modules in the GHG Protocol.

Corporate Value Framework means MH's Corporate Value Framework (i.e., "CVF") which it has integrated into its Copper Leaf C55 software. *"A CVF is a systematic framework to understand the value of all investments in an organization. The CVF helps identify the optimal set of investments that deliver the greatest value (or mitigates risk) to the organization, while respecting funding, resource and timing constraints."* The CVF is "*used to assess the value of capital investments across all areas of the corporation in support of allocating funds to projects and assets that optimize strategic value or mitigate risk. There are five broad value categories within the CVF, namely: financial, reliability, environmental, safety & security, and corporate citizenship. The CVF includes various measures within each of the categories to be used in scoring the Corporation's capital projects when determining the appropriate pacing and prioritization of capital expenditures across the organization"* [Manitoba Hydro, 2016b].

D12P means the 230 kV transmission line between Dorsey and the Portage-South Transmission Station (Section 3.6).

D54N means the 230 kV transmission line between Dorsey and the Neepawa Transmission Station (Section 3.6).

D83P means the proposed 230 kV transmission line between Dorsey and the Portage-South Transmission Station. It is included in alternatives to the PACE Project in the NRES and has been included in previous transmission planning models (Section 4.2.6.1). This line has been replaced

with D83W

D83W means the new 230 kV line being constructed between Dorsey and Wash'ake Mayzoon. This line has replaced D83P in transmission planning models.

Dorsey means the Dorsey Convertor Station located just west of Rosser, Manitoba, which is northwest of Winnipeg (Figure 1).

Eastern Interconnection means one of the two major electrical grids in North America, of which the MB Electrical System is part. A map of the Eastern Interconnection (as well as Québec Interconnection) is shown in Figure 6.

Eastern Region means the transmission planning area in south-eastern MB shown in Figure 17.

ECCC means Environment and Climate Change Canada.

EF means emission factor.

Effective Assessment Period means the March 1, 2027 through October 31, 2030 temporal period; this is the specific 44-month period of time over which GHG effects are estimated in this GHG mitigation assessment. It represents the sub-period of the Assessment Period where non-zero net GHG effects occur. This choice is detailed in Section 4.1.

EIA Data means data obtained from the U.S. Energy Information Association's *State Electricity Profiles 2018* [i.e., U.S. EIA, 2020], as noted in Section 4.6.2.3.

ELF means MH's Electric Load Forecast (i.e., Manitoba Hydro (2018)). The 2018 ELF is referenced for analysis work performed for this assessment (Section 4.2.6.1).

Electricity Project Guidelines means the document entitled *Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects*, published August 2007 by the WRI. This document is a supplement to the Project Protocol (i.e., WRI (2007)).

emissions means GHG emissions.

EF means emission factor, typically in t/GWh within this assessment.

energy means specifically electric energy, unless indicated otherwise, such as in the instance of the EPF.

Energy Criterion means that ""*Manitoba Hydro will plan to have adequate energy resources to supply the firm energy demand in the event that the lowest recorded coincident water supply conditions are repeated. Imports may be considered as dependable energy resources provided they utilize [full path firm transfer] Service and are sourced from either an Organized Power*

Market or a bilateral contract. The total quantity of energy considered as dependable energy from imports shall be limited to that which can be imported during the Off-Peak Period. Energy from imports which may be available in the On-Peak Period shall not be considered dependable energy, but rather be considered a reserve for energy contingencies" [Manitoba Hydro, 2020c].

EPA means the U.S. Environmental Protection Agency.

EPA EFs means average marginal EFs from U.S. EPA (2020).

EPF means MH's 2019 Energy Price Forecast (Section 4.6.2.4).

Fiscal Year means the 12-month period starting April 1st and ending March 31st, coinciding with MH's Fiscal Year. Transmission planning analysis typically uses the Fiscal Year so that each Winter Peak Period falls entirely within one year.

Firm Transmission Service means Firm Point-to-Point Transmission Service or Firm Network Integration Transmission Service as defined in the MH *Open Access Transmission Tariff* [e.g., Manitoba Hydro, 2021a].

flow means the volume of water per unit of time (i.e., m^3/s) as specified in the LTFD, unless it is specifically referring to **"energy flow", "power flow",** or **"load flow"** (which refer to the flow along the MB Electricity System)**.** Flow can represent hydrologic conditions at a specific point in space (e.g., the Winnipeg River) and time (e.g., January) or can be aggregated among multiple sub-basins (e.g., for the entire Nelson-Churchill Watershed) and for coarser temporal representation (e.g., annual). The terms "high-flow" and "low-flow" are used generally herein to describe longer-term (e.g., annual) hydrological conditions that result in higher or lower levels of electricity production at MH's hydroelectric generating stations. Since MH has generation on multiple river systems and flow conditions can vary in space, it is recognized that flow-years with similar aggregated flows in the Nelson-Churchill Watershed may result in different levels of total hydroelectric energy production, depending on where (i.e., which sub-basin) the flows are occurring.

flow-case means one of 107 flow-cases used in energy modelling, each with a different starting year (fiscal year) from the LTFD record. The chronology of flows in each flow-case is preserved, with a carousel approach that loops data back to the start of the LTFD record when the end of the LTFD record is reached.

flow-year means flow data from one of the 107 years of data in the LTFD; **worst-case**, **median-case**, and **best-case** flow-years and directly related **lowest-flow**, **median-flow** and **highest-flow** conditions are defined in Section 3.9.

full path firm transfer means **"***full path firm transfer transmission service of the highest priority that may not be interrupted unless all lower priority levels of service have already been interrupted*" [Manitoba Hydro, 2020c].

g means grams (and **kg** means kilograms), a unit of mass.

generation effect means the PACE Project's "GHG effects" on generation emissions within the interconnected region, over the Effective Assessment Period. "Generation effect" is used for clarity in this report as impacts on combustion emissions from grid-connected power plants would be considered "upstream" or "downstream" of PACE Project infrastructure, but in the context of the PACE Project most generation effects are primary, not secondary, effects (Sections 4.1.6 and 4.1.7).[8] The term "Generation effect" was adopted from Madrigal & Spalding-Fecher [2010]. Generation effects include both build margin and operating margin effects and they occur during the O&M phase.

GHG means greenhouse gas (and **GHGs** means greenhouse gases).

GHG effect means "*changes in GHG emissions, removals, or storage caused by a project activity. There are two types of GHG effects: primary effects and secondary effects"* [WRI & WBCSD, 2005][9]. The primary and secondary effects of the PACE Project are defined in Sections 4.1.6, 4.1.8, and 4.1.8. "Generation effects" are a sub-category of GHG effects.

GHG project means a climate change mitigation project (defined as "Project" in the Climate Lens).

GHG Protocol means the Greenhouse Gas Protocol Initiative. This is a multi-stakeholder partnership of businesses, nongovernmental organizations, governments, academics, and others convened by the WBCSD and the WRI. Launched in 1998, the Initiative's mission is to develop internationally accepted GHG accounting and reporting standards and/or protocols, and to promote their broad adoption.

GSPRO means the suite of Generation system Simulation, Planning and Resource Optimization (GSPRO) modelling tools used by MH for generation expansion planning, production costing, and related pre- and post-processing tasks.

GWP means the specific Global Warming Potential of different GHGs set out in Annex C (*Global Warming Potentials for GHG Mitigation Assessments*) of the Climate Lens.

ha means hectare, a unit of area which is equivalent to 0.01 km^2.

[8] Note: The Climate Lens currently defines "Upstream and Downstream Effects" as secondary.

[9] Project Protocol – Chapter 2.4 (*GHG Effects)*, p.11

HVDC means high voltage direct current.

IESO means Independent Electricity System Operator (IESO). The IESO operates and settles ON's wholesale electricity markets and is an Organized Power Market.

IPCC means the Intergovernmental Panel on Climate Change.

ISO 14064-2 means the ISO Standard 14064-2 published by the International Organization for Standardization in 2006 entitled *Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements* (i.e., International Organization for Standardization (2006)).

ISD means in-service date.

Keeyask LCA means the document entitled *Keeyask Generating Station – A Life Cycle Assessment of Greenhouse Gases and Select Criteria Air Contaminants*, prepared for MH by The Pembina Institute and published in February 2012 (i.e., Switzer (2012)).

kt means kilotonnes (and **Mt** means Megatonnes and **t** means tonnes[10]). When used in this report they refer specifically to units of CO_2e emitted (often shown as **t CO_2e**, **kt CO_2e**, or **Mt CO_2e**), unless indicated otherwise.

kWh means kilowatt-hour (and **MWh** means megawatt-hour and **GWh** means gigawatt-hour), a unit of energy.

kV means kilo-volt, a unit of voltage.

L means litre (and **kL** means kilolitre), a unit of volume.

LCA means life cycle assessment.

load means electrical load (i.e., electrical consumption).

LTFD means Long-Term Flow Dataset. LTFD encompasses 107 years (1912 through 2018) of historical inflow data (either observed or estimated) for the Nelson-Churchill Watershed that have been adjusted to reflect present-use conditions. LTFD is disaggregated into sub-basins that align with MH's hydroelectric generating infrastructure. (Section 3.9)

m means metre (and **km** means kilometre), a unit of distance.

[10] Note: To improve clarity, "tonne" is not always abbreviated as "t" within this assessment.

MB means Manitoba.

MB Electrical System means all electrical facilities owned and operated by Manitoba Hydro, including the MH Distribution System, MH Transmission System, MH Northern Collector System, and the MH HVDC Transmission System. It also includes all MB Generation Facilities, even if they are not owned and/or operated by Manitoba Hydro. It can also include the four remote, off-grid, diesel generating systems, though they are not relevant to this assessment.

MB Generation Facility means a facility, in Manitoba, that generates and delivers power to the MH Transmission System (including delivery via the MH HVDC Transmission System and MH Northern Collector System). Nearly all utility scale generating facilities in MB are owned and operated by MH (Section 3.5).

MH means Manitoba Hydro (Section 3.5)**.**

MH Distribution System means A/C transmission facilities, below 100 kV, owned and operated by MH used to serve MB load.

MH HVDC Transmission System means MH's HVDC transmission lines including all converter stations, and associated equipment.[11]

MH Northern Collector System means isolated 138 kV and 230 kV transmission systems in Northern Manitoba owned by MH that interconnect the Keeyask, Kettle, Long Spruce, and Limestone generating stations to the MH HVDC Transmission System.[12]

MH North-South 230 kV A/C Network means the network of 230 kV A/C transmission lines which connect MH's northern hydroelectric generating stations with the southern MB.

MH Northwestern A/C Generation means the combined generation from four hydroelectric MB Generating Stations (Grand Rapids, Kelsey, Jenpeg, and Wuskwatim) which are the primary source of energy to the MH North-South 230 kV A/C Network (Section 4.2.6.2).

MH Tie-Line means a transmission line which connects the MH Transmission System with a transmission system outside of MB (either IESO, MISO, or the SPC Transmission System). A summary of all MH Tie-Lines is provided in Section 3.8.

MH-TPL-001-4 Standard means the document entitled *Transmission System Planning Performance Requirements*, published in 2017 by MH [i.e., MH 2017].

[11] [Manitoba Hydro, 2016a]

[12] [Manitoba Hydro, 2016a]

MH Transmission System means transmission facilities, 100 kV and above, owned and operated by Manitoba Hydro; excluding the MH Northern Collector System and the MH HVDC Transmission System.[13]

MH TSIR means the document *Transmission System Interconnection Requirements* (Version 4), published July 2016 by MH [i.e., Manitoba Hydro, 2016a]. This document identifies the technical requirements for interconnection of facilities (e.g., customer load facilities, generating stations, and non-Manitoba Hydro transmission systems/facilities) to the MH Transmission System and operation of facilities connected to the MH Transmission System.

MISO means the Midcontinent Independent System Operator region (Figure 10), regional transmission system, Organized Power Market, and/or organization; the terms are often interchangeable. MH is a coordinating member of MISO.

MISO-N means the MISO North, a subregion of MISO.

MMTP means the Manitoba-Minnesota Transmission Project, a recently completed 500 kV transmission line incorporated into the MH Transmission System. It connects across the U.S. border with the Great Northern Transmission Line.

MMWG means Multiregional Modeling Working Group (Section 4.2.2).

MN means Minnesota.

MRO means Midwest Reliability Organization. The MRO region is a defined NERC region (Figure 5).

MRO/MMWG Planning Model means a transmissions planning model prepared by the MMWG for the MRO region (Section 4.2.2).

MROW means Midwest Reliability Organization/West. It is the "*eGRID*" [U.S. EPA, 2020] regional description of the "Upper Mid-West" and is comparable to MISO-N but includes some additional regions, including South Dakota and Nebraska. The EPA EF for the MROW region is assumed comparable to the MISO-N region for the purposes of this assessment (Section 4.6.2.5).

MVA means megavolt-ampere, a unit of apparent power. Both reactive and real power contribute to apparent power.

MVAR means megavolt-ampere reactive, a unit of reactive power.

[13] [Manitoba Hydro, 2016a]

MW means megawatt, a unit of real power.

N56C means the 230 kV transmission line between the Neepawa Transmission Station and Cornwallis Transmission Station (Section 3.6).

ND means North Dakota.

NERC means the North American Electric Reliability Corporation.

NIR means the document entitled *National Inventory Report 1990-2019: Greenhouse Gas Sources and Sinks in Canada (Canada's Submission to the United nations Framework Convention on Climate Change)*, published April 2021 by ECCC (i.e., ECCC (2021)).

NRES means the document entitled *Brandon/Portage Area Network Reliability Evaluation Study (SPD 2019/01),* prepared by MH in 2019 (i.e., Manitoba Hydro (2019b)). A comprehensive network reliability evaluation study was performed to identify potential issues and propose alternatives to enhance the MH Transmission System in SW MB. The study focused on the steady state performance of the MH Transmission System. The NRES included the identification of system issues, evaluation of the performance of potential transmission enhancement alternatives, and comparison of the viable alternatives in terms of technical performance, planning level cost, impacts on transmission system reliability, and timeline of implementation.

O&M means operation & maintenance.

O&M phase means the period during which project infrastructure is operational. GHG effects during the O&M phase include both "generation effects" and "O&M emissions". But, as noted in Section 4.1.8.5, net O&M emissions are assumed to be zero.

Off-Peak Period means "*the following hours in a week, during which the market load is typically lower than the weekly average load: overnight - 7 days x 8 hours per day; weekends - 2 days x 12 hours per day; total = 80 hours per 168-hour week*" [Manitoba Hydro, 2020c].

ON means Ontario.

On-Peak Period means the 88 hours per 168-hour week not included in the Off-Peak Period.

operating margin means "*electricity generation from existing power plants whose output is reduced in response to a project activity. [operating margin] emissions are estimated using methods that attempt to approximate the emissions from the specific power plants whose operation is displaced*" [WRI, 2007][14]. For this assessment "existing power plants" includes any

[14] Electricity Project Guidelines – Chapter 2.5 (*The Operating Margin (OM)*), p.13

plant operating in both the Baseline and Project Scenarios, even if it does not currently exist. (Section 4.1.1)

Organized Power Market means a "*centrally operated market which collects generation offers and dispatches generation to meet forecast loads, including exports from the market region, and which will provide physical energy to external market participants such as MH on a non-discriminatory basis"* [Manitoba Hydro, 2020c]. Independent system operators such as MISO and IESO operate Organized Power Markets.

P3 Planning Event means the multiple contingency event classified in the MH-TPL-001-4 as "P3". It is the critical contingency related to the MH Transmission System planning analysis performed for this assessment and is described in Section 4.2.4. For clarity, while MH has no prior knowledge that a P3 Planning Event will occur, MH nonetheless plans for it.

P52E means the 230 kV tie-line between the Rall's Island Transmission Station (located adjacent to the town of The Pas) and SPC's E.B. Campbell Transmission Station (Section 3.8).

P81C means the 230 kV transmission line that currently connects the Cornwallis Transmission Station and the Portage-South Transmission Station, and has a tap (i.e., a third terminal) which connects the Roquette Transmission Station (Section 3.6). It will be reconfigured as part of the PACE Project so that it connects to Wash'ake Mayzoon instead of the Roquette Transmission Station (Section 3.4); this will require the creation of W97R to connect the Roquette Transmission Station to Wash'ake Mayzoon.

PACE Project means the Portage Area Capacity Enhancement Project (Section 3.4).

PdB means the Pointe du Bois hydroelectric generating station.

PdB Assessment means the *Pointe du Bois Unit Replacement Project – Greenhouse Gas Mitigation Assessment* (i.e., Manitoba Hydro, 2021). Some results from the PdB Assessment have been incorporated into this Assessment (Sections 4.5 and 5.6).

PdB Project means the PdB Unit Replacement Project.

PdB Transmission Project EAR means the Pointe du Bois Transmission Project Environmental Assessment Report prepared by MH in 2014 [i.e., Manitoba Hydro, 2014a; Manitoba Hydro, 2014b; Manitoba Hydro, 2014c]. While they have not been finalized, the Pointe du Bois Transmission Project's design and requirements are anticipated to be similar to the transmission upgrades required for the PdB Project.

Portage means the city of Portage la Prairie, MB (shown on Figure 18 and Figure 19).

Portage Area means the MH Transmission System area in and around Portage. Roquette Canada Limited (Figure 21) is one of the major industrial loads in the Portage Area. Capacity issues in the Portage Area are related to power capacity issues in the Brandon Area.

proficiency runs means operation of generation resources according to protocols to verify capacity accreditation to a regulatory authority.

project activity(ies) means "[electric generation] p*roject activities that supply electricity to the grid. These project activities generate electricity and deliver it into the power grid, in effect displacing electricity from other sources. GHG reductions occur where the emission rate of the project activity is lower than that of displaced sources"* [WRI, 2007][15].

Project Scenario means the hypothetical description of what will occur should the PACE Project proceed without delay (Section 4.1.3); in a generic sense "project scenario" could be applied to any GHG Project. The similar terms "project activity" and "GHG project" are used in the Project Protocol, Electricity Project Guidelines, and ISO 14064-2 and are often interchangeable with "project scenario" or, for the specific purposes of this assessment, "Project Scenario".

power means electrical power.

Project Protocol means the document entitled *The GHG Protocol for Project Accounting* published November 2005 by the WRI and WBCSD (i.e., WRI & WBCSD (2005)). It is one of two modules in the GHG Protocol.

PSS/E means the Siemens Power Technologies International PSS®E Power Flow Program (Version 34). A description is in Section 4.2.6.

PW75 means the proposed 46.5km 115 kV transmission line from PdB to Whiteshell.

R7B means the 230 kV tie-line between the Reston Transmission Station (located southwest of the City of Brandon) and SPC's Auberton Transmission Station (Section 3.8).

R25Y means the 230 kV tie-line between the Roblin South Transmission Station (located west of the Town of Dauphin) and SPC's Yorkton Transmission Station (Section 3.8).

Riel means the Riel Convertor Station located just southeast of Winnipeg, MB (Figure 1).

ROW means a transmission line right-of-way, typically the D83W ROW.

[15] Electricity Project Guidelines – Chapter 2.1 (*Grid-Connected Project Activities*), p.11

SCC means MH's System Control Centre. The SCC leads the operation of the MB Electrical System.

SK means Saskatchewan.

SLL means Summer Light Load, a MRO/MMWG Planning Model case (Section 4.4).

SPC means the SaskPower Corporation, the SK equivalent of MH.

SPC Transmission System means the transmission facilities, 100 kV and above, owned and operated by SPC. It is the SK equivalent of the MH Transmission System.

SSH means Summer Shoulder, a MRO/MMWG Planning Model case (Section 4.4).

Steady-State Voltage Criterion means that MH must plan/operate (as per the MH TSIR and MH-TPL-001-4 Standard) to ensure steady-state voltage (i.e., during System Intact Conditions) variations along the MH Transmission System are maintained within +/- 5% of the rated voltage. The Steady-State Voltage Criterion is described in Section 4.2.3.

SUM means Sumer Peak, a MRO/MWG Planning Model case (Section 4.4).

Supplemental CT Operation Period means the period of time the Brandon CTs are expected to operate for Voltage Support over and above the minimum operating times determined by analysis (Section 4.3) done for this assessment. The rationale for this period is discussed in Section 4.3.1.

System Intact Conditions means the MH Transmission System is not experiencing any outages. The Steady-State Voltage Criterion applies during System Intact Conditions.

SW MB means a region of south-west MB that encompasses both the Portage Area and Brandon Area and, as described in Section 3.6, is a region highly stressed with transmission issues. It is not a formal transmission planning region as it encompasses sections of both the Eastern Region and Western Region; it does not include most of the eastern sections of the Eastern Region.

T&D means transmission and distribution (with "transmission" referring to transmission facilities 100 kV and above).

t/GWh means t CO_2e emitted per GWh produced, a unit of emissions intensity (per unit of electricity production).

tonne C/ha means tonnes of carbon content per ha.

transmission means electrical transmission.

Transmission Reliability Risk means a measure of transmission reliability used in Corporate Value Framework evaluations to capture the value of avoiding or reducing the risk of an outage to the transmission network that could impact Manitoba customers.

Voltage Support means providing additional MVA to the MH Transmission System to ensure both the Steady-State Voltage Criterion and Contingency Voltage Criterion are met (Section 3.7). For the purpose of this assessment it typically refers to the use of a Brandon CT to provide the MVA.

U.S. means the United States of America.

W97R means the transmission line from Wash'ake Mayzoon to the Roquette Transmission Station. It will be a 230 kV line, approximately 4 km in length. Nearly the entire line currently exists as a part of P81C, which will be sectionalized as part of the PACE Project (Section 3.6).

Wash'ake Mayzoon means the new 230-66 kV transmission station, located west of Portage near the Roquette Transmission Station (Figure 21), being built as part of the PACE Project (Wash'ake means Power in Dakota and Mayzoon means House in Michif).

WBCSD means the World Business Council for Sustainable Development.

Western Region means the transmission planning area in south-western MB shown in Figure 17.

WIN means Winter Peak, a MRO/MMWG Planning Model case (Section 4.4).

Winter Peak Period means the period of the year where the MB Electrical System experiences it's highest load levels, due to cold weather. MH Transmission System planning for winter peak focuses on the months of December, January, and February, though cold weather peaks can potentially occur outside these three months.

WRI means the World Resources Institute.

3.3 ISO AND GHG PROTOCOL REPORTING PRINCIPLES

As directed by the Climate Lens, "*The (GHG effect) quantification process should adhere to the following principles identified in both the ISO 14064-2 standard and the GHG Protocol for Project Accounting:*

- ***Relevance:*** *The data and GHG quantification procedures most appropriate to the project should be selected. The levels of accuracy and uncertainty associated with the quantification process should reflect the intended use of the data and the objectives of the project. As such projects in the Climate Change Mitigation sub-stream should strive for higher levels of accuracy and lower levels of uncertainty.*

- ***Completeness:*** *All relevant GHG emissions and removals should be included, along with information to support criteria and procedures.*
- ***Consistency:*** *All data, methods, criteria, and assumptions shall be applied consistently to ensure meaningful comparisons between the baseline and project scenario.*
- ***Accuracy:*** *Estimates and calculations should be unbiased, and uncertainties should be reduced as far as practical. Calculations should be conducted in a manner that minimizes uncertainty.*
- ***Transparency:*** *All assumptions, methods, calculations, and associated uncertainties should be explained to allow for the intended users to make decisions with reasonable confidence.*
- ***Conservativeness:*** *Where there are uncertainties, the values used to quantify GHG emissions should err on the side of underestimating potential reductions."* [Infrastructure Canada, 2019][16]

3.4 PROJECT OVERVIEW

The Portage Area "*is one of the most stressed segments of the [MH Transmission System]. Above-average load growth, new industrial customers, increasing exports to Saskatchewan, and deferral of planned transmission projects are causing a deterioration of reliability to customers in the area*" [Manitoba Hydro, 2020b]. As a result of these developments, capacity for connection of large industrial customers in the Portage Area is limited.

The proposed PACE Project being assessed is the outcome of a Network Reliability Evaluation Study ("NRES"), and succeeding Corporate Value Framework[17] evaluation, conducted by MH to examine three major transmission issues in the Portage Area and to identify possible alternatives to address the issues. The three major issues are:

- "*Insufficient transformation capacity at Portage-South Station requires immediate enhancement to prevent possible overloads*
- *Low voltages at several 115 kV and 230 kV stations require improvements before 2027 in order to continue to meet NERC transmission planning criteria*
- *Longer-term low voltage and high thermal loading issues in the area require significant enhancements including new transmission stations and lines within the next 10 year*" [Manitoba Hydro, 2020b]

Five viable development plans were identified in the NRES that would resolve those issues. As

[16] Climate Lens – Subsection 2.5.ii (*Required Information and General Instructions - Asset's estimated GHG emissions calculations*)
[17] Note: A detailed description of the Corporate Value Framework is provided in Section 3.2.

per NRES recommendations, each was evaluated using the Corporate Value Framework. The PACE Project had the highest net value because it had a much higher Transmission Reliability Risk score than the other alternatives and therefore was chosen as the recommended alternative.

The PACE project will proceed in two stages and will include the following scope:

- Stage 1 (currently proposed in-service date ("ISD") of February 2027):
    - Construct a new 230-66 kV station ("Wash'ake Mayzoon") west of Portage la Prairie ("Portage")
    - Sectionalize the existing P81C Tap (creating W97R)
    - Terminate a new 3 km long 66 kV line[18] at Wash'ake Mayzoon
    - Install protection changes at the Cornwallis Transmission Station, the Portage-South Transmission, and the Roquette Transmission Station
- Stage 2 (currently proposed ISD of February 2027):
    - Build a new 230 kV transmission line ("D83W") from the Wash'ake Mayzoon to Dorsey
    - Terminate D83W at Wash'ake Mayzoon
    - Terminate D83W at Dorsey
    - Add a 230 kV circuit breaker at Dorsey

The PACE Project is expected to provide relief of the above-mentioned transmission issues until approximately 2035 based on current load forecasts, system commitments, and committed developments for the area. As it will address ongoing reliability concerns, it is desirable to move ahead with the PACE Project as soon as reasonably possibly (i.e., meet the currently proposed ISDs) to best serve Manitobans.

3.5 COMPANY INFORMATION

MH is the "person responsible" for, and owner of, the MH Transmission System. MH (Table 6), a vertically integrated provincial Crown Corporation, has charge and management of the PACE Project. The governance of MH is through the Manitoba Hydro-Electric Board.

Table 6 Company Information

Legal Name	Manitoba Hydro
Civic Address	360 Portage Avenue, Winnipeg (Manitoba), R3C 0G8, Canada
Canada Revenue Agency Business Number	122063779

[18] Note: Line 601 is the name of the new 66 kV line that will run from Wash'ake Mayzoon straight south, approximately 3 km, and tap into the existing 66 kV "Line 84". A portion of Line 84 will also be renamed (i.e., incorporated into) Line 601.

MH is one of the largest integrated electricity and natural gas distribution utilities in Canada. Over the long-term, 99.8% of the electricity MH produces is renewable energy generated at 16[19] hydroelectric generating stations on the Nelson, Winnipeg, Saskatchewan, Burntwood, and Laurie rivers. MH can also use the following resources to meet MB demand:

- 1[20] MH operated fossil-fuel generating station (i.e., Brandon);
- 4 MH operated remote diesel generating stations;
- wind power purchases from independent (i.e., not owned by Manitoba Hydro) wind farms in MB;
- electricity imported from interconnected regions.

Manitoba Hydro physically[21] trades electricity within three wholesale markets in the United States of America ("U.S.") and Canada (Section 3.8). A system map is shown in Figure 1 and Figure 16.

3.6 SOUTHWESTERN MANITOBA TRANSMISSION SYSTEM

As noted in Section 3.4, the MH Transmission System in the Portage Area (located in the Eastern Region; Figure 19) is stressed. Furthermore, this stress is interrelated with substantial MH Transmission System stresses in the Brandon Area (located in the Western Region; Figure 18). The southwestern region of Manitoba ("SW MB"), encompassing sections in both the Western Region and Eastern Region, is a region of concern for MH Transmission System planning (e.g., both areas were considered in the NRES).

As an example of how the SW MB Region is considered as a whole in MH planning (even though it encompasses parts of two regions), the "Winnipeg-Brandon Transmission System Improvements[22]" (a Western Region project) were replaced by the PACE Project (an Eastern Region project) because the PACE Project was the "*preferred solution*" [Manitoba Hydro, 2020b] to some of the issues impacting both regions. Key existing transmission infrastructure related to the PACE project includes:

- 230 kV Alternating Current ("A/C") Transmission Lines:

[19] Note: This includes the partially operational Keeyask generating station; all units are expected to be connected to the MH Transmission System by the end of 2021.

[20] Note: Selkirk generating station was disconnected from the MH Transmission System, and is no longer available to produce power, as of April 1, 2021.

[21] Note: Manitoba Hydro is also capable of participating in Organized Power Markets it isn't physically connected to. For example, Manitoba Hydro is a Southwest Power Pool market participant.

[22] Note: These improvements are described in Manitoba Hydro (2020b).

- N56C: Connects the Neepawa Transmission Station and Cornwallis Transmission Station. It links with D54N via Neepawa and is part of one of three (Figure 1) 230 kV connections to the Brandon Area from the east.
- D12P: Connects Dorsey and the Portage-South Transmission Station (Figure 20). It is the only 230 kV line connecting the Portage Area from the East. A D12P outage is currently considered the most severe "contingency" in the Portage Area (Section 4.2.4).
- D54N: Connects Dorsey and Neepawa (Figure 18 and Figure 19); it links, via Neepawa, with N56C to form a path from Dorsey to the Cornwallis Transmission Station.
- P81C: Connects the Cornwallis Transmission Station and Portage-South Transmission Station (Figure 18 and Figure 21), and has a tap (i.e., a third terminal) which connects the Roquette Transmission Station. It will be reconfigured as part of the PACE Project, to terminate at the Cornwallis Transmission Station, the Portage-South Transmission Station, and the new Wash'ake Mayzoon Station (it will no longer terminate at the Roquette Transmission Station).

- Transmission Stations:
  - Brandon Transmission Station: The generating station (Figure 1 and Figure 18) is adjacent to a transmission station that is well connected with the MH Transmission System's 115 kV network and has multiple links with the Cornwallis Transmission Station, which is directly west, across 33 Street East. As described in Section 3.7, the combustion turbines at Brandon ("Brandon CTs") have the capability of providing "Voltage Support" to the MH Transmission System in both the Brandon Area and Portage Area.
  - Brandon-Victoria Transmission Station: Located in the city of Brandon (Figure 18). It is not a terminal for 230 kV transmission but has links to MH Transmission System's 115 kV network.
  - Cornwallis Transmission Station: Located southeast of the City of Brandon and right beside (west of) the generating station. It is the only transmission station in the Brandon Area (excluding Neepawa Transmission Station) capable of handling 230 kV transmission. It is a terminal for P81C and N56C with transmission links to the SPC Transmission System, the Midcontinent Independent System Operator ("MISO"), the MH North-South 230 kV A/C Network, and the St. Leon and St. Joseph Wind Farms (Figure 1).
  - Neepawa Transmission Station: Located in the town of Neepawa, Manitoba (Figure 18). It is a terminal for N56C and D54N and also links with transmission connected to the SPC Transmission System and MH Transmission System's 115 kV

network around Winnipeg.

- Portage-Saskatchewan Transmission Station: Located in the east end of Portage (Figure 19). It is not a terminal for 230 kV transmission, but has links to the MH Transmission System's 115 kV network around Winnipeg.
- Portage-South Transmission Station: Located south, and slightly east, of Portage (Figure 19) and currently the only station in the Portage Area capable of handling 230 kV transmission. Both D12P and P81C terminate at Portage-South.
- Roquette Transmission Station: The transmission station adjacent to a large industrial customer (i.e., Roquette Canada Limited) supplied by the P81C line (Figure 21).

The Riel Convertor Station ("Riel") and Dorsey (Figure 1[23]), critical pieces of the MB Electrical System, also support the MH Transmission System in SW MB as they convert high voltage direct current ("HVDC") energy to A/C energy for delivery to SW MB. SW MB also receives energy from the northern hydroelectric generating stations via the MH North-South 230 kV A/C Network (Figure 1).

3.7 BRANDON CT OPERATION

Brandon is MH's only operational grid-connected fossil-fuel electric power generation facility. Brandon has two operational[24] grid-connected combustion turbine generating units: Unit 6 and Unit 7 (i.e., the Brandon CTs). The Brandon CTs are both 140 MW (winter rated capacity[25]) dual fuel combustion turbine generators (natural gas and fuel oil); however, beyond testing they have only ever operated on natural gas.

The Brandon CTs can be called upon to operate in order to meet MH Transmission System reliability needs (e.g., Voltage Support) or to function as "sources of economic supply". Economic operation requires unusually high Organized Power Market (or SPC) prices; typically, the Brandon CTs are uneconomic (from an energy production perspective) to operate, and the majority of their operation is for reliability purposes. Brandon CTs operate for the following system reliability purposes:

- Covering planned outages to MB Electrical System facilities (e.g., MB Generating Stations, MH Transmission System facilities, the MH HVDC Transmission System facilities)
- Supporting the MB Electricity System during system emergencies

[23] Note: Riel and Dorsey are labelled as "Riel CS" and "Dorsey CS" respectively in Figure 1.

[24] Note: Brandon has another operational generating unit that has been converted to a synchronous condenser and does not burn fuel: Unit 5.

[25] Note: The Brandon CTs can each provide 140 MW during cold weather (e.g., during the Winter Peak Period), which is relevant to this assessment. Their rated capacity, however, is often listed at 130 MW.

- Providing Voltage Support to the Portage Area and Brandon Area (i.e., SW MB)
- During "proficiency runs"
- Energy production during "low-flows"
- Increasing MB Electrical System Capacity during abnormally high load events

The Voltage Support function refers to the Brandon CTs providing additional MVA to the MH Transmission System to ensure both the Steady-State Voltage Criterion and Contingency Voltage Criterion are met (Section 4.2.3). The focus of this assessment is the requirement for the Brandon CTs to operate during Winter Peak Period load scenarios to provide Voltage Support in the Portage Area. As noted in Section 4.1.6, the Brandon CT "operating margin" GHG effects of the PACE Project focus on this reliability function.

3.8 MANITOBA HYDRO TIE-LINES

Manitoba Hydro has multiple tie-lines ("MH Tie-Lines") with Saskatchewan ("SK"), Ontario ("ON"), and the U.S. The benefits of these interconnections "*can be summarized as:*

- *improving reliability by enabling imports during (low-flow) conditions and under supply contingencies (e.g., temporary loss of supply due to equipment outages);*
- *increasing revenues by enabling the export of surplus hydro power and import of market energy at costs lower than the cost of fossil resources available within Manitoba"* [Manitoba Hydro, 2013].

The MH Transmission System currently has 14 cross border interconnections. Of these, three 230 kV and two 500 kV lines interconnect the MH Transmission System to the U.S. (i.e., with MISO), four 230 kV and two 115 kV lines interconnect to SK (i.e., with the SPC Transmission System), and two 230 kV and one 115 kV lines interconnect to ON (i.e., with IESO). The four[26] 230 kV interconnections to SK in southern MB have the most significant impact on Portage Area transmission issues (because they are all connected with the MH North-South 230 kV A/C Network); but, the GHG effects resulting from the PACE project are influenced by all of the MH Tie-Lines.

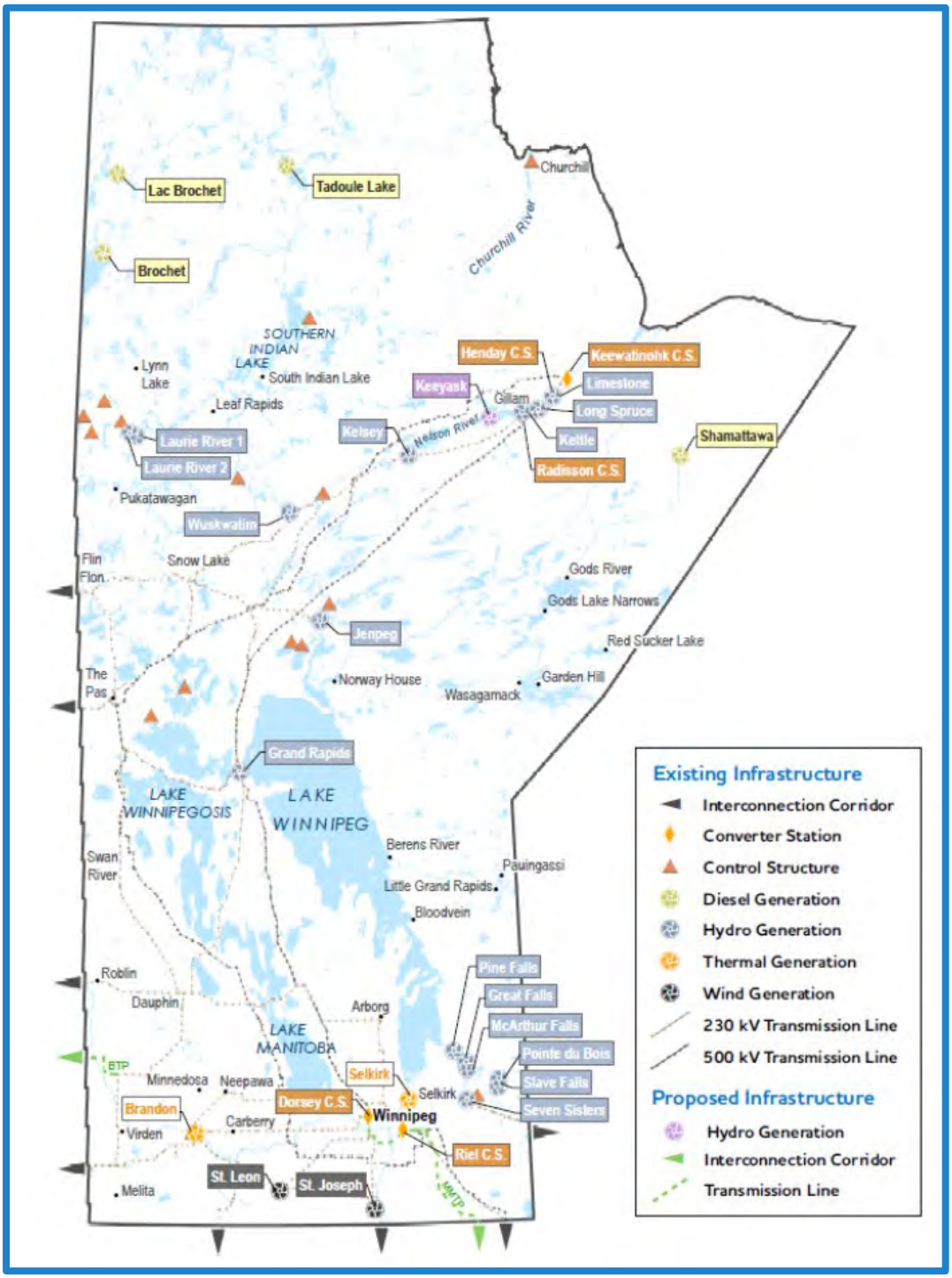
Current "full path firm transfer" export (import) capability is 2,983 MW to the U.S. (1,398 MW from the U.S.), 150 MW to ON (0 MW from ON), and 351 MW to SK (60 MW from SK).[27] These

[26] Note: The four relevant MH Tie-Lies are R7B, R25Y, P52E, and B71T.

