Silver to Rosser Tap (S65R Tap) Transmission Project

Environmental Assessment Report

Prepared by Manitoba Hydro

Asset Planning and Delivery

Transmission and Distribution
Environment and Engagement

August 2024

Prepared for:

Environmental Approvals Branch

Land acknowledgement

Manitoba Hydro has a presence across Manitoba – on Treaty 1, Treaty 2, Treaty 3, Treaty 4, and Treaty 5 lands – the original territories of the Anishinaabeg, Cree, Anishininew, Dakota and Dene Peoples and the homeland of the Red River Métis. We acknowledge that these lands, its water, and resources have allowed us to provide power to our customers, and we pay our respects to the ancestors of this territory who have stewarded the land since time immemorial and continue to care for the land.

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

We acknowledge these longstanding cultural and spiritual connections with the land throughout the territory and acknowledge the impacts of our projects and operations. The legacy of the past remains a strong influence on our relationships with Indigenous communities today. We remain committed to having meaningful and mutually beneficial relationships. Let us reaffirm our relationship with one another. This is important as we move forward together in a spirit of truth, reconciliation, and collaboration.

Executive summary

Manitoba Hydro has developed this report to outline the environmental assessment carried out for the Silver to Rosser (S65R) tap transmission project. This report outlines the proposed project, project engagement, the biophysical and socio-economic environment in which the project will be built and operated, the potential effects of the project, and our assessment of the significance of those effects.

Using input from project engagement and drawing from our experience with the design and construction of transmission lines and proven mitigation, we feel the proposed project meets the intent of sustainable development. We also feel that the proposed project will be undertaken in a manner that protects and maintains the environment and its ability to sustain a high quality of life, including social and economic development, recreation, and leisure for present and future generations.

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5 km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

The assessment process was developed through a review of regulations, current environmental assessment practices, experience undertaking assessments of similar projects, and feedback received during project engagement.

Based on the above, the environmental assessment was focused on the following eight valued components:

- Vegetation and wetlands
- Wildlife and wildlife habitat
- Harvesting and important sites
- Commercial agriculture
- Infrastructure and services
- Economic opportunities
- Human health risk
- Community well-being

The preferred route does not traverse any Crown land.

The proposed project will alter the landscape affecting the biophysical and socio-economic environments. The changes to the biophysical environment are primarily through vegetation clearing to establish a new 40 m right-of-way for the transmission line. Land cover in the proposed transmission line right-of-way is dominated by range and grassland, deciduous forest and agricultural cropland.

The project will remove approximately 33 ha of forest, increase the density of linear features on the landscape, but not affect large intact forests.

The project will potentially limit agricultural production on 10 hectares of cropland and 30 hectares of pasture during construction. It will remove less than a tenth of a hectare of annual cropland due to the presence of permanent tower footprints and increase nuisance effects to agricultural production (e.g., farming around towers, increased need for weed control) along approximately 2,700 m of the route.

Project construction will cause a temporary increase in noise, potentially affecting wildlife, the ability to harvest, as well as community well-being. There will be a small change to infrastructure and services with the influx of workers, increasing traffic and potentially straining services (e.g., accommodations or healthcare).

The influx of workers will provide some economic opportunities as well as the possibility for jobs related to the project.

The long-term presence of the project may alter community well-being through potential stress resulting from alteration of the landscape, perceived health effects (e.g., EMF), or perceived effects to property values.

Manitoba Hydro aims for sustainable development and understands that any change to the landscape alters the human-nature relationships and land use. We will continue to engage on the project and use the knowledge gathered to continually improve how we undertake projects and assess the effects of these projects.

Manitoba Hydro’s environmental protection program and associated protection plans, including project specific mitigation measures, have been adapted and updated to minimize the overall impacts of the project. The proposed project was considered in the context of the current landscape, including past changes, as well as future anticipated changes to determine the significance of the project. Based on Manitoba Hydro’s planned mitigation and past outcomes from similar projects in southern Manitoba, the overall assessment conclusion is that the proposed project’s effects to the environment will be not significant and that the project meets the intent and purpose of sustainable development.

Authors’ acknowledgement

Staff from the following Manitoba Hydro departments and external consultant companies contributed to the preparation of this environmental assessment report:

Department/Role	Organization
Staff from the departments of Transmission & Distribution Environment and Engagement; Transmission and Distribution Projects; Partnerships & Projects Support; Engineering Standards & Support Services; Transmission Overhead & Civil Engineering; Line Contracts; Water Resources; Energy Resource Planning; Property; Grid Infrastructure Planning	Manitoba Hydro
Vegetation consultant	Szwaluk Environmental Consulting
Heritage consultant and project archaeologist	Western Heritage

TABLE OF CONTENTS

List of Tables

List of figures

List of Maps

List of appendices

Acronyms and abbreviations

AQMS	Air Quality Management System
AHCCD	Adjusted and homogenized Canadian climate data
BBA	Breeding bird atlas
CAAQS	Canadian Ambient Air Quality Standards
CEnvPP	Construction environmental protection plan
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
dBA	A-weighted decibels
D83W	Dorsey to Wash'ake Mayzoon Transmission Project
ECCC	Environment and Climate Change Canada
ELF EMF	Extremely low-frequency electric and magnetic fields
EIWD	East Interlake Watershed District
EMF	Electric and magnetic fields
EPRI-GTC	Electric Power Research Institute and Georgia Transmission Corporation
ESEA	Endangered Species and Ecosystems Act
ESS	Environmentally sensitive site
FNMEP	First Nation and Métis engagement process
GDP	Gross domestic product
IAP2	International Association of Public Participation
ICES	International Committee for Electromagnetic Safety