[27] Note: 2,983 MW includes 150 MW of reserve delivery that exists between MB and the U.S. 60 MW of the 351 MW capability to SK is to the northern SK region, which can be considered distinct, transmission wise, from the southern region. The 351 MW is often rounded down to 350 MW, leading to an assumption of 290 MW of full path firm transfer capability to southern SK.

are representative quantities of firm transfer capability (net of reliability margin and reserves); actual capability varies with power system conditions.

Figure 1: Map – MB Electrical System[28]



[28] Note: All proposed infrastructure in Figure 1 (i.e., Keeyask, BTP, and MMTP) is now operational.

3.9 HYDROLOGIC FLOW VARIABILITY

As noted in Section 3.5, over the long-term nearly 100% of the energy produced by MH is from hydroelectricity. On shorter temporal scales (e.g., monthly), hydroelectric generation levels can be adjusted by varying the amount of water that flows through the powerhouses at the hydroelectric generating stations; however, on coarser temporal scales (e.g., annual), total hydroelectric generation is directly related to total water supply[29].

Therefore, MH's generation is greatly affected by variability in water supply; the impact of variability is incorporated into MH analyses using the Long-Term Flow Dataset ("LTFD"); the LTFD encompasses 107 years (1912 through 2018[30]) of historical inflow data (either observed or estimated) for the Nelson-Churchill Watershed that have been adjusted to reflect present-use conditions.

The 1940 "flow-year", based on the 12-month period from April 1940 to March 1941, is the annual period of "lowest-flow" conditions and is the "worst-case" flow-year as it consistently results in minimum system wide energy production; the 2005 flow-year is the annual period of "highest-flow" conditions and is the "best-case" as it consistently results in maximum simulated system wide energy production.

The 1963 flow-year represents the "median-case" (i.e., "median-flow" conditions) for hydroelectric energy production. As an example of the range of variability: in 2030, MH modelling (using GSPRO) projects that hydro generation will range from 19,600 GWh under lowest-flow conditions when making use of available water in storage, to 46,000 GWh under the highest-flow conditions. This variability results in uncertainty regarding the year-over-year generation levels of the MB Electrical System, and how the corresponding generation and transmission assets will be operated.

Modelling results drawn on for this assessment either assume "median-flow" conditions (e.g., PSS/E modelling results) or average results from the 107 "flow-cases" (e.g., PdB Assessment results). The actual quantity, and location, of GHG effects in any given month or year in the future can be expected to vary from averaged/median simulation results.

[29] Note: On coarser temporal scales (e.g., annual) it is typically economic to let as much water as possible flow through the hydroelectric powerhouses and to operate the generating units optimally along their power curves.

[30] Note: Modelling work using LTFD was performed prior to the spring of 2021 when the LTFD was updated to 2019 data (i.e., it now encompasses 108 years).

4 METHODOLOGY

4.1 ASSESSMENT BOUNDARIES AND BASIS OF ANALYSIS

Methods employed in this assessment were designed to fulfill the requirements of the Climate Lens and to follow the ISO 14064-2 Principles (Section 3.3).To assess the impact of emissions on long-term global climate change, this assessment uses the Intergovernmental Panel on Climate Change ("IPCC") 100-year baseline model to calculate tonnes of carbon dioxide equivalent ("CO_2e"). For consistency with Climate Lens and other federal requirements, IPCC's Fourth Assessment Report GHG global warming potentials ("GWPs") were applied[31]. In developing its approach, MH drew on guidelines from the World Resources Institute ("WRI") and the World Business Council for Sustainable Development ("WBCSD").

The boundaries of this assessment incorporate all significant GHG effects of the PACE Project; they are not restricted by the physical boundaries of the PACE Project (e.g., D83W and Wash'ake Mayzoon), the MB Electrical System, or Canada's borders. *"Primary and significant secondary effects are considered within the GHG assessment boundary, irrespective of whether they occur near the project, or at GHG sources or sinks owned or controlled by the project participants. Under the Project Protocol, it is not necessary to define a project boundary based on a GHG project's physical dimensions or according to what is owned or controlled"* [WRI & WBCSD, 2005][32].

The Electricity Project Guidelines state that "*the primary effect for grid-connected project activities will be reducing combustion emissions from grid-connected power plants"* [WRI, 2007][33]. Furthermore, the Project Protocol states that "*A primary effect is the intended change caused by a project activity…"*[WRI & WBCSD, 2005][34] The PACE Project is intended to relieve transmission issues in the Portage Area (Section 3.4), resulting in two[35] primary effects:

1. Due to transmission constraints in the Portage Area, Brandon CTs, functioning as

[31] Note: Canada has not adopted the Fifth Assessment Report's GWPs. The IPCC is in their sixth assessment cycle and are producing their Sixth Assessment Report; The Working Group I contribution to the Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis,* is now out.

[32] Project Protocol – Chapter 2.5 (*GHG Assessment Boundary*), p.12

[33] Electricity Project Guidelines – Chapter 4.2 (*Identifying Primary Effects*), p.27

[34] Project Protocol – Chapter 2.4 (*GHG Effects*), p.11

[35] Note: As noted in Chapter 2.4 of the Project Protocol, it is atypical for a GHG Project to have more than one primary effect. And, improving MH Transmission System efficiency was not a primary goal of the PACE Project; however, it was deemed appropriate, and helpful, to categorize them both as distinct primary effects for this GHG assessment because the PACE Project's project activities directly cause both GHG effects and because both GHG effects impact combustion emissions from grid connected fossil-fuel generating stations. Alternatively, it could be stated the PACE Project has one primary effect (reducing combustion emissions from grid-connected power plants) with two distinct drivers.

transmission assets, can be required to operate (Section 3.7) in order to provide Voltage Support (one Brandon CT can provide up to 140 MW during pre-contingency (Section 4.2.4) conditions). The first primary effect of the PACE Project is the reduction in combustion emissions at Brandon due to the reduction in the need to operate the Brandon CTs to provide Voltage Support[36] (Section 4.1.6) during the Winter Peak Period.

2. Capacity Enhancement projects will typically improve the overall efficiency of a transmission system and thereby reduce overall transmission system losses. The PACE Project will be adding a second 230 kV path from Dorsey to the Portage Area (currently, D12P provides the other comparable path) inherently lowering overall MH Transmission System resistance. The second primary effect of the PACE Project is the ongoing reduction in combustion emissions from regional grid-connected fossil-fuel generating stations due to the continuous net reduction in MH Transmission System losses.

Quantifying the GHG effects of the PACE Project requires comparing a Project Scenario against a hypothetical Baseline Scenario where the PACE Project does not occur as planned. "*Baseline candidates provide a product or service identical (or nearly identical) to that of the project activity. To identify baseline candidates, it is therefore important to first clearly define the product or service provided by the project activity. The product or service can take many forms, depending on the type of project activity, and in some cases may not be intuitively obvious*" [WRI &WBCSD, 2005][37]. The service provided by the MH Transmission System is the reliable transmission of electricity. The PACE Project will enhance this service as it results in additional electrical transmission capacity (i.e., Capacity Enhancement) being added to the MH Transmission System in the Portage Area.

Due to transmission issues in the Portage Area the PACE Project, or a comparable[38] project, is considered a necessity (i.e., inevitable); and, Corporate Value Framework[39] evaluation indicated that the PACE Project had a Corporate Value Framework score well above all four viable alternatives. It was not considered relevant, for the purposes of this GHG assessment, to contrast the GHG effect of the PACE Project with a comparable, but less desirable, Capacity Enhancement project; the intent of applying the Climate Lens is to "*provide meaningful insight into the climate impacts of individual projects*" [Infrastructure Canada, 2019][40].

[36] Note: The Brandon CTs would still be required to support the other functions listed in Section 3.7. Potential impact on those functions is discussed in Section 4.1.6.

[37] Project Protocol – Chapter 7.1 (*Defining the Product or Service Provided by the Project Activity*), p.39

[38] Note: All viable project alternatives include a 230 kV line from Dorsey to the Portage Area as well as either a new transmission station or substantial upgrades to an existing station, or stations, in the Portage Area.

[39] Note: A detailed description of the Corporate Value Framework is provided in Section 3.2.

[40] Climate Lens – Section 1.2 (*Why implement a Climate Lens?*)

Therefore, the Baseline Scenario selected for this assessment is one where the PACE Project is still pursued, but where the ISD is delayed by 44 months (Section 4.1.1). As such, incremental O&M phase emissions after October 2030 are assumed to be zero. The Baseline Scenario inherently provides a nearly identical service to that of the project activity in the Project Scenario. It simply does so on a different schedule.

"*Mitigation assessments will assess each project across the construction (excluding supply chain) and operations and maintenance (O&M) phases*" [Infrastructure Canada, 2019][41]; however, construction emissions are assumed to be identical[42] in both the Baseline and Project Scenarios as identical infrastructure is assumed to be constructed. Therefore, the Effective Assessment Period for this assessment spans from the assumed ISD in the Project Scenario (i.e., March 1, 2027) to the assumed ISD in the Baseline Scenario (i.e., November 1, 2030) and only includes O&M phase impacts[43] during that time frame.

All the significant GHG effects of the PACE Project are indirect and outside the fence line of PACE Project infrastructure; i.e., all the significant GHG effects of the PACE Project are Scope 3, and potentially border on "*optional information*" [WRI & WBCSD, 2004][44] as defined in the Corporate Accounting Standard. Results are therefore categorized by "effect significance" and "effect category", as per Table 7, instead of by "scope".

This categorization method is consistent with the Project Protocol where emphasis is placed on whether effects are primary or secondary and not whether they are direct or indirect. The categorization of project effects into Scopes 1, 2, or 3 is not discussed in ISO 16046-2, the Project Protocol, or the Electricity Project Guidelines. The three scopes are instead emphasized in the Corporate Accounting Standard, the other standard of the GHG Protocol, which relates to company, not project, reporting. Notwithstanding the above, this assessment will still consider all direct (i.e., Scope 1) project effects as required by the Climate Lens[45]; rationale is provided when the PACE Project's impact on a direct emission source is assumed nil (Table 7).

[41] Climate Lens – Section 2.4 (*Timescale/Forecast Window*)

[42] Note: As construction related technology evolves there is the potential for construction of similar projects in the future to result in less emissions; however, the 44-month difference in ISD is considered negligible from that perspective (e.g., it is not expected that heavy-duty fully-electric construction vehicles will become significantly more available in that short time frame).

[43] Note: O&M phase GHG effects include both generation effects and O&M emissions. But, as noted in Section 4.1.8.5, net O&M emissions are assumed to be zero.

[44] Corporate Accounting Standard – Chapter 9 (*Reporting GHG Emissions*), p.63

[45] Climate Lens – Section 2.3 (*Assessment Boundary*)

Table 7 Categorization of PACE Project GHG Effects

Effect Description	PACE Project Contribution	Effect Significance	Effect Category	Location of Effect
Reduced Fossil-fuel Generation	Less reliance on Brandon CTs for voltage support	Primary (Section 4.1.6)	Generation (Indirect)	MB (Brandon)
	Reduces overall system losses: Increase in net exports	Primary (Section 4.1.7)	Generation (Indirect)	MB, ON, SK, & MISO
Increased Fossil-fuel Generation	Less overall MB generation: Decrease in net exports	Secondary (Section 4.1.8.1)	Generation (Indirect)	ON, SK, & MISO
Reduced Non-Emitting Generation	Reduces overall system losses: Increase in net exports	Assumed Nil (Section 4.6.2.2)	Generation (Indirect)	MB, ON, SK, & MISO
Reduced Fuel Extraction & Transportation Emissions	Resulting from the project's generation effects	Secondary (Section 4.1.8.4)	Indirect Generation (Indirect)	Global
Potentially alters the location of industrial load	Increases the potential for MB load growth	Out of Scope (Section 4.1.8.2)	Both Direct and Indirect	Global
Potentially alters the location of generation effects	Increases the potential for electricity sales to/through SK	Out of Scope; Assumed Nil (Section 4.1.8.3)	Generation (Indirect)	MB, ON, SK, & MISO
On-Site Construction Emissions	Fuel required during construction	Nets to Zero (4.1.8.5)	Direct	MB
Land use Change Emissions	Clearing will permanently remove some above ground biomass	Nets to Zero (Section 4.1.8.6)	Direct	MB
Supply Chain Emissions	Material required for unit replacements	Nets to Zero (Section 4.1.8.5)	Indirect	Global
O&M Emissions	Fuel required during O&M	Nets to Zero (Section 4.1.8.5)	Direct	MB
	Material required for O&M	Nets to Zero (Section 4.1.8.5)	Indirect	Global
Decommissioning Emissions	Emissions related to unit decommissioning	Excluded (As per Climate Lens)	Direct	MB

4.1.1 D83W IN-SERVICE DATES

As noted in Section 3.4, the PACE Project is divided into two sequential stages: Stage 1 involves the construction of Wash'ake Mayzoon (and other more minor system modifications) and Stage 2 involves the construction of D83W (and other more minor system modifications). Stage 1 alone is not expected to have a material impact on either MH Transmission System losses[46] (Section 4.1.7) or operation of the Brandon CTs for Voltage Support (Section 4.1.6). Therefore, for the purposes of this assessment the relevant ISD is the February 2027 Stage 2 ISD (i.e., once both major PACE Project elements are in-service).

"…deferral of planned transmission projects are causing a deterioration of reliability to customers in the area" [Manitoba Hydro, 2020b]. It is a desirable, from a reliability perspective, for the PACE Project to be in-service as soon as reasonably possible; for example, PSS/E modelling (Section 4.3) indicates that post-contingency (Section 4.2.4) load curtailment will be required prior to the earliest probable PACE Project ISD (Table 8).

The currently assumed ISD for Stage 2 (i.e., D83W) of the PACE Project is February 2027[47]. This is the chosen D83W ISD for the Project Scenario. For conservativeness, it was assumed no system loss (Section 4.1.7) benefits would be accrue until March 1, 2027 (after February 2027) and no Voltage Support (Section 4.1.6) benefits would occur during the 2026/27 Winter Peak Period (the Winter Peak Period typically ends during February).

The ISD for the Baseline Scenario assumes the PACE Project is delayed until pre-contingency (Section 4.2.4) load curtailment is required. PSS/E modelling (Section 4.3) was required to identify the Pace Project ISD under the Baseline Scenario, making the identification of the Effective Assessment Period (Section 4.1) an iterative process. A Baseline Scenario ISD of November 1, 2030 was chosen, as per Section 4.1.2.

4.1.2 BASELINE SCENARIO

"*The project proponent shall demonstrate equivalence in type and level of activity of products or services provided between the project and the baseline scenario and shall explain, as appropriate, any significant differences between the project and the baseline scenario*" [International

[46] Note: Stage 1 will add a fourth 230-66 kV transformer bank to the Portage Area (three are currently in operation at the Portage-South Transmission Station). While this will improve reliability in the Portage Area it will not have a material impact on overall system efficiency prior to it being connected to D83W.

[47] Note: The actual ISD could vary from this assumption.

Organization for Standardization, 2006][48]. For the purposes of assessing the GHG effects of the PACE Project, the Baseline Scenario must also rectify the transmission issues in the Portage Area (Section 3.4).

MH has an obligation to "*Establish [MH Transmission System] planning performance requirements within the planning horizon to develop Manitoba's portion of the Bulk Electric System (BES) that will operate reliably over a broad spectrum of System conditions and following a wide range of probable Contingencies*" [Manitoba Hydro, 2017a][49]. While MH has some flexibility in determining how (e.g., the NRES and Corporate Value Framework analysis) and when (e.g., Section 4.1.1) it rectifies transmission issues, it must eventually do so otherwise MH risks violation of North American Electric Reliability Corporation ("NERC") reliability standards, which are the primary guide behind the MH-TPL-001-4 Standard.

Electricity system standards (e.g., Sections 4.2.3 and 4.2.4) exist for a reason. For example, insufficient transformation capacity can result in the need for rotating customer outages or load shed under certain operating conditions. Low voltages could result in poor power quality which might damage customers' electrical equipment or cause manufacturing processes to falter. And, high thermal loading on transmission lines could mean insufficient line to ground clearance which represents a safety hazard. The selection of a "do-nothing" Baseline Scenario for the assessment was not considered a feasible, or relevant, option.

As noted in Section 3.4, "*The PACE Project had the highest net value because it had a much higher Transmission Reliability Risk score than the other alternatives and therefore was chosen as the recommended alternative."* It was deemed irrelevant, for the purposes of this assessment, to evaluate comparable alternative projects to the PACE Project. Therefore, the only significant difference between the Baseline Scenario and the Project Scenario is the ISD of D83W (Section 4.1.1).

The ISD for the Baseline Scenario assumes the PACE Project is delayed until pre-contingency (Section 4.2.4) load curtailment is required; pre-contingency load curtailment is undesirable as MH would be required to shed MB load during the Winter Peak Period, even during System Intact Conditions; if interruptible load is unavailable, this could potentially violate planning criteria (Section 4.2.4) and NERC reliability standards.

[48] ISO 14064-2 – Section 5.4 (*Determining the Baseline Scenario*), p.10

[49] MH-TPL-001-4 Standard – Section A.3 (*Introduction – Purpose*), p.1

PSS/E modelling (Section 4.3) indicates that the Voltage Support capabilities of a Brandon CT (one Brandon CT can provide up to 140 MW) would not be sufficient[50] during some hours in the 2030/31 Winter Peak Period and some pre-contingency load curtailment would be required (Table 8). Therefore, for the purposes of this assessment the ISD of the PACE Project during the Baseline Scenario is assumed to occur right before the 2030/31 Winter Peak Period (i.e., a November 2030 ISD).

Table 8 Load Curtailments Without the Pace Project (2026/27 through 2030/31)[51]

Winter Peak Period	Pre-Contingency Load Curtailment (MW)	Post-Contingency Load Curtailment (MW)
2026/27	0	25
2027/28	0	30
2028/29	0	35
2029/30	0	45
2030/31	10	65

MH has been deferring planned transmission projects[52] due to limitations on available capital; this could potentially occur with the PACE Project as well. As noted above, deferring beyond the Baseline Scenario ISD could potentially violate planning criteria (Section 4.2.4) and NERC reliability standards and therefore the Baseline Scenario ISD represents the "maximum plausible delay" of the PACE Project. The primary reason that the PACE Project would not move forward along the Project Scenario timeline is due to limitations on available capital (i.e., the main project "barrier" [WRI & WBCSD, 2005][53] is capital cost limitations); the reliability benefits of the PACE Project are desirable as soon as possible.

4.1.3 PROJECT SCENARIO

The Project Scenario assumes the PACE Project (Section 3.4) is fully in-service by March 1, 2027. The rationale for the choice of Project Scenario is laid out in Sections 3.4, 4.1, and 4.1.1.

[50] Note: PSS/E simulation results (Section 4.3) show that bus voltages drop below 90% of the rated voltage (Section 4.2.3) immediately after a contingency (Section 4.2.4), even with a Brandon CT operating at 140 MW (and Brandon Unit 5 providing maximum Voltage Support).

[51] Note: Values in this table assume maximum Northwestern A/C Generation assumptions for consistency with transmission planning studies. Under median Northwestern A/C Generation conditions (Section 4.2.6.2), pre-contingency load curtailment would be required sooner. While maximum output could not be maintained for the entire Winter Peak Period, it would likely be available when Brandon CT generation requirements are at 140 MW, as that's a small # of hours (Table 33). This further highlights the desirability of the Project Scenario ISD timeline versus the Baseline Scenario ISD timeline (Section 4.1.1).

[52] Note: Deferrals are noted in Manitoba Hydro (2020b).

[53] Project Protocol – Chapter 8.1 (Performing a Comparative Assessment of Barriers), p.50

Assumptions related to MB load and generation are summarized in Section 4.2. The only significant difference between the Project Scenario and the Baseline Scenario (Section 4.1.2), is that the ISD (Section 4.1.1) of the PACE Project in the Project Scenario is 44 months prior to the ISD in the Baseline Scenario.

4.1.4 OPERATING MARGIN GHG EFFECTS

The Electricity Project Guidelines directs that "*The operating margin refers to electricity generation from existing power plants whose output is reduced in response to a project activity"* [WRI, 2007][54]. For this assessment "existing power plants" includes any plant operating in both the Baseline and Project Scenarios, even if it does not currently exist; as noted in Section 4.1.5, the PACE Project is not expected to influence the decommissioning, or capacity reduction, of any generation asset inside[55], or outside, of MB.

There are three types of operating margin effects resulting from the PACE project: 1) primary effects from reduced Voltage Support requirements for Brandon CTs (Section 4.1.6), 2) primary effects from the reduced operation of regional fossil-fuel generating units both inside Manitoba (i.e., the Brandon CTs) and outside of Manitoba (Section 3.8), due to a reduction in MH Transmission system losses, and 3) secondary effects from reduced Voltage Support requirement for Brandon CTs (Sections 4.1.8.1) that increase the operation of regional fossil-fuel generating units.

Operating margin GHG effects occur during two flow-dependent (Section 3.9) circumstances: when the MB Electrical System is being used as a "source of economic supply", that is for the "export of surplus renewable energy", and when MH is using the interconnected system for "the importation of energy during low-flow conditions or extreme supply loss in MB". The two flow-dependent (Section 3.9) circumstances are defined as follows:

1. **Source of economic supply and export of surplus renewable energy** - Under typical hydrologic conditions MH uses reservoir storage to economically supply energy to the interconnected grid preferentially during the On-Peak Period. In such circumstances, On-Peak Period generation outside MB, which is nearly always fossil based ("*Fossil is virtually always on the margin in operation*"[56]), is displaced resulting in a reduction in global emissions.[57] Figure 2 demonstrates how surplus energy can be available over a large

[54] Electricity Project Guidelines – Chapter 2.5 (*The Operating Margin*), p.13

[55] Note: While the PACE Project will reduce the requirement to use the Brandon CTs for Voltage Support, they will still be required for several other functions (Section 3.7).

[56] [Murphy et al., 2013]

[57] Climate Change Report – Chapter 3.4 (*Global Emission Reductions*), p.79

range of flow conditions. The PACE Project will increase the amount of surplus renewable energy available by reducing overall system losses (Section 4.1.7), but it will also decrease the amount of surplus energy available by reducing total Brandon CT operation (Section 4.1.8.1).

In some circumstances, MH's export activity results primarily in a timing shift for fossil-fuel generation in non-MB markets, rather than a straightforward displacement. This occurs when the displacement of On-Peak Period fossil-fuel generation by MH exports requires the release of water from storage, which is then no longer available to generate Off-Peak Period exports. The net GHG effect from this generation shifting effect will depend upon whether there is a consistent differential between On-Peak Period and Off-Peak Period marginal fossil-fuel generation emission rates outside MB. Analyzing this differential is outside the scope of this assessment (Section 4.6).

In summary, as a source of economic supply, the PACE Project will have a modest impact on the net exportation of surplus renewable energy (Sections 4.1.7 and 4.1.8.1).

2. **The importation of energy during low-flow conditions or extreme supply loss in MB** - Under low-flows, MH may require the use of imported, or even fossil-fuel (Section 3.7), energy to meet its electrical load commitments; in this circumstance renewable generation in MB is not sufficient to meet electrical load and these alternative sources are required to satisfy that load. The PACE Project will reduce MH's imported energy (Section 3.8) and MB fossil-fuel generation (Sections 3.7) requirements during low-flow (Section 3.9) years by reducing overall system losses (Sections 4.1.7). The GHG effect will depend on the marginal regional generation unit, but, as shown in Figure 2, imported energy is generally dispatched[58] ahead of the Brandon CTs.

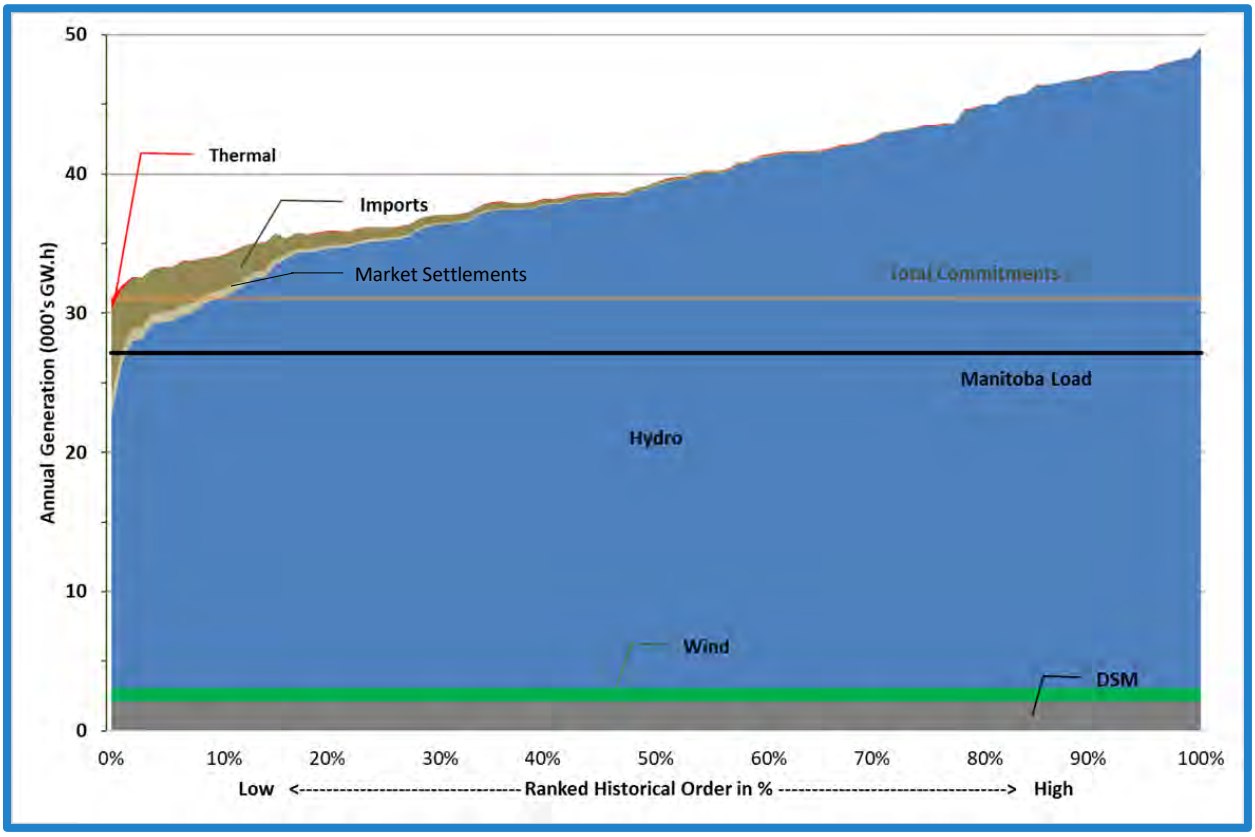
   While the energy supplied by the Brandon CTs is planned for as part of meeting MH's Energy Criterion, operationally the Brandon CTs are typically not required during the Winter Peak Period due to the 12% Capacity Criterion contingency and other conservative planning assumptions. And, as shown in Figure 2, Brandon CT energy is only required during the lowest of flows. For the purposes of this assessment, it is generally assumed that the Brandon CTs are not already operating when required to provide Voltage Support (i.e., Voltage Support operation is typically "additional"). Operationally, there may be a small number of instances where this is not the case; the possibility of redundant operation is captured in the assessment of a Secondary Effect (Section 4.1.8.1).

[58] Note: Within GSPRO, and actual operations, imported energy functions as a dispatchable resource, with some limitations.

The effect of extreme supply loss[59] in MB is similar to the effect of low-flows on the system in that MH must rely upon imported and/or fossil-fuel energy.

While the PACE project could potentially have very minor impacts on the operation of MH's hydroelectric generating stations over short periods of time, it is assumed to have no impact on MH's annual hydroelectric[60] generation levels. The only generation resources in Manitoba impacted by the PACE project (on an annual basis) are assumed to be the Brandon CTs (Section 4.1.6).

Figure 2: 2030 Generation by Resource Type Over a Range of Ranked Flow Conditions[61]



[59] Note: Quantifying the GHG benefits of the PACE Project during extreme supply loss situations is outside the scope of this assessment. Potential GHG benefits during extreme supply loss situations is considered a qualitative benefit.

[60] Note: It also is assumed to have no effect on solar or wind generation within MB.

[61] Note: Dark beige is physically delivered imports; Light beige is market settlements (i.e., non-physical imports which represents the financially settling firm exports which are then supplied by the market). Flow conditions are ranked (approximately) by system-wide hydroelectric generation. 'DSM' represents the impact of demand side management on reducing MB Load.

In summary, PACE Project will decrease the use of MB's fossil-fuel resources (i.e., the Brandon CTs) due to both the PACE Project's Voltage Support primary effects (Section 4.1.6) and the benefits of system loss reductions during supply shortages due to low-flows (Section 4.1.7). The PACE Project will also have a modest impact on the net exportation of surplus renewable energy, due to its Secondary Effects (Section 4.1.8.1).

4.1.5 BUILD MARGIN GHG EFFECTS

> *"**Is the project activity considered as a source of new capacity?** Some project activities may be implemented for reasons having nothing to do with the grid's need for new capacity. These can include electricity-reduction project activities (see Chapter 3) whose primary purpose is to avoid the need for grid-based power at a particular site. If grid operators give no consideration to the project activity in determining their capacity requirements, then the project activity may not displace new capacity. Once again, the appropriate value for w[62] would be zero. In some cases, project activities involving certain types of "small" power plants may fall into this category, although the possible cumulative effects of small plants on capacity demand should still be considered.*" [WRI, 2007][63]

The Electricity Project Guidelines directs that "*The incremental new capacity displaced by a project activity, and its associated generation, are referred to as the build margin" [WRI, 2007]*[64]*.* The PACE Project is not adding any generation capacity to the MB Electrical System and any increase in deliverable capacity (less than 5 MW during the Winter Peak Period, as per Table 46) to the MB Electrical System is negligible (compared with rated capacities in MB of approximately 5,900 MW of hydroelectric, 280 MW of fossil-fuel, and 258 MW of wind generation as well as import capability). Therefore, it is assumed that the PACE Project will not directly influence the decommissioning, or capacity reduction, of any generation asset inside, or outside, of MB throughout the Effective Assessment Period.

While the PACE Project will substantially reduce the need to operate a Brandon CT for Voltage Support (Table 35), the Brandon CTs are required for several other purposes (Section 3.7). As MB load continues to increase post-2030/31, as per the ELF, operation of Brandon CTs for Voltage

[62] Note: Equation 1 of the Electricity Project Guidelines stipulates that the overall emissions rate is a combination of the build margin EF multiplied by "w" and the operating margin EF multiplied by "(1-w)". Thus, when "w" is zero, the overall emissions rate equals the operating margin EF: "*Per Equation 1 in Section 2.3, this means assigning a value to w for the BM, and (1-w) for the OM"* [WRI, 2007].

[63] Electricity Project Guidelines – Chapter 2.6 (*Determining Relative Build Margin and Operating Margin Effects*), p.14

[64] Electricity Project Guidelines – Chapter 2.4 (*The Build Margin*), p.13

Support is also expected to increase until the MH Transmission System in SW MB undergoes further Capacity Enhancement; the PACE Project reduces Brandon CT operating hours, but it does not eliminate the long-term need for the Brandon CTs.

As noted in Section 4.1.4, for this assessment the operating margin definition of "existing power plants" is modified to include lower emitting power plants that may not currently exist, so long as they are assumed to exist in both the Baseline and Project Scenarios. As such, generation effect emission factors ("EFs") were assumed to decrease over time, when appropriate (Section 4.6). Since the Effective Assessment Period is from March 2027 through October 2030, this mitigates the limitation of neglecting near-term changes in the electricity market by only considering operating margin effects related to currently (i.e., in 2021) operational power plants.

4.1.6 PRIMARY GHG EFFECT – VOLTAGE SUPPORT

The "*intended change*" [WRI & WBCSD, 2005][65] of the PACE Project is adding electrical transmission capacity (i.e., "Capacity Enhancement") to the Portage Area; the Voltage Support provided by this Capacity Enhancement is a transmission function also currently supported by the Brandon CTs (Section 3.7).

Quantification of this primary effect of the PACE Project is done by modelling Brandon CT Voltage Support requirements, in the Baseline and Project Scenarios, during a "P3 Planning Event" (Section 4.2.4). Since the PACE Project will improve voltages in the Portage Area during the Winter Peak Period, the Brandon CTs will operate much less often, and at lower loads, under the Project Scenario.

Beyond providing Voltage Support, the Brandon CTs operate for other reliability purposes (Section 3.7), however those functions are assumed to typically be minimally impacted by the PACE Project and/or have too much uncertainty to quantify. Some justifications for this assumption are as follows:

- It is probable that under the Project Scenario the Brandon CTs will operate less to support planned system outages and long duration unplanned outages (e.g., the long-term outages of a couple 115 kV transmission lines following the "October 2019 Storm"). The timing and location of such outages is highly uncertain, and the benefit of the PACE Project will be outage-specific. As such, potential emissions reductions in Brandon CT operation to support outages are considered a qualitative benefit, are not quantified, and are out of the scope of this assessment.

[65] Project Protocol – Chapter 2.4 (*GHG Effects*), p.11

- As noted in Section 4.1.4, "*For the purposes of this assessment it is generally assumed that the Brandon CTs are not already operating when required to provide Voltage Support*". This specifically refers to the potential need for Brandon CT energy to meet load during low flows. During lowest-flow conditions it would actually be expected that the Brandon CTs would already be operating; however, when considering the full range of flow-cases (Section 3.9) these occurrences become rare. They are however still quantified, to a very small extent, as noted in Sections 4.1.7, 4.1.8.1, and 4.5.
- Proficiency runs are required annually to confirm capacity accreditation to regulatory authorities; but this minimum level would not be impacted by the PACE Project.

4.1.7 PRIMARY GHG EFFECT – MH TRANSMISSION SYSTEM LOSSES

While the PACE Project won't impact end-use electricity load, it will impact both the energy consumption within the MH Transmission System itself and resulting system loss emissions. System loss emissions are indirect emissions associated with generated energy lost through the transmission & distribution ("T&D") process; they indirectly occur within the physical boundary of T&D infrastructure making them a distinct generation effect sub-category. As with GHG effects related to other forms of electric consumption, these indirect impacts depend on both the embedded emissions of the net electricity being physically transmitted and other indirect generation effects.

High system losses do not result in high embedded system loss emissions[66] if the electricity source is renewable (i.e., non-emitting), but they do diminish the amount of renewable energy which is delivered to load, which indirectly affects generation elsewhere in the interconnected region. For example, line loss emissions along the MH HVDC Transmission System (Scope 2) are assumed to be zero as the electricity source is 100% hydroelectricity; however, if the MH HVDC Transmission System were to be made more efficient, then more hydroelectricity could be exported from MB, potentially lowering fossil-fuel generation in the interconnected region (Scope 3). I.e., even though reducing MH HVDC Transmission System losses wouldn't reduce MH's Scope 2 emissions, it would reduce global emissions.

The PACE project will result in an overall improvement in MH Transmission System efficiency (Table 46). Since this improvement results in a reduction in system losses, the resulting effect is the general "*reduction in combustion emissions from generating grid-connected electricity*" [WRI,

[66] Note: For corporate reporting, system loss emissions are a Scope 2 emission assigned to the utility that owns the transmission or distribution system where the losses occur.

2007][67], similar to the primary effect of renewable energy projects. The PACE Project will cause a net increase in exports from MB resulting in emission reductions inside and outside of MB.

The accurate calculation of system losses is complex. Section 4.4 describes how the net reduction in system losses, due to the PACE Project, was estimated. The allocation of the GHG effects of those system loss reductions was determined based on results from the PdB Assessment (Section 4.5). In addition to impacting net export levels, there is also a minor impact on Brandon CT operation during low-flows (Table 14).

4.1.8 SECONDARY GHG EFFECTS

This assessment will follow the Electricity Project Guidelines which indicate that "*It is not necessary to conduct a full life-cycle analysis of a project activity's net impacts on GHG emissions*" [WRI, 2007][68]; however, some secondary effects will be considered because they are potentially significant and/or required to be assessed by the Climate Lens.

4.1.8.1 EFFECT OF REDUCED CT OPERATION ON NET EXPORTS

Whenever the Brandon CTs operate to provide Voltage Support they produce energy[69] (i.e., MWhs). Following the same logic applied to system loss GHG effects (Section 4.1.7), any reductions in operation for Voltage Support will result in a net decrease in exports from MB. This GHG effect will partially offset the benefits of the Voltage Support primary effect (Section 4.1.6) of the PACE Project. As with system loss GHG effects (Section 4.1.7), the allocation of the GHG effects of the reduction in Brandon CT operation on net exports will be determined based on results from the PdB Assessment (Section 4.5). While this effect is significant it was categorized as secondary as it is a consequence of a primary effect of the PACE Project and not a direct consequence of the PACE Project itself.

4.1.8.2 INCREASED INDUSTRIAL LOAD (OUT OF SCOPE)

As noted in Section 3.4, "*capacity for connection of large industrial customers in the Portage Area is limited*." It is feasible that the PACE Project will allow for industrial load in SW MB to increase during the Effective Assessment Period, compared to the Baseline Scenario; however, any

[67] Project Protocol – Table 7.1 (*Examples of the product or service and baseline candidates for some types of project activities*), p.40

[68] Electricity Project Guidelines – Chapter 4.3.2 (*Upstream and Downstream Effects*), p.28

[69] Note: Comparatively, voltage support facilities such as synchronous condensers (e.g., Brandon Unit 5) and static VAR compensators do not produce energy.

assumptions regarding the level and type of industrial load, in both the Baseline and Project Scenarios, would be speculative.

Of critical relevance is that the net GHG effect of increased industrial load in SW MB could be negative, neutral, or positive on a global basis. It is reasonable to assume that if the load did not increase in SW MB, a comparable load would increase somewhere else (i.e., elsewhere in Canada, North America, or globally) to accommodate the global supply/demand balance.

Due to the high levels of uncertainty regarding industrial customers' decisions to move forward on projects, and whether/how these decisions could be influenced by Capacity Enhancement of the MH Transmission System, any GHG effects related to increased industrial load were placed outside the scope of this assessment. SW MB industrial load is assumed to be equal in both the Project and Baseline Scenario. Placing potential industrial load impacts outside the scope of this assessment is consistent with an assessment that focuses on the primary effects (Sections 4.1.6 and 4.1.7) of the PACE Project.

4.1.8.3 INCREASED ELECTRICITY SALES TO SK (OUT OF SCOPE)

The allocation of generation effects is based on results from the PdB Assessment (Section 4.5), which are based on existing contracted sales, which are equivalent in both the Baseline and Project Scenarios; the ratios presented in Table 14 could change should a significant new electricity sale to SK (or a different region) take place. This would be most relevant to this assessment if sales levels changed as a direct result of the PACE Project.

As noted in Section 3.4, increasing exports to SK, along with above-average load growth, new industrial customers, and deferral of planned transmission projects, is contributing to the deterioration of reliability to customers in the Portage Area (and Brandon Area). The recently completed Birtle Transmission Project ("BTP") increased the full path firm transfer export capability to the southern SPC Transmission System up to 291 MW (Section 3.8), from 191 MW (i.e., by over 50%); however, by 2022 MH will be supplying up to 290 MW of hydroelectricity to southern SK based on assumed contractual obligations, leaving little room on the interconnection for additional energy sales.

Hypothetically, were an additional significant sale to SK to be made during the Effective Assessment Period, it is highly probable a new MH Tie-Line would be required. Were an additional MH Tie-Line (Section 3.8) between MB and southern SK to be built, it would likely require MH Transmission System enhancements in SW MB as well. Therefore, the PACE Project could feasibly lessen any MH Transmission System enhancement requirements; however, it is

assumed that the decision to proceed with a new MB-SK interconnection would be negligibly impacted by the PACE Project having a 2027 ISD instead of a 2030 ISD.[70] i.e., any new MH Tie-Line would exist in both the Baseline and Project Scenario and would be unlikely to be in-service prior to the end of the Effective Assessment Period.

Speculative effects on incremental increases in sales to SK, and new MH Tie-Lines, have been placed outside the scope of this assessment. The ratio (Table 14) of net-exports to MISO, SK, and ON is assumed to be equal in both the Project and Baseline Scenario; and, the loading assumptions in the SW MB area are based on current MH Tie-Line capacity (Section 4.2.6.1). Placing potential long term export sale impacts outside the scope of this assessment is consistent with an assessment that focuses on the primary effects (Sections 4.1.6 and 4.1.7) of the PACE Project.

4.1.8.4 FUEL PRODUCTION, PROCESSING, AND TRANSPORTATION EMISSIONS

Direct generation effects relate to the combustion of fossil-fuels within grid-connected power plants (Section 4.1.6); however, experience has shown that emissions resulting from the production, processing, and transportation of combusted fossil-fuels (i.e., "indirect generation effects"), especially natural gas, can be significant (Figure 4). Life cycle assessment ("LCA") work contracted by MH (i.e., Switzer (2012)) showed the median impact of upstream emissions (producing, processing, and transporting fuel) related to natural gas generating stations was around 22% of total life cycle emissions (Figure 3), or 30% of the level of on-site combustion emissions. Scientific studies and assessments[71] have also raised concern about the underestimation of upstream natural gas emissions, with a focus on choice of the appropriate metric to gauge the impacts of leaked and vented methane ("CH_4") emissions on global climate change.

As a counterpoint, the Electricity Project Guidelines note that "*Most grid-connected project activities will either reduce or cause no increase in fuel extraction and transportation GHG emissions, so changes in these emissions can often be ignored as secondary effects"* [WRI, 2007][72]. In a similar context, Madrigal & Spalding-Fecher (2010) does not recommend incorporating fuel supply stages into the LCA of T&D projects, only direct combustion emissions at fossil-fuel generators inter-connected to the T&D project in question: "*Given that all the grid*

[70] Note: For comparison, a 20-year power purchase agreement, related to the BTP, was signed in January 2016. B71T, the BTP transmission line, was energized over 5 years later (March 29, 2021). With a typical power purchase agreement requiring multiple years of negotiation, an optimistic timeline for a new MH Tie-Line would be at least 7 years.

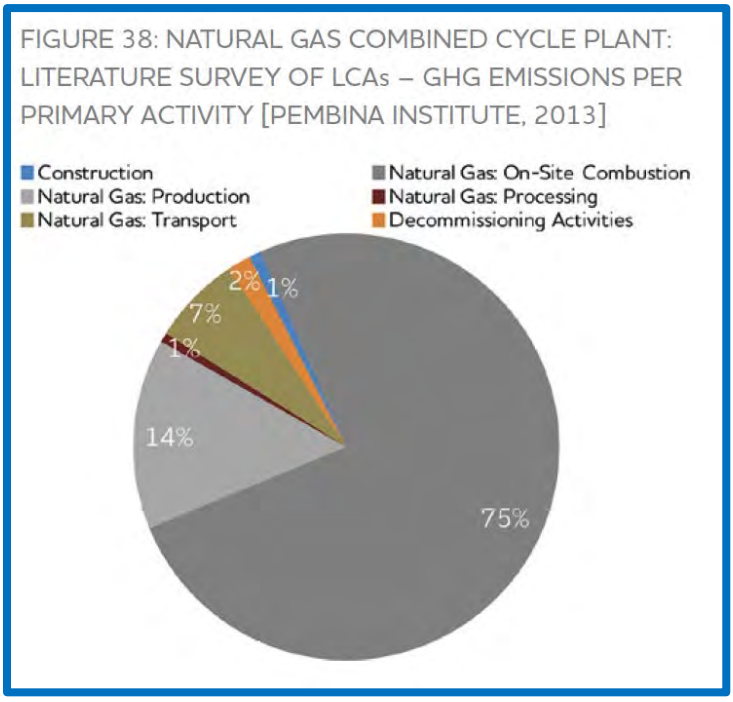
[71] [E.g., Howarth, 2014; Marchese et al., 2015; Switzer, 2012]

[72] Electricity Project Guidelines – Chapter 4.3.2 (*Upstream and Downstream Effects*), p.28

power Clean Development Mechanism methodologies consider only combustion emissions at the power plant, and not upstream, this study proposes to limit the project boundary for assessing net impacts to only the power generation stage" [Madrigal & Spalding-Fecher, 2010]; however, Madrigal & Spalding-Fecher (2010) incorrectly calculated that the upstream impacts (producing, processing, and transporting natural gas) were only 0.4% of total life cycle emissions at natural gas generating stations; the actual percentage, based on their base assumptions[73], was 12%. While 12% is lower than the 22% determined by the work contracted by MH (i.e., Switzer (2012)), it is still significant (and much higher than 0.4%). A wide range of estimates in regard to upstream natural gas emissions, especially as they relate to CH_4 leaks, is typical[74] in the industry.

Recognizing that fuel production, processing, and transportation emissions (i.e., "indirect generation effects") are relevant, it was decided to include them in this assessment to fulfill the principle of completeness; however, for both transparency and conservativeness the quantification of these emissions will be kept separate from primary generation effects; net overall PACE Project emissions (Section 5.9) are presented as a range with and without these specific secondary GHG effects.

Figure 3: Figure 38 from Manitoba Hydro (2015) - Combined Cycle Natural Gas Unit LCA



[73] Note: Madrigal & Spalding-Fecher (2010) assumed combustion emissions of 0.0561 tone of CO_2e/gigajoule of natural gas and upstream emissions of 0.296 kg of CH_4/gigajoule of natural gas. With a GWP of 25, 0.296 kg converts to 0.0074 t CO_2e /gigajoule, or 11.65% of 0.0635 t CO_2e/gigajoule (from both life cycle stages combined). Details are on page 54 of their report under sub-section "*Recommended Project Boundary*" in Section 6 "*Recommended Approach*".

[74] [E.g., Howarth, 2014; Marchese et al., 2015; Switzer, 2012; Madrigal & Spalding-Fecher, 2010]

4.1.8.5 CONSTRUCTION AND ON-SITE O&M RELATED EMISSIONS

Generation effects during the Effective Assessment Period (Section 4.1) phase of the PACE Project are the primary focus of this assessment and this excludes the construction phase and the bulk of the O&M phase; however, the Climate Lens directs that "*Mitigation assessments will assess each project across the construction (excluding supply-chain) and operations and maintenance (O&M) phases. The assessment should not seek to estimate construction emissions associated with the asset's future major rehabilitative maintenance or decommissioning. Assessments should include estimates of a project's cumulative construction and O&M emissions over the useful lifespan of the infrastructure, i.e., annual emissions for each year from the start year of the project to the end of its useful life"* [Infrastructure Canada, 2019][75].

Because PACE Project infrastructure (Section 3.4) will be built in both the Baseline and Project Scenarios, net construction and on-site O&M emissions are assumed to be zero[76]; however, to help "*provide meaningful insight*" [Infrastructure Canada, 2019][77] regarding the climate change impacts of the PACE Project a high-level estimate of gross construction related emissions was completed (Sections 4.7 and 5.8) as part of this assessment. A high-level estimate of O&M[78] related emissions was also completed (Section 4.7.5). Gross construction and on-site O&M emissions (i.e., where the Project Scenario is compared against a "do-nothing" scenario instead of the Baseline Scenario) are not incorporated into the assessment of the PACE Project's overall GHG effects (Section 5.9).

As a sub-component of the estimate of gross construction emissions, a high-level estimate of gross global supply-chain emissions related to the construction phase of the PACE Project has been incorporated (Sections 4.7 and 5.8), even though net supply-chain emissions are zero, to provide meaningful insight. The Climate Lens notes that the "*quantification of supply-chain emissions is not required given the complexities associated with both sourcing and quantifying these emissions"* [Infrastructure Canada, 2019][79]; however, experience with the GHG assessment of other MH projects (Figure 4 and Table 9) has shown that for projects that require significant portions of pre-manufactured materials, embedded emissions in 'Building Materials'

[75] Climate Lens – Section 2.4 (*Timescale / Forecast Window*)

[76] Note: As construction related technology evolves there is the potential for construction of similar projects in the future to result in less emissions; however, the 44-month difference in ISD is considered negligible from that perspective (e.g., it is not expected that heavy-duty fully-electric construction vehicles will become significantly more available in that short time frame).

[77] Climate Lens, Section 1.2 (*Why Implement the Climate Lens?)*

[78] Note: Generation effect emissions are considered O&M phase emissions, not O&M emissions.

[79] Climate Lens – Section 2.4 (*Timescale / Forecast Window*)

substantially outweigh the emissions directly attributable (Scope 1) to their installation ('On-Site Activities'). Indirect construction emissions resulting from the 'Transportation' of construction materials (and workers) are often higher than the direct emissions resulting from their installation as well. As material required for O&M will be negligible, compared to construction material, no high-level estimate was completed for global supply-chain emissions related to O&M material.

Figure 4: Figure 36 from the Climate Change Report – "MMTP" LCA results[80]

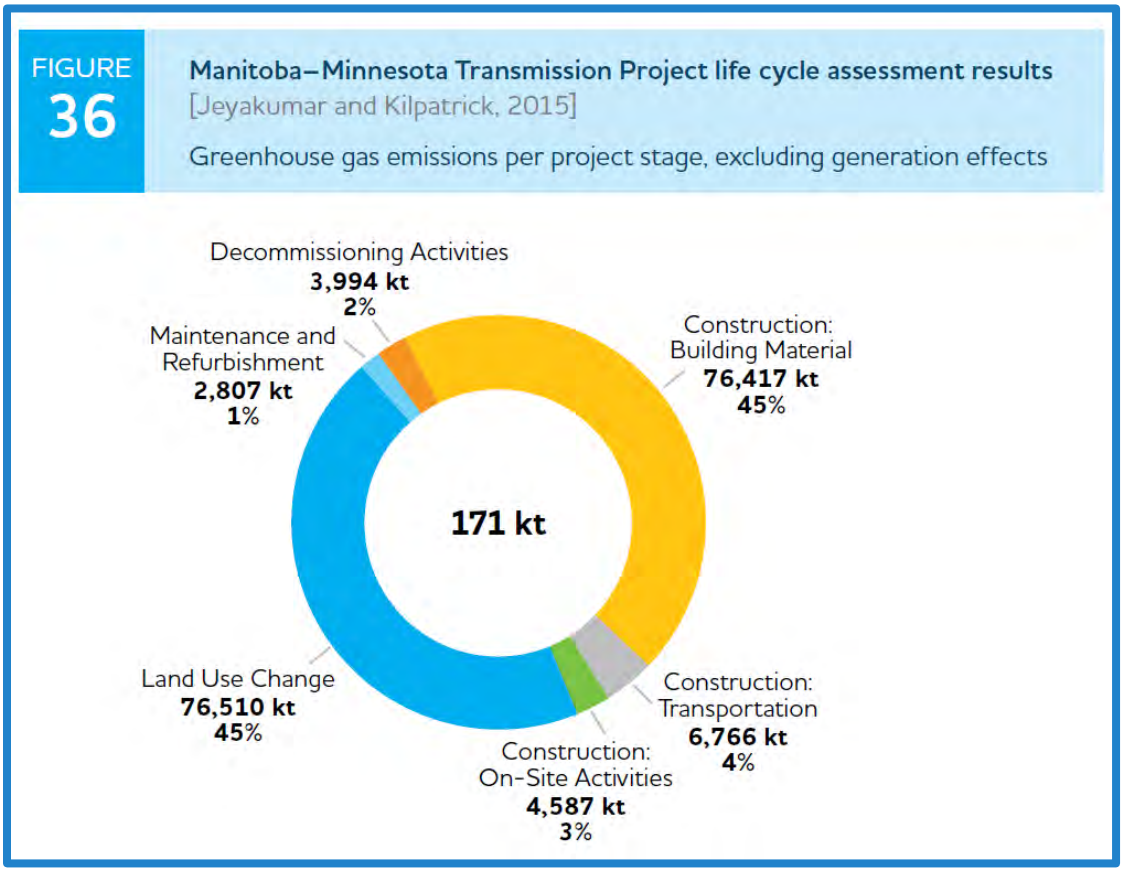


Table 9 Net PdB Project Construction Related Emissions[81]

Construction Related Activity	kt CO_2e	% of total
Construction: Building Material & Construction: Transportation	13.5	33.9%
Construction: On-Site Activity	2.3	5.8%
Maintenance and Refurbishment	1.5	3.8%
Land Use Change	22.5	56.5%
All Construction Related Emissions	**39.9**	

[80] [Manitoba Hydro, 2020a]

[81] [Manitoba Hydro, 2020b]

4.1.8.6 LAND USE CHANGE EMISSIONS

The PACE Project will require the construction of Wash'ake Mayzoon and D83W. D83W will require the permanent establishment of new right-of-ways ("ROWs") and potentially the permanent expansion of existing ROWs. ROWs will cross some forestland that is assumed to be permanently disturbed with a resulting permanent reduction of above ground carbon content (i.e., biomass). The Wash'ake Mayzoon will require the permanent removal of above (and some below) ground biomass to install station equipment.

As with construction and on-site O&M related emissions net land use change emissions are assumed to be zero because PACE Project infrastructure (Section 3.4) will be built in both the Baseline and Project Scenarios; however, to help "*provide meaningful insight*" [Infrastructure Canada, 2019][82] regarding the climate change impacts of the PACE Project, a high-level estimate of gross land use change emissions was done (Sections 4.7.4 and 5.8.1) as part of this assessment. Gross land use change emissions (i.e., where the Project Scenario is compared against a "do-nothing" scenario instead of the Baseline Scenario) are not incorporated into the assessment of the PACE Project's overall GHG effects (Section 5.9).

4.1.9 GREENHOUSE GASES CONSIDERED

All primary GHG effects of the PACE Project are related to the combustion of fossil-fuels to generate electricity (i.e., they are all generation effects). Carbon dioxide ("CO_2") is by far the most significant GHG produced by combustion, however CH_4 and nitrous oxide ("N_2O") are also produced. Results will be presented in CO_2e, and not disaggregated by GHG, due to the dominance of CO_2 in the results. This is consistent with the Climate Lens that requires that "*Emissions must be converted into CO_2 equivalent (CO_2e) using the Global Warming Potentials identified in the most up-to-date version of Canada's National Inventory Report (see Annex C) and reported in tonnes (t), kilotonnes (kt), or megatonnes (Mt)*" [Infrastructure Canada, 2019][83].

Where GHG specific emissions are calculated, IPCC's Fourth Assessment Report GWPs (Table 10) will be used to aggregate the results into CO_2e, consistent with federal reporting guidelines, including the Climate Lens. Other GHGs were indirectly considered in two of the secondary effect categories (fuel production, processing, & transportation emissions and construction related

[82] Climate Lens – Section 1.2 (*Why Implement the Climate Lens?)*

[83] Climate Lens – Section 2.3 (*Relevant Greenhouse Gases*)

emissions) as they are incorporated in some LCA EFs. Otherwise, other GHGs are "*deemed insignificant*" [Infrastructure Canada, 2019][84].

Table 10 Global Warming Potentials of Select Gases[85]

Gas	Molecular Formula	GWP
Carbon Dioxide	CO_2	1
Methane	CH_4	25
Nitrous Oxide	N_20	298
Carbon Tetrafluoride	CF_4	7,390
Sulphur Hexafluoride	SF_6	22,800

4.2 MODELLING & ASSUMPTIONS

Manitoba Hydro performed transmission studies to evaluate the primary effects of the PACE Project:

- Steady-state power flow analysis performed with PSS/E software was undertaken (Section 4.3) to study the Voltage Support primary effects of the PACE Project (Section 4.1.6). The MH-TPL-001-04 Standard, MH TSIR, and other applicable criteria were applied (Sections 4.2.3 and 4.2.4) to the assessment in order to determine the need for Brandon CT operation for Voltage Support in both the Baseline and Project Scenarios.
- PSS/E produced results were also used to study the impacts of the PACE Project on MH Transmission System loss primary effects (Section 4.4).
- Planning cases, representing future loading conditions, for both the study of Voltage Support and MH Transmission System loss primary effects were developed by starting with Midwest Reliability Organization/Multiregional Modeling Working Group planning models ("MRO/MMWG Planning Models", as described in Section 4.2.2).
- The allocation of generation effects resulting from incremental changes in net exports relied on the results from the PdB Assessment (Section 4.5). GSPRO was used for generation expansion planning and production costing throughout the PdB Assessment.
- Emissions data from the operation of the Brandon CTs in 2019 and 2020 was used to quantify the generation effects related to their operation (Section 4.6.1).

[84] Climate Lens – Section 2.3 (*Relevant Greenhouse Gases*)

[85] Climate Lens – Annex C (*Global Warming Potentials for GHG Mitigation Assessments*)

PSS/E, MRO/MMWG, and GSPRO models evolve, and embedded assumptions are updated, on an ongoing basis. Modelling work undergone for this assessment was completed prior to May 2020. This section is intended to describe modelling configuration details specifically applicable to this assessment.

4.2.1 DESCRIPTION OF PSS/E

"PSS®E is a power system simulation and analysis tool for Power Transmission Operations and Planning. It is used in over 145 countries around the world by utility transmission Planning and Operations engineers, consultants, universities, and research labs. PSS®E allows users to perform a wide variety of analysis functions, including: power flow, dynamics, short circuit, contingency analysis, optimal power flow, voltage stability, transient stability simulation, and much more. Since its inception in 1972 as the first commercially available software for transmission system simulation, PSS®E has achieved "industry standard" status…" [Siemens AG, 2017]

4.2.2 DESCRIPTION OF MRO/MMWG PLANNING MODELS

For transmissions studies, MH typically incorporates transmission planning models of MRO (Figure 5), and adjacent regions, that are developed by the MMWG. The MRO/MMWG Planning Models include a detailed representation of the MB Electrical System (excluding the MH Distribution System) as well as transmission systems and generation resources in the Eastern Interconnection, which is shown in Figure 6. The SPC Transmission System, MH Transmission System, MISO, and IESO are all among the regions included in the models.

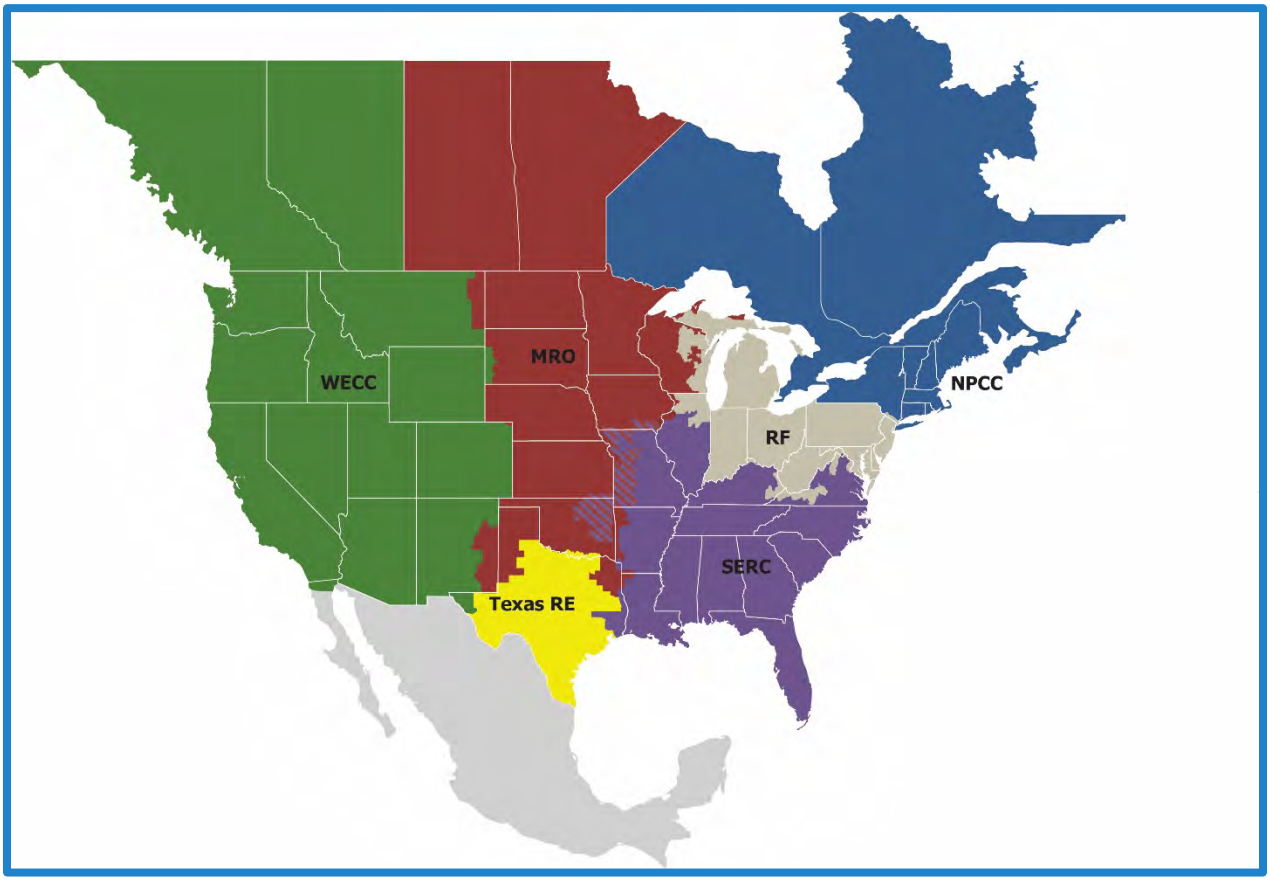
MRO/MMWG Planning Models (i.e., "cases") are updated on an ongoing basis, by MH and adjacent planning coordinators and transmission planners, to reflect the most up-to-date existing and planned facility information; however, due to the inherent MMWG model building process delay of 1.5 years, MB Electrical System information is typically slightly out-of-date in the MRO/MMWG Planning Models. As such, appropriate MRO/MMWG Planning Model cases(s) are selected as a starting point for transmission studies and then modified, as appropriate, to meet study requirements. For this assessment, MH adjusted both 2019 and 2020 MRO/MMWG Planning Model cases, within PSS/E, to more accurately reflect the most up-to-date MB Electrical System information (existing and planned) as well as to analyze the outcomes of the specific system impacts being studied (Sections 4.2.6, 4.3, and 4.4).

Cases from 2019 MRO/MMWG Planning Models were referenced to assess Brandon CT Voltage Support requirements as available cases were setup to stress the system with high loading and high MB to SK power transfers. The 2019 MRO/MMWG Planning Model case for the 2029 Winter

Peak Period was the primary reference for the analysis (Section 4.3).

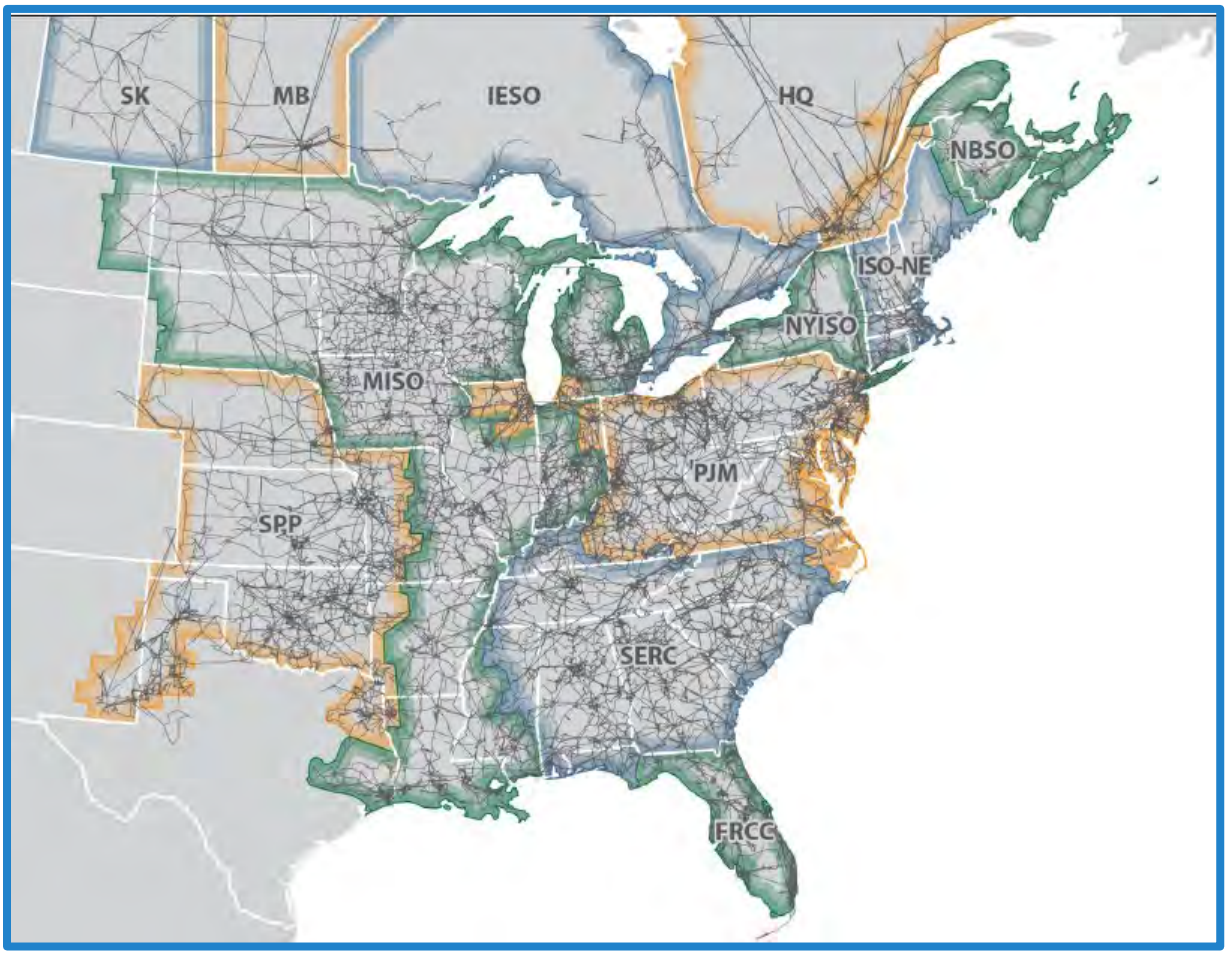
MH Transmission System loss analysis, however, was undertaken by using cases from the 2020 MRO/MMWG Planning Models because they provide more appropriate average loading scenarios than the cases used in the Voltage Support primary effect analysis. For example, 2020 cases have two Off-Peak Period loading cases and do not model maximum exports. As the MH Transmission System loss analysis (Section 4.4) considered the full range of loading conditions in MB, it was appropriate to reference multiple different cases.

Figure 5: Map - NERC Planning Regions[86]



[86] [NERC, 2021]

Figure 6: Map - Base Transmission Network of the Eastern (and Québec) Interconnection[87]



4.2.3 VOLTAGE CRITERIA

"*Equipment connected to the MH Transmission System shall be capable of withstanding steady-state voltages variations and meet the specified maximum voltage rating*" [Manitoba Hydro, 2016a][88], with steady-state operating limits being placed at +/- 5% of nominal voltage ratings. Also, *"Equipment connected to the MH Transmission System shall be capable of withstanding post-contingency voltages variations.*", where "*The MH Design and Transmission Planning post-contingency voltage variation criteria is: ±10% of nominal system voltage for up to 30 minutes*" [Manitoba Hydro, 2016a][89].

[87] [National Renewable Energy Laboratory, 2016]

[88] MH TSIR – Section 2.2 (*MH Transmission System – System Information and Design Practice: Nominal Voltage, Steady State Voltage Variations and Equipment Voltage Ratings*), p.19

[89] MH TSIR – Section 2.3 (*MH Transmission System – System Information and Design Practice: Post-contingency Voltage Variations*), p.20

It is therefore incumbent upon MH to plan for (and operate) the MH Transmission System to function within the above limits to avoid equipment failure and damage. During transmission studies bus voltages are monitored for voltages +/- 10% of the rated voltage immediately after, and for the first 30 minutes following a contingency ("Contingency Voltage Criterion"). Bus voltages are also monitored for voltages +/- 5% of the rated voltage for both System Intact Conditions and 30 minutes after a Contingency ("Steady-State Voltage Criterion"), even if System Intact Conditions have not returned. "*Mitigation and/or system upgrades are required if bus voltages violate post-contingency voltage criteria*" [Manitoba Hydro, 2016a][90] and "*Mitigation or system upgrades may be required if bus voltages violate steady-state voltage criteria*" [Manitoba Hydro, 2016a][91].

4.2.4 CRITICAL CONTINGENCY

As noted in Section 4.2.3, MH must plan for the MH Transmission System to stay within designed voltage limits post-contingency (i.e., the Contingency Voltage Criterion and Steady-State Voltage Criterion). "*An objective of the planning process should be to minimize the likelihood and magnitude of interruption of Firm Transmission Service following Contingency events"* [Manitoba Hydro, 2017a][92]. While interruption of Firm Transmission Service is allowed in certain Contingencies (and as a part of MH Transmission System adjustments), the MH-TPL-001-4 Standard does not allow for it during a P3 Planning Event, which involves an "*initial condition*" of the "*loss of generator unit followed by system adjustments*" followed by a subsequent event.

The subsequent event could be the loss of another generator, a transmission line, a transformer, a shunt device, or the single pole of a D/C line [Manitoba Hydro, 2017a][93]; however, the most relevant events related to SW MB Voltage Support requirements are the losses of critical 230 kV lines in the region, including D12P, P81C, and D54N (Section 3.6). For the cases without D83W in operation (i.e., the Baseline Scenario), a D12P contingency is evaluated in PSS/E because it is the most severe contingency in the area. For the cases with D83W in operation (i.e., the Project Scenario), P81C and D54N contingencies are considered because they represent the most severe contingencies.

[90] MH TSIR – Section 2.3 (*MH Transmission System – System Information and Design Practice: Post-contingency Voltage Variations*), p.20

[91] MH TSIR – Section 2.2 (*MH Transmission System – System Information and Design Practice: Nominal Voltage, Steady State Voltage Variations and Equipment Voltage Ratings*), p.19

[92] MH-TPL-001-4 Standard – Table 1 (*Steady State & Stability Performance Footnotes (Planning Events and Extreme Events)*), p.12

[93] MH-TPL-001-4 Standard – Table 1 (*Steady State & Stability Performance Footnotes)* p.9

The P3 Planning Event is the only "multiple contingency" event which does not allow[94] for the interruption of Firm Transmission Service, which often makes it the "critical contingency". In SW MB the loss of either Unit 6 or Unit 7 at Brandon is inherently the most impactful as they are the only generating units in the region and are used as transmissions assets (Section 3.7). For the purpose of this assessment, Unit 7[95] is assumed to be unavailable.

When a P3 Planning Event would result in a voltage violation (Section 4.2.3), the MH Transmission System must be modified "pre-contingency" (i.e., MH assumes the P3 Planning Event will happen and modifies the system accordingly, even though it is unknown whether it will occur or not, and probabilistically it would rarely occur). During the Winter Peak Period this might require the preemptive operation of a Brandon CT prior to the loss of a 230 kV line, which is the relevant primary effect being studied in this assessment.

In summary, for the purposes of the assessment of the Voltage Support primary effects of the PACE Project, the Critical Contingency is a P3 Planning Event which involves planning for an outage of Unit 7 followed by an outage of D12P, P81C, or D54N. The focus of this assessment is whether a Brandon CT must operate "pre-contingency", and whether that requirement is impacted by the PACE Project.

4.2.5 LOAD DURATION CURVE

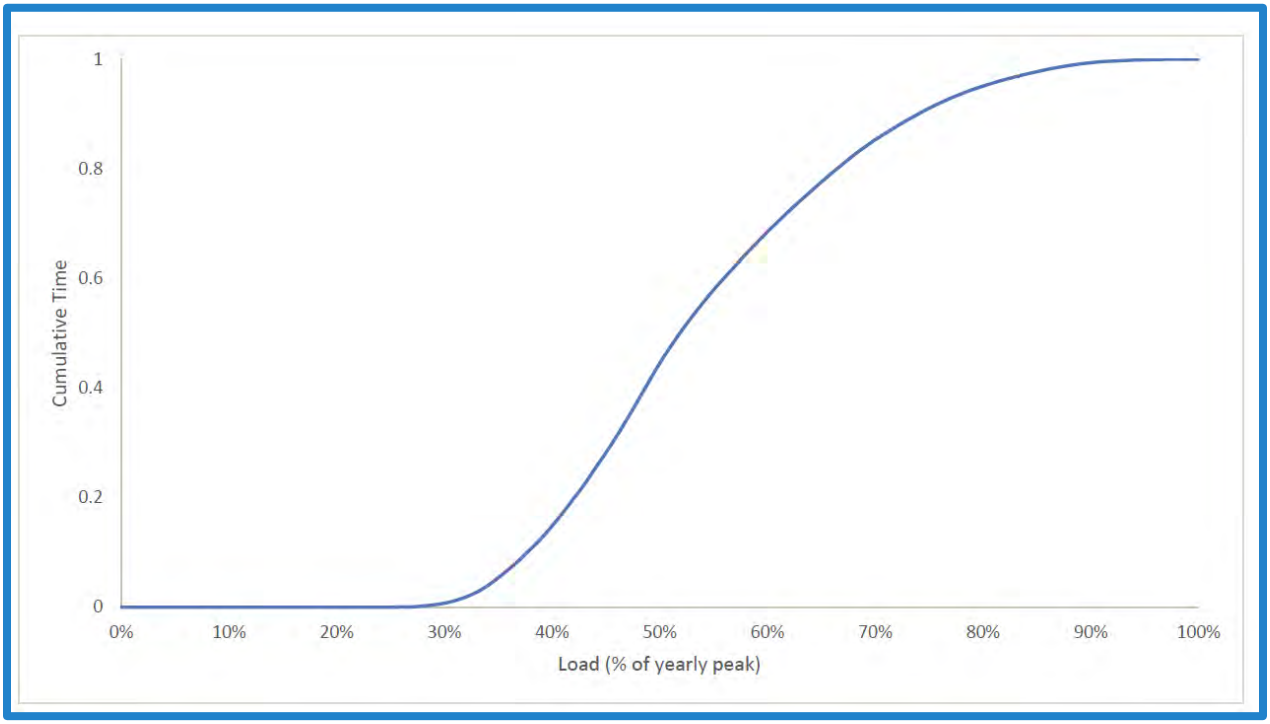
For the assessment of the Voltage Support primary effects, the MB Electrical System is evaluated (using PSS/E) at several distinct loading levels (i.e., 99%-100%, 98%-99%, 97%-98%, etc…) based on a load duration curve and a projected Annual Peak. A load duration curve (Figure 7) was derived using 15-minute real power load data from 2016 to 2020 (inclusive) from multiple transmission stations in SW MB[96]. Figure 7 indicates that loading above 80% of maximum load occurs for a relatively small number of annual hours. This is relevant for the assessment of Voltage Support primary effects, as Brandon CT operation in the Baseline Scenario is only required above 81% loading (Table 37). Figure 7 also indicates that loading never drops below approximately 27% of the Annual Peak. This is relevant as the load duration curve was also used to establish loading probabilities (Table 13) for the MH Transmission System loss primary effect analysis (Section 4.4).

[94] Note: P4 and P5 contingencies related to extra-high voltage facilities, defined as greater than 300 kV, also do not allow for the interruption of Firm Transmission Service; however, that is not relevant to the assessment of the PACE Project which involves facilities less than 300 kV.

[95] Note: As Unit 6&7 are identical, the choice of unit is arbitrary.

[96] Note: Transmission stations include Neepawa, Portage-South, Crocus Plains, Fortier, Highland Park, and Brandon Victoria.

Figure 7: Annual Load Duration Curve ("Cumulative Time" of 1 is 8,760 hours)



4.2.6 PSS/E MODELLING ASSUMPTIONS – VOLTAGE SUPPORT PRIMARY EFFECTS

This section summarizes the model input assumptions that drive the PSS/E results, forming the basis for the assessment of the PACE Project's Voltage Support primary effects (Section 4.1.6). These assumptions remain constant in both the Baseline and Project Scenarios, though their impacts can vary. This section is not a detailed list of all modelling inputs but allows "*intended users to make decisions with reasonable confidence*" [Infrastructure Canada, 2019][97].

4.2.6.1 TRANSMISSION & LOAD ASSUMPTIONS

Transmission and load assumptions typically align with the MRO/MMWG Planning Models (Section 4.2.2), though these can be modified to meet study requirements. Key transmission infrastructure and service assumptions applied within PSS/E are as follows:

- D83P is removed from service in all study models (because it has been replaced with the D83W in both the Baseline and Project Scenarios).
- 365 MW of export power flow from MB to SK along the 230 kV southern SK interface. This

[97] Climate Lens – Subsection 2.5.ii (*Required Information and General Instructions - Asset's estimated GHG emissions calculations*)

includes the 290 MW of full path firm transfer capability (Section 3.8) along with a reliability margin of 75 MW. The 290 MW includes 140 MW of transmission service that was not embedded in the 2019 MRO/MMWG Planning Models, but is now in service[98]. Even though 365 MW of export power flow will not typically be required, the capability can essentially be called upon at any time and therefore is assumed to be fully booked when determining whether pre-contingency conditions (Section 4.2.4) require the operation of the Brandon CTs for Voltage Support (Section 4.3).

- 70 MW of import power flow from SK on the 115 kV interface between the MH Transmission System and SPC Transmission System. This includes 60 MW of full path firm transfer capability (Section 3.8) along with a reliability margin of 10 MW.
- Brandon Unit 5 is operating as a synchronous condenser. It is currently operating as a synchronous condenser and is assumed to continue operating as such throughout the Effective Assessment Period. When determining whether a Brandon CT is required (Section 4.3), Brandon Unit 5 is assumed to already be providing maximum Voltage Support.
- Median MH Northwestern A/C Generation levels are assumed. This assumption is discussed further in Section 4.2.6.2.
- The 2029 Winter Peak Period MRO/MMWG case and the 2018[99] MH Electric Load Forecast ("ELF") are used to derive a scaling factor to scale Manitoba (PSS/E area 667) load to create 2027, 2028, and 2030 cases. Generation is dispatched from the MH Northern Collector System to supply the load scaling adjustments. The 2018 ELF reflects the best estimate of future load growth and is produced with the expectation that there is a 50% chance that the actual load will be higher or lower than forecast. Net MB load is calculated by deducting demand-side management (i.e., "DSM") from forecast electric load.
- Portage-South Transmission Station load is updated to match the most recent Station Peak Load Forecast, developed internally by MH.

4.2.6.2 MH NORTHWESTERN A/C GENERATION

MB generation is delivered to the MH Transmission System in SW MB via both the MH North-South 230 kV A/C Network and the A/C lines from eastern MB (mostly from Dorsey and Riel). The MH North-South 230 kV A/C Network relies mostly on generation from the 4 of MH's 16

[98] Note: This includes the BTP (100 MW) and an additional 40 MW.