ICNIRP	International Commission on Non-Ionizing Radiation Protection
kV	Kilovolt
LAA	Local assessment area
MBCDC	Manitoba Conservation Data Centre
MMTP	Manitoba-Minnesota Transmission Project
MVA	Megavolt ampere
NAAQS	National ambient air quality standards
NIEHS	National Institute of Environmental Health Sciences
PDA	Project development area
PEP	Public engagement process
PR	Provincial road
PTH	Provincial trunk highway
PW75	Pointe du Bois to Whiteshell Transmission Project
RAA	Regional assessment area
RCMP	Royal Canadian Mounted Police
RM	Rural municipality
ROW	Right of way
RTAC	Roads and Transportation Association of Canada
SAR	Species at risk
SARA	Species at Risk Act
SOCC	Species of conservation concern

SOP	Standard operating procedure
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
VC	Valued component

Glossary

Term	Definition
A-weighted decibels (dBA)	Measurements taken by sound meters that have the same sensitivity to sound as the average human ear (European Environment Agency n.d.)
Biosecurity	The security of crops and livestock from transmission of infectious diseases, parasites, and pests.
Borden number	A Canada-wide system assigning registered archaeological sites with alphanumeric codes representing the location of the site and order in which it was discovered. Borden Number Blocks are measured in degrees and minutes Latitude and Longitude.
Commercial agriculture	For-profit production of crops and livestock.
Criteria air contaminants	Emissions of criteria air contaminants contribute to smog, poor air quality and acid rain. CACs include Total Particulate Matter (TPM), Particulate Matter with a diameter less than 10 microns (PM10), Particulate Matter with a diameter less than 2.5 microns (PM2.5), Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulphur Oxides (SO x), Volatile Organic Compounds (VOC) and Ammonia (NH 3).
eCampaign	A notification mechanism targeted to self-identified interested parties. Email campaign recipients can unsubscribe from the email campaign service at any time, forward to other individuals, post on X (formerly Twitter) or share on Facebook.

Interested party	A general term used to describe an individual or group that would potentially have feedback to provide, may be affected by the project or decisions about the project, have a specific interest or mandate in the area, data to share, ability to disseminate information to membership or a general interest in the area. Interested party is used in place of the term stakeholder.
Linear infrastructure	An existing network or system composed of transportation or utility-based facilities (e.g., roads, highways, railways, pipelines, and transmission lines).
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).
Project engagement	A process of sharing information and seeking feedback to inform decision-making from those affected by or interested in our projects.
Viewscape	"The visible portions of a landscape that create a visual connection between a human observer and their 3-dimensional surroundings" (Vukomanovic et al. 2018)

1.0 Introduction

This environmental assessment (EA) report outlines the assessment of potential effects of a proposed project in pursuit of a provincial Class 2 Environment Act Licence.

The proposed project consists of the construction and operation of a new 230 kV transmission line to provide hydroelectric power to Diageo Canada Inc. (Diageo)'s operational liquor distillery at 19107 Seagram Road, in Gimli, Manitoba (Map 1-1). The proposed transmission line would connect to and tap from an already existing 230 kV transmission line that runs from Silver to Rosser electrical stations (i.e., S65R transmission line) and would be primarily on privately-owned lands zoned for agricultural land use. The project would involve:

1. Construction of a tap structure off an existing 230 kV transmission line (S65R)
2. Construction of an 18.5 km long 230 kV transmission line that will initiate at the tap structure and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli

The project in-service date is scheduled for the winter of 2025/2026.

Based on the conclusions of the undertaken environmental assessment, the potential effects of constructing, operating, and decommissioning the proposed transmission line are deemed not significant.

1.1 Project need and justification

As a Crown Corporation, Manitoba Hydro is under statutory obligation to provide an adequate supply of power to meet the needs of the province. The project is required to meet the needs of Diageo, an existing Manitoba Hydro customer that operates a liquor distillery in Gimli and plans to fully power their facility with renewable energy. Currently, Diageo uses a combination of hydroelectricity and non-renewable natural gas at their facility. Details of the additional hydroelectricity load requested by Diageo as well as alternatives to hydroelectricity considered are provided in Section 2.0 Project Description.

1.2 Regulatory framework

Manitoba Hydro projects are subject to provincial and federal regulations. The following sections describe the regulatory framework of the project.

1.2.1 Provincial regulatory framework

The project involves the construction of a 230-kV transmission line, which requires a provincial licence for a Class 2 development (i.e., transmission lines of 115-kV and over but not exceeding 230-kV) under *The Environment Act* (Manitoba).

This environmental assessment has been 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 proposal for the project.

1.2.2 Federal regulatory framework

Federally, the 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 Manitoba Hydro's mission and goals

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 significant role in the development of the provincial economy and the province. Manitoba Hydro's operations are based on our foundational principles of safety, environmental leadership, respectful engagement with interested parties and communities, and respect for each other.

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

We consider the environmental impacts of our activities, products, and services. To deliver on this commitment effectively, we employ an Environmental Management System that aligns with ISO 14001 Standard by:

- 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.
- Fostering an environment of continual improvement.

1.4 Purpose of this document

The purpose of this report is to support Manitoba Hydro's application for a Class 2 development licence under *The Environment Act* (Manitoba), to construct and operate the S65R Tap transmission line. For Class 2 developments, proponents are required to submit a cover letter, an Environment Act Proposal Form, an EA report, and an application fee to Manitoba Environment and Climate Change's Environmental Approvals Branch.

This EA report identifies and assesses the potential effects of the project and identifies the mitigation measures used to address adverse environmental effects and enhance benefits associated with the project and forms part of the Environment Act proposal.

1.5 Environmental assessment report outline

Chapter 2.0 (Project description) describes the project including anticipated project components, considered alternatives, and schedule.

Chapter 3.0 (Route selection) summarizes the route selection process used to determine the location of the proposed project's footprint.

Chapter 4.0 (Environmental assessment methods) outlines the methods used to conduct the environmental assessment, including the selection of valued components (VC), spatial and temporal boundaries, existing conditions, assessment of project effects and cumulative effects, mitigation, and determination of significance.

Chapter 5.0 (Project engagement) summarizes the engagement undertaken for the project, including the goals, objectives, and methods of engagement, as well as a summary of the feedback received.

Chapter 6.0 (Environmental setting) provides existing condition information for aspects relevant to the environmental assessment that are broad or not covered in individual VC chapters (e.g., climate, physiography and drainage, geology, soils, land and resource use, communities, and historical and cultural setting).

Chapters 7.0 to 14.0 present the assessment of potential project effects on each of the eight VCs considered relevant for the project. In order of presentation, the eight VCs are vegetation and wetlands, wildlife, and wildlife habitat, harvesting and important sites, commercial agriculture, infrastructure and community services, economic opportunities, human health risk, and community and well-being. Each VC chapter identifies specific mitigation measures, characterizes residual effects, assesses cumulative effects, presents follow-up and monitoring, and describes sensitivity to future climate change scenarios, for that VC.

Chapter 15.0 (Greenhouse gases and climate change) summarizes greenhouse gas and climate change information compiled for the project.

Chapter 16.0 (Effects of the environment on the project) discusses the effects of the environment on the project.

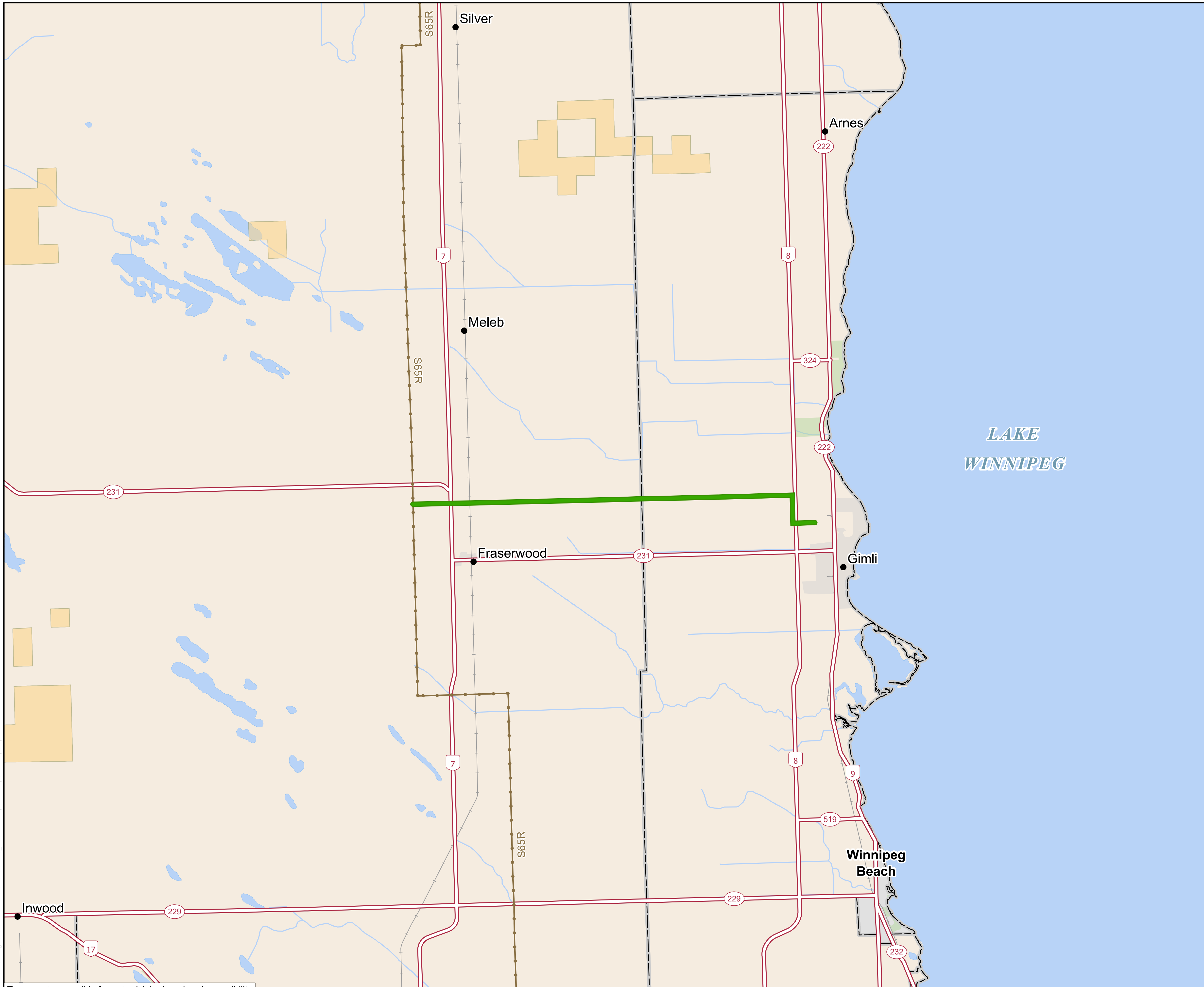
Chapter 17.0 (Accidents and malfunctions) outlines unplanned events that may occur due to project activities.