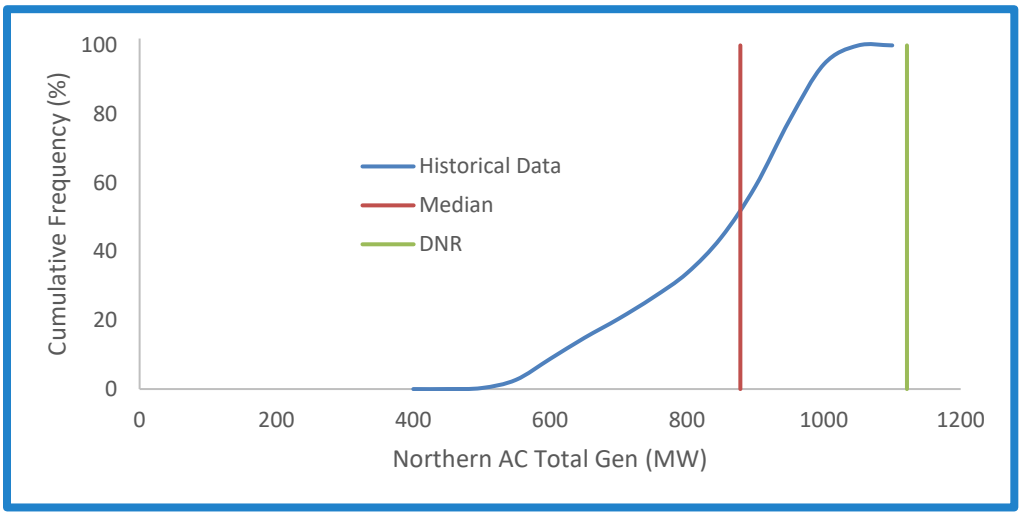
[99] Note: The PdB Assessment used the 2019 ELF; however, due to the inherent MMWG model building process delay of 1.5 years, the 2018 ELF is used for this assessment; the 2019 ELF was not available for use, within Manitoba Hydro's transmission models, at the time of this assessment. These modelling delays are built into the decision-making process for transmission developments.

hydroelectric generating stations: Grand Rapids, Kelsey, Jenpeg, and Wuskwatim (shown on Figure 1). These generating stations are all located West of most[100] of MH's hydroelectric generating stations and well north of the 6 stations on the Winnipeg River. Their combined generation is categorized as "MH Northwestern A/C Generation".

In typical MH Transmission System planning studies, MH Northwestern A/C Generation is modeled at maximum generation levels to stress certain constraints in the system; however, transmission studies have found that in some system conditions, the SW MB area is more stressed when Northwestern A/C Generation is lower since more power flow must come from Dorsey and Riel to serve SW MB load, including exports to southern SK (Section 3.6). This is particularly relevant for this assessment as the Voltage Support primary effects of the PACE Project relate to the requirement for Brandon CT operation due to transmission stresses in the Portage Area (Section 4.1.6): When MH Northwestern A/C Generation is low, this increases the negative impacts of the Critical Contingency (Section 4.2.4) and thereby makes it more likely that a Brandon CT will be required for pre-contingency Voltage Support.

In order to understand operating patterns, MH Northwestern A/C Generation data for the Winter Peak Period from 2015 to 2021 was collected: Figure 8 presents the cumulative distribution of Northwestern A/C Generation and clarifies that the maximum generation values ('DNR'[101] in Figure 8) modelled in the typical transmission planning cases did not occur in the observation period from 2015-2021.

Figure 8: Northwestern A/C Generation – 2015 to 2021 Data



[100] Note: Manitoba Hydro's westernmost hydroelectric generating stations are Laurie River 1 and Laurie River 2, but these are small 10 MW stations that are fairly isolated and not directly connected to the MH North-South 230 kV A/C Network.

[101] Note: DNR typically means maximum Designated Network Resource in transmission planning.

The intent of this assessment is to provide an estimate of emissions during actual operation. Therefore, it was deemed relevant to assume median MH Northwestern A/C Generation; median MH Northwestern A/C Generation capacity values were developed for this assessment and are provided in Table 11.

Table 11 MH Northwestern A/C Generation Capacity (MW)

Generating Station	Maximum Values	Median Values
Grand Rapids	480	334
Jenpeg	135	88
Kelsey	287	265
Wuskwatim	220	189
Total	**1,122**	**878**

Because the Brandon CTs must operate more often under median MH Northwestern A/C Generation conditions, versus maximum MH Northwestern A/C Generation conditions, estimated emission reductions resulting from the PACE Project increase as a result of the application of this assumption; however, this choice of assumption was considered more reasonable and relevant; the choice of maximum MH Northwestern A/C Generation conditions would downplay the Voltage Support benefits of the PACE Project, and would be excessively conservative as illustrated by the distribution shown in Figure 8.

4.2.7 NON-MB SYSTEM LOSS ASSUMPTIONS

When there are incremental changes in net exports from MB, non-MB end load can switch between being served by a non-MB generating resource and a MB generating resource, and vice versa. System losses between the MB border (originating from a MB generating resource) and the non-MB end load may be different than the losses between an alternative non-MB energy source and the same non-MB end load. Modelling/estimation of non-MB system losses is outside the scope of this assessment. For the post-processing of PSS/E results (i.e., translating the PSS/E results to generation effects), this assessment assumes there are no transmission grid losses, or limits, outside of MB. This “copper plate” assumption is standard in electricity transmission modelling.[102]

The resulting simplification, of the copper-plate assumption, is that a MWh of energy delivered to the MB border has the same ability to meet a non-MB load as a non-MB energy source. That

[102] [E.g., Ortner & Kruijer, 2014; Cao et al, 2018]

is, no net system losses, beyond those which are assumed within MB (e.g., Section 4.4), are calculated. Such a simplification could result in an overestimate of the net benefit of the PACE Project, but an underestimation is comparably probable. Because non-MB generation effects are relatively low compared with MB generation effects (Section 5.7), the significance of any overestimation or underestimation is minimal.

4.3 METHODOLOGY – BRANDON CT OPERATION FOR VOLTAGE SUPPORT

In order to estimate the impact of the PACE Project on Brandon CT operation (i.e., the PACE project's Voltage Support primary effects) steady-state power flow studies were conducted using the criteria described in Section 4.2.3, PSS/E software (Section 4.2.1), planning model cases (Section 4.2.2) and distinct loading levels along the load duration curve (Section 4.2.5). These studies included the evaluation of voltage performance and reactive capability in pre-contingency and post-contingency (Section 4.2.4) analyses.

The focus of the studies was the Critical Contingency outlined in Section 4.2.4. Evaluations were conducted for multiple cases, based on assumptions summarized in Section 4.2. Ten key cases were analyzed: cases for each Fiscal year between 2026/27 and 2030/31 (inclusive), both with and without the PACE Project in service. Within PSS/E, each case incorporates MH Transmission System assumptions related to interconnected generation, tie-line power flows, MVAR production, and load.

Within the PSS/E model, monitoring was done for all MH Transmission System elements (i.e., most transmission elements of 100 kV and above within Manitoba) at multiple distinct load levels (as described in Section 4.2.5). In order to represent the time period immediately following a contingency, load flow is solved with all controls, transformer taps, switched shunts, and phase shifter adjustments disabled. In order to represent the system post-contingency steady state (30 minutes after a contingency), load flow is solved with all controls, transformer taps, switched shunts, and phase shifter adjustments enabled. A Brandon CT was dispatched as required. Generator voltage set-points were adjusted in the pre-contingency cases and held at their pre-contingency values in the post-contingency simulation.

The current operating practice (Section 3.7) is assumed: a Brandon CT is dispatched to eliminate MH Transmission System voltage violations in SW MB, specifically pre-contingency (Section 4.2.4). Brandon CT real power output is dispatched under pre-contingency conditions to eliminate post-contingency voltage violations. The Cornwallis Transmission Station 230/115 kV transformer tap changers are adjusted to control Brandon 115 kV bus voltage to 1.0 per unit (i.e.,

to 115 kV so that the actual voltage matches the nominal voltage)[103]. Brandon Unit 5 and Unit 6 (Unit 7 is assumed unavailable, as noted in Section 4.2.4) voltage set-points are adjusted to control bus voltages within an acceptable range.

The results of this assessment focus on the need to run Unit 6 to satisfy pre-contingency requirements. After the loss of a transmission circuit (i.e., post-contingency), it is known that Brandon CT output will likely be increased (Section 3.7), however, the resulting impact of the PACE Project on emergency Brandon CT operation is assumed to be negligible because the expected unavailability of a transmission line is 10 hours per year and would be unlikely to coincide with maximum Winter Peak Period loading. As noted in Section 4.1.6, "*potential emissions reductions in Brandon CT operation to support outages are considered a qualitative benefit*" of the PACE Project.

4.3.1 SUPPLEMENTAL CT OPERATION PERIOD AND MINIMUM CT LOADING

The Brandon CTs can be called upon to start, or ramp up (operational range is typically between 4 MW and 140 MW), by either MH's System Control Centre ("SCC") or Wholesale Power Trading[104]:

- SCC can require the operation of the Brandon CTs for reliability purposes. This includes requiring operation for Voltage Support.
- Wholesale Power Trading can require the operation of the Brandon CTs for economic purposes. This can include choosing to leave a Brandon CT operating (or ramp it up to higher generation levels) after it has been started by SCC, but when it is no longer required for reliability purposes.
- Typically, either SCC or Wholesale Power Trading can initiate the operation of a Brandon CT, but both would agree to turn a unit off. SCC would rarely (essentially never) override a "leave on" or "ramp up" order from Wholesale Power Trading.

Section 4.3 outlines the methodology used to determine the theoretical minimum length of Brandon CT operation for Voltage Support; however, a Brandon CT would not operate for the minimum required periods, as determined by PSS/E results alone, for the following reasons:

- SCC performs sophisticated "contingency analysis" of the MH Transmission System on an ongoing basis (i.e., every five minutes) and can quickly determine whether a Brandon CT

[103] Note: Brandon 115 kV bus voltage is limited by the ratings of a number of 115 kV breakers in the area. It is a standard operating practice to maintain the bus voltage at approximately 115 kV.

[104] Note: Brandon O&M staff can also initiate start-up, but typically this is only for O&M purposes and would be done with consensus from SCC and/or Wholesale Power Trading.

must be activated for pre-contingency Voltage Support. And, in any borderline situations, it is inherently prudent to call for the operation of a Brandon CT; however, SCC's analysis capabilities are less sophisticated[105] when it comes to determining whether a Brandon CT can be turned off, after it's already operating. It is reasonable to assume a lag of a couple hours before SCC is confident that a Brandon CT[106] is no longer required.

- Every start-up of a Brandon CT has an Equivalent Operating Hour ("EOH") penalty of 20 hours, representing wear and tear on the Brandon CT[107], which is currently assumed to cost approximately $20K. This is critical for economics as at minimum load Brandon CT fuel costs would typically be under $2K per hour[108]. Thus, when a Brandon CT is required to operate twice (or more) in one day it is often economic to leave the CT on at low load, instead of turning it on and off multiple times. Wholesale Power Trading will often make a "leave-on" decision during the Winter Peak Period when SCC indicates Brandon is reasonably likely to be subsequently required for reliability in the same day[109].

PSS/E analysis was performed at multiple distinct load levels (as described in Section 4.2.5) and model output is disaggregated by load level (Table 33 and Table 35) as well. MH estimated the number of startup/shutdown cycles for each load level using historical load data from 2016 to 2020 (Figure 7) and aggregated them (Table 34 and Table 36).

The "Supplemental CT Operation Period" is the assumed length (in hours) a Brandon CT would be left on, over and above required levels (as determined by PSS/E modelling analysis), for each assumed startup/shutdown cycle. Following internal discussion with SCC and Wholesale Power Trading a Supplemental CT Operation Period of 4 hours was selected for this assessment. This assumption is mildly conservative as it downplays the possibility of Wholesale Power Trading choosing to leave a Brandon CT running due to favourable market prices (refer to the last paragraph of this section).

It is assumed that loading during the Supplemental CT Operation Period is at minimum Brandon CT loading; however, while the Brandon CTs can operate at loadings as low as 4 MW, for the

[105] Note: Ensuring MH Transmission System reliability is a critical SCC function whereas minimizing Brandon CT operation is not.
[106] Note: A re-start immediately after a unit is shutoff is very undesirable economically in terms of wear and tear on the unit.
[107] Note: Generating units are assumed to require minor and major overhauls after operating for certain amounts of hours (e.g., 30,000 hours). The penalty is based on the proportional cost of 20 hours. Start-ups are more taxing on the units than continuous operation.
[108] Note: At 4 MW a $3/GJ price would translate to approximately $1,100 in natural gas fuel costs. Prices above $6/GJ are not typical, though they can occur.
[109] Note: For example, when a Brandon CT is required to provide Voltage Support during MB Electrical System's "morning peak" (i.e., approximately 9 am) it is not unusual for it to be required during the "evening peak" (i.e., approximately 7 pm) as well.

purpose of this assessment the minimum loading is assumed to be 15 MW. This is consistent with current operational practice by Wholesale Power Trading: The Brandon CTs are exceptionally inefficient below 15 MW, especially at 4 MW (Figure 9). As a result, the fuel costs at 15 MW loading are comparable to the fuel costs 4 MW; however, the additional 9 MW has revenue value in the regional electricity market.

Beyond the probable economic benefits of selecting 15 MW as a Brandon CT load minimum (for the purposes of this assessment), the choice is conservative from a global emissions perspective as well: Table 12 provides a simplified comparison of the emissions effects of Brandon CT operation at low load. In this simplified comparison, all Brandon CT generation is assumed to displace U.S. fossil-fuel generation at a U.S. EPA EF (Table 19) of 803 t CO_2e per GWh ("t/GWh"), which is comparable to actual incremental MB generation effects (Section 4.5). While Brandon emissions are 33% higher at 15 MW, versus 4 MW, corresponding emissions reductions outside of MB are 375% (i.e., 15/4) higher. On a global basis, the PACE Project would reduce more emissions using a 4 MW minimum loading assumption, making the 15 MW assumption both the more relevant and conservative choice.

Table 12 Brandon CT Low Loading Emissions (t CO_2e/hour)

Brandon CT Loading	Brandon CT Emissions	U.S. Emission Reductions	Net Emissions
4 MW	18.89	3.21	15.67
15 MW	25.24	12.05	13.20

While this assessment assumes that Wholesale Power Trading would request that all sub-15 MW loading requests by SCC be ramped up to 15 MW, it does not assume any further ramp ups. The variable operating cost of the Brandon CTs is typically above (very often significantly above) the market (i.e., MISO) price of electricity, making their operation typically uneconomic. This is why absolute Baseline Scenario Brandon CT emissions are already so low (Table 59). And, when market prices are high enough to justify economic Brandon CT operation, they would operate in both the Baseline and Project Scenarios, and there would be zero net impact. There is one exception: When the market price is just above the variable cost of Brandon CT operation. In this instance it would likely not be economic to turn on a Brandon CT (due to the startup penalty noted above), but it likely would be economic to both keep a Brandon CT running and ramp it up to maximum loading. It was deemed reasonable to leave this one specific situation outside the scope of this assessment as it is rare. As this situation would result in higher Baseline Scenario emissions, the assumption of no further ramp ups above minimal required loading levels (Table 33 and Table 35) is mildly conservative.

4.4 METHODOLOGY – MH TRANSMISSON SYSTEM LOSSES

The PACE Project will improve the overall efficiency of the MH Transmission System (Section 4.1.7) by providing additional energy flow options (the PACE Project will be adding a second 230 kV path from Dorsey to the Portage Area). The net reduction in system losses can be estimated by comparing PSS/E modelling results from identical cases analyzed with and without the PACE Project in service.

Net loss reductions depend significantly on overall system load, which varies throughout the year (Figure 7). For this assessment, annual load was divided into four MMWG/MRO Planning Model based cases: Spring Light Load ("SLL", 40% of peak), Summer Shoulder ("SSH", 50% of peak), Summer Peak ("SUM", 70% of peak), and Winter Peak ("WIN", 100% of peak). Then, each case was assigned[110] a representative range of MB's annual load curve (Figure 7). The mid-point between each load case was selected as the boundary of the representative ranges (as presented in Table 12). For example, 60% of peak is the mid-point between SSH (50% of peak) and SUM (70% of peak).The probability of each case was determined by applying the representative range to the Load Duration Curve (Figure 7).The resulting weighted average loading (419 Amperes), of the four cases (Table 13), was compared to historical data to confirm the four-case simplification was a reasonable approach.[111] Loading for each of the four seasonally-named cases along with their probability of occurrence are presented in Table 13.

Table 13 System Loss Study Case - Probabilities

2025 Case	Manitoba Load (MW)	Manitoba Load (% of peak)	Representative Range	Probability	D12P Loading (Amperes)
SLL	1,796	40	0% – 45%	0.2813	322.6
SSH	2,240	50	45% - 60%	0.4036	399.3
SUM	3,129	70	60% - 85%	0.2923	598.6
WIN	4,458	100	85% - 100%	0.0231	824

[110] Note: For clarity, while each case is described by a seasonal name, part of the representative range assigned to each case won't necessarily fall within that season. E.g., the entirety of the 0% to 45% range assigned to SLL does not occur in the spring.

[111] Note: As a cross check, Manitoba Hydro compared the expected value of D12P loading, based on a weighted average of 2021 loading conditions (using 2020 MMWG/MRO Planning Models), with average loading based on the historical data. The difference between the two values was reasonably small, indicating that the assigned probabilities (Table 12) were also reasonable. The weighted average (based on the Planning Models) of 419 Amperes was lower than historical average loading (446 Amperes); this indicates that the reduction in MH Transmission System losses, as a result of the PACE Project, may be slightly underestimated in this assessment.

2020 MMWG/MRO Planning Model cases (Section 4.2.2) for 2025 loading conditions (for SLL, SSH, SUM, and WIN cases) were the primary reference cases for the system loss analysis. The 2018 ELF is used to derive a scaling factor to scale Manitoba (PSS/E area 667) load to create 2027/28, 2028/29, 2029/30, and 2030/31 cases. A summary of the results of the MH Transmissions System loss analysis are presented in Table 46.

Cases with the PACE Project in place inherently result in additional net exports from Manitoba (PSS/E area 667), compared with identical cases without the PACE Project. Within the model, a default fossil-fuel generating station in southern MRO[112] is ramped down. Having a non-MB generator ramp down ensures consistency in MB loading and generation assumptions since, on an annual basis, MB hydroelectric and wind generation[113] is not expected to change as result of the PACE Project (4.1.4). MB customer load at the customer meter (which excludes system losses) is also assumed to be unaffected by the PACE Project (Section 4.1.8.2).

Any MB Electrical System loss impacts resulting from the increase in net exports from MB are inherently included in the PSS/E modelling results; however, only the change in MB losses are evaluated. Determining the specific non-MB fossil-fuel generating station impacted by the increase in net exports is outside the scope of this assessment as is any resulting change in non-MB system losses (Section 4.2.7). Non-MB generation effects are evaluated using EFs, not by the direct modelling of non-MB generators (Section 4.6).

4.5 INCREMENTAL CHANGES IN MB LOAD/GENERATION – GENERATION EFFECTS

As noted in Section 4.1.4, incremental changes in load or generation, within MB, typically have generation effects outside of MB (Section 3.8). The PACE Project will impact MB load[114] by reducing losses along the MH Transmission System (Section 4.1.7) and the PACE Project will impact generation by reducing the operation of the Brandon CTs (Section 4.1.6).

Generation effects outside of MB can occur in either adjacent provinces (i.e., in Canada) or in the U.S.; with full path firm transfer capability to the U.S. (i.e., to MISO) being an order of magnitude greater than capability to adjacent provinces, it is expected the vast majority of generation

[112] Note: The selection of a default fossil-fuel generating station in southern MRO is arbitrary. The actual "backed down" unit could be one of any number of units in MISO/MRO. Analysis of MISO generation effects is discussed in Section 4.6.2.

[113] Note: The PACE Project is expected to impact Brandon CT generation, but this is already incorporated into the assessment of Voltage Support primary effects.

[114] Note: As noted in Sections 4.1.8.2 and 4.4, MB customer load at the customer meter is assumed to be unaffected.

effects will occur in the U.S. and not in Canada.[115] In the recent PdB Assessment, GSPRO modelling of the impact of increasing generation at PdB revealed that 92.3% of incremental energy would flow to the U.S. with 7.3% of incremental energy flowing to adjacent provinces (Table 14), prior to construction of new generation in MB[116].

Once operational, the PdB Project would add 400 GWh annually to the MB Electrical System, or 1.05% of projected future MB hydroelectric generation without the PdB Project.[117] This relatively small amount of incremental energy was at the low end of what could be accurately[118] analyzed with the GSPRO model. For comparison, the incremental energy effects of the PACE Project are much lower: annual effects are up to 13 GWh (Table 37) on the Brandon CTs and up to 12 GWh (Table 46) on MH Transmission System losses. As such, GSPRO modelling was not an option for assessment of the PACE Project. It is was deemed reasonable to assume the energy flow percentages for the PACE Project would match the percentages produced by PdB Project analysis (Table 14).

Table 14 Percentage Breakdown of the Effect of Incremental Load/Generation Changes in MB[119]

Brandon CT Generation	0.3%
Net Exports to Canada	7.3%
Net Exports to the U.S.	92.3%

Section 3.9 notes how the maximum level of annual system-wide hydroelectric generation can be more than double the lowest expected level, due to water supply variability. Table 14 values are an average of all flow-cases, they are not median case values[120]. Actual impacts in any specific

[115] Note: As noted in Section 4.1.8.3, much of the full path firm transfer capability between MB and southern SK is already under contract and there is limited opportunity for incremental increases (without a new MH Tie-Line).

[116] Note: Table 14 isolates pre-"need year" effects: Modelling for the PdB Assessment indicated that Manitoba Hydro was projected to require new resources to meet MB's capacity and/or energy needs (i.e., as per the Capacity Criterion and Energy Criterion) in 2042. This "need year" can change over time as planning assumptions are updated and may no longer be accurate; however, this is not relevant the assessment of the PACE Project.

[117] PdB Assessment – Section 5.1 (*Primary GHG Effects), p.91*

[118] Note: GSPRO has been setup as a monthly model with a time-blocking scheme to approximate intra-monthly input variations. Simplifications of the MH system are required for GSPRO modelling, including for the transmission network; GSPRO does not model individual transmission lines and assumes a constant, pre-determined A/C transmission loss value. Such simplifications are reasonable and required for long-term production costing modelling, but when combined with the inherent uncertainty of long-term input forecasts, a limitation is created on the minimum magnitude of a change to the system that can be modeled to produce meaningful results.

[119] PdB Assessment – Section 5.1 (*Primary GHG Effects), p.91*

[120] Note: "median-flow" conditions are different than the "average of all flow-cases"; for example, the GHG effects on Brandon CT generation (due to incremental changes in load or generation) is only captured by evaluating the entire suite of 107 flow-cases (Section 3.9) as there are no GHG effects (due to incremental changes in load or generation) on the Brandon CTs during median-flows.

year have a wide range of potential variation.

The use of "average of all flow-cases" values is the reason a small amount of energy flow (i.e., 0.3%) is assigned to "Brandon CT Generation". PdB Assessment modelling indicated that there is no effect, or a negligible effect, on Brandon CT generation in 90% to 95% of all flow-years; however, in the lowest-flow year the effect was around 20%. The "0.3%" captures two distinct considerations regarding the GHG effects of the PACE Project:

- MH Transmission System Loss GHG Effects (Section 4.1.7): In very low-flow years, the improved system efficiency resulting from the PACE Project will slightly lower the level of required Brandon CT generation (for MB load).
- Voltage Support GHG Effects (Section 4.1.6): As noted in Section 4.1.4, "*For the purposes of this assessment it is generally assumed that the Brandon CTs are not already operating when required to provide Voltage Support*". The "0.3%" is the exception. For the purpose of this Assessment it represents the notional amount of occasions when the Brandon CTs would, in fact, already be operating. This does not include instances where the Brandon CTs would already be operating due to system emergencies or unusually high load events (Section 3.7).

4.6 GENERATION EFFECT EMISSION FACTORS

Quantification of generation effects (in t CO_2e) is accomplished by multiplying generation and energy flow values (in GWh) by EFs (in t/GWh). EFs vary depending upon the location and timing of the net GHG impact.

As noted in Sections 4.1.4 and 4.1.5, generation effects inside of MB are assumed to only be operating margin effects, not build margin effects, and are only assumed to affect the Brandon CTs. Brandon CT EFs depend significantly on unit loading (Figure 9), and are therefore disaggregated by load level when evaluating the Voltage Support primary effects (Section 4.1.6). The small impact (Section 4.5) on Brandon CT operation as the result of other PACE Project GHG effects (Section 4.1.7 and 4.1.8.1) assumes full load CT operation. This is because these other GHG effects assume a Brandon CT is operating to provide energy to meet MB load, not to provide Voltage Support, and higher loading is therefore very probable.

As noted in Sections 4.1.4 and 4.1.5, generation effects outside of MB are also assumed to only be operating margin effects, not build margin effects. Energy flow across the MH Tie-Lines (on an annual basis) will adjust to accommodate incremental changes in MB load (i.e., changes in MH Transmission System losses) and generation (i.e., changes in Brandon CT operation) caused by the PACE Project. These adjustments are modelled via PSS/E, based on embedded modeling

assumptions (Section 4.2). The net impact on emissions can be estimated by comparing the net change in MH Transmission System losses and/or Brandon CT generation between the Baseline and Project Scenarios.

MB, MISO, SK, and ON are all interconnected (directly and/or indirectly) with each other and surrounding regions; however, for this assessment it is assumed that incremental changes in MB Load/Generation will occur according to Table 14, based on results from the PdB Assessment (Section 4.5). Non-MB Canadian effects (i.e., effects in ON and SK) are assumed to occur equally. It is difficult to accurately predict future incremental changes in electricity trade with ON versus trade with SK; however, based on current tie-line capacity (3.8), it is probable there would be more effects in SK than ON. Therefore, the assumption of equal effects is conservative since ON's EF (Table 22) is lower than SK's (Table 21) in the pre-2030 period.

Non-MB generation effects, as per Table 14, are assumed to be localized in ON, SK, and MISO. In reality, generation effects can partially cascade into surrounding markets as well. But such minor generation effects are outside the scope of this assessment. The electricity grid emission profiles in MISO, SK, and ON are quite different from each other and segregated evaluation of these three regions is warranted.

4.6.1 MANITOBA GENERATION (BRANDON CT) EMISSION FACTORS

"*The ideal method to estimate operating margin (OM) emissions would be to identify precisely which power plants on a grid are backed down in response to the project activity's operation*" [WRI, 2007][121]. Since MB only has one grid connected fossil-fuel generating station, and that station operates two identical units (e.g., Units 6&7), this is precisely what occurs when evaluating MB generating effects.

Natural gas combustion EFs for fossil-fuel generation are derived from MB specific natural gas composition, actual data from the operation of Brandon in 2019 and 2020, and methods outlined in ECCC (2020)[122]:

- CO_2 EF = 50.03 kg of CO_2/GJ of natural gas (Table 15)
- CH_4 EF = 13 g of CH_4/GJ of natural gas[123]
- N_2O EF = 1.3 g of N_2O/GJ of natural gas[124]

[121] Electricity Project Guidelines – Chapter 10 (*Estimating the Operating Margin Emission Factor*), p.54

[122] Note: The MB specific EF from Table A6.1-1 of ECCC (2021), is based on older data from McCann (2000). The ECCC (2020) method for CO_2 was considered more relevant and appropriate as it is based on recent actual gas composition in MB.

[123] Table 2-4 from ECCC [2020], "Electric Utilities" EF from SGA Energy (2000).

[124] Table 2-4 from ECCC [2020], "Electric Utilities" EF from SGA Energy (2000).

- Aggregate CO_2e EF = 50.7458 kg of CO_2e/GJ of natural gas

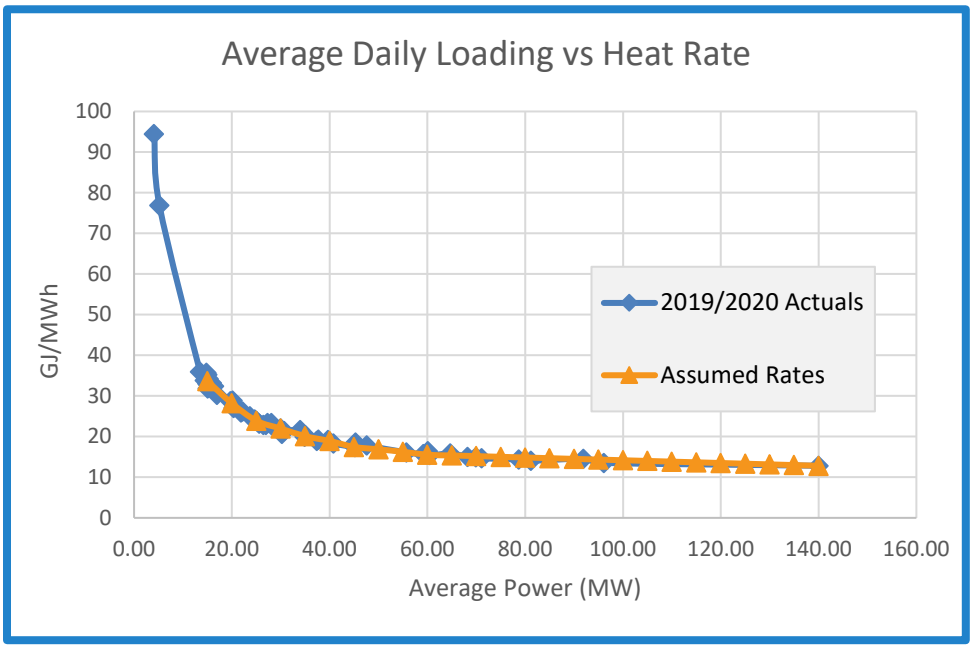
Natural gas is a "variable fuel", thus the EF can vary slightly; however, gas composition in MB is very consistent. Table 15 summarizes CO_2 EFs calculated using 58 data points from Brandon CT operation in 2019 and 2020. The average value is assumed for this assessment.

Table 15 Brandon Natural Gas EFs – kg of CO_2/GJ of natural gas (2019 & 2020 data)[125]

Minimum	49.92
Maximum	50.12
Average	50.03

MH developed an "assumed rate" curve for the heat rate (in GJ/MWh) of the Brandon CTs based on loading (Figure 9). This curve was developed based on interpolation from 58 data points from 2019 and 2020 as well as an assumed full load (140 MW) hate rate of 12.151[126] MMBtu/MWh, based on Brandon CT testing.

Figure 9: Brandon CT Heat Rate – Load Curve



[125] Note: Equation 2-9 from section 2.A.2.c (*Gaseous Fuels)* of ECCC [2020] applied in the derivation of these CO_2 EFs. This equation is specific to natural gas and includes a "*Empirical equation (g of CO_2/cubic meter of natural gas) representing a very close relationship between carbon dioxide and volume of natural gas determined through higher heating value with a discreet set of available data where, 60.554 is the slope and 404.15 the intercept".*

[126] Note: A January heat rate was selected, for consistency with the focus on the Voltage Support primary effects (Section 4.1.6) of this assessment, which occur during the Winter Peak Period.

Direct generation EFs (in t/GWh) for the combustion of natural gas in the Brandon CTs are presented in Table 16. These EFs are derived by multiplying the heat rate (in GJ/MWh) by the CO_2e EF of 50.7458 (in kg/GJ). The EF at low 15 MW load (Section 4.3.1) is over 2.5 times that of the full 140 MW EF.

Table 16 Brandon CT Emission Factors – Disaggregated by Loading

Average Power (MW)	Heat Rate (GJ/MWh)	Direct EF (t/GWh)	Indirect EF (t/GWh)
15.00	33.66	1,708.1	512.4
20.00	28.20	1,431.0	429.3
25.00	23.89	1,212.5	363.8
30.00	21.98	1,115.3	334.6
35.00	20.10	1,019.9	306.0
40.00	18.91	959.7	287.9
45.00	17.46	885.9	265.8
50.00	16.86	855.5	256.7
55.00	16.26	825.1	247.5
60.00	15.53	788.1	236.4
65.00	15.36	779.5	233.8
70.00	15.19	770.9	231.3
75.00	15.02	762.3	228.7
80.00	14.85	753.7	226.1
85.00	14.68	745.1	223.5
90.00	14.51	736.4	220.9
95.00	14.34	727.8	218.4
100.00	14.17	719.2	215.8
105.00	14.00	710.6	213.2
110.00	13.83	702.0	210.6
115.00	13.66	693.4	208.0
120.00	13.50	684.8	205.4
125.00	13.33	676.2	202.9
130.00	13.16	667.6	200.3
135.00	12.99	659.0	197.7
140.00	12.82	650.4	195.1

As a secondary effect, fuel production, processing, and transportation emissions related to generator fuel combustion (i.e., indirect generation effects) are based on LCA work produced by the Pembina Institute, on behalf of MH: "*The comparison technology intensities are based on the*

results of a literature survey of published life cycle values" [Switzer, 2012][127]. This work indicated that, as a median, indirect natural gas use emissions were equivalent to around 30% of the combustion emissions. There is a large range of estimates regarding the upstream emission rate of natural gas use but undergoing a life cycle study of natural gas delivered to MB throughout the Effective Assessment Period is not within the scope of this assessment. To provide an idea of the potential upper level of this secondary effect a 30%[128] adder for upstream fossil-fuel emissions is assumed for all units (Table 16). While there is no longer any coal generation in MB, the same study suggests a 5% adder would represent the same secondary effect for non-MB coal generation.[129]

4.6.2 MISO EMISSION FACTORS

While EFs for evaluating generation effects in MB are based specifically on the Brandon CTs, this is not the case outside of MB. While PSS/E does have the capability of modelling generation outside of MB, it is a Transmission Planning tool (Section 4.2.1), not a Market Planning/Production Costing tool (such as GSPRO). It does not incorporate electricity price forecasts nor model economic dispatch decisions. Therefore, grid-wide EFs, intended to represent impacted fossil-fuel generators, will be used for the assessment of emissions outside of MB.[130]

4.6.2.1 METHOD DESCRIPTION

Year-specific EFs for the MISO region were generated as follows:

1. The ratio of coal ("%C") to natural gas ("%NG"), where %C + %NG = 100%, was based on the average of the four independent price forecast consultant reports used for MH's 2019 Energy Price Forecast ("EPF"; Figure 11).
2. The assumed direct combustion EF for a MISO coal and natural gas plant was based on the 2016-2018 average of generation in MN and North Dakota ("ND"; Table 18).
3. Year-specific direct combustion EFs were estimated by applying the following formula: EF = (%C*1,091 t/GWh) + (%NG *485 t/GWh) (Table 18).
4. Year-specific direct combustion EFs resulting from the application of the above formula

[127] Keeyask LCA – Section 4.4 (*Comparison Technologies*), p.18.

[128] Note: As described in Section 4.1.8.4 a 30% adder is equivalent to indirect effects being 22% of total life cycle emissions. Upstream emissions could be higher or lower than 30%, but 30% is in the upper range of industry estimates.

[129] Note: Coal generating stations are often "mine-mouth" with limited transportation emissions. Also, methane leaks during transportation are a relatively negligible issue for coal versus natural gas.

[130] Note: The selection of a default fossil-fuel generating station in southern MRO, as part of the MH Transmission System loss analysis (Section 4.4), was arbitrary. The actual "backed down" unit could be one of any number of units in MISO/MRO. Therefore, selecting a regional average is the appropriate method.

were modified downwards so that the 2019 EF was 806 t/GWh; this matches the EPA EF for "MROW", which is a fossil-fuel "load-following" EF (Table 19).

5. Year-specific upstream fossil-fuel EFs were determined using steps 1 to 4 as well, but modifying step 3 to be: upstream fossil-fuel EF = (%C * 1,091 t/GWh * 5%) + (%NG * 485 t/GWh *30%) as per the Pembina Institute's LCA work (Section 4.6.1).

4.6.2.2 CHOICE OF METHOD

The PACE Project will effect generation outside of MB (Section 4.1.7 and 4.1.8.1), with most of those effects occurring in MISO (Section 4.5). Which specific plant in the MISO region is most likely to be "backing-down" or "ramping up" depends on the state of the grid and its resources and is difficult to predict. Chapter 10 of the Electricity Project Guidelines lays out multiple operating margin EF estimation methods but leaves the choice of method up to the assessor, to be based on application of the GHG reporting principles (Section 3.3). The method selected for this assessment is most closely related to the elements/concepts of prescribed method 1: "*average load-following*". "*This type of method calculates the average annual emissions of power plants that are not baseload or must-run*" [WRI & WBCSD, 2005][131]. Concepts from methods 2 (average marginal), 3 (historical marginal), and 4 (marginal modeled) were also used to produce a dynamic EF that reduces annually; these three "marginal" methods can incorporate "baseload" and "must-run" fossil-fuel generators into the resulting EFs.

MH used modified modelled dispatch projections from EPF data (Section 4.6.2.4) to determine a variable annual grid-average fossil-fuel EF. Following the principle of conservativeness, this projected variable annual fossil-fuel only EF was adjusted downwards to match a "load-following" EF provided by the EPA (Section 4.6.2.7). This method has the following key benefits:

1. **It uses readily available modelled data:** Procuring additional modelling work was not practicable nor was it necessary to fulfill the purpose of this assessment (Section 3.1). "*Generally, the farther out into the future one tries to project "what would have happened", the more uncertain this projection becomes*" [WRI & WBCSD, 2005][132]. A detailed daily/hourly assessment of the export regions' grid, matched on a daily/hourly basis to the incremental shifts produced by the PACE Project (during the Effective Assessment Period) would be ideal; but, it would also be incredibly complex and require such a large number of assumptions that the presented accuracy could be misleading. In any case, capturing daily/hourly incremental shifts was not within the scope of the assessment of the PACE Project's primary effects (Sections 4.3 and 4.4): results are

[131] Project Protocol – Chapter 2.11 (*Valid Time Length for the Baseline Scenario*), p.14
[132] Project Protocol – Chapter 2.11 (*Valid Time Length for the Baseline Scenario*), p.14

aggregated by either Winter Peak Period or Fiscal Year.

Customized EPF data is procured by MH annually. Multiple external modelers forecast future pricing and generation levels based on their models of MISO-North regions ("MISO-N"). A consensus average of modelling information from the four independent forecasts was applied.

2. **It excludes negligibly impacted resources:** While build margin effects can easily impact non-emitting resources, this is less likely when considering operating margin effects. It is reasonable to assume the vast majority of backed-down units, on an operating margin basis, will be fossil-fuel units. "*MWh from intermittent or non-firm power sources such as wind, hydro, or solar should be excluded from this [dispatch order] ranking, since these sources will have low capacity factors but will not be displaced at the margin*" [WRI, 2007][133]. For clarity, while hydroelectric generators can "follow load" via reservoir storage, on a long-term (e.g., annual) basis their energy production is assumed to not vary with load. Incorporating renewables into the EF would result in more conservative results but this would not be as accurate, relevant, or consistent.
   Occasionally, intermittent renewable generation, such as wind or solar photovoltaic, are curtailed due to over-supply or congestion issues; however, the PACE Project is increasing the capacity of the MH Transmission System and it is unlikely that the PACE Project would increase curtailment of renewable resources within MB or within MISO.
3. **It covers the MISO-N region:** It is appropriate to evaluate EFs for the independent system operator within which MH operates rather than using more general (e.g., U.S.) or targeted (e.g., MN-only) EFs.
4. **The EFs are dynamic:** Many methods for the calculation of operating margins and build margins for GHG EFs use static baseline EFs that do not change over time which, for grids that become greener before and during an assessment period, may over-estimate the benefits of the project being assessed. Indeed, the U.S. grid will change significantly by 2031. While the future is uncertain, the selected methodology provides some insight into the impacts of future grid changes via the use of decreasing variable annual EFs.
5. **The EF was the lower of multiple fossil-fuel based EF options**: The EPA "load-following" EF is lower than EFs produced by averages of fossil-fuel generation from U.S. Energy Information Association data ("EIA Data"; Table 18) and EPF data (e.g., Figure 13). While it is expected that the PACE Project will not only result in generation effects on load-following generators (i.e., it could have some impact on baseload generators), this choice of EF is considered consistent with the principle of conservativeness.