Chapter 18.0 (Environmental protection program) describes the environmental protection program for the project including the various plans, roles, and communication protocols that will be in place to mitigate project activities and effects.

Chapter 19.0 (Conclusion) provides a conclusion for the document.

Chapter 20.0 (References) lists the references from which information was drawn.

Following Chapter 20.0, the document ends with appendices in Chapter 21.



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

Final Preferred Route

Existing Infrastructure

Existing ≥69kV Transmission Line

Landbase

Railway

Provincial Highway/Road

First Nation

Provincial Park

Wildlife Management Area

Urban Area

Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 3.5 7 Kilometres

0 2 4 Miles

1:160,000

Project Area

Draft/Confidential: For Discussion Purposes Only

Map 1-1

2.0 Project description

The proposed project consists of the construction and operation of a new 230 kV transmission line to supply additional electricity to the Diageo distillery facility in Gimli, Manitoba (see Map 2-1). The new transmission line will tap off an existing 230 kV transmission line that runs from silver station to Rosser station (i.e., S65R) approximately 17 km west of the distillery. Construction is anticipated to begin in early winter 2025 and end in spring 2026.

The preferred route does not traverse any Crown land.

2.1 Project need and alternatives

Diageo currently operates their existing Gimli facility with electricity from a 66 kV distribution line and augments their energy supply using a boiler system powered by non-renewable natural gas. The company is aiming to remove the use of natural gas from their facility to achieve targets associated with their membership to RE-one hundred, a global membership of companies targeting the use of 100% renewable energy. To achieve this goal, Diageo requires a new fifty megavolt ampere (MVA) load.

Diageo requested Manitoba Hydro evaluate system upgrades required to accommodate a new 50 MVA load interconnection. Based on Manitoba Hydro's evaluation, presented in Load Interconnection Facilities Study (Load IFS) report GIP 2022-12, a new 230 kV hydroelectricity transmission line is required to provide the requested load to the Diageo facility. Diageo signed a construction agreement with Manitoba Hydro in July 2023 to tap the existing 230 kV transmission line, S65R, to supply the proposed load.

Other alternatives to hydroelectricity, including a wind farm or solar panels, were considered but would not provide a reliable source of electricity for the load requirement, and were not pursued.

Manitoba Hydro has a duty to provide natural gas and/or electric service to all customers within the province, and a new 230kV line was determined to be the feasible option to replace natural gas use for the Diageo facility.

2.2 Scope

The project involves construction of a tap structure off the existing S65R transmission line within the Road 9E road allowance at NW 27-19-2 EPM and a new 230 kV transmission line approximately 18.5 km in length. The proposed transmission line begins at the tap structure and runs along a new right-of-way comprised of easements on private property and road allowances to the termination point (*i.e.,* point of delivery) at the property line of Diageo's property at NE 20-19-4 EPM (Figure 2-1).

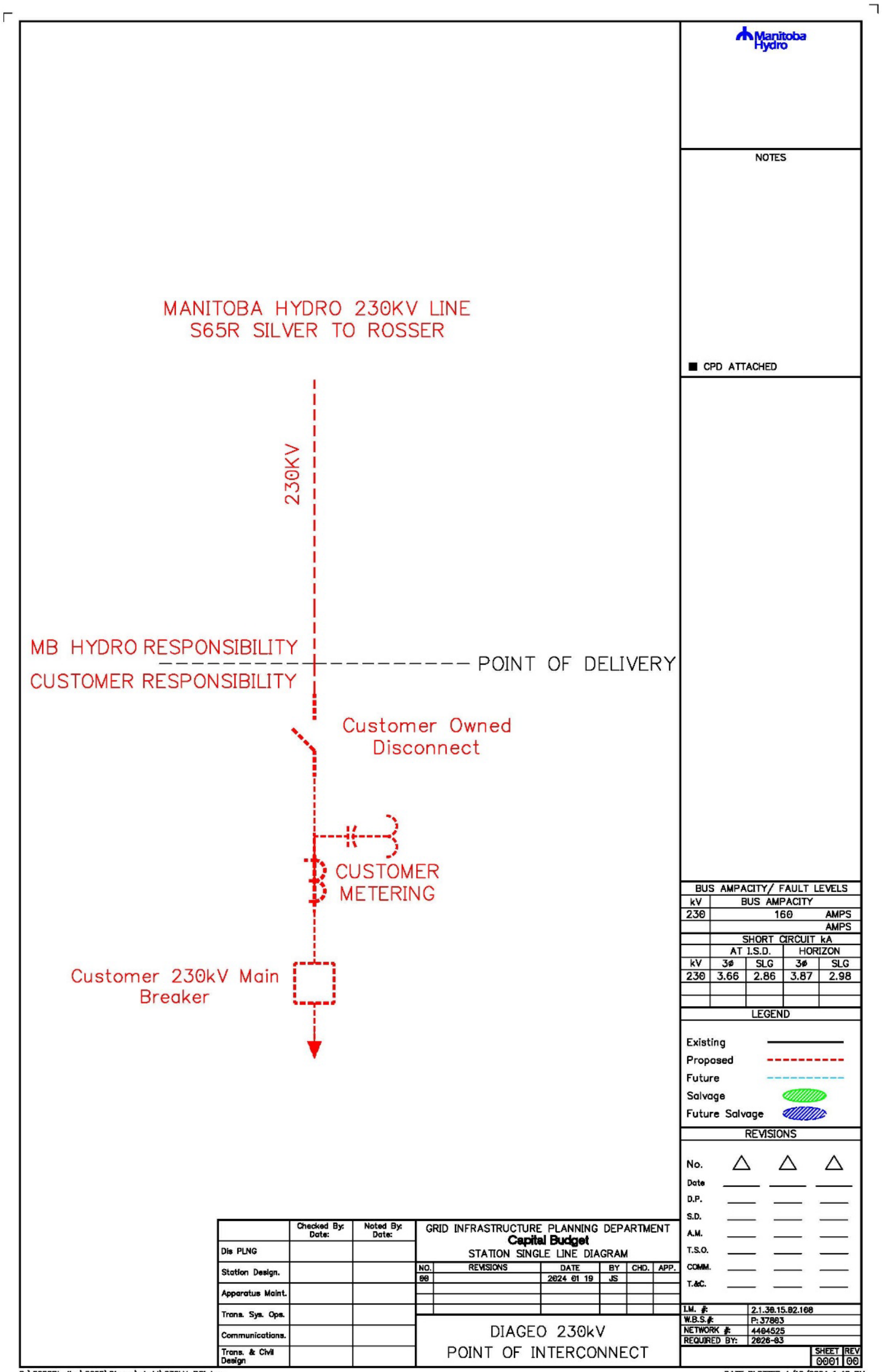


Figure 2-1: Schematic illustration of the point of delivery

The distillery's current connection to a 66 kV distribution line (GW25-11) will be disconnected once the new 230 kV line is in service.

2.2.1 Out of scope ancillary activities

Manitoba Hydro will undertake ancillary activities outside of the projects scope described above that are required to accommodate the new transmission line including:

- Protection upgrades inside the existing footprints of the Silver and Rosser stations, including dual redundant three terminal line protection setting changes, GPS clocks, and redundant and independent electrical modifications
- Protection upgrades and customer revenue metering at the point of delivery (*i.e.,* termination point) and within the customer's property
- Pre-construction activities to inform transmission line design and prepare for right-of-way clearing including geotechnical investigations in cleared areas and road allowances to create a soil profile used by civil designers to inform the foundation design, and land surveying to establish the centerline of the right-of-way, flag the edges of the right-of-way, and to establish the specific locations of each transmission structure

2.3 Design considerations

Transmission line design and construction will meet or exceed the design standards as 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.

2.4 Transmission line routing

The final preferred route for the S65R tap transmission line is shown on Map 2-1. 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.

2.5 Transmission line right-of-way

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 width for the project will be 40 m (Figure 2-2).

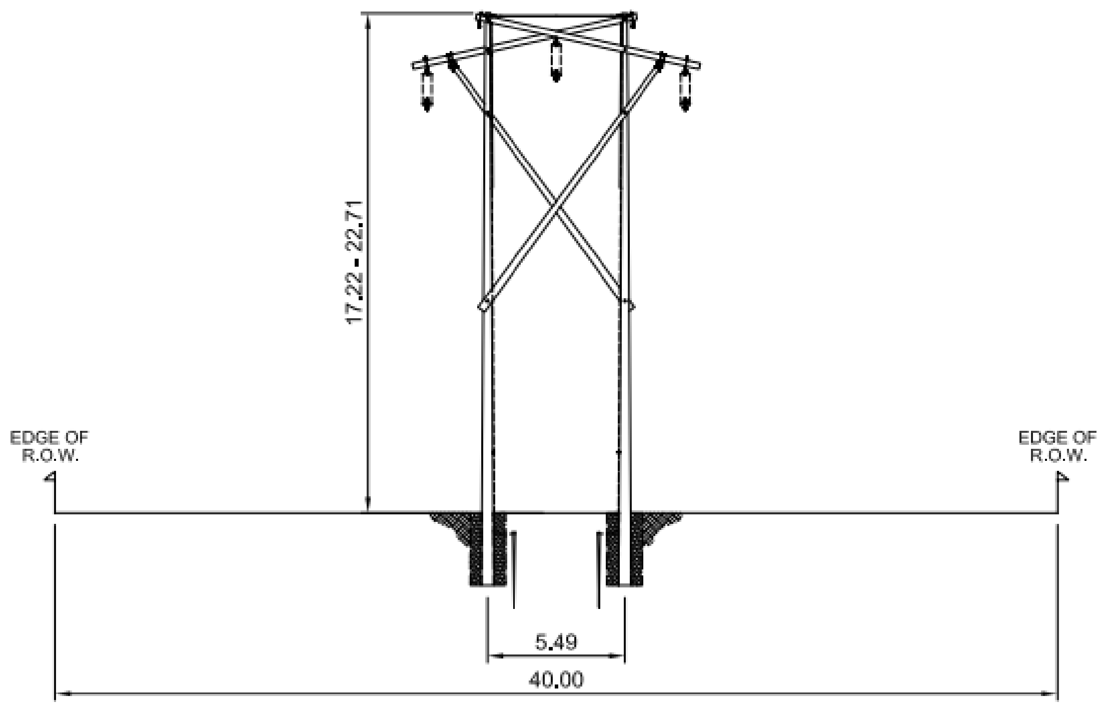


Figure 2-2: Typical right-of-way requirements

2.5.1 Easement procurement and compensation

This section outlines the easement and procurement process for obtaining land rights to construct and operate the transmission line. It covers private land easement and compensation, namely land compensation, construction damage compensation, structure impact compensation, and ancillary damage compensation.

Typically, once a transmission line's final preferred route is selected, Manitoba Hydro begins the process of acquiring easements from landowners.