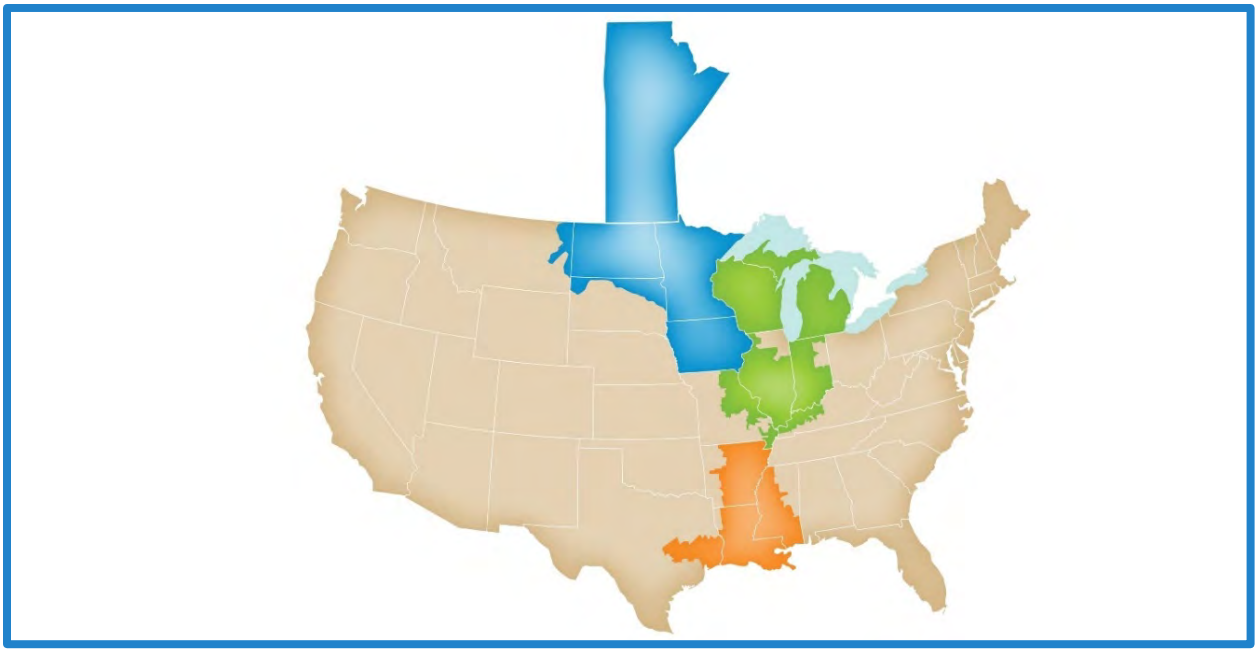
[133] Electricity Project Guidelines – Chapter 10.4.2 (*Operating Margin Method #1: Average Load-Following Emissions*), p.59

4.6.2.3 DIRECT COMBUSTION EMISSION FACTORS

Border states, MN and ND, are two of MH's primary trading areas and, of all the regions in MISO-N (Figure 8), their emission profiles are the most relevant in an assessment of the GHG effects of the PACE Project.

EIA Data provides emissions information for fossil-fuel generation technologies. Table 17 shows the fossil-fuel technology breakdowns for MN and ND in 2018. The method used in this assessment focuses on the proportion of coal and gas, but petroleum and "other" fuels are shown as well. These fuels have a much less significant presence on the grid and generally are impacted much less by variations in cross-border trade.[134]

Figure 10: Map - MISO (MISO-N in Blue)[135]



[134] Note: "Other" includes non-biogenic municipal solid waste, batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, tire-derived fuels, waste heat and miscellaneous technologies. Petroleum generation is significantly more expensive to run than natural gas and coal.

[135] [MISO, 2020]

Table 17 EIA Data – 2018 Fossil-fuel Combustion Technology Emission Rates for MN and ND

	MN			ND		
	GWh	kt CO_2e	t/GWh	GWh	kt CO_2e	t/GWh
Coal	23,455	25,176	1,073	27,541	30,620	1,112
Gas	8,555	4,012	469	1,019	621	609
Petroleum	47	44	945	38	33	861
"Other"	406	573	1,411	52	8	154
All Fuel	32,463	29,805	918	28,650	31,282	1,092

The fossil-fuel generation profiles of both MN and ND remain dominated by coal, however natural gas has been increasing its proportion over time. Over the past 10+ years the average emission rate of MISO-N coal generators has been very consistent (Table 18). As more efficient gas has come online the average emission rate has dropped, but it has been consistent for the last few years as well. As a simplification, petroleum and "other" fossil-fuel generation, were not included in determination of the year-specific EFs for this assessment. Table 17 demonstrates how coal and natural gas dominate the fossil-fuel generation profiles of the region.

Table 18 EIA Data – Gas and Coal Emission Rates for MN and ND (Combined)

	ND and MN - Coal			ND and MN - Gas		
	GWh	kt CO_2e	t/GWh	GWh	kt CO_2e	t/GWh
2009	58,934	64,069	1,087	2,863	1,624	567
2010	56,545	61,188	1,082	4,357	2,293	526
2011	55,368	60,007	1,084	3,371	1,910	567
2012	50,937	55,308	1,086	7,110	3,545	499
2013	50,996	55,737	1,093	6,355	3,188	502
2014	55,351	60,265	1,089	4,104	2,189	533
2015	52,432	57,127	1,090	8,100	3,833	473
2016	49,787	54,089	1,086	9,999	4,841	484
2017	49,538	54,159	1,093	7,384	3,607	489
2018	50,996	55,796	1,094	9,575	4,633	484
2016-2018	**150,321**	**164,044**	**1,091**	**26,957**	**13,081**	**485**

4.6.2.4 EPF FORECAST EMISSION FACTORS

The dispatch order outside MB determines what sources of electricity are on-the-margin which, in turn, determines the market price, and the corresponding emissions intensity (Section 4.6.2). In a locational marginal price electricity market such as MISO's, the marginal unit is the resource which is either producing incremental exports (i.e., imports to MB) or is being displaced by

incremental imports (i.e., exports from MB). Energy price forecasts are important considerations in the creation of industry resource development plans, including choices related to new generation, decommissioning timelines, T&D development, and long-term contracts between entities.

The MISO EF forecast is based on data from MH's EPF. MH's EPF is used in export revenue forecasting which involves valuing transactions where prices are not already defined under contract (e.g., day ahead opportunity exports), and is based on a consensus of multiple proprietary[136] price forecasts from independent consultants; the EPF provides electrical energy (On-Peak Period and Off-Peak Period) and capacity prices for the Minnesota Hub, adjusted to the MB border, of the MISO market.[137] In addition to providing pricing information, these consultant reports provide disaggregated energy generation projections for the MISO-N region.

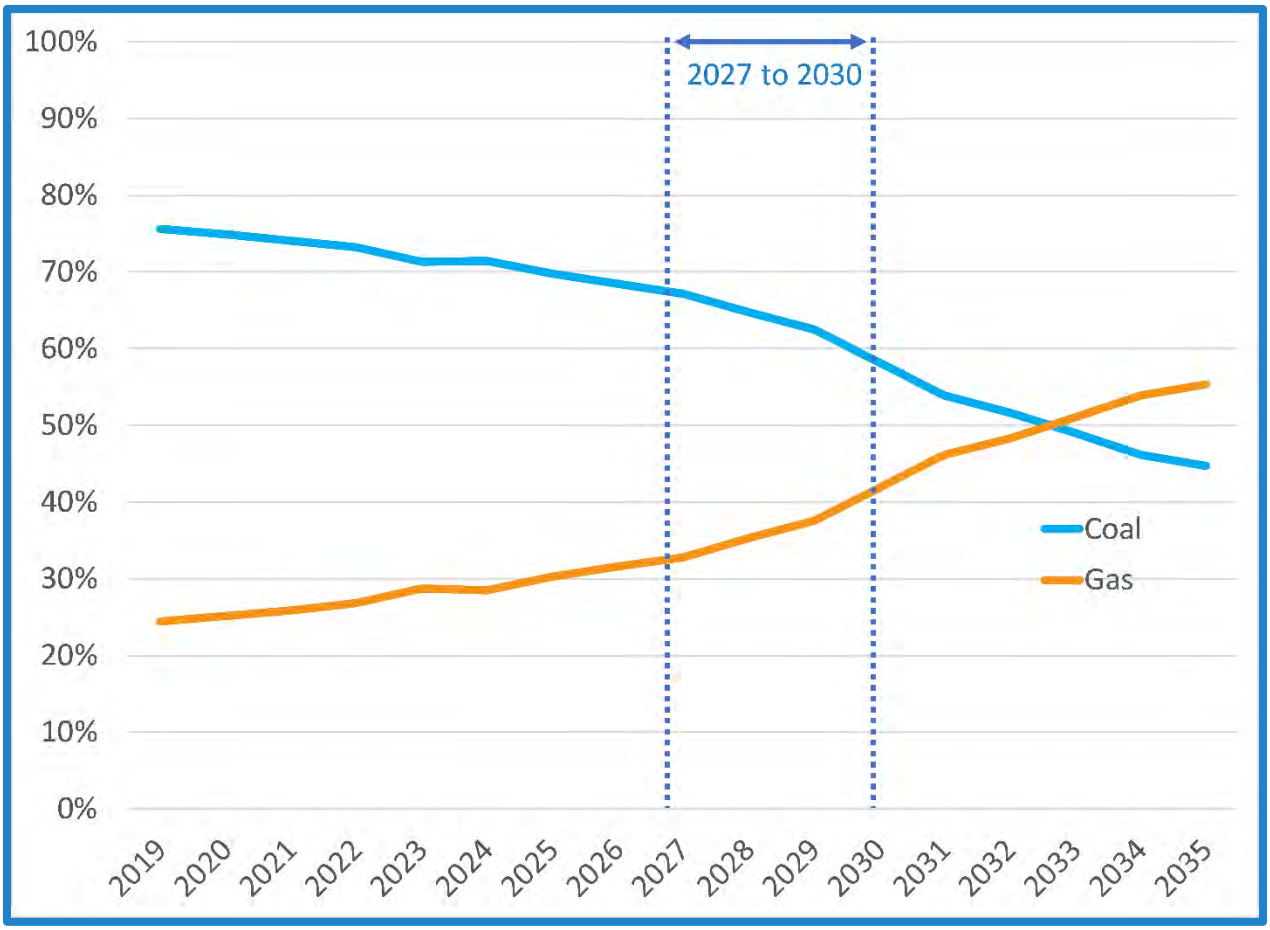
For this assessment, we focus on the trend in coal to gas generation proportions (Figure 11) projected in the EPF consultant data. In MISO-N "*coal and gas can have similar economics, often "crossing over" in the economic ordering, but have very different emissions*" [Murphy et al., 2014]. Slightly different system conditions can cause switching between coal and gas making it inappropriate to assume only gas units will be following load.

As presented in Figure 11, the ratio of coal to gas is currently approximately 4:1; by 2031 it is approaching 1:1. The noticeable change in the MISO grid over time illustrates the merits of using a dynamic EF.

[136] "*As has been discussed in previous proceedings, Manitoba Hydro purchases external price forecasts from a number of forecastors in order to create Manitoba Hydro's consensus forecast…Manitoba Hydro is under a contractual obligation to treat the forecasts as confidential as public disclosure of the forecasts would results in a substantial financial loss to the creators of the forecasts. The forecasts cannot be provided to third parties without prior written consent. Manitoba Hydro has sought consent to provide the forecasts to the PUB and consent has been granted provided they be held in confidence."* [Manitoba Hydro, 2019a]

[137] Note: The EPF also provides natural gas prices at a number of key gas hubs in North America.

Figure 11: Forecast (Consensus Average) of MISO-N % of total coal/gas generation



4.6.2.5 MISO AVERAGE LOAD-FOLLOWING EMISSION FACTORS

U.S. EPA (2020)'s consideration of "*Avoided Emissions from Green Power*" is very comparable to the generation effects resulting from the PACE Project and aligns with the "*Operating Margin Method #1: Average Load-Following Emissions"* described in the Electricity Project Guidelines.[138] "*To compute the avoided emissions benefit, we use a different factor…This factor looks specifically at the generation facilities that are operated coincident with peak demands. These units are the first to shut off when demand is reduced, and therefore better estimate the emissions benefits of reductions in grid supplied electricity use*" [U.S. EPA, 2020]. For the purposes of this study the MROW region EF from U.S. EPA (2020) is considered sufficiently equivalent to the MISO-N region (Figure 12).

[138] Note: "Load-following" can sometimes be considered synonymous with "on the margin" or "marginal", but this is not always the case; Method 1 (Average Load-Following) explicitly excludes baseload or must run plants, whereas Methods 2, 3, and 4 can include these plants.

Figure 12: Map - MROW Region

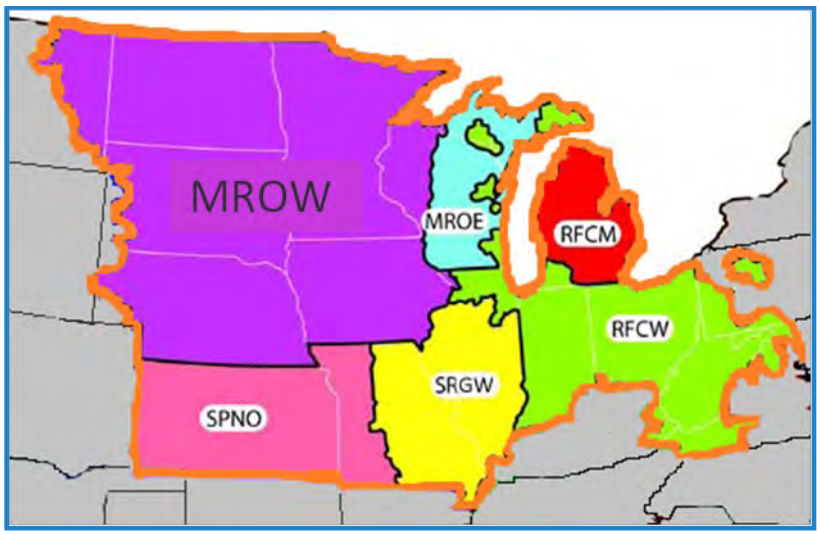


Table 19 compares load-following EFs from U.S. EPA (2020) (i.e., EPA EFs) with average fossil-fuel EFs derived from EPF data. EPA's load-following EFs incorporate all fossil-fuels, further minimizing the impact of the simplification (focusing on coal and gas only) made in Section 4.6.2.4.

Table 19 EIA – Non-Baseload Factors used for Avoided Emissions (t/GWh)

Region	EPA EF [139]	EPF 2019 Avg	EPF 2030 Avg	"NIR"[140] 2019 Avg
MROW[141]	806	943	838	N/A
SK	521	N/A	N/A	819
ON	394	N/A	N/A	406

4.6.2.6 APPLICABILITY OF THE LOAD-FOLLOWING EMISSION FACTORS

The use of load-following EFs (as defined in Chapter 10 of the Electricity Project Guidelines) assumes that only non-baseload fossil-fuel units are displaced by incremental activity resulting from the PACE Project. While this is generally true, incremental cross-border trade is expected to impact baseload and mid-merit fossil-fuel plants, as well as peakers. For example, imports are often timed when market prices are low and baseload fossil-fuel plants are, in fact, partially load-following. It is also appropriate to be cautious when making blanket assumptions regarding the

[139] *Figure 8* (p.14) and *Figure 9* (p.15) from U.S. EPA [2020].

[140] Refer to Table 20and Table 21.

[141] Note: MROW (Midwest Reliability Organization/West) is the "eGRID" [U.S. EPA, 2020] regional description of the "Upper Mid-West" and is comparable to MISO-N but includes some additional regions, including South Dakota and Nebraska.

difference between Off-Peak Period and On-Peak Period coal/gas mixes in load-following EFs. Expectations are that "*shifting energy between peak and off-peak period means trading one mix of coal and gas energy for a somewhat different mix, for only a modest overall effect*" [Murphy et al., 2014].

There is substantial complexity and uncertainty in determining what the long-term average load-following EFs are, in relation to incremental PACE Project activity, as on-the-margin fossil-fuel emission rates change continually: Minute-to-minute, On-Peak Period to Off-Peak Period, day-to-day, and season-to-season. The actual marginal EF during cross-border trade events depends heavily on what MH's current watershed flow conditions[142] are and how the electricity system is being used because these variables will affect the quantity and timing of cross-border energy transactions (Section 4.1.4). An EF in MISO-N weighted based on the timing of cross-border trade with MB would therefore not match an annual EF of MISO-N (i.e., the Table 19 MROW value).

In summary, the application of an average marginal EF (as defined in Chapter 10 of the Electricity Project Guidelines) or a fossil-fuel grid-average EF, instead of the average load-following EF applied in this assessment, would not necessarily result in an increase in accuracy. The more simplified approach applied to this assessment was deemed reasonably appropriate and relevant; it was also deemed the conservative choice (Section 4.6.2.2).

4.6.2.7 MODIFICATION OF THE EPF DATA

Notwithstanding the limitations (Section 4.6.2.6) of using the Table 19 MROW load-following EF, it is used in this assessment as a starting point for the downward trend in the MISO EF. Due to data availability and practical limitations, the unmodified trended EFs are not load-following EFs. The generation and emissions from baseload, mid-merit, and peaker coal and gas fossil plants were all averaged to generate the export region's projected average combustion EFs. This is an assessment limitation, as ideally these EFs would reflect an average of what fossil-fuel power plants were actually load-following during specific cross-border trade activities.

The EPF data based EF forecast ("Direct - EPF" in Figure 13) is, however, adjusted downward approximately 16% (not upwards), so that the 2019 EF becomes 806[143] t/GWh ("Direct –

[142] Note: The complexity of determining weighted average marginal EFs within MISO, based on Manitoba Hydro's exports/import activity, is greatly increased by the MB Electrical System's hydrologic variability. Were it to be calculated, then 107 flow conditions would need to be modelled, assigned 107 distinct average marginal EFs, and assessed at very fine levels of granularity.

[143] Note: For simple analysis Manitoba Hydro currently employs a 750 t/GWh EF to calculate the implications of its significant net exports and corresponding GHG displacement outside of MB. As demonstrated by the 806 t/GWh factor, this EF is conservative

Modified EPF" in Figure 13) and matches the Table 19 MROW EF. Therefore, the limitation noted above is mitigated by applying the principle of conservativeness: choosing the lower starting point for the forecast.

Figure 13: Forecast Combustion EFs for MISO-N

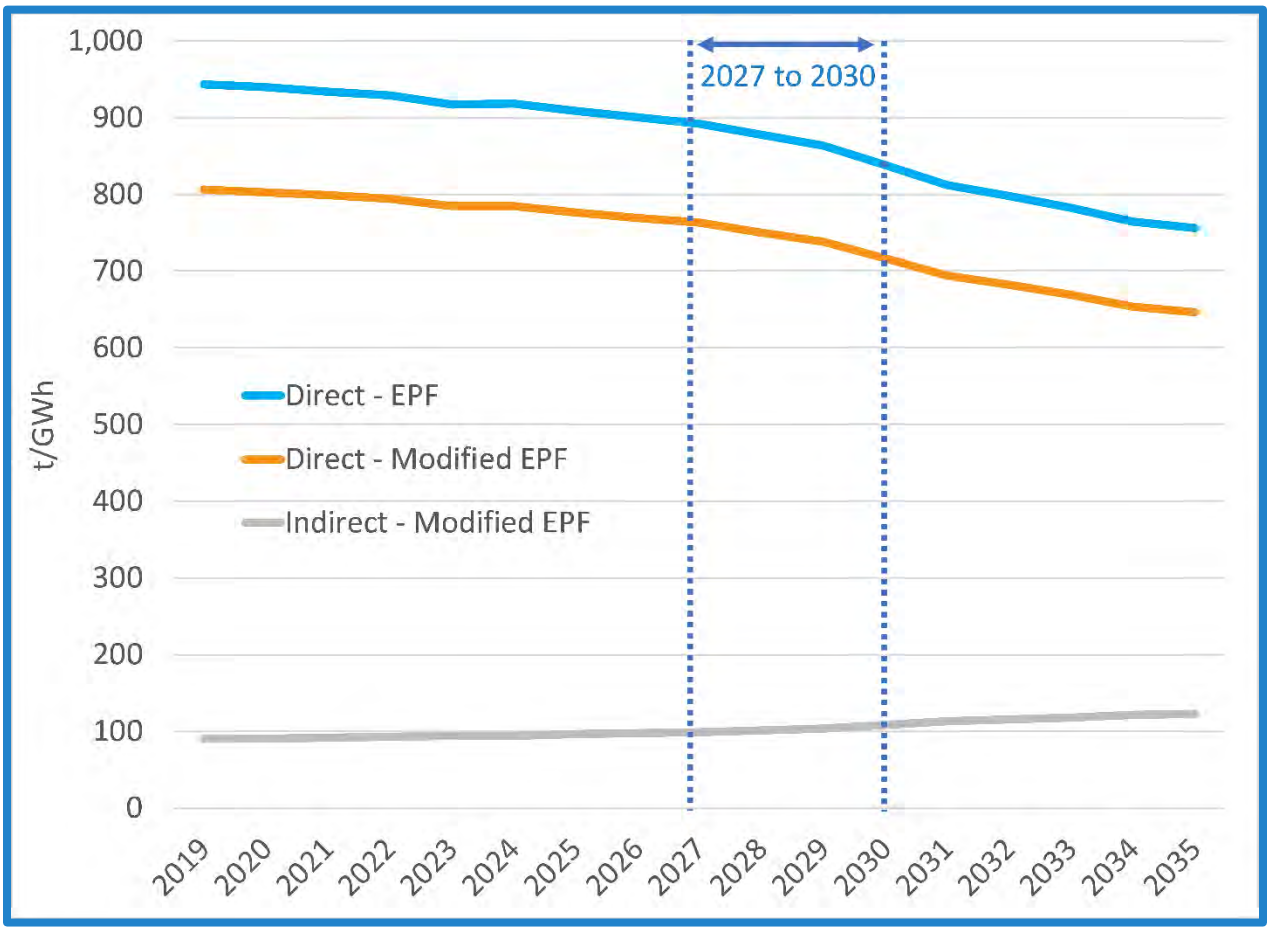


Figure 13 also displays the projected indirect EFs due to the production, processing, and transportation of the fuel consumed in the impacted generating stations (i.e., due to indirect generation effects). This factor increases over time as the indirect implications of natural gas combustion are assumed to be significantly higher than those of coal combustion (4.6.1). For conservativeness, this EF ("Indirect – Modified EPF" in Figure 13) was modified downward approximately 16% as well.

(when evaluating emission reductions or "benefits"). As demonstrated by Figure 11, and Table 23, it would be a reasonable approximation if applied over the entire Effective Assessment Period.

4.6.2.8 MISO-N (MROW) TRENDS

As indicated in Figure 11, the ratio of coal to gas is declining in MISO-N. Coal retirements are expected to continue and are likely to accelerate. Despite attempts to protect coal units, retirements during the Trump administration were higher than during the last 4 years of the Obama administration.[144] Beyond government policies and regulations, coal units are increasingly retiring as the economics of both gas plants and ever increasing renewables diminish coal plant profitability with time, causing "economic" retirements.[145]

Renewable-heavy generation expansion sequences are being pushed by economics as state policies, such as renewable portfolio standards, have often been reached and exceeded. Customer choice is also pushing utilities to decrease carbon intensity of generation.[146] While renewables will continue to alter energy markets in the long term, the recent record low natural gas prices are driving coal increasingly to the margins and out of market. The inclusion of gas generation in future MISO-N generation expansion sequences will depend on economics around renewable alternatives (including battery storage) and on local and national climate regulations.

4.6.2.9 ADDITIONALITY OF REDUCTIONS IN MISO-N (MROW)

The Climate Lens does not discuss the concept of additionality; however, it is discussed in the Project Protocol: "*The concept of additionality is often raised as a vital consideration for quantifying project-based GHG reductions. Additionality is a criterion that says GHG reductions should only be recognized for project activities that would not have "happened anyway." While there is general agreement that additionality is important, its meaning and application remain open to interpretation. The Project Protocol does not require a demonstration of additionality per se. Instead, additionality is discussed conceptually in Chapter 2 and in terms of its policy dimensions in Chapter 3. Additionality is incorporated as an implicit part of the procedures used to estimate baseline emissions (Chapters 8 and 9), where its interpretation and stringency are subject to user discretion*" [WRI & WBCSD, 2005][147].

This assessment applies the performance standard approach to additionality outside of MB. A reasonable choice of performance standard outside of MB, in this case within MISO, is therefore paramount in the estimation of emission reductions. "*The challenge is to set the performance standard at a sufficiently stringent level to ensure that, on balance, only additional GHG*

[144] (E.g., Storrow, 2020]
[145] [E.g., St. John, 2020]
[146] [E.g., Farrell, 2018]
[147] Project Protocol, Chapter 1.5 (*Project Protocol Treatment of Additionality), p.8*

reductions are quantified" [WRI & WBCSD, 2005][148]. The applications of the following conservative approaches, noted within Section 4.6.2 (and its subsections), makes it more probable that the performance standard is sufficiently stringent:

1. The lower of two proposed 2019 EFs was chosen: The EPA EF versus the unadjusted EPF derived EF (Table 19).
2. The direct EFs reduce yearly to avoid over-estimation of future reductions (Figure 13).

Climate change policy that puts a legislated limit on emissions in a region can make it arguable as to whether any one specific GHG project produces additional reductions, unless it can be shown reductions go beyond those legislated limits. There are currently no direct caps on electricity sector emissions in MISO, however future limits, such as those proposed under the cancelled Clean Power Plan, could be enacted. MISO states do however have Renewable Portfolio Standards (MN has a Renewable Portfolio Standard; ND has a voluntary renewable energy objective) which obligate or encourage utility companies to meet mandatory renewable energy targets. MH-produced Renewable Energy Credits can be used for Renewable Portfolio Standard compliance by companies, however qualifying renewable technologies differ by state and program type.

It is beyond the scope of this assessment to model the additionality of MISO reductions under various energy policy futures. Renewable Portfolio Standard targets in the U.S. have often been voluntarily/naturally exceeded (Section 4.6.2.8), in which case additional supply of renewable energy is truly additional. Also, emission caps/targets are adjusted over time as a response to changes in emissions levels, which means that over the long term most reduction measures (e.g., new renewable generation projects) are additional (partially or in full) as, in aggregate, they allow for future caps/targets to be more stringent.

This assessment assumes that net emission reductions in MISO are fully additional, but it is acknowledged that future policy measures enacted in the U.S. could potentially disprove that assumption. This approach will help "*provide meaningful insight*" [Infrastructure Canada, 2019][149] regarding the potential benefits of the PACE Project.

[148] Project Protocol, Chapter 2.14 (*Additionality), p.16*

[149] Climate Lens, Section 1.2 (*Why Implement the Climate Lens?)*

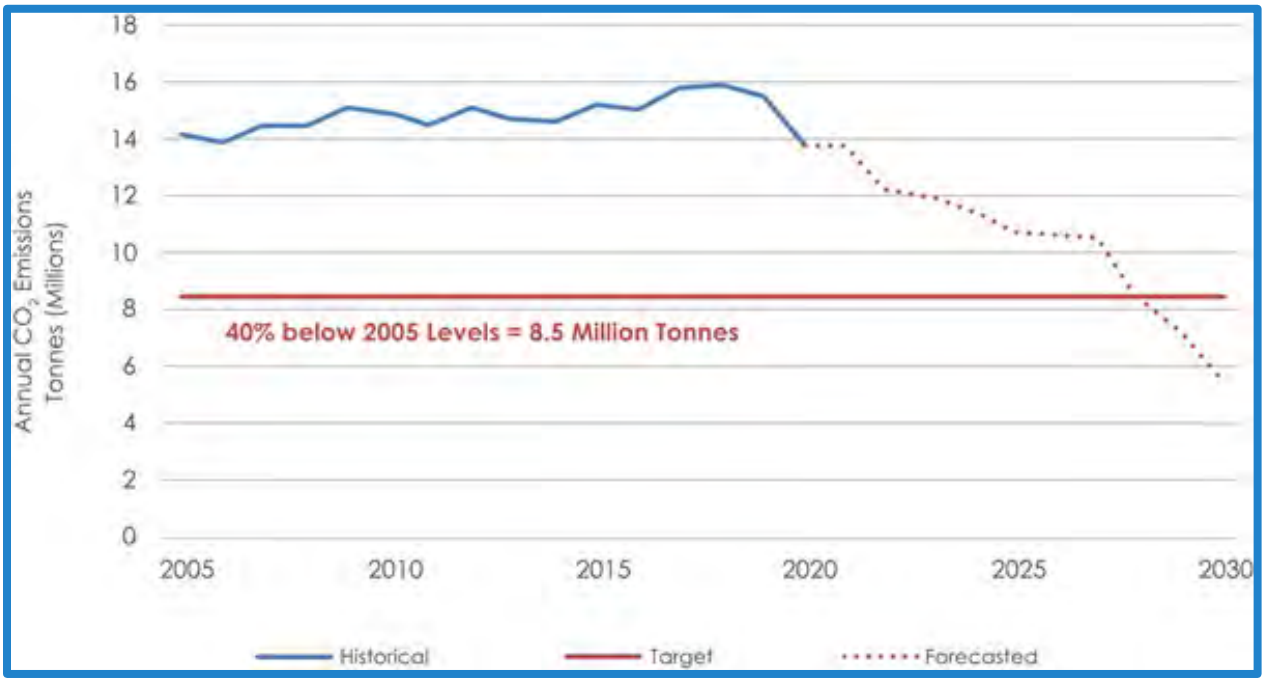
4.6.3 SASKATCHEWAN GRID EMISSION FACTORS

As with the U.S. factor, a load-following EF is used to assess the generation effects within SK as a result of the PACE Project. MH does not model the export price in SK and ON as they do with MISO (Section 4.6.2.4) and therefore similar modelled generation projections are not available.

4.6.3.1 PROVINCIAL GRID TRENDS

SPC has a goal of reducing emissions by 40% by 2030 (Figure 14). This aligns with federal regulations limiting the use of coal generation which were committed to by SK in an equivalency agreement[150] with the Canadian government. Non-carbon capture and storage coal generation after 2030 is assumed to be zero as per the Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations.[151] SPC's current fossil generation mix (on an energy basis) is approximately half gas and half coal. The resulting fossil-fuel generation combustion intensity is currently around 817 t/GWh (Table 20).

Figure 14: SPC Emission Trend[152]



[150] [ECCC, 2019]

[151] [Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations, 2012]

[152] [SPC, 2020]

Table 20 Grid Combustion EFs for SK (Combustion Generation Only)[153]

	GWh	kt CO_2e	t/GWh
2014	14,730	15,180	1,031
2015	19,090	16,120	844
2016	20,220	15,980	790
2017	20,660	16,530	800
2018	19,320	16,100	833
2019	19,270	15,780	819
2017-2019	**19,750**	**16,137**	**817**

4.6.3.2 SASKATCHEWAN AVERAGE LOAD-FOLLOWING EMISSION FACTORS

U.S. EPA (2020) analysis suggests that SK's current average load-following EF is around 521 t/GWh (Table 19), quite a bit less than its fossil-fuel combustion average of 831 t/GWh in 2018. This load-following EF is only about 10% higher than SK's recent natural gas emission rate of 475 t/GWh (Table 21).

Following the principle of conservativeness, this assessment will incorporate the EPA EF of 521 t/GWh (plus 156 t/GWh for indirect effects using the 30% assumption noted in Section 4.6.1) from 2027 through 2029. For 2030 it will be conservatively assumed that the average load-following EF in SK will match that of ON (Section 4.6.4.1), which currently has no coal generation.[154]

Table 21 Combustion Technology EFs for SK[155]

	Coal			Gas		
	GWh	kt CO_2e	t/GWh	GWh	kt CO_2e	t/GWh
2014	10,200	12,600	1,235	4,530	2,580	570
2015	12,100	12,600	1,041	6,990	3,520	504
2016	12,000	12,200	1,017	8,220	3,780	460
2017	12,000	12,500	1,042	8,660	4,030	465
2018	10,300	11,700	1,136	9,020	4,400	488
2019	10,000	11,400	1,140	9,270	4,380	472
2017-2019	**10,767**	**11,867**	**1,102**	**8,983**	**4,270**	**475**

[153] Table A13–9 (*Electricity Generation and GHG Emission Details for Saskatchewan*) from ECCC (2021).

[154] Note: net energy flows to and from both SK and ON are relatively small and depend on system representation. From a GSPRO perspective it is beneficial to apply the same EF to each region and consider the GHG effects in both in aggregate.

[155] Table A13–9 (*Electricity Generation and GHG Emission Details for Saskatchewan*) from ECCC [2021].

4.6.3.3 ADDITIONALITY OF EMISSION REDUCTIONS IN SASKATCHEWAN

As with the MISO region (Section 4.6.2.9), it is beyond the scope of this assessment to model future SK electricity sector emissions. Emissions from electricity generation in SK until 2030 are controlled by a federal equivalency agreement (4.6.3.1). *"As part of this Agreement, it is recognized that the MRGG regulations include the following mandatory greenhouse gas emissions limits for the electricity sector in Saskatchewan for the years 2018 to 2029:*

a. *for the calendar years 2018 to 2019, not greater than 33.5 Mt of carbon dioxide equivalent, and*
b. *for the calendar years 2020 to 2024, not greater than 77 Mt (or 82 Mt if a carbon capture and storage system is installed at Boundary Dam units 4 & 5) of carbon dioxide equivalent, and*
c. *for the calendar years 2025 to 2029, not greater than 64.5 Mt of carbon dioxide equivalent."* [ECCC, 2019]

If, during the Effective Assessment Period up to 2030 (i.e., 2027-2029), the electricity sector emissions in SK are at those limits, then it could be argued any emission reductions in SK as the result of the PACE Project are not additional as they would otherwise have been obtained by alternative methods; however, the SK government voluntarily agreed to the equivalency agreement under the expectation they would surpass these limits and SPC expects to surpass its long term reduction goal (Figure 14). As a purpose of the Climate Lens is to "*provide meaningful insight*" [Infrastructure Canada, 2019][156], and an assumption of "no additional impact" (i.e., a reduction EF of 0 t/GWh) would not support this purpose, the reasonable assumption will be made that emissions in SK are below mandatory limits so that contributions from PACE Project GHG effects in SK are in fact beneficial and "additional".

4.6.4 ONTARIO GRID EMISSION FACTORS

As noted in the Section 4.6, it is assumed that non-MB generation effects resulting from the change in net exports between MB and ON specifically occurs in ON and not in any secondary markets. This is a more limiting simplification for ON as the IESO actively participates in inter-regional electricity trade, whereas SK is comparatively much more 'islanded'. As ON's combustion EF is lower than most of the region (i.e., MROW's EF), this simplification results in conservative results.

[156] Climate Lens, Section 1.2 (*Why Implement the Climate Lens?).*

4.6.4.1 ONTARIO AVERAGE LOAD-FOLLOWING EMISSION FACTORS

ON hasn't had coal generation since 2014 due to provincial legislation[157]. As a result, natural gas is the dominant combustion source on the grid. The intensity of its average gas unit has been fairly consistent, around 407 t/GWh from 2017-2019. This is only slightly higher than the EPA load-following EF of 394 t/GWh (Table 19).

Table 22 Combustion Technology EFs for ON[158]

	Natural Gas			Other Fuels[159]		
	GWh	**kt CO_2e**	**t/GWh**	**GWh**	**kt CO_2e**	**t/GWh**
2014	14,700	5,810	395	780	120	154
2015	15,300	6,170	403	640	80	125
2016	12,700	5,420	427	900	120	133
2017	5,900	2,420	410	870	140	161
2018	9,800	3,970	405	840	120	143
2019	9,400	3,820	406	750	60	80
2017-2019	**8,367**	**3,403**	**407**	**820**	**107**	**130**

If a natural gas unit is the assumed load-following unit, then the resulting EF cannot be much lower than 394 t/GWh as new combined cycle[160] natural gas units tend to perform in the 350 to 400 t/GWh range. And, it is unrealistic to assume that the only load-following gas units are combined cycle units, and not simple cycle units. A more probable future scenario, that results in a lower EF than 394 t/GWh, is one where biomass generators become significant contributors to the average load-following emission rate, but this is unlikely to occur prior to the end of the Effective Assessment Period. This assessment will incorporate a flat 394 t/GWh EF for ON generation effects (plus 118 t/GWh for indirect effects) throughout.

4.6.4.2 ADDITIONALITY OF REDUCTIONS IN ON

Effective July 3, 2018, the ON government cancelled their cap and trade regulation. There is currently no legislated cap on emissions provincially or federally. Therefore, as with MISO (Section 4.6.2.9) and SK (Section 4.6.3.3), reductions in ON as a result of the PACE Project will be

[157] [Ending Coal for Cleaner Air Act, 2015]

[158] Table A13–7 (*Electricity Generation and GHG Emission Details for Ontario*) from ECCC [2021].

[159] Note: Includes emissions from the combustion of refined petroleum products (light fuel oil, heavy fuel oil, and diesel), petroleum coke, still gas and other fuels not easily categorized.

[160] Note: The most efficient natural gas units on the grid are combined cycle units. Units can potentially approach efficiencies just over 60%.

presented as beneficial and additional.

4.6.5 COMPARISON OF NON-MB EMISSION FACTORS

Table 23 contrasts the EFs used to assess the generation effects in non-MB regions. As a result of coal generation impacts, the MISO direct EF is higher at the start of the Effective Assessment Period (i.e., 2027) than at the end of the Effective Assessment Period (i.e., 2030). The 2027 EF is also lower than the EPA EF (Table 19), which was assumed to represent 2019 emission intensity. Progressive GHG regulations have lowered the baseline emission intensities within Canadian jurisdictions.

Table 23 Average Fossil-Fuel Load-Following EFs (Non-MB Generation Effects)

	Direct EFs		Indirect EFs	
	U.S.	Canada	U.S.	Canada
2027	763	458	99	137
2028	750	458	101	137
2029	738	458	104	137
2030	716	394	108	118

The indirect generation effect EFs in for the U.S. are lower than they are in Canada due to the indirect effects of coal combustion being less significant than natural gas combustion (Section 4.6.1). For this assessment it is assumed that the upstream implications of natural gas combustion, on a percentage basis (30% adder), will be comparable in the U.S. and Canada, however Canada's more progressive methane regulations[161] make it likely that natural gas upstream effects will be less, per GWh, in Canada than in the U.S. As noted in Section 4.1.8.4 these EFs are meant to provide insight into the potential upper range of generation effects. Comprehensive analysis of upstream effects, and potential differences between regions, was outside the scope of this assessment.