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 by a Crown land reservation or 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 an easement for a transmission line right-of-way. It is based on the following:

- Total land area (acres) of easement required,
- Current market value of the land (per acre), and
- Easement compensation factor, which is determined based on the location of the infrastructure (i.e., whether underground or above-ground). For above ground hydro or gas transmission line rights-of-way, Manitoba Hydro's compensation factor is 150% of current market value. For underground hydro or gas transmission lines, Manitoba Hydro's compensation factor is 100% of current market value.

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.

If crops were in place prior to construction of the transmission line, the crop owner will be compensated for monetary loss due to damage. This compensation generally considers the most recent average value of the harvested crop reported by Manitoba Agricultural Services Corporation.

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

- lands permanently removed from production, determined by the type of structure constructed on the land
- reduced productivity in an area of overlap around each tower structure
- additional time required to manoeuvre farm machinery around each structure
- double application of seed, fertilizer and weed control in the area of overlap around each tower structure

Ancillary damage compensation is a one-time payment that applies where Manitoba Hydro's use of the right-of-way directly or indirectly affects property use. Ancillary damage compensation is negotiated. Landowners may be compensated for:

- agricultural effects (e.g., effects on irrigation and aerial spraying activities)
- constraint effects, such as restricted access to adjacent lands

2.6 Project components

This section describes each component of the project including:

- Transmission structures
- Conductors and insulators
- Ground wire
- S65R tap
- Point of delivery

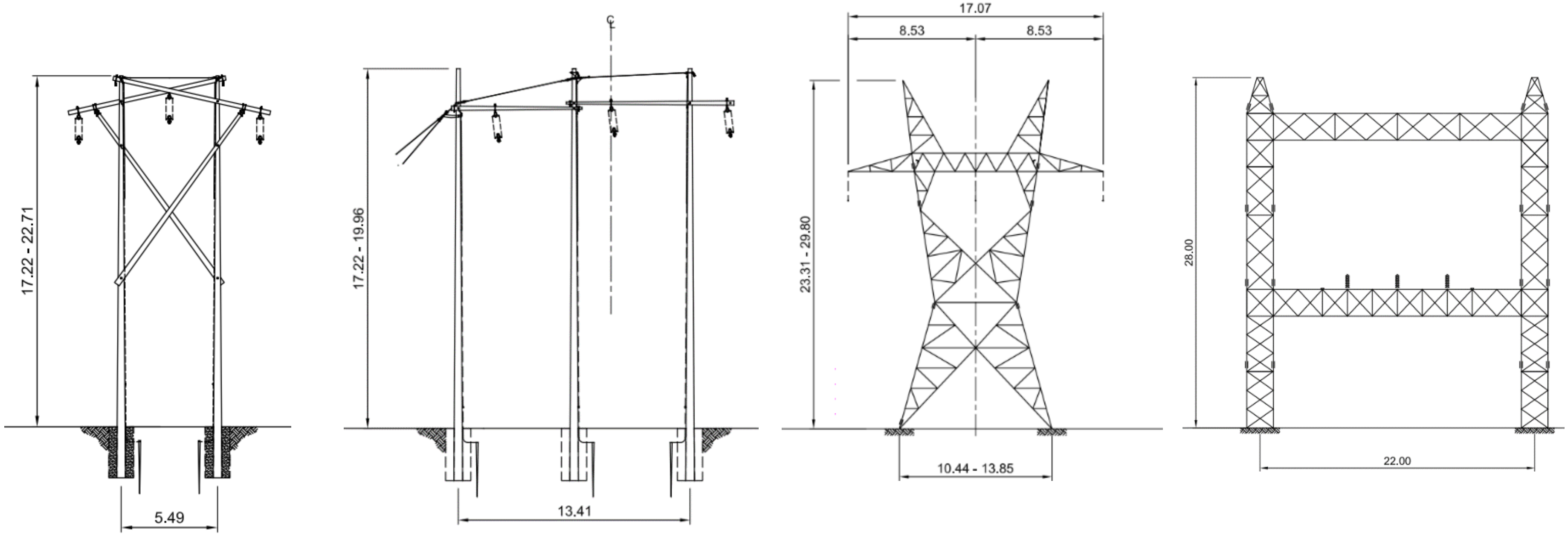
2.6.1 Transmission structures

A combination of single circuit Gulfport suspension (Type A), 3-pole (Type B) light angle, lattice steel heavy angle or dead end, and lattice steel switch structure types will be required for the project (Figure 2-3).

Angle and dead-end structures will be required at specific locations to accommodate line redirection and to terminate the transmission line into the stations.

Other structure designs may be considered to mitigate site-specific issues along the route alignment.

Typical span length will be approximately 230 m.



Typical Type A "Gulfport" suspension structure

Typical light angle Type B structure

Typical lattice steel heavy angle or dead-end structure

Typical lattice steel switch or tap structure.

Figure 2-3: Typical tower structure types (preliminary design)

2.6.1.1 Foundations

Self-supporting steel H-frame structures will be supported by either mat, cast-in-place, or helical pile foundations. Cast in place concrete foundations will be used for lattice heavy angle and switch structures. Depending on soil conditions, mat or pile foundations may alternatively be used.

2.6.2 Conductors and insulators

S65R tap 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).

2.6.3 Ground wire

Two ground wires (sky wires) will string 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.

2.6.4 Tap structure

To connect the proposed transmission line to the existing S65R transmission line, a tap structure (Figure 2-3) will be needed to facilitate the operation of S65R as a three-terminal line.

The tap structure will be within the S65R right-of-way, constructed of steel lattice, and will support three 230 kV vertical break switches. The structure foundation for the tap structure will be selected depending on the soil conditions.

2.7 Project activities

2.7.1 Construction

2.7.1.1 Schedule

Following the submission of an Environment Act Proposal, including this environmental assessment report, should the project be approved, the receipt of a provincial licence under *The Environment Act* is anticipated in early winter 2025. Construction is anticipated to commence in winter 2025 and will take approximately four months.

Construction will take place in four phases: clearing, foundations, tower assembly/tower erection, and conductor stringing. The in-service date for the project is planned for spring 2026. Table 2-1 illustrates the anticipated construction schedule, including key construction activities.

Table 2-1: Construction schedule

Construction activity	Anticipated timeline		
	2025	2026	
	Winter	Winter	Spring
Mobilization			
Right-of-way clearing			
Vehicle / equipment use			
Marshalling yards			
Tower construction			
Helicopter use			
Implodes			
Construction wraps up			

2.7.1.2 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 project.

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

Based on the planned construction schedule, up to 40 workers are anticipated to work on the project during peak construction.

2.7.1.3 Right-of-way clearing

Clearing of trees on the right-of-way will be undertaken in advance of other construction activities. Right-of-way clearing will be subject to standard environmental protection measures, which have been established based on Manitoba Hydro transmission line construction practices, as well as the Environmental Protection Program. Final clearing methods will be determined based on detailed surveys of the transmission line route, and site-specific identification of environmentally sensitive features.

2.7.1.4 Vehicle and equipment use.

Clearing and construction equipment may 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

2.7.1.5 Marshalling or fly yards.

Marshalling yard(s) or fly yards may be established near the 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 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.

2.7.1.6 Access

Access to the right-of-way will typically be from adjacent or intersecting roadways or existing trails.

The development of construction access routes, drainage facilities, and erosion and sediment control plans will be developed by the contractor, subject to Manitoba Hydro approval, and in accordance with the project Environment Act Licence and the access management plan referenced in the Environmental Protection Program.

If provincial permits are required, they will be secured. Manitoba Transportation and Infrastructure will be contacted for access from provincial highways.

2.7.1.7 Transmission tower construction

Foundation installation

Foundation types for each tower structure will be determined based on geotechnical investigations prior to final design. Mat foundations will typically be 4 m^2 (13.1 ft.) by 3 m^2 (9.8 ft.) deep, for each leg of the structure. Helical pile foundations will involve individual piles or pile groups, for each leg of the structure. Pile foundations will typically consist of steel pile groups with a welded cap. 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 project.

Structure and conductor installation

Tower structure assembly can be done at each tower site. After assembly, the tower gets erected by crane. Alternatively, towers may 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.

2.7.1.8 Implosive connectors

To create a continuous conductor, sections of conductor are spliced together by use of implosive sleeves, which make a loud bang and a flash like a firework (Manitoba Hydro 2022).

Implosive connectors are used to join the conductors and to secure the conductor to the dead-end structures.

2.7.1.9 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 transport the structures to site by truck or helicopter to be erected by crane or helicopter.

2.7.1.10 Construction wrap-up

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

Once the 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 of 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 18.0.

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.

2.7.2 Operation and maintenance

2.7.2.1 Transmission line operation

The 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.

2.7.2.2 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.

Depending on geographical location, ease of access, and the time of year, patrols may be conducted by snow machine, all-terrain vehicle, light truck, or helicopter.

2.7.2.3 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.

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.

2.7.2.4 Vegetation management

Throughout operations, vegetation management within the right-of-way is required to make sure that vegetation re-growth following construction does not interfere with reliable operation of the line or public and employee safety. Vegetation management procedures may also involve the removal of danger trees in the immediate vicinity of the right-of-way.

Manitoba Hydro uses an integrated approach for vegetation management that may incorporate mechanical, chemical, biological, or cultural options depending upon several factors including site conditions and the sensitivity of surrounding areas. 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 5 and 10 years. The focus of vegetation management is on managing 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.

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.

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*. 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 and Climate Change's Environmental 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 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.

2.7.3 Decommissioning and restoration

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

2.7.3.1 Preparation activities

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

- Trip the breaker(s) at the customer station
- Open the 230 kV disconnects
- Disconnect the conductors

2.7.3.2 Removal of facilities

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

Salvage will involve removing and salvaging the conductor onto spools under tension then removing 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.

2.7.3.3 Disposal

After dismantling the 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.

2.7.3.4 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.