4.7 CONSTRUCTION RELATED EMISSIONS

It is assumed that there will be no net change in construction related emissions between the Baseline and Project Scenarios as identical PACE Project infrastructure is eventually constructed

[161] [Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector), 2018]

in both scenarios.[162] The timing of emissions will be different, with Project Scenario construction assumed to take place from 2023 to 2027 and Baseline Scenario construction assumed to take place from 2023[163] to 2030. For context, and to support environmental assessment activities, an estimate of gross construction emissions has been incorporated into this assessment.

Gross construction emissions will result from the construction of Wash'ake Mayzoon and D83W, the reconfiguration of P81C, construction of a new 3 km long 66 kV line, and minor upgrades at some existing MH transmission stations (Section 3.4); emissions resulting from the reconfiguration of P81C[164], construction of the new 66 kV line[165], and upgrades at the existing stations will be negligible (compared to constructing a completely new station and transmission line) and have been placed outside the scope of this assessment.

Combined on-site construction emissions (at Wash'ake Mayzoon and along D83W) will be noticeably smaller than embedded supply-chain emissions. While the need for an estimate of supply-chain emissions is explicitly excluded from Climate Lens' mandatory requirements, supply-chain emissions have been estimated at a high-level to provide a useful point of Comparison with direct on-site construction emissions.

The estimate of gross construction emissions incorporated into this assessment does not have a high-level of accuracy. As net construction emissions are assumed to be zero (for the purpose of this assessment, where the PACE Project is built in both the Baseline and Project Scenario) this was deemed an appropriate approach; it was deemed reasonable to use readily available construction information and LCA EFs and not undertake any comprehensive additional analyses; however, where detailed construction information was readily available, it has been incorporated.

Design and construction assumptions related to Wash'ake Mayzoon and D83W are based on preliminary project design scopes and similar MH projects (e.g., the De Salaberry East

[162] Note: As construction related technology evolves there is the potential for construction of similar projects in the future to result in less emissions; however, the 44-month difference in ISD is considered negligible from that perspective (e.g., it is not expected that heavy-duty fully-electric construction vehicles will become significantly more available in that short time frame).
[163] Note: the ISD of the Wash'ake Mayzoon Station is assumed to be 2025 in both the Baseline and Project Scenarios, though so long as its ISD is prior to D83W the exact timing has no bearing on the primary effects of the Pace Project (Sections 4.1.6 and 4.1.7).
[164] Note: E.g., the P81C reconfiguration will require four new structures whereas D83W is expected to require between 215 and 247.
[165] Note: The 66 kV line will likely be a single pole structure, compared with the much more robust D83W structures. And, it's length will be much shorter than D83W as well.

Transmission Station[166]); the final design will change from what was assumed herein. At the time of this assessment multiple route options are being considered for D83W, there is no currently preferred route, and the final route has not been selected. "*The final transmission line design will vary based on the final approved route, more detailed investigation of site conditions, contract requirements, and evolving standards and regulations"* [Manitoba Hydro, 2014a][167]. Construction assumptions incorporated into this assessment are intended for emissions estimation purposes only.

4.7.1 CONSTRUCTION ACTIVITIES

For this assessment the PACE Project has been broken down into five major construction activities:

1. Manufacture of D83W components/materials (supply-chain)
2. Manufacture of Wash'ake Mayzoon components/materials (supply-chain)
3. Transportation of construction components/materials (supply-chain)
4. Construction of D83W
5. Construction of Wash'ake Mayzoon

1. Manufacture of D83W components/materials (supply-chain)

Material estimates for D83W components (Table 28) are based on preliminary project scopes. As there is currently no preferred route, this assessment considered assumptions for two routes, "B_4" and "B_37661", to present a possible range of emission estimates. Assumed material totals are presented in Table 28. Key assumed design elements are as follows:

1. B_4 will be 85 km long. B_37661 will be 98 km long.
2. D83W is designed for three 954 MCM 54/7 ACSR (Aluminum Conductors, Steel Reinforced) "Cardinal" type conductors, 30.4 millimetres ("mm") in total diameter, to be carried by the structures. Each conductor is assumed to be 5% longer than the length of the line to account for jumpers, wastage, sag, and maintenance spares.
3. Current design calls for two 9 mm total diameter galvanized steel ground wires (i.e., shield wires) to be strung at the top of the structures (7 strand grade 1300 as per CSA CAN/CSA-G12) for the majority of the line, and 7 #7 (i.e., 7 strands, 11 mm diameter) Alumoweld (or similar to meet fault dissipation requirements) to be strung near Dorsey Station. Proper sizing of the Alumoweld portion will be determined during detailed design. For

[166] Note: A project description is provided in Manitoba Hydro (2017c).

[167] PdB Transmission Project EAR – Chapter 2.2.1 (*Project Description – Project Components - Pointe du Bois to Whiteshell Stations 115 kV Transmission Line (PW75)*), p.1

simplicity[168], two 9 mm steel wires were assumed for the entire length.

4. D83W will be comprised of three common tower types: self-supporting suspension towers ("A Structures"), self-supporting light angle towers ("B Structures"), and dead-end (i.e., heavy-angle) self-supporting towers ("D Structures" and "F Structures"). Since the majority of the ROW will be over farmland, no guyed towers are assumed. This is a conservative assumption as guyed towers weigh less than self-supporting towers. All towers are assumed to be comprised of galvanized stainless steel. Tower quantities are broken down as follows:
    a. B_4 will require 215 towers. Due to its longer length, B_37661 will require 247 towers. In both cases the average design span length between towers is approximately 400 m, with spans varying to suit local terrain.
    b. "*Heavy angle and dead-end structures will be required at specific locations to accommodate line redirection and to terminate the transmission line into the stations"* [Manitoba Hydro, 2014a][169]. Based on the number of directional changes, B_4 will require 22 D or F Structures and B_37661 will require 31. Tower weights (excluding foundations) are assumed to average 17.7 tonnes, based on the most common tower extension weight.
    c. Remaining towers for both B_4 and B_37661 will be self-supporting suspension towers: B_4 will require 191 A Structures and two B Structures. B_37661 will require 212 A Structures and four B Structures. The weight of A Structures and B Structures are assumed to be 8.6 and 10.3 tonnes respectively.
5. All tower foundations are assumed to be piled (no mat foundations), based on terrain, tower design (all are self-supporting), and recent construction experience: 85% of foundations are assumed to be concrete[170] and 15% helical steel. Each of the four legs per tower will have its own concrete pile or helical pile configuration. Sizes are broken down as follows:
    a. Concrete piles will be 9 m in length.
        i. A and B Structures will require 864 mm diameter piles. Total weight is 50.66 tonnes per tower.[171]
        ii. D and F Structures will require 2,483 mm diameter piles. Total weight is

[168] Note: Ground wire mass is approximately 2.5% of the expected total weight of steel and aluminum of D83W. This simplification impacts total weight by <0.1%.

[169] PdB Transmission Project EAR – Chapter 2.2.1.1 (*Project Description – Project Components - Pointe du Bois to Whiteshell Stations 115 kV Transmission Line (PW75) - Structures*), p.2

[170] Note: Concrete piles will likely *"be cast in place, which involves drilling a shaft into the soil, placing reinforcing cage and filling it with concrete"* [Manitoba Hydro, 2017c], but pre-fabricated driven piles are also possible. Based on the applied quantification methods either option results in the same assumed emissions.

[171] Note: Assumed concrete density is 2.4 tonnes/m^3.

403.34 tonnes per tower.

b. Helical steel piles will be 219 mm in diameter (with 3 helices), weighing approximately 0.68 tonnes each.
    i. A and B Structures would require 2 piles per leg. A 0.045 tonne cap is also required. Total weight is 5.62 tonnes per tower.
    ii. D and F Structures would require 5 piles per leg. A 0.18 tonne cap is also required (4 times the size of the smaller A and B Structure cap). Total weight is 14.33 tonnes per tower.

6. Based on general transmission design guidelines it was assumed each D or F Structure would require 12 jumper insulators and 14 dead-end insulators in each direction per phase, with a total insulator weight of 819 kg per tower. A or B Structures would require 12 insulators per phase, with a total insulator weight of 161 kg per tower. Insulators will likely be comprised of ceramic or glass material.
7. D83W components/materials (e.g., towers, conductors, shield wires, and insulators) may be manufactured in Canada or internationally. Products being sourced from Asia are not unusual. For this assessment, India was selected as the presumed source location because application of that assumption results in higher emissions; but, the actual source location of the components/materials is unknown at this time.
8. The original source for cement is assumed to be Edmonton, based on recent projects and Canadian availability. It is assumed that concrete will be mixed near or on-site and aggregate will be obtained from within a 100 km radius.

The manufacture of D83W components will require multiple processes (e.g., steel making and rolling, forging, extrusion, etc.). As an approximation of the entire process, LCA EFs for both the production of galvanized steel sheets and the forging of steel bars were applied to the entire weight of steel (Table 25). Similarly, LCA EFs for the production of aluminum conductor were applied to the entire weight of aluminum (Table 25). EFs for other materials (e.g., insulator materials) are based on the overall average of the main materials. 15% of the total concrete weight is assumed to be cement, with a cement production LCA EF listed on Table 25 as well. This same approach for estimating supply-chain emissions was applied to the "Manufacture of Wash'ake Mayzoon components/materials (supply-chain)".

2. Manufacture of Wash'ake Mayzoon components/materials (supply-chain)

High-level material estimates for required station equipment (Table 28) are based on the preliminary project scope with some assumptions pulled from design of the De Salaberry East

Transmission Station[172]. Material totals are shown in Table 25 and include aggregated estimates for electrical apparatus (e.g., transformers, disconnects, circuit breakers etc.), the control building (including major internal equipment), above ground conductors, the below-grade grounding system, foundations (for the control building and electrical apparatus), yard cover, electrical apparatus supports, take-off structures (e.g., gantry towers), and fencing. For simplicity, some minor station components (e.g., the control building washroom) were left out of the scope of the overall material estimate.

Approximately 37% of the overall weight of material (excluding foundations and yard cover) is due to the new 230-66 kV power transformer, which is assumed to be approximately 155 tonnes (filled with oil)[173]. Structural steel for the electrical apparatus supports, takeoff structures, control building, and fencing was estimated at approximately 170 tonnes, or 40% of the overall weight of material. While some components would likely originate from closer to Wash'ake Mayzoon (e.g., the fencing), for consistency and conservativeness India will be the presumed source location for all materials (excluding yard cover and concrete foundations).

Consistent with methods applied to the estimation of supply-chain emissions from the "Manufacture of D83W components/materials (supply-chain)", uniform material specific EFs will be applied separately to the weight of copper (wire EF), aluminum (wire EF), steel (bars EF), and insulating oil (Table 25). EFs for other materials (e.g., ceramics) will be based on the overall average of these four main materials. The approach for estimating emissions related to concrete foundations was also the same as applied to D83W.

3. Transportation of construction components/materials (supply-chain)

As noted above, for conservativeness, India is the assumed manufacture location for estimating transportation emissions for steel, aluminum, and copper materials. Metal-based materials and equipment will be assumed to be transported by ocean to Vancouver, then by rail to Portage, and then by road to site. Transportation emissions for diesel (and insulating oil) are embedded in the "Produce and Deliver Diesel" EF (Table 25).

Cement is assumed to be transported by rail from Edmonton to Portage and then by road to site. For PW75 (the transmission line considered as part of the PdB Assessment) it was assumed that "*Aggregate material will be required for tower foundation construction. This material will generally be obtained from within the ROW and existing licensed borrow areas. In the event that*

[172] Note: A project description is provided in Manitoba Hydro (2017c).

[173] Note: Approximate transformer mass breakdown is: 22 tonnes steel; 90 tonnes copper; 43 tonnes oil.

additional borrow area locations are developed, it is expected that these areas will be very small in size and situated close to existing access" [Manitoba Hydro, 2014b][174]; however, given the prairie land-cover for the D83W ROW it is reasonable to expect aggregate material will likely be sourced from outside of the ROW from local suppliers (no new borrow areas would need to be developed). It is further assumed that the fenced in area[175] (3 ha) of the Wash'ake Mayzoon will be covered ("yard cover") with compacted granular fill (minimum 450 mm deep) topped with 150 mm deep granite isolation stone. A conservative average source distance of 100 km was assumed for estimating the transportation emissions of aggregate and yard cover since no specific supplier is currently identified.[176]

Alternative source locations (than India) for steel, aluminum, and copper would likely result in lower transportation emissions; however, Table 26 shows that transportation emissions make up less than 10% of overall life cycle emissions for these materials, even with this conservative assumption.

4. Construction of D83W

Estimated workforce requirements were assumed to be proportional based on project scope to those presented in the PdB Transmission Project EAR:

- 1,539 person-months (842 person-months[177] * 85 km/46.5[178] km) for the construction of B_4, including the mobilizing phase, clearing, construction, and demobilization.
- 1,774 person-months (842 person-months * 98 km/46.5 km) for the construction of B_37661, including the mobilizing phase, clearing, construction, and demobilization.

"*It is expected that…existing local accommodations will be used for the most part for housing the transmission construction workforce*" [Manitoba Hydro, 2014a][179]. The assumed typical housing locations for the workforce are Portage and Winnipeg due to their relative proximity to D83W,

[174] PdB Transmission Project EAR – Chapter 7.2.1.1 (*Effects Assessment and Mitigation – PW75 115 kV Transmission Line – Physical Environment - Physiography*), p.2

[175] Note: It also assumed that 6.5 ha of farmland may be lost due to the construction of Wash'ake Mayzoon, with 17 ha potentially lost due to future development of the transmission and distribution system around the station; however, these expanded areas will not be covered with granular fill, and areas outside of the fence in area are assumed to continue growing low-lying vegetation, similar to farmland.

[176] Note: For every 10 km of distance between the supplier and site emissions increases by approximately 32 tonnes.

[177] [Manitoba Hydro, 2014a]

[178] Note: PW75 is assumed to be 46.5 km in length.

[179] PdB Transmission Project EAR – Chapter 2.2.3.1 (*Project Description – Project Components – Project Construction – PW75 115 kV Transmission Line*), p.17

with the average commute distance conservatively[180] assumed to be 40 km.

Construction equipment will include feller-bunchers, skidders, bulldozers, drill rigs, backhoes, excavators, cranes, trucks, and other equipment[181]. This assessment assumes that the typical construction vehicle would be an aerial device vehicle (e.g., a bucket truck) and that the vehicles would be left on-site while workers commuted from Portage or Winnipeg daily. It is assumed that there will be one major construction vehicle for every three workers and that workers will arrive on site using one light duty truck for every three workers. Construction vehicles are assumed to consume, on average, twice the 3.4 L/hour rate of fuel required to continually idle without load over the course of 10 hours a day. The doubling incorporates a high-level estimate of average vehicle loading under various seasons and work requirements.

An exception to the above is that, in addition to the assumed 6.4 L/hour average consumption rate (per vehicle) throughout construction, additional fuel is assumed to be consumed for the two most energy intense construction activities:

- Based on assumptions from similar projects, 900 L of diesel fuel is consumed for every hectare ("ha") of forested area cleared on the ROW; however, only 6.96 and 1.74 ha of ROW is assumed to require clearing for B_4 (Table 31) and B_37661 (Table 32) respectively.
- While crane erection of the towers is presumed, for conservativeness it has been assumed that all towers are erected via heavy duty helicopter at a rate of 750 L of fuel per tower.[182]

5. Construction of the Wash'ake Mayzoon

Emissions estimation methods for the construction of the Wash'ake Mayzoon are similar to those applied to the "Construction of D83W". Key differences are as follows:

- Estimated workforce requirements are presented in Table 24 and are based on preliminary project specific estimates[183].
- It is assumed a typical worker will commute from Portage (15 km) instead of Winnipeg (100 km). But, since not all workers will commute from Portage, and for consistency, the same average one-way 40 km commute distance was assumed.
- The same simplified approach to on-site emissions is applied as there will be a similar, but

[180] Note: Commute distances would typically range between 10 km and 70 km, with 10 km to 40 km expected to be more likely than 40 km to 70 km.

[181] PdB Transmission Project EAR – Chapter 2.2.3.1 (*Project Description – Project Components – Project Construction – PW75 115 kV Transmission Line*), p.16

[182] Note: Assumed helicopter burn rate of 500 gallons of fuel per hour and erection rate of 25 towers per 10-hour day. For the purposes of this assessment, the full LC EF for diesel combustion was assumed equivalent to that of aviation fuel.

[183] Note: These estimates are similar to those present on Table 4-1 (*Workforce Presence*) of Manitoba Hydro (2017c).

different, mix of construction vehicles. Machinery operation may include excavators, loaders, dozers, graders, backhoes, cranes (e.g., 20 tonne, 50 tonne), semi-trailers, dump trucks, tracked vehicles, pick-up trucks, drill rigs, bucket trucks, telehandlers, tensioners, pullers, person lifts, all-terrain and support vehicles as well as generators, compressors and other small construction equipment.

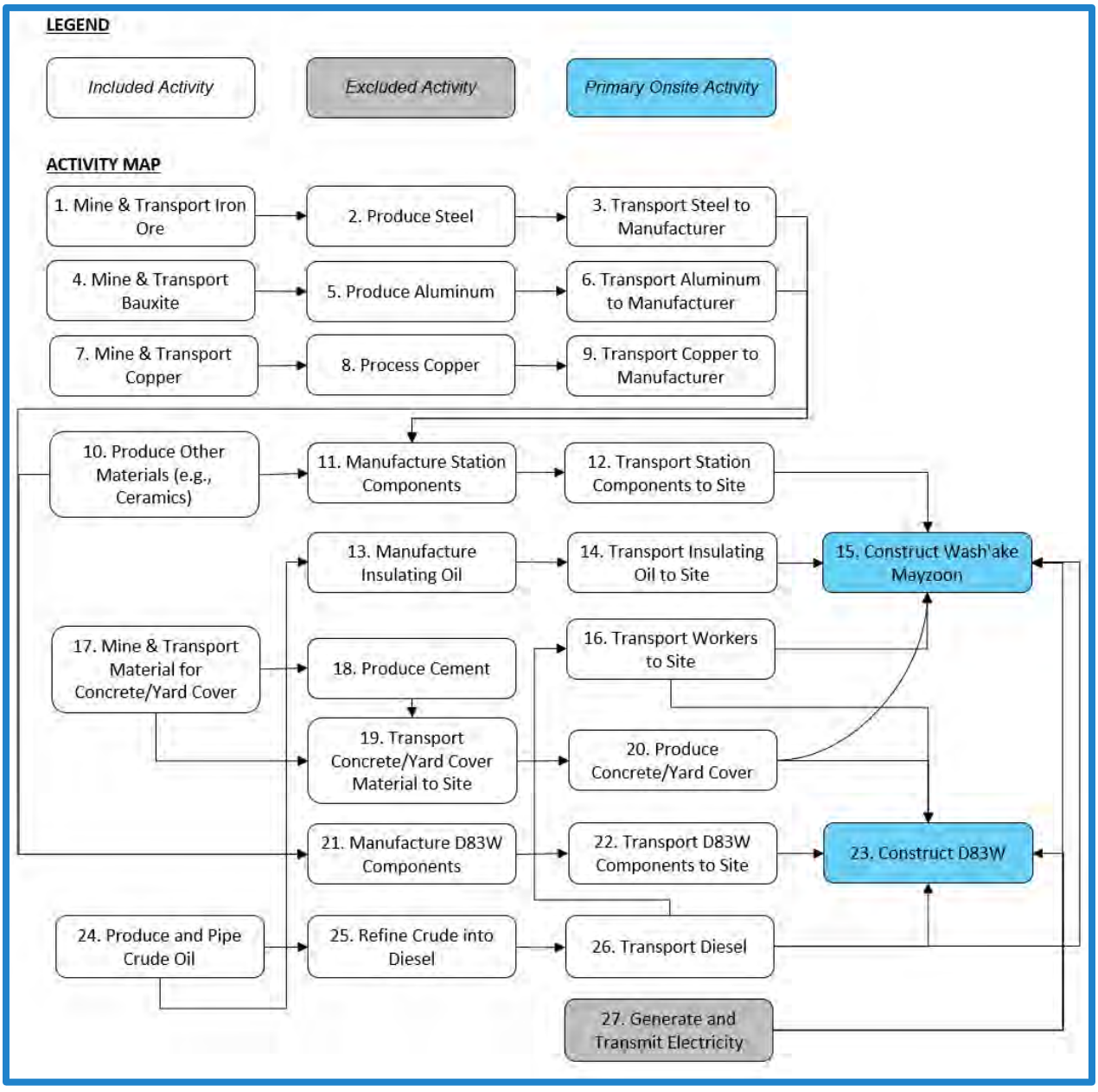
Table 24 Wash'ake Mayzoon Workforce and Schedule

Project activity	Start	End	Workforce	Person-Months
Civil Construction – Site development	May-23	Jul-23	25	50
Civil Construction – Install foundations, ground grid, fence, cable trench, oil containment and control building	Aug-23	Jan-24	45	225
Electrical Construction – Install structures	Jan-24	Jun-24	12	60
Electrical Construction – Assemble, install and test equipment	Jun-24	Dec-24	12	72
Telecommunications – Install and commission equipment	Jan-24	Sep-24	3	24
Commissioning	Jan-25	Mar-25	1	2
			Total	**433**

4.7.2 HIGH LEVEL CONSTRUCTION ACTIVITY MAP

Figure 15 lays out a high-level construction activity map for the PACE Project. Activities related to non-foundation materials other than steel, aluminum, copper, and insulating oil are not shown, except for ceramics for insulators, which are partially shown. As noted in Section 4.7.1, "*EFs for other materials (e.g., insulator materials) are based on the overall average of the main materials*".

Figure 15: PACE Project High Level Construction Activity Map



4.7.3 KEY ASSUMPTIONS AND INPUTS

Table 25 lists the EFs applied for the assessment of construction emissions. These EFs were selected for the LCA of the MMTP[184] and reapplied for this high-level estimate.

Table 25 Life Cycle Activity EFs

Activity	CO_2e	Unit	Source[185]
Ocean Transport	15.84	g/tonne-km	NREL
Rail Transport	18.97	g/tonne-km	NREL
Road Transport	79.91	g/tonne-km	NREL
Mine Iron Ore	43.04	g/kg of ore	StatsCan
Produce Galvanized Steel Sheet	2,706.09	g/kg steel	NREL
Forge Steel into Bars/Wire/Other	354.61	g/kg steel	Chalmers University
Mine Bauxite	9,627.19	g/kg aluminum	NREL
Produce Aluminum Ingot			
Produce Aluminum Conductor	860.00	g/kg aluminum	CPM LCA Database
Mine Copper	1,424.62	g/kg copper	ICE and StatsCan
Process Copper	1,625.44	g/kg copper	ICE and StatsCan
Produce Copper Wire	3,192.00	g/kg copper	LCA of Copper Products
Produce Cement	928.39	g/kg of cement	LCI of Portland Cement
Produce and Deliver Diesel	979.29	g/L of diesel	GHGenius
Combust Diesel	2,803.53	g/L of diesel	[ECCC, 2020]

To provide a more complete understanding of the impact of specific input assumptions, Table 26 presents EFs for aggregated activities closely aligned with the five main activities laid out in Section 4.7.1. Table 26 includes references to the activity numbers listed in Figure 15. "g/kg material" for Wash'ake Mayzoon, B_4, and B_37661 exclude emissions related to concrete, yard cover, and insulating gases as these emissions are calculated separately. The person-month estimate from the PdB Transmission Project EAR incorporated the extraction and short-distance transport of aggregate and water. Therefore, only additional transportation emissions (i.e., the 100 km assumption noted in "Transportation of construction components/materials (supply-

[184][Jeyakumar & Kilpatrick, 2015]

[185] "NREL" is the U.S National Renewable Laboratory; "ICE" is the "Inventory of Carbon and Energy (ICE) Version 1.6a" produced by the Sustainable Energy Research Team from the University of Bath in the United Kingdom; Copper Products LCA is the *European Update Study on Life Cycle Assessment of Copper Products*; "Chalmers University" is based on the 2002 master thesis "LCA Based Solution Selection" by Berg, H. & Haggstrom, S. from the Chalmers University of Technology and ; "CPM LCA Database" is the Centre for Environmental Assessment of Product and Materials System's LCA Database; "LCI of Portland Cement" is the "Life Cycle Inventory of Portland Cement Manufacture" report prepare by Marceau, M., Nisbet, M & Vangeem, M. in 2006; "GHGenius" is GHGenius 4.03a Modeling Software.

chain)") were incorporated into the "Full LC – Aggregate, Yard Cover (all locations)". Supply side emissions for cement were, however, incorporated into the "Full LC – Cement (all locations average)"

Table 26 Life Cycle EFs for Aggregated Activities

Activity	CO_2e	Unit	Activities Impacted
Transport from India to Wash'ake Mayzoon	320.2	g/kg material	3, 6, 9, 12
Transport from Edmonton to Wash'ake Mayzoon	24.3	g/kg material	19
Transport from India to D83W	322.2	g/kg material	3, 6, 9, 12
Transport from Edmonton to D83W	26.3	g/kg material	19
Full LC - Wash'ake Mayzoon Material	4,355	g/kg material	1-14
Full LC - B_4 Material	4,366	g/kg material	1-10, 21-22
Full LC - B_37661 Material	4,351	g/kg material	1-10, 21-22
Full LC - Diesel Combustion (all locations average)	3,783	g/L of diesel	15, 23, 24-26
Full LC - Cement (all locations average)	143	g/kg concrete	17-19
Full LC - Aggregate, Yard Cover (all locations)	8	g/kg material	17,19-20
Worker Transport to Wash'ake Mayzoon	45,394	g/vehicle-day	15-16, 24-26
Worker Transport to D83W	45,394	g/vehicle-day	16, 23-26
Construction Vehicle Emissions	257,231	g/vehicle-day	15, 23-26

Table 27 lists the key assumptions used in the estimate of construction emissions. Rationale for the selection of these values are described in Section 4.7.1.

Table 27 Construction Emissions – Key Input Assumptions

Assumption	Value	Unit	Source
Transmission Line Length: B_4	85	km	Manitoba Hydro
Transmission Line Length: B_37661	98	km	Manitoba Hydro
Total # of Transmission Towers: B_4	215	towers	Manitoba Hydro
Total # of Transmission Towers: B_37661	247	towers	Manitoba Hydro
Average Transmission Tower Mass: B_4	9.55	tonnes	Manitoba Hydro
Average Transmission Tower Mass: B_37661	9.77	tonnes	Manitoba Hydro
Conductor Mass - Steel	0.49	tonnes/km	[Midal Cable, 2010]
Conductor Mass - Aluminum	1.34	tonnes/km	[Midal Cable, 2010]
Shield Wire Mass (Steel)	0.39	tonnes/km	[Super Metal, 2009]
Light Duty Truck Mileage	0.15	L/km	Manitoba Hydro
"Aerial Device" Mileage	0.50	L/km	Manitoba Hydro
"Aerial Device" vehicle idling (no load)	3.4	L/hour	Oak Ridge National Lab
ROW Clearing - Additional Energy	900	L/ha	Manitoba Hydro

Tower Erection - Additional Energy	750	L/tower	Manitoba Hydro
India to Vancouver by Ocean	17,500	km	sea-distances.org
Vancouver to Portage by Rail	2,200	km	Google Maps
Edmonton to Portage by Rail	1,220	km	Google Maps
Portage to Wash'ake Mayzoon by Road	15	km	Google Maps
Portage to D83W by Road	40	km	Google Maps
Hours per Construction Day	10	hours	Manitoba Hydro
Construction Days Per Month	22	days	Manitoba Hydro
Vehicle Ratio (Worker Transport/Construction)	3	persons/vehicle	Manitoba Hydro
Construction Labour: B_4	33,660	person-days	[Manitoba Hydro, 2014a]
Construction Labour: B_37661	38,808	person-days	[Manitoba Hydro, 2014a]
Construction Labour: Wash'ake Mayzoon	9,526	person-days	Manitoba Hydro

Table 28 summarizes the mass of construction materials required for the PACE Project. The mass of metal required for D83W will be about an order of magnitude greater than the metal required for Wash'ake Mayzoon.

Table 28 Construction Material - Mass Summary (tonnes)

Construction Material	B_4	B_37661	Wash'ake Mayzoon
Aluminum	359.6	414.6	18.5
Steel	2,463.6	2,893.5	210.6
Copper	0.0	0.0	117.8
Insulating Oil	0.0	0.0	54.4
Other	49.1	60.2	13.1
Material Total (Excluding Concrete/Yard Cover/CF_4/SF_6)	**2,872**	**3,368**	**414**
Concrete	15,853	19,928	3,000
Yard Cover	0.0	0.0	25,000
Breaker CF_4	0.0	0.0	0.1360
Breaker SF_6	0.0	0.0	0.2270

4.7.4 LAND USE CHANGE EMISSIONS

D83W will require permanent clearing due to the ROWs and Wash'ake Mayzoon will require permanent covering of the yard as well as a short permanent access road. As there is currently no preferred route, this assessment considered assumptions for two routes, "B_4" and "B_37661", to present a possible range of emissions.

The PACE Project will also require temporary land disturbances (e.g., temporary access roads,

marshalling yards). Manitoba Hydro's preference is to use 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. Where access is not required for operations, Manitoba Hydro will decommission the access route and rehabilitate vegetation, as required. These temporary disturbances are assumed to return to their original state, from a carbon content perspective, and resulting land use change emissions are assumed to be zero whether calculating net land use change emissions (i.e., comparing the project Scenario to a Baseline Scenario) or gross land use change emissions (i.e., comparing the Project Scenario to a "do-nothing" scenario).

For estimating land use change impacts, this assessment followed similar methods to those used for the LCA of the MMTP[186]. From a carbon content perspective, only forestland within the project ROW footprint is permanently[187] disturbed. It is assumed it will be converted to "Non-Treed" land (Table 29). While this land could convert to a variety of low-lying vegetation land-types the "Non-Treed" carbon content of 15.33 tonne C/ha (Table 29) was deemed a reasonable approximation of the final mix. "*Other areas of low-lying vegetation such as wetlands, peatland, agricultural, riparian and shrub lands along the ROW are assumed to be minimally disturbed and, when disturbed for construction, are assumed to return to their natural state within the project life"* [Jeyakumar & Kilpatrick, 2015]. Along the ROW, this assessment assumes only above ground carbon content is permanently disturbed: "*Carbon content of soils is assumed to be unchanged after clearing*" [Jeyakumar & Kilpatrick, 2015].

All forestland within the ROW is assumed to be completely cleared and converted to low-lying vegetation. 6.96 and 1.74 ha of forest is assumed to be cleared (i.e., permanently disturbed) for routes B_4 (Table 31) and B_37661 (Table 32) respectively. Some land will be permanently converted to concrete for tower foundations and the yard at Wash'ake Mayzoon will be covered with equipment/take-off structure foundations, a control building, granular fill, and granite isolation stone. It is assumed no above ground biomass will remain throughout the fenced in area (i.e., 3 ha[188]) of Wash'ake Mayzoon and at tower foundation[189] locations (i.e., those specific areas will lose all ability to grow anything). Consistent with ROW assumptions, below-ground carbon content is not assumed to be permanently impacted below most of the yard cover; however, it

[186][Jeyakumar & Kilpatrick, 2015]

[187] Note: The assumption of permanence focuses on the Assessment Period; however, ROW impacts can be expected to persist beyond 2100 as well.

[188] Note: The fenced in area of Wash'ake Mayzoon is assumed to be 172 m X 172 m, along with a short access road, resulting in a total permanently impacted area of 3 ha. Preliminary estimates place the full site area (in and outside of the fence line) of Wash'ake Mayzoon to be 26 ha, all on existing farmland. The area outside the fenced area is assumed to remain either farmland or other low-lying vegetation.

[189] Note: The area impacted by tower foundations is quite small: 0.09 ha and 0.11 ha for B_4 and B_37661 respectively.

will be impacted below the control building, tower foundations, the power transformer[190], and possible other station equipment foundations. Total area of below ground disturbed area is assumed to be less than 0.2 ha. Based on a 79 tonne C/ha total soil carbon assumption [Shaw et al., 2005][191], potential impact could range between 0 and 60 t CO_2e. But, for consistency, assessment of below ground impacts has been left out of the quantified emission totals shown on Table 31 and Table 32.

This assessment follows IPCC (2003) direction on calculation methodology while using MB specific carbon contents, for different forestland types, from Shaw et al. (2005). Biomass assumptions in Table 29 are MB specific, not ROW footprint specific.

Table 29 MB specific forest above ground biomass (tonne C/ha) [Shaw et al., 2005][192]

Dominant Stand Species	Stands in Sample	Total Live Tree Carbon
Non-Treed	**3**	**15.33**
Jack Pine	16	23.13
Black Spruce	19	32.37
White Spruce	2	88.50
Mixed Coniferous (i.e., Needle)	**37**	**31.41**
Balsam Popular	2	95.00
White Birch	3	50.67
Trembling Aspen	11	49.00
Mixed Deciduous (i.e., Broadleaf)	**16**	**55.06**
Mixed Deciduous/Coniferous	**8**	**69.00**

Manitoba Hydro utilized geographical information system data to produce an estimate of treed areas along both the B_4 (Table 31) and B_37661 (Table 32) ROWs. Stand species data were taken from the Forest Resource Inventory dataset and assigned to MH's forest areas geometry. A standard 60 m ROW was assumed. Table 30 presents the relevant species codes.

[190] Note: The 155 tonne power transformer is assumed to have a 0.6m deep slab (8m X 6m) on piles while most other (less heavy) Wash'ake Mayzoon equipment is assumed to be slabs on grade and piled foundations.

[191] Note: Based on data from three non-treed stand samples (of 64) provided on pages 89-90 and 108-109 of Shaw et al. (2005). Total soil carbon a combination of mineral and organic soil.

[192] Note: Based on data from 64 tree stand samples provided on pages 89-90 and 108-109 of Shaw et al. (2005). Above ground biomass includes stem wood, stem bark, branch, and foliage carbon. Shaw et al. (2005) listed both a dominant and co-dominant species for each tree stand. "Mixed" stands were stands where a coniferous species was dominant and a deciduous species was co-dominant, or vice versa.

Table 30 Forestry Species Codes

Species Code	Species	Classification
AS	Ash	Deciduous
B	Basswood	Deciduous
BA	Balsam Poplar	Deciduous
BO	Bur Oak	Deciduous
CO	Eastern Cottonwood	Deciduous
E	White Elm	Deciduous
MM	MB Maple	Deciduous
TA	Trembling Aspen	Deciduous
W	Willow	Deciduous

Table 31 and Table 32 simplify the breakdown for carbon content estimation purposes, using the following guidelines:

1. Where 80%, or more, of a region had the same dominant stand species, 100% of the stand was assumed to be dominated by that species. If there were no stands dominated by that species in Shaw et al. (2005), then guideline 2 applied.
2. Where 80%, or more, of a region had dominant stand species that were either coniferous or deciduous, 100% of the region was assumed to be dominant by that species category (i.e., either "Mixed Coniferous" or "Mixed Deciduous"), unless guideline 1 applied.
3. In all other cases the region was assumed to be "Mixed Deciduous/Coniferous."[193]

All non-shelterbelt stands were either a mix of deciduous species or had a dominant deciduous species that wasn't listed in Table 29. Therefore, the Mixed Deciduous above ground biomass factor of 55.06 tonne C/ha was applied to all treed areas along the B_4 and B_37661 ROWs. The Mixed Deciduous/Coniferous factor of 69.00 tonne C/ha was applied to "shelterbelt" regions, for conservativeness.

[193] Note: The mixed stands in Shaw et al. (2005) had consistently higher above grounds carbon contents which is generally expected from more diverse forestlands.

Table 31 B_4 – Original State Forestry Breakdown Summary

Stand Species Breakdown	Dominant Stand Species	Forestland Withdrawal (ha)	Above Ground Biomass (tonne C/ha)
AS4E3MM2BO1	Mixed Deciduous	0.185	55.06
AS4E4MM1BO1	Mixed Deciduous	0.862	55.06
AS4MM3BO2TA1	Mixed Deciduous	0.155	55.06
AS6MM2E1BO1	Mixed Deciduous	1.842	55.06
BO4AS3E2B1	Mixed Deciduous	0.955	55.06
BO5MM3AS2	Mixed Deciduous	0.098	55.06
BO8AS2	Bur Oak	0.061	55.06
CO5MM3AS2	Mixed Deciduous	0.005	55.06
E3AS3MM2BO1CO1	Mixed Deciduous	0.293	55.06
MM7AS3	Mixed Deciduous	1.080	55.06
MM8AS2	Manitoba Maple	0.106	55.06
Shelterbelt	Undetermined	1.012	69.00
Willow	Willow	0.311	55.06
	All Stands	**6.96**	**57.09**

Table 32 B_37661 – Original State Forestry Breakdown Summary

Dominant Stand Species	Dominant Stand Species	Forestland Withdrawal (ha)	Above Ground Biomass (tonne C/ha)
Shelterbelt	Undetermined	1.547	69.00
TA7BA3	Mixed Deciduous	0.192	55.06
Willow	Willow	0.001	55.06
	All Stands	**1.74**	**67.46**

Land use change emissions are estimated using Equation A. Equation A assumes all carbon is released as CO_2 as all biomass is combusted. CO_2 emissions are assumed to occur at, or soon after, the time of clearing; it is assumed that there is no significant decay[194]. Should the biomass be productively harvested for use elsewhere (instead of being combusted), net emissions would likely be less than presented in Table 66 and Table 67. These assumptions are consistent with mitigation measures outlined in Manitoba Hydro (2014b).

[194] Note: The combustion of cleared debris is the preferable disposal method, compared with gradual decomposition, as the carbon is released as CO_2 and not CH_4, which has a higher GWP (Table 9).

Equation A: CO_2e emissions (tonnes CO_2e) = Area Effected (ha) * [Original Carbon State (tonne C/ha) - Modified Carbon State (tonne C/ha)] * 44/12[195]

4.7.5 O&M EMISSIONS

In both the Baseline and Project Scenarios it is assumed that D83W will be constructed. This will require additional O&M:

1. "*The inspections of the transmission line will include air patrols, ground patrols and nonscheduled maintenance by air or ground in the event that unexpected repairs are required. Ground travel can include snowmobile, flex-track type or road vehicles. Regular inspections will typically occur once per year by ground and can occur up to three times per year by air"* [Manitoba Hydro, 2014a][196].
2. *"Vegetation management within the ROW is required for public and employee safety, as well as the reliable operation of the line. The ROW will be maintained on an ongoing basis throughout the life cycle of operation. An integrated vegetation management approach will be undertaken to address undesirable and non-compatible vegetation issues within the ROW. Vegetation control methods on MH's ROWs are achieved primarily through mechanical control (wheeled or tracked prime movers with drum or rotary cutters, mulcher, feller-bunchers, bulldozers with modified brush blades, etc.), herbicides, and manual control (chain saws, brush saws, and brush axes)"* [Manitoba Hydro, 2014a][197].

Based on emissions from MH's entire vehicle fleet (25 kt CO_2e)[198] and the size of MH's existing transmission (13,800 km) and distribution (75,500 km) infrastructure[199], at a high level additional O&M emissions due to D83W are expected to be in the 25 to 50 t CO_2e per year range (including air patrols). But, as technology (e.g., electric vehicles) improves, these emissions are expected to approach zero over the very long term (i.e., over 75 years).

In both the Baseline and Project Scenarios it is also assumed that Wash'ake Mayzoon will be constructed. Fossil-fuel combustion related O&M emissions (e.g., due to the use of construction vehicles) at Wash'ake Mayzoon are expected to minimal, especially compared to O&M emissions due to D83W; however, Table 28 indicates that 0.136 tonnes of carbon tetrafluoride ("CF_4") and

[195] Note: 44/12 is the approximate ratio of the molecular weight CO_2 (44) to that of carbon (12).

[196] PdB Transmission Project EAR – Chapter 2.2.4.1 (*Project Description – Project Components – Project Operations and Maintenance – PW75 115 kV Transmission Line*), p.20

[197] PdB Transmission Project EAR – Chapter 2.2.4.1 (*Project Description – Project Components – Project Operations and Maintenance – PW75 115 kV Transmission Line*), p.20-21

[198] [Manitoba Hydro, 2020b]

[199] [Manitoba Hydro, 2020d]

0.227 tonnes of sulphur hexafluoride ("SF_6") will be added to the MH Transmission System as a result of the PACE Project. These are potent GHGs with global warming potentials of 7,390 t CO_2e/tonne of CF_4 and of 22,800 t CO_2e/tonne of SF_6 (Table 10). Based on these emission equivalency factors, and the total amount of CF_4 and SF_6 associated with the project, there is a total potential of 6,181 t CO_2e related to these installed gases. New breakers are expected to have an average release rate of <1%/year, which translates to be 0 to 62 t CO_2e per year.

As noted in Section 4.1.8.5, an assessment of supply-side emission related to O&M materials was excluded from this assessment and presumed to be relatively negligible. The quantity of material required to construct Wash'ake Mayzoon and the D83W will be substantially higher than any material required for repairs. Any large-scale replacements of Wash'ake Mayzoon or D83W equipment (e.g., full line replacement) is placed outside the scope of this assessment.

At a high level, additional O&M emissions are expected to be less than 0.05 kt CO_2e per year on average, over the entire Assessment Period. As a result of the lifespan of Wash'ake Mayzoon being indefinite (from an environmental assessment perspective), a 75-year period has been identified as the temporal boundary for O&M activities; an upper limit of 3.75 kt (i.e., 75 years * 0.05 kt/year) will be assumed for the entire Assessment Period. 2.3 kt, or 37.5%[200] of the 6.2 kt CO_2e of insulating gases, is assigned to Wash'ake Mayzoon for allocation purposes on Table 68.

[200] Note: 37.5% matches an assumed a release rate of 0.5% over 75 years. It is possible that a much lower level of CF_4 and SF_6 is unintentionally released throughout the life of the station.

5 ASSESSMENT RESULTS & DISCUSSION

The PACE Project results in net decreases in emissions in MB, Canada, and the U.S. These decreases result from the PACE Project's direct generation effects. Indirect generation effects (i.e., upstream fossil-fuel implications) may result in additional GHG reductions as well. As PACE infrastructure is built in both the Baseline and Project Scenarios, incremental O&M and construction related emissions from the PACE Project are assumed to be nil.

Where relevant, results assume median MH Northwestern A/C Generation conditions (Section 4.2.6.2). When results consider the implication of incremental changes in available Manitoba grid energy, the results are inherently based on an average of 107 flow-cases, based on modelling results from the PdB Assessment (Section 4.5). Cumulative totals may not match values from individual years due to rounding and simplifying assumptions that have been applied to convert Fiscal Year results to Calendar Year results.

5.1 PRIMARY GHG EFFECTS – REDUCTION IN BRANDON CT VOLTAGE SUPPORT

One of the two primary effects of the PACE Project is a result of the decrease in the use of the Brandon CTs for Voltage Support (Section 4.1.6) under the Project Scenario; over the Effective Assessment Period, the PACE Project reduces the Brandon CT's running time by 1,700 hours (Table 33, Table 34, Table 35, and Table 36) and output by 35 GWh (Table 37 and Table 38). Results presented in this section only relate to the operation of the Brandon CTs for Voltage Support and not the operation of the Brandon CTs for other reasons (Section 3.7). For context, an estimate of gross Effective Assessment Period Brandon CT emissions is presented in Section 5.6.

Table 33 presents the required Brandon CT loading at various percentages of Annual Peak during the Baseline Scenario: Brandon CT Voltage Support is required for less than 5% of overall Effective Assessment Period hours. Results are presented for Fiscal years 2026/27 through 2030/31, but only results from 2027/28 through 2029/30 are incorporated into the overall Effective Assessment Period results. 2026/27 and 2030/31 are provided for context, to show the impact of one-year changes in the assumption of Effective Assessment Period length.

Table 33 Baseline Scenario - Required Voltage Support Loading (MW)

Load (% of Annual Peak)	Operating Time (hours)	2026/27	2027/28	2028/29	2029/30	2030/31
99% - 100%	1	140	140	140	140	140
98% - 99%	1.2	140	140	140	140	140
97% - 98%	1.9	130	135	140	140	140
96% - 97%	3.05	105	115	125	140	140
95% - 96%	4.05	90	100	115	125	135
94% - 95%	5.7	75	85	95	105	110
93% - 94%	6.4	60	70	80	85	100
92% - 93%	9.2	45	55	60	70	85
91% - 92%	10.1	30	35	45	55	65
90% - 91%	15.6	15	20	30	40	50
89% - 90%	20.25	15	15	15	25	35
88% - 89%	25.2	15	15	15	15	20
87% - 88%	27.85	15	15	15	15	15
86% - 87%	32.65	15	15	15	15	15
85% - 86%	38.65	15	15	15	15	15
84% - 85%	39.05	15	15	15	15	15
83% - 84%	43.4	15	15	15	15	15
82% - 83%	44.7	N/R	15	15	15	15
81% - 82%	50.15	N/R	N/R	N/R	15	15
0%-81%	8379.9	N/R	N/R	N/R	N/R	N/R

Where PSS/E modelling results indicated a required loading of 5 MW or 10 MW, loading is presented in Table 33 (and Table 35) as 15 MW to represent minimum operational assumptions (Section 4.3.1). Table 34 presents Baseline Scenario Supplemental CT Operation Period assumptions that correspond with the values in Table 33. Combined Brandon CT run time hours for Voltage Support, during the Effective Assessment Period, is estimated to be less than 7% of total hours.

Table 34 Baseline Scenario – Supplemental CT Operation Period Assumptions

	2026/27	2027/28	2028/29	2029/30	2030/31
Startup/Shutdown Cycles Required	52	55	55	57	57
Additional Hours	208	220	220	228	228

Table 35 presents the required Brandon CT loading at various percentages of Annual Peak during the Project Scenario. Brandon CT Voltage Support is required for only 1 hour during the entire Effective Assessment Period, with an additional 4 hours during the assumed Supplemental CT Operation Period (Table 36); the CTs are expected to be negligibly required for Voltage Support during the Project Scenario (i.e., when the PACE Project is operational).

Table 35 Project Scenario - Required Voltage Support Loading (MW)

Load (% of Annual Peak)	Operating Time (hours)	2026/27	2027/28	2028/29	2029/30	2030/31
99% - 100%	1	N/R	N/R	N/R	15	15
98% - 99%	1.2	N/R	N/R	N/R	N/R	15
97% - 98%	1.9	N/R	N/R	N/R	N/R	N/R
0%-97%	8755.9	N/R	N/R	N/R	N/R	N/R

Table 36 Project Scenario – Supplemental CT Operation Period Assumptions

	2026/27	2027/28	2028/29	2029/30	2030/31
Startup/Shutdown Cycles Required	0	0	0	1	1
Additional Hours	0	0	0	4	4

Table 37 presents the gross generation of the Brandon CTs, due to Voltage Support operation, under the Baseline Scenario. Generation values (MWh) are a product of loading (MW) and operating time (h). Estimated generation during the Supplemental CT Operation Period (Table 34) is assumed to be at 15 MW loading, as per the assumption discussed in Section 4.3.1.

Table 37 Baseline Scenario - Required Voltage Support Generation (MWh)

Load (% of Annual Peak)	2026/27	2027/28	2028/29	2029/30	2030/31	Effective Assessment Period
99% - 100%	140	140	140	140	140	**420**
98% - 99%	168	168	168	168	168	**504**
97% - 98%	247	257	266	266	266	**789**
96% - 97%	320	351	381	427	427	**1,159**
95% - 96%	365	405	466	506	547	**1,377**
94% - 95%	428	485	542	599	627	**1,625**
93% - 94%	384	448	512	544	640	**1,504**
92% - 93%	414	506	552	644	782	**1,702**
91% - 92%	303	354	455	556	657	**1,364**

90% - 91%	234	312	468	624	780	**1,404**
89% - 90%	304	304	304	506	709	**1,114**
88% - 89%	378	378	378	378	504	**1,134**
87% - 88%	418	418	418	418	418	**1,253**
86% - 87%	490	490	490	490	490	**1,469**
85% - 86%	580	580	580	580	580	**1,739**
84% - 85%	586	586	586	586	586	**1,757**
83% - 84%	651	651	651	651	651	**1,953**
82% - 83%	N/R	671	671	671	671	**2,012**
81% - 82%	N/R	N/R	N/R	752	752	**752**
0%-81%	N/R	N/R	N/R	N/R	N/R	**0**
All Loadings	**6,408**	**7,501**	**8,025**	**9,504**	**10,393**	**25,030**
Supplemental CT Operation Period	**3,120**	**3,300**	**3,300**	**3,420**	**3,420**	**10,020**
Combined Total	**9,528**	**10,801**	**11,325**	**12,924**	**13,813**	**35,050**

Table 38 presents the gross generation of the Brandon CTs, due to Voltage Support operation, under the Project Scenario. Gross generation (75 MWh, as presented in Table 38) required for Voltage Support during the Project Scenario is less than 1% of the corresponding generation during the Baseline Scenario (Table 37).

Table 38 Project Scenario - Required Voltage Support Generation (MWh)

Load (% of Annual Peak)	**2026/27**	**2027/28**	**2028/29**	**2029/30**	**2030/31**	**Effective Assessment Period**
99% - 100%	N/R	N/R	N/R	15	15	**15**
98% - 99%	N/R	N/R	N/R	N/R	18	**0**
97% - 98%	N/R	N/R	N/R	N/R	N/R	**0**
0%-97%	N/R	N/R	N/R	N/R	N/R	**0**
All Loadings	**0**	**0**	**0**	**15**	**33**	**15**
Supplemental CT Operation Period	**0**	**0**	**0**	**60**	**60**	**60**
Combined Total	**0**	**0**	**0**	**75**	**93**	**75**

Table 39 presents the direct emissions from the Brandon CTs, due to Voltage Support operation, under the Baseline Scenario. Emissions (in t CO_2e) are a product of generation (Table 37) and emission rate (t/GWh), as presented in Table 16. As the emission rate varies with loading, emissions must be calculated in a disaggregated manner for each loading level. While the Supplemental CT Operation Period contributes to 29% (i.e., 10,020 MWh of 35,050 MWh, as

presented in Table 37) of overall Effective Assessment Period energy production, it contributes to 35% (i.e., 17,115 t CO_2e of 48,689 t CO_2e, as presented in Table 39) of total emissions. This is due to the higher emission rates at lower loading levels (e.g., at 15 MW).

Table 39 Baseline Scenario - Brandon CT Emissions Due to Voltage Support (t CO_2e)

Load (% of Annual Peak)	2026/27	2027/28	2028/29	2029/30	2030/31	Effective Assessment Period
99% - 100%	91	91	91	91	91	273
98% - 99%	109	109	109	109	109	328
97% - 98%	165	169	173	173	173	515
96% - 97%	228	243	258	278	278	779
95% - 96%	268	291	323	342	360	957
94% - 95%	326	361	394	425	440	1,180
93% - 94%	303	345	386	405	460	1,137
92% - 93%	367	418	435	496	583	1,349
91% - 92%	338	361	403	458	512	1,222
90% - 91%	400	446	522	599	667	1,567
89% - 90%	519	519	519	614	723	1,652
88% - 89%	646	646	646	646	721	1,937
87% - 88%	714	714	714	714	714	2,141
86% - 87%	837	837	837	837	837	2,510
85% - 86%	990	990	990	990	990	2,971
84% - 85%	1,001	1,001	1,001	1,001	1,001	3,002
83% - 84%	1,112	1,112	1,112	1,112	1,112	3,336
82% - 83%	N/R	1,145	1,145	1,145	1,145	3,436
81% - 82%	N/R	N/R	N/R	1,285	1,285	1,285
0%-81%	N/R	N/R	N/R	N/R	N/R	N/R
All Loadings	**8,411**	**9,797**	**10,056**	**11,720**	**12,201**	**31,574**
Supplemental CT Operation Period	**5,329**	**5,637**	**5,637**	**5,842**	**5,842**	**17,115**
Combined Total	**13,741**	**15,434**	**15,693**	**17,562**	**18,042**	**48,689**

Table 40 presents the direct emissions from the Brandon CTs, due to Voltage Support operation, under the Project Scenario. Project Scenario emissions are less than 0.3% of Baseline Scenario emissions. Therefore, net avoided Voltage Support related emissions (Table 56), due to the PACE project, are approximately equivalent to Baseline Scenario emissions (Table 39).

Table 40 Project Scenario – Fiscal Year Brandon CT Emissions Due to Voltage Support (t CO_2e)

Load (% of Annual Peak)	2026/27	2027/28	2028/29	2029/30	2030/31	Effective Assessment Period
99% - 100%	N/R	N/R	N/R	26	26	26
98% - 99%	N/R	N/R	N/R	N/R	31	N/R
97% - 98%	N/R	N/R	N/R	N/R	N/R	N/R
0%-97%	N/R	N/R	N/R	N/R	N/R	N/R
All Loadings	**N/R**	**N/R**	**N/R**	**26**	**56**	**26**
Supplemental CT Operation Period	**N/R**	**N/R**	**N/R**	**102**	**102**	**102**
Combined Total	**N/R**	**N/R**	**N/R**	**128**	**159**	**128**

The Climate Lens requires that "*The body of the report must detail emissions calculations for each calendar year, and provide the cumulative total*" [Infrastructure Canada, 2019][201]. In order to convert the Fiscal Year results presented in Table 39 and Table 40 into Calendar Year results (presented in Table 42 and Table 43 respectively), the allocation process presented in Table 41 is applied. As the Winter Peak Period, for planning purposes, is three months (December, January, and February) it was simply assumed 1/3 of required operating hours would occur prior to Jan 1st, and 2/3 would occur on or after. 2026/27 results are not included as the Winter Peak Period occurs before March 1, 2027, which is the start of the Effective Assessment Period. 2030/31 results are not included as the Winter Peak Period occurs after October 31, 2030, which is the end of the Effective Assessment Period. Due to the chosen methodology it is necessary to calculate the Voltage Support primary effect emissions in Fiscal Year prior to allocation.

Table 41 Voltage Support – Calendar Year Data Allocation

Calendar Year	Data Allocation
2027	1/3 of 2027/28
2028	2/3 of 2028/29 + 1/3 of 2029/30
2029	2/3 of 2027/28 + 1/3 of 2028/29
2030	2/3 of 2029/30

As discussed in Section 4.5, there is a small number of occasions (assumed to be 0.3%[202] of energy production on average, as per Table 14) where, when called upon to provide Voltage Support,

[201] Climate Lens – Subsection 2.5.ii (*Asset's Estimated GHG Calculations*)

[202] Note: Were a higher percentage (i.e., higher than 0.3%) to be assumed (thereby reducing the 'Net Exports to the U.S.' value of 92.3%) this would slightly lower the net global emission reductions of the PACE Project (presented in Section 5.9) as the MISO EFs (Table 22) are slightly higher than the Brandon CT EF at 140 MW load (Table 15).

the Brandon CTs would already be operating due to very low-flow conditions. The method of calculating this 'low-flow adjustment' is the same as that of the secondary GHG effects discussed in Section 5.2. Table 42 (Baseline Scenario) and Table 43 (Project Scenario) present direct emissions from the Brandon CTs, due to Voltage Support operation, before and after the 'low-flow adjustment' is applied; the 'low-flow adjustment' has a minimal impact. The 'adjusted values' are carried through presented results for the remainder of Section 5.

Table 42 Baseline Scenario – Calendar Year Brandon CT Emissions Due to Voltage Support (t CO_2e)

Direct Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Table 39 Value	5,145	15,520	16,316	11,708	48,689
Low-Flow Adjustment	-8	-25	-27	-20	-80
Adjusted Value	**5,137**	**15,495**	**16,289**	**11,688**	**48,609**

Table 43 Project Scenario – Calendar Year Brandon CT Emissions Due to Voltage Support (t CO_2e)

Direct Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Table 40 Value	0.00	0.00	17.08	8.54	25.62
Low-Flow Adjustment	0.00	0.00	-0.01	-0.02	-0.03
Adjusted Value	**0.00**	**0.00**	**17.07**	**8.52**	**25.59**

5.2 SECONDARY GHG EFFECTS – REDUCTION IN MB GENERATION

Whenever the Brandon CTs operate they produce emissions (Table 39 and Table 40); however, they also produce energy (Table 37 and Table 38) which, due to the MB Electricity System's relationship to the interconnected region (Section 3.8), will reduce net emissions in regions neighbouring Manitoba. Results discussed in this section relate to changes in net exports due to the impact the PACE Project has on the need for Brandon CTs for Voltage Support (changes in net exports due to the reduction in MH Transmission System Losses are presented in Section 5.3). An estimate of gross emissions reduced as a result of MH's overall electricity exports is presented in Section 5.6 for context.

While the Voltage Support primary effect of the PACE Project is a reduction in CT operation, a corresponding secondary effect is a reduction in overall Manitoba generation and therefore an increase in emissions outside of MB. Voltage Support secondary effect emissions are calculated by first allocating generation (from Table 37 and Table 38) into Calendar Year generation values

(as per Table 41) and then applying the appropriate EFs from Table 23 and Table 16; thus, the secondary effect emissions discussed this section are only presented in Calendar Year.

Table 44 presents Baseline Scenario emission related to the secondary effects of Voltage Support requirements. Primary effects related to voltage support (already presented in Table 42) are also shown in Table 44, for comparison purposes. More than half (i.e., 25,059 t CO_2e of 48,609 t CO_2e, as presented in Table 44) of Brandon CT emissions (due to Voltage Support) are offset by corresponding secondary effect reductions; while operating the Brandon CTs results in direct emissions it also results in a reduction in emissions outside of MB.

Table 44 Baseline Scenario - Voltage Support Primary & Secondary Emissions (t CO_2e)

Direct Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	5,137	15,495	16,289	11,688	48,609
Secondary - SK/ON	-120	-367	-397	-248	-1,132
Secondary - MISO	-2,536	-7,604	-8,087	-5,700	-23,927
Secondary - Global	**-2,657**	**-7,971**	**-8,483**	**-5,948**	**-25,059**
Overall Voltage Support Impact	**2,480**	**7,524**	**7,806**	**5,740**	**23,550**

Table 45 presents Project Scenario emission effects related to the secondary effects of Voltage Support requirements. Primary effects related to voltage support (already presented in Table 43) are shown in Table 45 as well, for comparison purposes. Both Primary and Secondary emissions are negligible as Brandon CTs are negligibly required during the Project Scenario. While emissions are presented to the nearest decatonne, this is only done for comparison purposes; it is not intended to imply that this level of accuracy was achieved in the emissions estimate.

Table 45 Project Scenario - Voltage Support Primary & Secondary Emissions (t CO_2e)

Direct Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	0.00	0.00	17.07	8.52	25.59
Secondary - SK/ON	0.00	0.00	-0.17	-0.29	-0.46
Secondary - MISO	0.00	0.00	-3.41	-6.62	-10.03
Secondary - Global	**0.00**	**0.00**	**-3.58**	**-6.90**	**-10.48**
Overall Voltage Support Impact	**0.00**	**0.00**	**13.49**	**1.61**	**15.11**

5.3 PRIMARY GHG EFFECTS – REDUCTION IN MH TRANSMISSION SYSTEM LOSSES

The addition of PACE to the MH Transmission System will make the overall system more efficient and thereby reduce system losses. Table 46 presents the results of the MH Transmission System loss analysis (Section 4.4) for Fiscal Years 2027/28 through 2030/31.

Table 46 Net MH Transmission System Losses (Fiscal Year)

Case	Probability	2027/28	2028/29	2029/2030	2030/31
SLL	0.2813	-1.2 MW	-1.1 MW	-1.2 MW	**-1.2 MW**
SSH	0.4036	-0.8 MW	-0.8 MW	-0.8 MW	**-0.8 MW**
SUM	0.2923	-1.9 MW	-1.9 MW	-2 MW	**-2 MW**
WIN	0.0231	-4.2 MW	-4.2 MW	-4.3 MW	**-4.4 MW**
All Cases (P=1)		**-1.31 MW**	**-1.28 MW**	**-1.34 MW**	**-1.35 MW**
All Cases (P=1)		**-11,500 MWh**	**-11,254 MWh**	**-11,777 MWh**	**-11,797 MWh**

Results for the Effective Assessment Period are presented in Table 48 on a Calendar Year Basis. In order to convert the Fiscal Year results presented in Table 46 into Calendar Year results, the allocation process presented in Table 47 is applied. Since the results are very similar year over year, it was deemed reasonable to allocate proportionally by month (e.g., on average 2027/28 losses are reduced by 958 MWh/month) and to apply 2027/28 average losses to March 2027 (even though March 2027 is in Fiscal Year 2026/27).

Table 47 MH Transmission System Losses – Calendar Year Data Allocation[203]

Calendar Year	Data Allocation
2027	10/12 of 2027/28
2028	3/12 of 2027/28 + 9/12 of 2028/29
2029	3/12 of 2028/29 + 9/12 of 2029/30
2030	3/12 of 2029/30 + 7/12 of 2030/31

System loss impacts are presented in Table 46 and Table 48 on an incremental basis. For context, system-wide losses are assumed to range from 168 MW (SSH in 2027/28) to 437 MW (WIN in 2030/31). On a system-wide basis the PACE Project will reduce average annual MB Electricity

[203] Note: E.g., since 2027/28 covers the April 2027 through March 2028 period, 10 months were allocated to 2027 (March to December is 10 months), 3 months were allocated to 2028 (January through March is 3 months). For simplicity, net losses for March 2027 (which is in Fiscal Year 2026/27) were assumed to match average 2027/28 losses. This is why 13 months are seemingly allocated from a 12-month period. No assessment of 2026/27 losses was performed (the D83W ISD during modelling was assumed to be May 1, 2027 instead of the currently assumed ISD of March 1, 2027).

System losses by less than 0.5%[204].

Table 48 Net Reduction in MH Transmission System Losses (MWh)

Year	2027	2028	2029	2030	Effective Assessment Period
Months	Mar to Dec	Jan to Dec	Jan to Dec	Jan to Oct	
Net Losses	9,584	11,316	11,646	9,826	**40,454**

The method for determining and allocating the emissions impacts resulting from reductions in system-wide losses are the same as those for the reductions in MB Generation (Section 5.2): Table 49 presents the emission reductions estimated to occur in MB, the rest of Canada (i.e., "ON/SK"), and the U.S. (i.e., "MISO"). The majority of impacts occur in the U.S. (Section 4.5). Emission reductions resulting from improvements in system efficiency (30,501 t CO_2e, as presented in Table 49) are approximately 30% greater than net overall emissions reductions due to using the Brandon CTs less for Voltage Support (23,535 t CO_2e, as presented in Table 56). I.e., on a global emissions basis the benefits of the improvement in MH Transmission System efficiency are the most impactful primary effect.

Table 49 Net Reduction in MH Transmission System Loss Emissions (t CO_2e), Excluding Upstream

Direct Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Brandon	-22	-26	-26	-22	**-96**
SK/ON	-320	-378	-389	-283	**-1,371**
MISO	-6,752	-7,840	-7,942	-6,500	**-29,034**
Overall MH Transmission System Loss Impact	**-7,094**	**-8,244**	**-8,358**	**-6,806**	**-30,501**

5.4 SECONDARY GHG EFFECTS – UPSTREAM FOSSIL-FUEL EFFECTS

The primary effects (Section 5.1 and 5.3) and one of the secondary effects (Section 5.2) of the PACE Project impact fossil-fuel combustion emissions from grid-connect power plants. But, as noted in Section 4.1.8.4, emissions from the use of fossil-fuels do not solely result from their direct combustion. They result from their production, processing, and transportation as well. Section 4.6.1 notes that the EFs used for estimating upstream fossil-fuel effects (i.e., indirect

[204] Note: As per the ELF (i.e., Manitoba Hydro (2018)) projected average transmission (includes the MH Transmission System, MH HVDC Transmission System, and the MH Northern Collector System) losses are just over 2,000 GWh a year and MH Distribution System losses are over 1,000 GWh a year.

generation effects) are meant to represent an "*idea of the potential upper level of this secondary effect*". Overall results (Section 5.9) will therefore be presented as a plausible range, with and without these indirect generation effects.

Table 50 presents the indirect generation effects during the Baseline Scenario related to Voltage Support requirements of the Brandon CTs (Sections 5.1 and 5.2). Indirect generation effects over the Effective Assessment Period are 10,889 t CO_2e (as presented in Table 50), which is deemed significant: adding these indirect generation effects to their corresponding direct generation effects (23,550 t CO_2e, as presented in Table 44) would increase global emissions during the Baseline Scenario related to Voltage Support by nearly 50% (34,440 t CO2e, as presented in Table 52). The large percentage, for an indirect effect, mainly results from potential upstream effects of additional Brandon CT operation (from 195 t/GWh to 512 t/GWh, depending on load, as per Table 16) being more significant than the upstream effects of less fossil-fuel generation occurring in the U.S. (99 t/GWh to 108 t/GWh, as per Table 23). On a per GWh basis, reducing Brandon CT generation is one of the most effective methods of reducing indirect generation effects.

Table 50 Baseline Scenario – Voltage Support Indirect Generation Effects (t CO_2e)

Indirect Generation Effect	**2027**	**2028**	**2029**	**2030**	**Effective Assessment Period**
Primary - Brandon	1,541	4,649	4,887	3,507	14,583
Secondary - SK/ON	-36	-110	-119	-74	-340
Secondary - MISO	-328	-1,027	-1,136	-862	-3,354
Secondary - Global	**-364**	**-1,137**	**-1,255**	**-936**	**-3,693**
Overall Voltage Support Impact	**1,177**	**3,511**	**3,631**	**2,570**	**10,889**

Table 51 presents the indirect generation effects during the Project Scenario related to Voltage Support requirements of the Brandon CTs. As with the direct generation effects (Table 45), emission impacts are minimal. As in Section 5.2, emissions are presented to the nearest decatonne; this is only done for comparison purposes; it is not intended to imply that this level of accuracy was achieved in the emissions estimate.

Table 51 Project Scenario – Voltage Support Indirect Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	0.00	0.00	5.12	2.56	7.68
Secondary - SK/ON	0.00	0.00	-0.05	-0.09	-0.14
Secondary - MISO	0.00	0.00	-0.48	-1.00	-1.48
Secondary - Global	**0.00**	**0.00**	**-0.53**	**-1.09**	**-1.62**
Overall Voltage Support Impact	**0.00**	**0.00**	**4.59**	**1.47**	**6.06**

Table 52 presents the aggregation of both direct and indirect generation effects, during the Baseline Scenario, related to Voltage Support requirements of the Brandon CTs. It's a summation of results presented in Table 44 and Table 50. Table 53 similarly presents Project Scenario results and is a summation of results presented in Table 45 and Table 51.

Table 52 Baseline Scenario – Voltage Support All Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	6,677	20,144	21,176	15,195	63,192
Secondary - SK/ON	-157	-477	-515	-323	-1,472
Secondary - MISO	-2,865	-8,632	-9,223	-6,562	-27,281
Secondary - Global	**-3,021**	**-9,109**	**-9,738**	**-6,885**	**-28,753**
Overall Voltage Support Impact	**3,656**	**11,036**	**11,437**	**8,310**	**34,440**

Table 53 Project Scenario – Voltage Support All Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	0.00	0.00	22.19	11.07	33.26
Secondary - SK/ON	0.00	0.00	-0.22	-0.37	-0.59
Secondary - MISO	0.00	0.00	-3.89	-7.62	-11.50
Secondary - Global	**0.00**	**0.00**	**-4.11**	**-7.99**	**-12.10**
Overall Voltage Support Impact	**0.00**	**0.00**	**18.08**	**3.08**	**21.17**

Table 54 presents the net indirect generation effects resulting from an overall improvement in MH Transmission System efficiency, as a result of the PACE Project (Section 5.3). The net indirect effects (-4,472 t CO_2e, as presented in Table 54) are 15% of the net generation effects (-30,501 t CO_2e from Table 49); indirect generation effects related to MH Transmission System loss reductions are proportionally less significant than Voltage Support related indirect Brandon CT emission reductions (10,889 t CO_2e, as presented in Table 50) because of the less intense MISO indirect EF (Table 23).

Table 54 Reduction in MH Transmission System Losses – Net Indirect Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Brandon	-7	-8	-8	-7	**-29**
SK/ON	-96	-114	-117	-85	**-411**
MISO	-874	-1,059	-1,116	-983	**-4,032**
Overall MH Transmission System Loss Impact	**-977**	**-1,180**	**-1,241**	**-1,074**	**-4,472**

Table 55 presents the aggregation of both direct and indirect net generation effects related to MH Transmissions System loss reductions resulting from the PACE Project. It's a summation of results presented in Table 49 and Table 54. Net generation effect reductions (indirect and direct) due to the reduction is system losses (34,973 t CO_2e from Table 55) is slightly higher than net generation effect reductions due to less need for Brandon CTs for Voltage Support (34,418 t CO_2e from Table 58).

Table 55 Reduction in MH Transmission System Losses – Net Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Brandon	-28	-33	-34	-29	**-125**
SK/ON	-417	-492	-506	-368	**-1,783**
MISO	-7,626	-8,899	-9,058	-7,483	**-33,066**
Overall MH Transmission System Loss Impact	**-8,071**	**-9,424**	**-9,599**	**-7,880**	**-34,973**

5.5 NET GHG EFFECTS – VOLTAGE SUPPORT IMPACTS

Sections 5.1, 5.2, and 5.4 presented results related to the impact the PACE Project will have on the use of Brandon CTs for Voltage Support. Results were presented for both the Baseline and Project Scenarios. In this section, Table 56, Table 57, and Table 58 present the net implications of those two scenarios (i.e., Project Scenario emissions/reductions less Baseline Scenario emissions/reductions). Because Project Scenario operation of the Brandon CTs for voltage support is minimal, values presented in Table 56, Table 57, and Table 58 are very similar to their Baseline Scenario counterparts: Table 44, Table 50, and Table 52 respectively.

Table 56 Net Implications – Voltage Support - Direct Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	-5,137	-15,495	-16,272	-11,680	-48,584
Secondary - SK/ON	120	367	396	248	1,132
Secondary - MISO	2,536	7,604	8,083	5,694	23,917
Secondary - Global	**2,657**	**7,971**	**8,479**	**5,941**	**25,049**
Overall Voltage Support Impact	**-2,480**	**-7,524**	**-7,793**	**-5,738**	**-23,535**

Table 57 Net Implications – Voltage Support - Indirect Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	-1,541	-4,649	-4,882	-3,504	-14,575
Secondary - SK/ON	36	110	119	74	339
Secondary - MISO	328	1,027	1,136	861	3,352
Secondary - Global	**364**	**1,137**	**1,255**	**935**	**3,692**
Overall Voltage Support Impact	**-1,177**	**-3,511**	**-3,627**	**-2,569**	**-10,883**

Table 58 Net Implications – Voltage Support - All Generation Effects (t CO_2e)

Generation Effect	2027	2028	2029	2030	Effective Assessment Period
Primary - Brandon	-6,677	-20,144	-21,154	-15,184	-63,159
Secondary - SK/ON	157	477	515	322	1,471
Secondary - MISO	2,865	8,632	9,219	6,554	27,270
Secondary - Global	**3,021**	**9,109**	**9,734**	**6,877**	**28,741**
Overall Voltage Support Impact	**-3,656**	**-11,036**	**-11,419**	**-8,307**	**-34,418**

5.6 GROSS GENERATION EFFECTS

The Climate Lens requires that "*The assessment's Executive Summary should expressly identify the (Baseline Scenario) emissions in 2030 as well as cumulative (Baseline Scenario) emissions over the asset's lifespan*" [Infrastructure Canada, 2019][205]. To meet the Climate Lens requirements, and to provide a point of reference, this section presents absolute (i.e., not incremental) Baseline Scenario emissions. These emissions are mainly based on analysis from the PdB Assessment.

The scope of this assessment involved estimating the incremental impact of the PACE Project on emissions in Manitoba (i.e., Brandon CT impacts) and outside of Manitoba (i.e., export impacts); however, the estimation of total future sectoral emission in Manitoba, Canada, and the U.S. is minimally relevant and was outside the scope of this assessment: The performance standard approach was applied to non-MB generation effects and total future electrical industry emissions in SK, ON, and MISO were not explicitly estimated on an absolute basis.

GSPRO modelling during the PdB Assessment indicated that, over an average of all flow-cases, Brandon CTs would generate around 23.4 kt CO_2e annually[206] in order to meet MB's load requirements during the Effective Assessment Period. Emissions are relatively low since, as noted in Section 4.5, in most flow-years Brandon CT operation is not required[207]. The Baseline Scenario emissions presented in Table 59 add the Baseline Scenario Voltage Support Brandon CT emissions

[205] Climate Lens – Section 2.5.i (*Required Information and General Instructions – Baseline GHG emissions calculations*)

[206] Note: 2030 MB emissions (23.4 kt CO_2e) were selected as an appropriate reference as the timeline matches the Effective Assessment Period and Selkirk Generating Station was not in-service. While projected emissions are presented to nearest hundred tonnes, this is only done for comparison purposes (with the Project Scenario value of 23.3 kt, presented in Table 58); it is not intended to imply that this level of accuracy was achieved in the emissions estimate.

[207] Note: Proficiency run emissions are assumed in all flow-years.

(from Table 44) to the GSPRO Brandon CT projection[208]. Actual Brandon CT emissions during the Effective Assessment Period could be substantially higher than presented in Table 59 if MB experiences lowest-flow (Section 3.9) conditions.

Table 59 Gross Brandon CT Emissions – Baseline & Project Scenarios (kt CO_2e)

Period	Baseline Scenario	Project Scenario	Reduction	Reduction
Effective Assessment Period	**130.4**	**81.7**	**48.7**	**37%**
12 Month Average	**37.2**	**23.3**	**13.9**	**N/A**
2027 - Mar to Dec	20.7	15.6	5.2	25%
2028 - Jan to Dec	38.9	23.3	15.5	40%
2029 - Jan to Dec	39.6	23.3	16.3	41%
2030 - Jan to Oct	31.2	19.5	11.7	38%

As presented in Table 59, under the Project Scenario there are almost no additional emissions (Table 45) due to the Voltage Support primary effect. Emissions actually drop slightly below the assumed minimum levels required to meet MB's (average of all flows) load requirements (i.e., below 23.4 kt CO_2e), due to the emissions benefits the PACE Project has on MH Transmission System losses. The PACE Project is expected to reduce emission for all of MB's grid-connected[209] fossil-fuel electricity generators by 37% throughout the Effective Assessment Period.

Existing MH generation is projected to help reduce global emissions, via exports, by 20 Mt CO_2e (20,055 kt CO_2e, as presented in Table 60) over the Effective Assessment Period, with or without the PACE Project. For comparison, additional export-related reductions, as a result of the PACE Project, are estimated to only be 0.005 Mt (240 t CO_2e + 5,117 t CO_2e, as presented in Table 61), or a negligible 0.02% increase in absolute Baseline Scenario net energy export effects.

[208] Note: GSPRO modelling does not incorporate the operation of the Brandon CTs for MH Transmission System reliability purposes.

[209] Note: Manitoba Hydro's four off-grid diesel generating stations emit 12 to 14 kt CO_2e annually [Manitoba Hydro, 2020b], but these emissions are not included in the Baseline.

Table 60 Non-MB Generation Effects – Baseline Scenario Reductions Due to Exports (kt CO_2e)

Period	Canada	U.S.	Global
Effective Assessment Period	**2,021**	**18,034**	**20,055**
12 Month Average	**577**	**5,153**	**5,730**
2027 - Mar to Dec	409	3,634	4,043
2028 - Jan to Dec	604	5,555	6,159
2029 - Jan to Dec	572	5,037	5,608
2030 - Jan to Oct	436	3,808	4,245

5.7 NET GENERATION EFFECTS

Sections 5.1, 5.2, 5.3, 5.4, and 5.5 presented generation effect results disaggregated by both effect description (Table 7) and/or Scenario. In this section, Table 61, Table 62, and Table 63 present aggregated generation effect results related to both the PACE Project's Voltage Support impacts and MH Transmission System impacts:

- Table 61 is an aggregation of Table 49 and Table 56.
- Table 62 is an aggregation of Table 54 and Table 57.
- Table 63 is an aggregation of Table 55 and Table 58.

Table 61 Net Direct Generation Effects (t CO_2e)

Region	2027	2028	2029	2030	Effective Assessment Period
Brandon	-5,158	-15,521	-16,298	-11,702	**-48,680**
SK/ON	-200	-11	7	-35	**-240**
MISO	-4,215	-236	141	-807	**-5,117**
Overall Impacts	**-9,574**	**-15,768**	**-16,150**	**-12,544**	**-54,036**

Table 62 Net Indirect Generation Effects (t CO_2e)

Region	2027	2028	2029	2030	Effective Assessment Period
Brandon	-1,547	-4,656	-4,890	-3,511	**-14,604**
SK/ON	-60	-3	2	-11	**-72**
MISO	-546	-32	20	-122	**-680**
Overall Impacts	**-2,153**	**-4,692**	**-4,868**	**-3,643**	**-15,356**

Table 63 Net Generation Effects (t CO_2e)

Region	2027	2028	2029	2030	Effective Assessment Period
Brandon	-6,706	-20,178	-21,188	-15,213	**-63,284**
SK/ON	-260	-15	9	-46	**-312**
MISO	-4,761	-268	161	-929	**-5,796**
Overall Impacts	**-11,727**	**-20,460**	**-21,018**	**-16,187**	**-69,392**

5.8 SECONDARY GHG EFFECTS – GROSS CONSTRUCTION RELATED EMISSIONS

Table 64 and Table 65 are intended to provide a high-level approximation of gross construction emissions for the B_4 and B_37661 Options, indicating the order of magnitude of potential emissions. While emissions are presented to the nearest tonne, this is only done for comparison purposes between activities; it is not intended to imply that this level of accuracy was achieved in the assessment of construction emissions. As the PACE Project is constructed in both the Baseline and Project Scenarios, net construction emissions are assumed to be nil.

Table 64 B_4 Option: Summary of Gross Construction Emissions

Construction Activity	t CO_2e	% of total
Full Wash'ake Mayzoon Supply Chain	2,454	11.2%
Full B_4 Supply Chain	14,883	68.0%
Wash'ake Mayzoon Construction: On-Site Energy	817	3.7%
Wash'ake Mayzoon Construction: Worker Transport	144	0.7%
B_4 Construction: On-Site Energy	3,082	14.1%
B_4 Construction: Worker Transport	509	2.3%
Material Supply Chain Total	**17,337**	**79.2%**
On-Site Energy Total	**3,899**	**17.8%**
Worker Transport Total	**653**	**3.0%**
Total	**21,889**	

Table 65 B_37661 Option: Summary of Gross Construction Emissions

Construction Activity	t CO_2e	% of total
Full Wash'ake Mayzoon Supply Chain	2,454	9.7%
Full B_37661 Supply Chain	17,654	70.1%
Wash'ake Mayzoon Construction: On-Site Energy	817	3.2%
Wash'ake Mayzoon Construction: Worker Transport	144	0.6%
B_37661 Construction: On-Site Energy	3,538	14.0%
B_37661 Construction: Worker Transport	587	2.3%
Material Supply Chain Total	**20,107**	**79.8%**
On-Site Energy Total	**4,355**	**17.3%**
Worker Transport Total	**731**	**2.9%**
Total	**25,193**	

Construction emissions are assumed to occur over the 2023-2030[210] period but have not been broken down by year. A high-level estimate of gross supply-chain emissions has been incorporated to demonstrate that estimated supply-chain emission are over four times more substantial than on-site construction emissions. Supply-chain emissions could occur anywhere in the world and are expected to mostly occur outside of Canada.

5.8.1 LAND USE CHANGE EMISSIONS

As they are a unique effect, land use change emissions are reported separately from other construction related emissions. Land use change emissions as a result of the B_4 Option of the PACE Project are estimated to be 1.24 kt CO_2e (1.066 kt CO_2e + 0.174 kt CO_2e, as per Table 66 and Table 67); land use change emissions as a result of the B_37661 Option of the PACE Project are estimated to be 0.51 kt CO_2e (0.333 kt CO_2e + 0.175 kt CO_2e, as per Table 66 and Table 67), about 2.5 times less than the B_4 Option.

Table 66 summarizes the key inputs assumed for land use change related to the permanent clearing of forestland from the D83W ROW. Table 67 summarizes the key inputs assumed for land use change related to the permanent covering of land for D83W tower foundations and the fenced-in are of Wash'ake Mayzoon. Because the majority of the ROW (both B_4 and B_37661 routes) is currently farmland, there is limited permanent disturbance: Assuming a 60 m ROW, only 0.3% (B_37661 Option) to 1.4% (B_4 Option) of the D83W ROW will be permanently disturbed by the PACE Project.

[210] Note: Construction emissions during the Project Scenario would be zero in 2030.

Table 66 PACE Project – ROW Clearing Land Use Change Summary

Land Use Change Component	B_4 Value	B_37661 Value	Unit
ROW Cleared Area (Ha)	6.96	1.74	ha
Above Ground Carbon Content - Original State	57.09	67.46	tonne C/ha
Above Ground Carbon Content - Modified State	15.33	15.33	tonne C/ha
Permanent Carbon Change	41.75	52.13	tonne C/ha
Total GHG Released	153.10	191.13	t CO_2e/ha
Total GHG Released	1,066	333	t CO_2e

Table 67 PACE Project – Covered Area Land Use Change Summary

Land Use Change Component	B_4 Value	B_37661 Value	Unit
Covered Area (Ha)	3.09	3.11	ha
Above Ground Carbon Content - Original State	15.33	15.33	tonne C/ha
Above Ground Carbon Content - Modified State	0.00	0.00	tonne C/ha
Permanent Carbon Change	15.33	15.33	tonne C/ha
Total GHG Released	56.22	56.22	t CO_2e/ha
Total GHG Released	174	175	t CO_2e

5.8.2 COMBINED GROSS CONSTRUCTION RELATED EMISSIONS

Table 68 presents the combined gross construction related emissions for the PACE Project: total emissions of 29.4 kt CO_2e assume the B_37661 Option because that results in higher emissions. But, on an annual basis combined gross construction related emissions for the PACE Project are estimated to average only 0.39 kt CO_2e (29.4 kt CO_2e divided by 75). For comparison, over the Effective Assessment Period cumulative net PACE Project Emissions Reductions (54 to 69 kt CO_2e, as presented in Table 69) average 15 to 19 kt CO_2e per year; PACE Project infrastructure, in both the Baseline and Project Scenarios, would be expected to reduce emissions beyond October 2030 (i.e., after the Effective Assessment Period), throughout the remainder of their assumed 75-year lives.

Table 68 Combined Gross Construction Related Emissions (t CO_2e)

	B_4	B_37661	Wash'ake Mayzoon	PACE Project
Material Supply Chain	14,883	17,654	2,454	20,107
On-Site Energy & Worker Transport	3,592	4,125	961	5,086
O&M Emissions	1,425	1,425	2,325	3,750
Land Use Change Emissions	1,071	339	169	508
All Construction Related Emissions	**21,000**	**23,500**	**5,900**	**29,400**

5.9 NET OVERALL PROJECT GENERATION EFFECTS

Table 69 presents the overall reductions resulting from the PACE Project. Overall Canadian emission reductions are expected to be 49 to 64 kt CO_2e. Totals are rounded to give a better representation of the level of accuracy of the results. Totals are presented as a range, based on estimations with and without the inclusion of GHG reductions as a result of impacts on upstream fossil-fuel emissions. As actual upstream effects may not be as high as assumed, projected reductions are assumed to fall within that range, for the purposes of this assessment[211]. When reporting the impact of the PACE Project as a single value, such as the Business Case within the PACE Project Investing in Canada Infrastructure Program submission, it is suggested the lower value is chosen for conservativeness.

Table 69 Cumulative Net PACE Project Reductions: 2027 to 2030 (kt CO_2e)

	Canada	Global
(A) Net Reductions - Generation Effects	48.9	54.0
(B) Net Construction Related Emissions	0.0	0.0
(C) Net Reductions - Indirect Generation Effects	14.7	15.4
Overall Net Reductions (range is from (A-B) to (A-B+C))	**49 to 64**	**54 to 69**

To fulfill Climate Lens obligations[212], Table 70 presents an estimate of emission reductions in 2030. These reductions are an average of all flow-cases and actual reductions will depend on flows (Section 3.9) during the 2029-2031 period.

[211] Note: Higher emission reductions are plausible, though upstream impacts would not be less than zero.

[212] Climate Lens – Section 2.5 (*Required Information and General Instructions*)

Table 70 Net PACE Project Emission Reductions in 2030 (kt CO_2e)

	Canada	Global
(A) Net Reductions - Generation Effects	11.7	12.5
(B) Net Construction Related Emissions	0.0	0.0
(C) Net Reductions - Indirect Generation Effects	3.5	3.6
Overall Net Reductions (range is from (A-B) to (A-B+C))	**12 to 15**	**13 to 16**

The Climate Lens requires a specific cost-per-tonne indicator of "*Total project cost (construction cost and O&M costs over lifetime) / cumulative GHG reductions over the asset's expected lifespan*" [213]. Capital investments required to move forward with the PACE Project are estimated to be $161,574,486[214] (2020 Canadian dollars). Table 71 provides the overall cost-per-tonne of the PACE Project using the rounded net emission reduction values from Table 69 and gross costs of the PACE Project.

Table 71 Cost-per-Tonne of emission reductions – Capital Investment Costs (2020 Canadian dollars)

Canadian Reductions Only	$2,500 to $3,300 (per t CO_2e)
Global Reductions	$2,300 to $3,000 (per t CO_2e)

The Climate Lens requires a second cost-per-tonne indicator: "*Federal dollars/GHG reductions in 2030 (non-cumulative)" [Infrastructure Canada, 2019]*[215]. While the precise amount of "federal dollars" is not set, the current draft proposal requests 63.3 million dollars. Based on Canadian GHG reductions of 12 kt in 2030 (Table 70) the cost indicator would be $5,300/tonne CO_2e.

[213] Climate Lens – Section 2.5.iv (*Required Information and General Instructions – cost-per-tonne calculations*)

[214] Cost estimates presented herein is the best available as of the date of this assessment. Detailed cost information is available in other documentation submitted as part of the Investing in Canada Infrastructure Program application.

[215] Climate Lens – Section 2.5.iv (*Required Information and General Instructions – cost-per-tonne calculations*)

5.10 CONCLUSIONS

Key take-aways from this GHG assessment are as follows:

- The PACE Project will result in significant reductions in MB Electricity System emissions: emissions from grid-connected fossil-fuel generating stations are estimated to be reduced by 37% over the Effective Assessment Period (i.e., March 2027 through October 2030).
- Over the Effective Assessment Period the PACE Project will reduce emissions in MB, Canada, and globally: cumulative net PACE Project emission reductions over the 44-month period are estimated to range from 54 to 69 kt globally. PACE Project infrastructure, in both the Baseline and Project Scenario, will continue to reduce global emissions throughout their assumed 75-year lives.
- The GHG reductions resulting from the PACE project will mostly occur within Manitoba, which is atypical for a MH project as there is limited opportunity to reduce MB Electricity system emissions. The PACE Project will contribute in a small way to Canada's Paris Agreement commitment.

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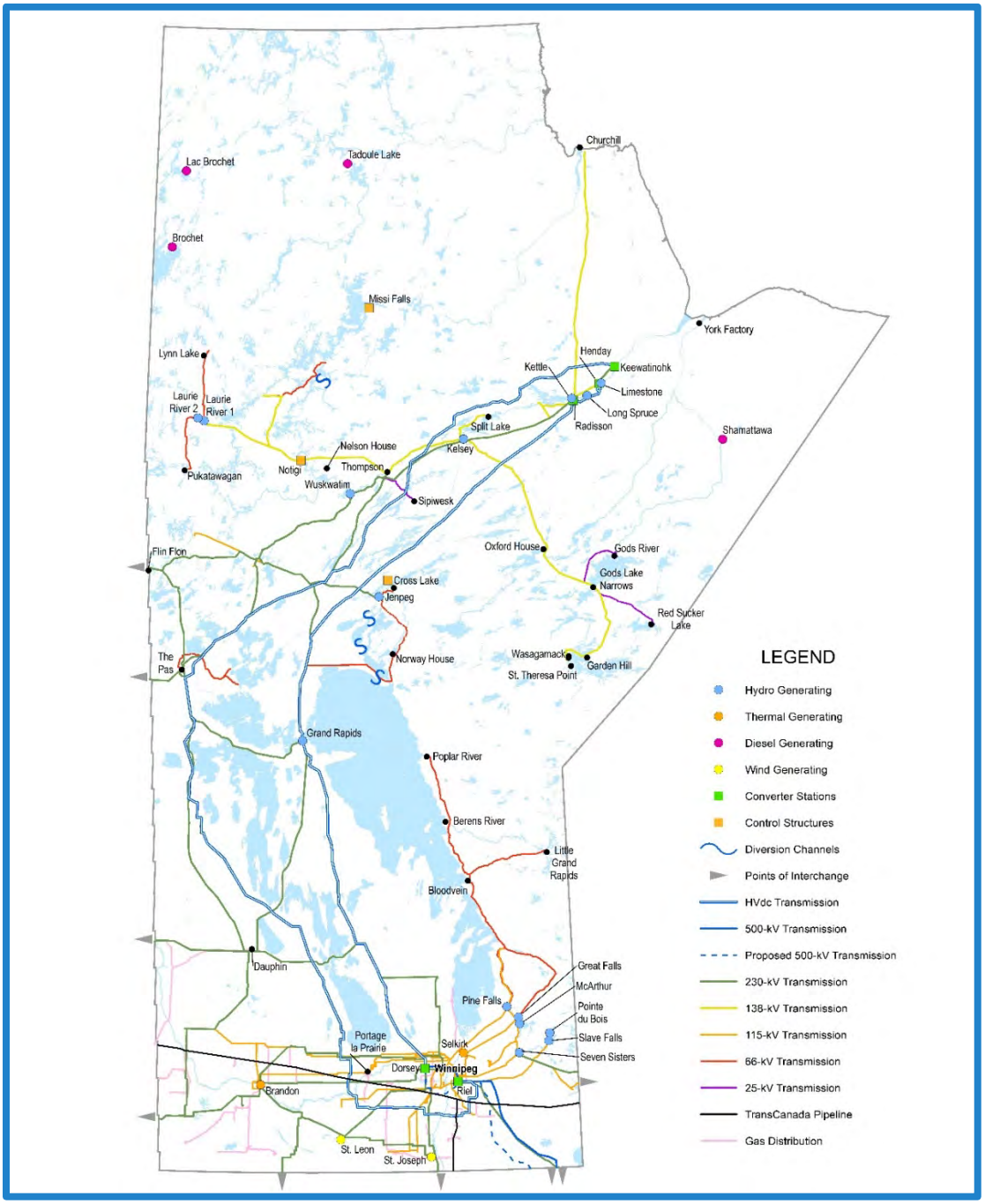
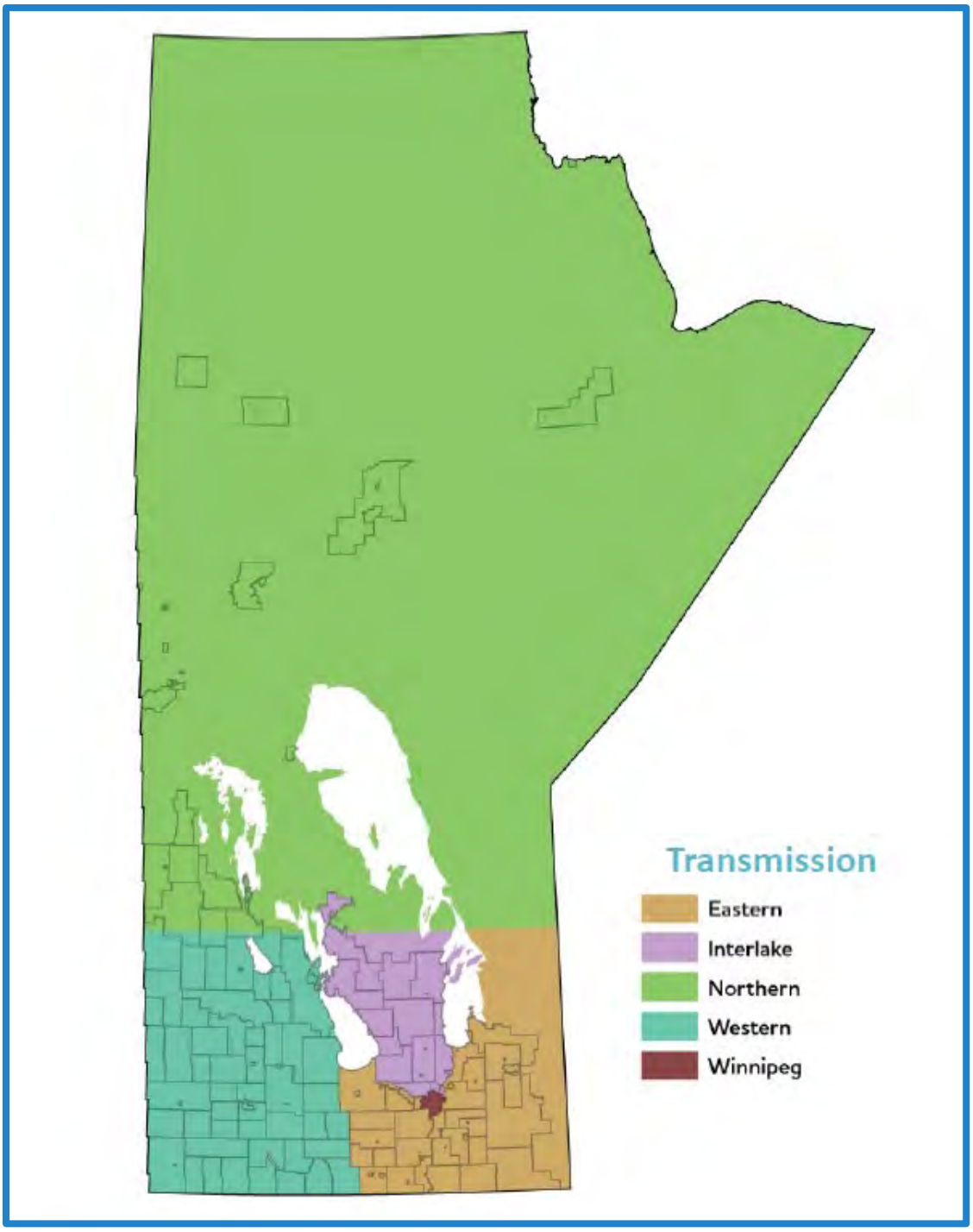
APPENDIX A ADDITIONAL MAPS

Figure 16 Map – MB Electrical System (Alternative Map)[216]



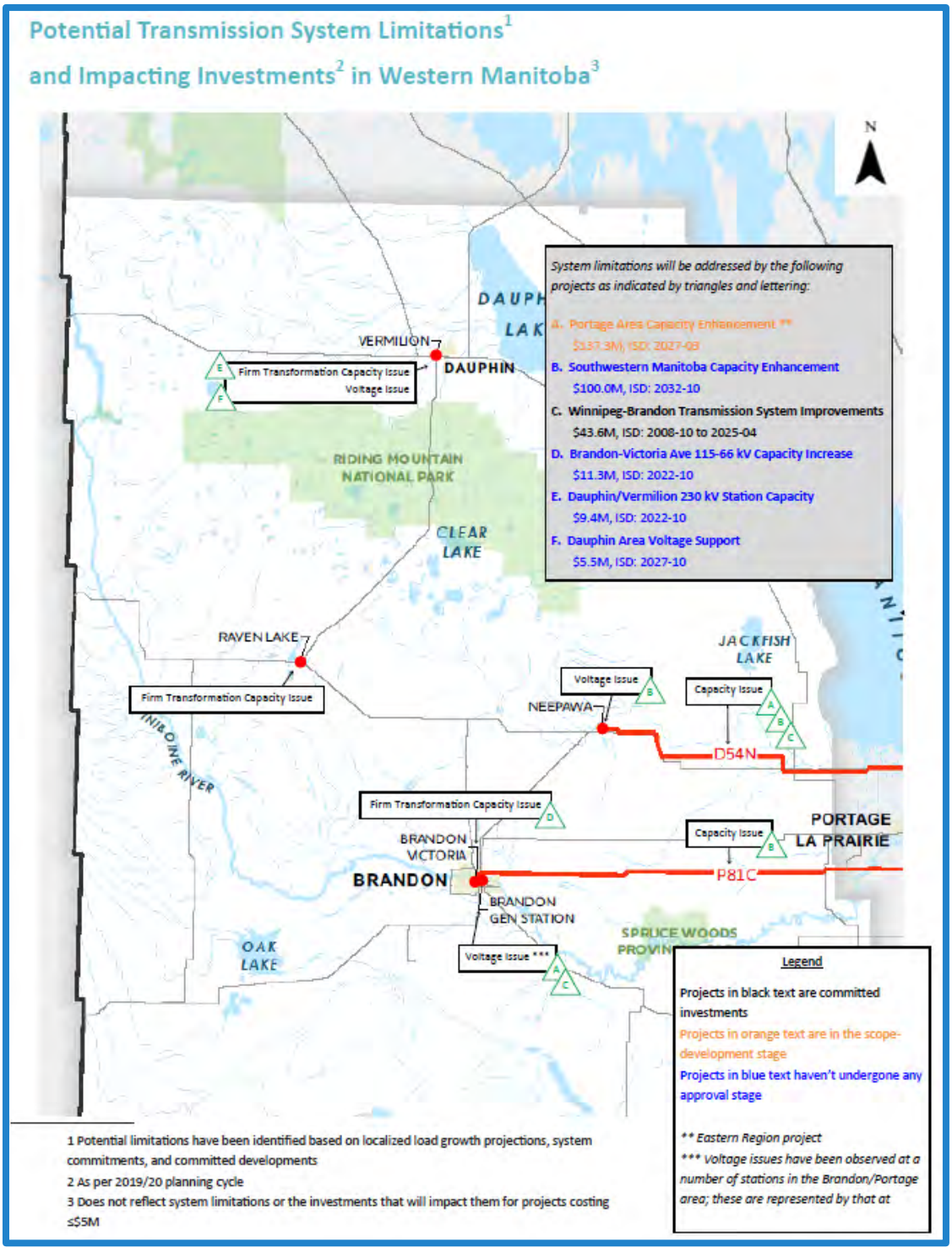
[216] Note: The proposed 500 kV line (the MMTP) is now operational. The now operational B71T (i.e., the BTP) is not shown.

Figure 17 Map – MH Transmission System Regions[217]



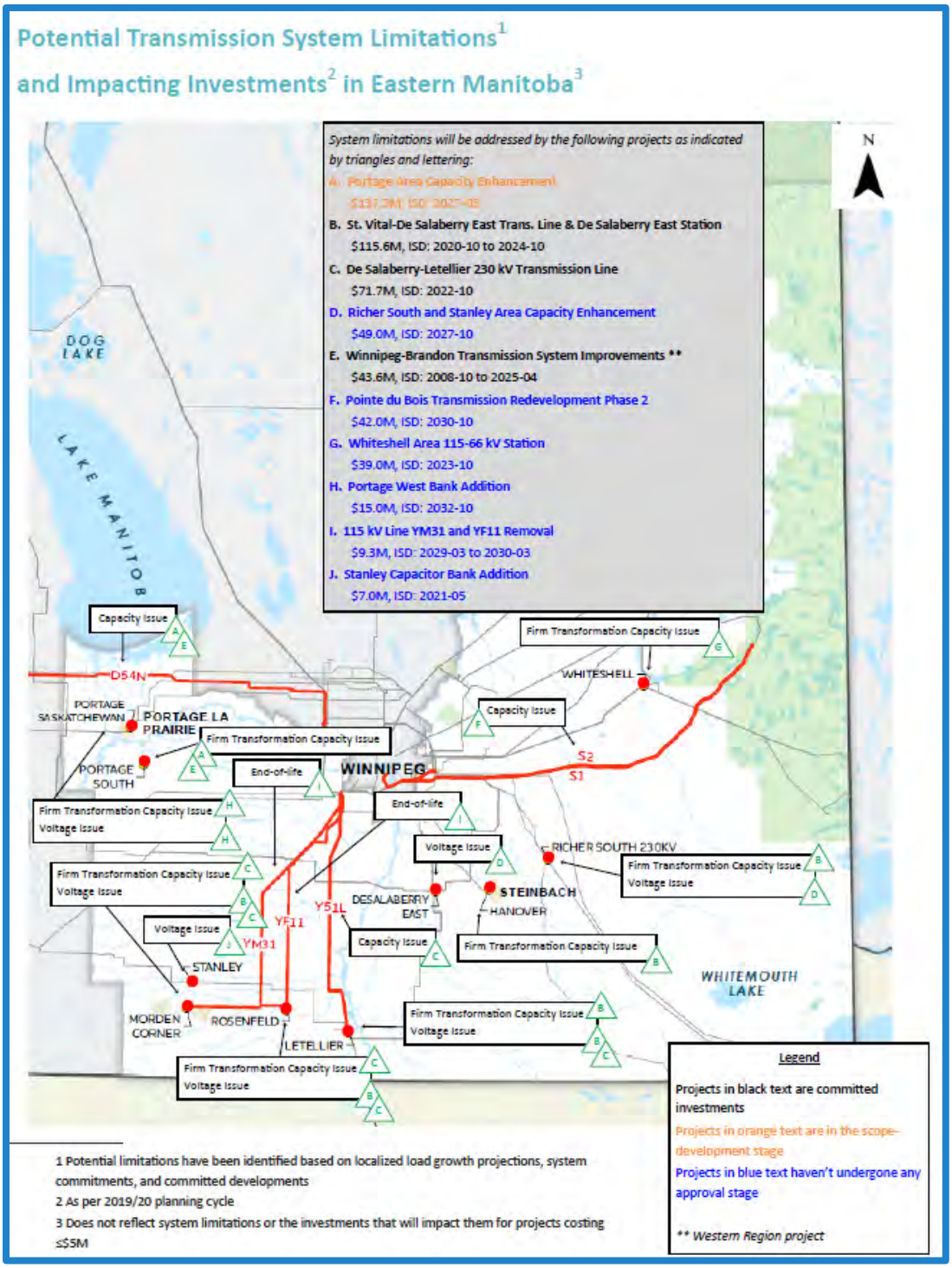
[217] [Manitoba Hydro, 2020b]

Figure 18 Map – Potential MH Transmission System Limitations in Western MB[218]



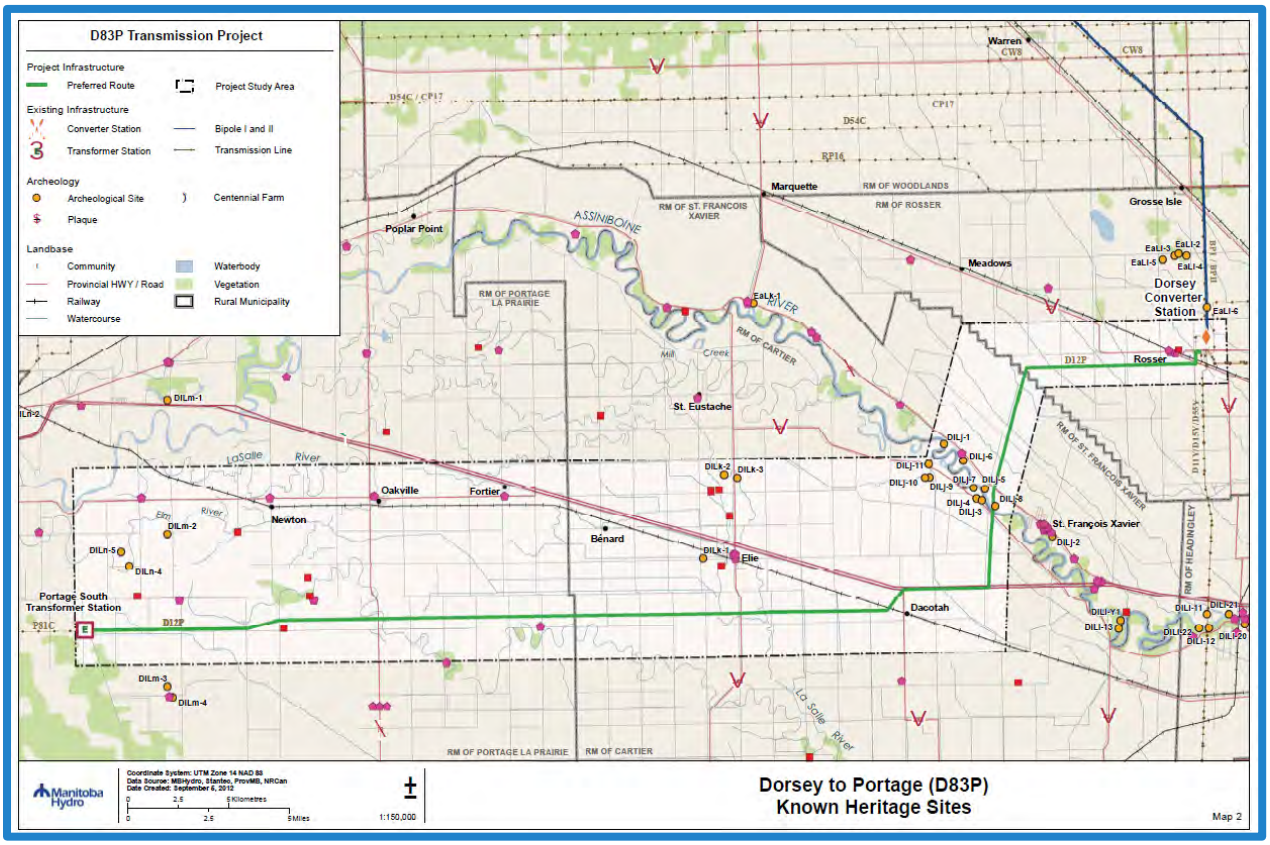
[218] [Manitoba Hydro, 2020b]

Figure 19 Map – Potential MH Transmission System Limitations in Eastern MB[219]



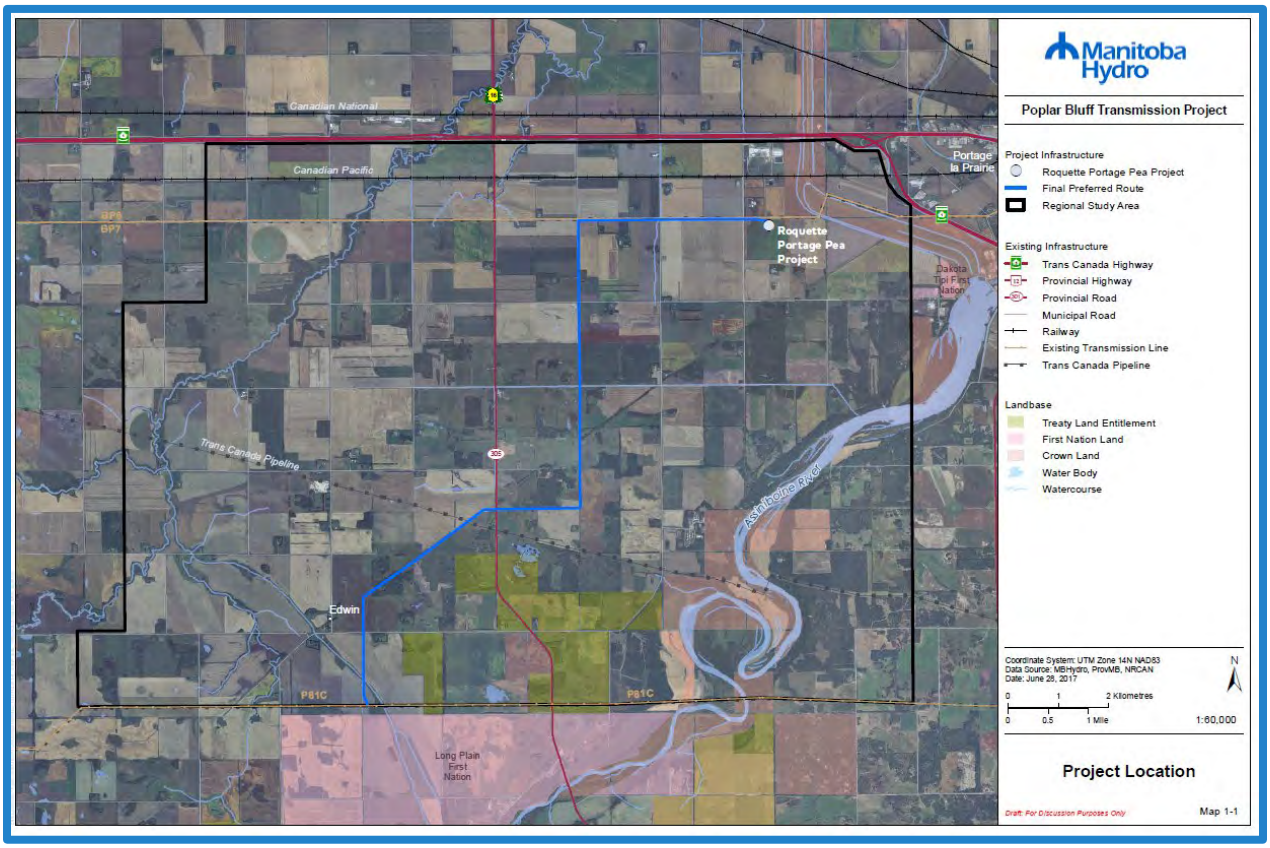
[219] [Manitoba Hydro, 2020b]

Figure 20 Map – Dorsey to Portage (D83P) Known Heritage Sites – D12P Highlighted[220]



[220] [Western Heritage, 2012]

Figure 21 Map – Poplar Bluff Transmission Project – P81C and Roquette Highlighted[221]



[221] [Manitoba Hydro, 2017b]

Appendix H: Cultural and heritage resources protection plan

Final 1.0 2020_0610

STANDARD CULTURAL AND HERITAGE RESOURCES PROTECTION PLAN

Manitoba Hydro

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

Version - Final 1.0

List of Revisions

Number	Nature of Revision	Section(s)	Revised By	Date
Final 1.0	Document has been approved and published			2020_06109

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Key messages for construction

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

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

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

Potential fines

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

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Preface

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

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

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

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Table of contents

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1.0 Introduction

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

1.1 Commitment to environmental protection

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

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

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

1.2 Regulatory and policy setting

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

1.3 Implementation

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

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

This Protocol could provide feedback on items such as:

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

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

1.4 On-site project management structure

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

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

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

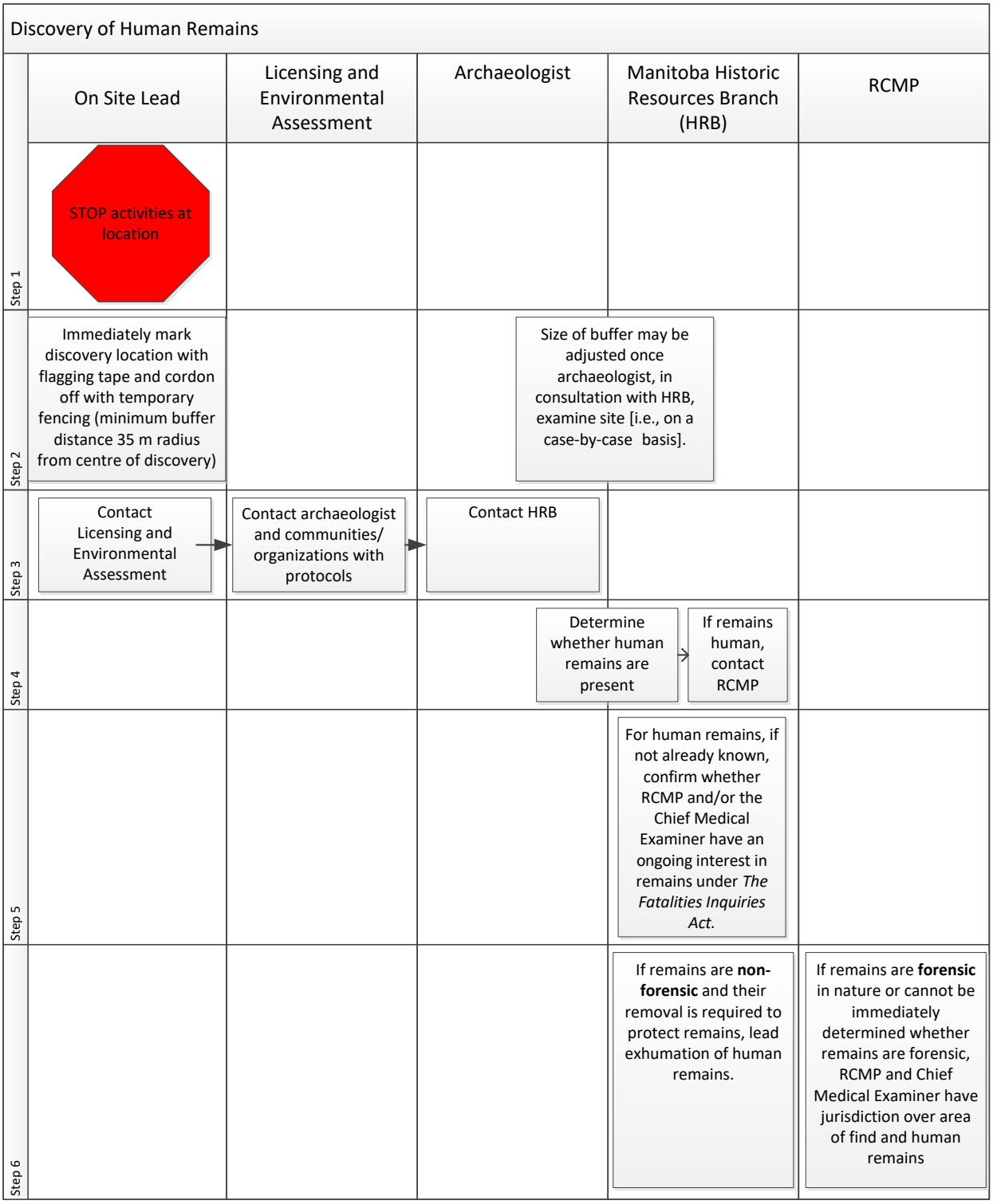
1.5 Human remains

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

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

Manitoba Hydro will not disturb or remove human remains from their original resting place unless removal is unavoidable and necessary. Out of respect for the remains, all work related to the remains will be conducted as much as possible out of the public eye. **Funerary (grave) goods** found with human remains will accompany human remains at all times. No reports related to any such find and its analysis will be published unless the Community Representative(s) consents to such publication, other than such reports provided to Manitoba Hydro and the Historic Resources Branch or other agencies as may be required by law. The following describes the practices that Manitoba Hydro will follow if **skeletal remains** believed or known to be human remains and/or accompanying grave goods are discovered or disturbed:

Figure 1-1 Discovery of human remains



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

1.6 Heritage resources

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

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

(a) a heritage site;

(b) a heritage object, and;

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

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

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

1.7 Cultural resources

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

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

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

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

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

Figure 1-2 Discovery of cultural and heritage resources

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

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

2.0 Reporting and follow-up

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

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

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

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

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

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

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

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

3.0 Glossary of terms

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

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

Appendix A: Resources Identification Guide

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Examples of cultural and heritage resources of potential interest

The following are some examples of surface or sub-surface heritage objects or features that may be encountered in the field that have the potential to be of archaeological interest or cultural significance. These descriptions are provided for information only. When the features described in these examples are encountered in the field, or when it is otherwise believed that a site potentially may be of archaeological interest, a Manitoba Hydro On-Site Supervisor/delegate or Environmental Inspector/Officer must be notified.

In situ artifacts

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

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

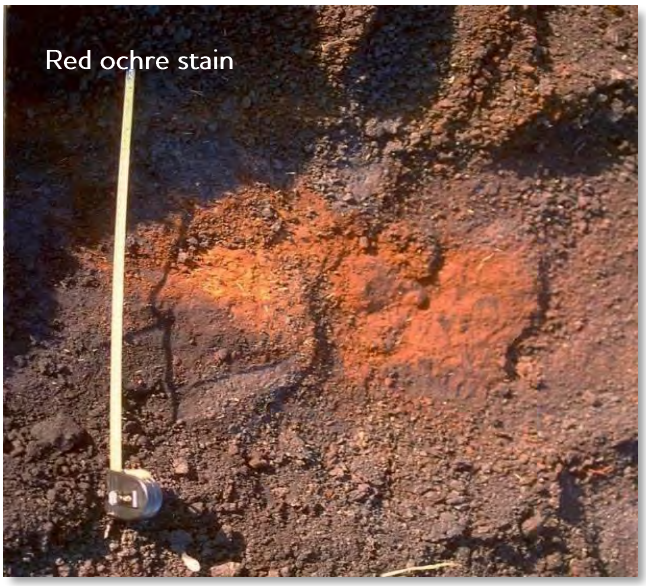

Pre-contact pottery sherd


Historic period kettle and tin cups


Projectile point (left) and lithic flake (right)

Soil Staining

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



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

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


Ash and organic soil staining of a hearth feature

Animal Bone

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

Animal Long Bone with red staining

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

Bison bone fragments

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

Culturally modified trees

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

Stone features

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

Ground or Structural Features

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


Log Cabin


Cellar Depression


Stone Building Foundation

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Appendix B: Cultural and heritage resource protection protocol

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CULTURAL AND HERITAGE RESOURCE PROTECTION PROTOCOL

Community/Organization: _____

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

   Yes ☐ No ☐

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

Human remains	Yes	☐	No	☐
Heritage/cultural resources (pictographs, petroforms, bone tools)	Yes	☐	No	☐

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

Phone number: _____

Cell phone: _____

Email address: _____

Preference for contact _____

(i.e.: cell phone, email)

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

Yes ☐ No ☐

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

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

Human remains	Yes	☐	No	☐
Heritage/cultural resources	Yes	☐	No	☐

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

Yes ☐ No ☐

Date: _____

Filled out by (Please print): _____

Signature _____