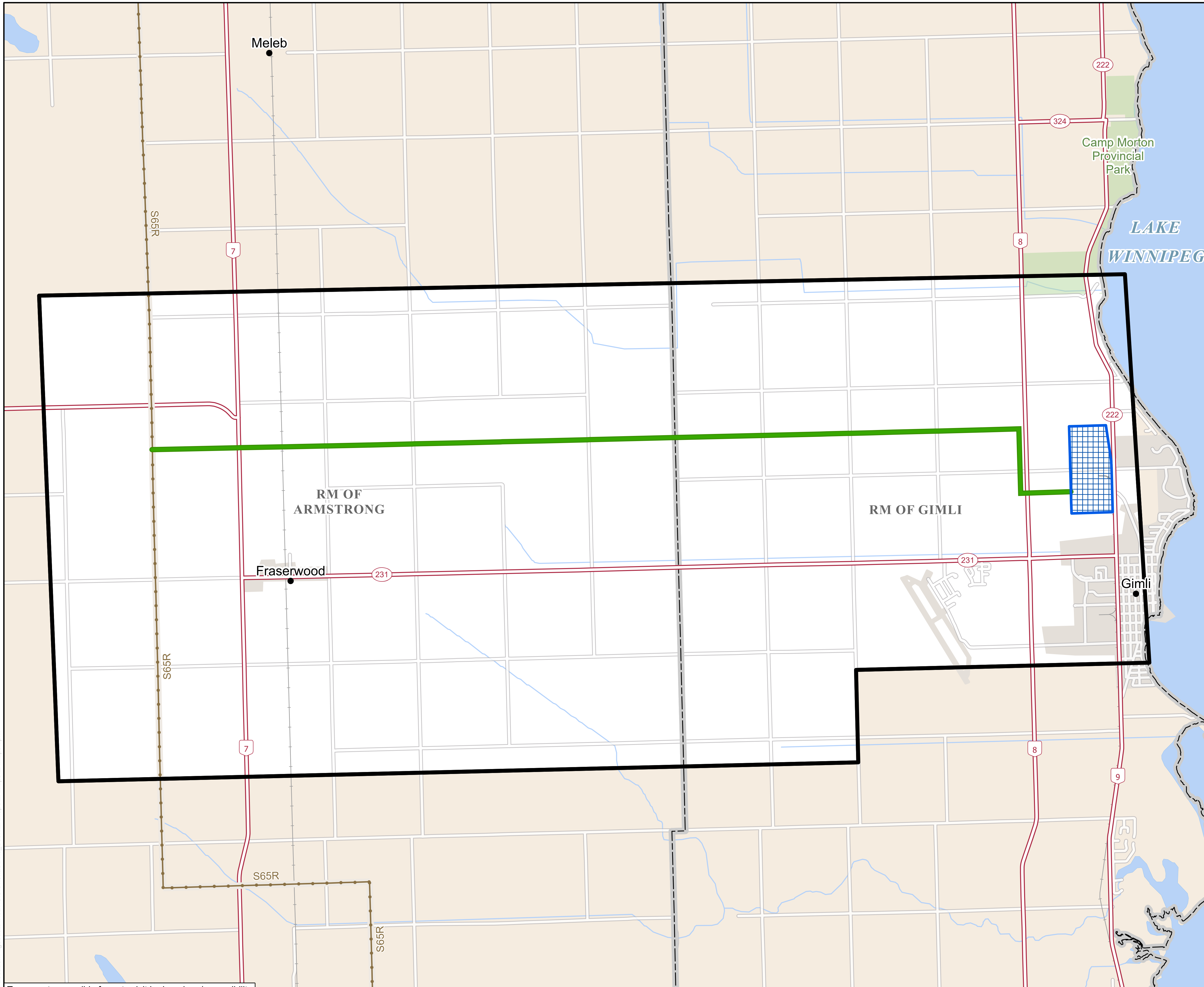
Disturbed areas will be rehabilitated consistent with the rehabilitation and invasive species management plan developed for the project. This will include the restoration of access areas along the right-of-way.

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.

2.8 Funding

Funding is currently being provided entirely by the customer.



Manitoba Hydro

Silver to Rosser
Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Route Planning Area

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Silver to Rosser Tap
Transmission Line

Draft/Confidential: For Discussion Purposes Only

Map 2-1

3.0 Route selection

3.1 Introduction

This chapter outlines the route selection process used to determine the location of the proposed Silver to Rosser Tap 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 were grouped into four perspectives, namely:

- Natural (e.g., forest, wetlands)
- Built (e.g., residences, agricultural land use)
- Engineering (e.g., cost, accessibility)
- Simple average (i.e., treating all three perspectives equally)

The routing process involved the following general steps:

- Establishing the route planning area (Section 3.2)
- Generating routing corridors (Section 3.3)
- Developing transmission line routes (Section 3.4)
- Presenting the routes through project engagement (Section 3.5)
- Analyzing the routes (Section 3.6)
- Developing mitigative segments (Section 3.7)
- Evaluating the routes using the route evaluation model (Section 3.8)
- Selecting the preferred route using preference determination (Section 3.10)
- Presenting the preferred route through project engagement (Section 3.11)
- Finalizing the preferred route (Section 3.11.1)

Each step involves a process of narrowing and refining the geographic area under consideration to get to a specific preferred route.

3.2 Establishing the route planning area

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

The existing Silver to Rosser (S65R) transmission line was used as the western boundary. The Gimli airport guided the southern boundary. The Diageo property guided the eastern boundary, and the northern boundary was set based on potential route length, as the further north routes were developed, the longer they would be.

3.3 Generating routing corridors

The next step in the routing process was 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:

- determining areas of least preference (Map 3-1)
- developing the corridor model
- gathering geospatial data
- creating geospatial data layers
- creating suitability surfaces
- developing routing corridors

Details on the above steps are provided in (Appendix A).

The combination of the four corridors resulted 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 Developing transmission line 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 during project engagement for feedback.

The routes are composed of individually numbered route segments that connect to form contiguous routes from the start (S65R) to end point (Diageo Station).

3.5 Presenting the routes through project engagement

A preferred route and alternate segments (Map 3-3) were presented for feedback through project engagement (Chapter 2.0).

Information received during project engagement (either general comments or specific segment suggestions) lead to the development of mitigative segments (see Section 3.7).

3.6 Analyzing 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 (Section 3.7).

3.7 Developing 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 these criteria are retained and moved forward for consideration in the next step of evaluation. For the Silver to Rosser tap transmission line, several mitigative segments were proposed and reviewed (Map 3-4).

A suggestion was made that the drains in the area provide a routing opportunity as they are an existing disturbed feature on the landscape. Several options were considered (Routes M1 and M2 on Map 3-4). However, the routes added additional length to the transmission line footprint but did not provide any net benefit. Considering the route statistics, the proposed routes had higher values.

Another mitigative segment was suggested (M3 on Map 3-4) during engagement. However, this new segment did not provide a net overall benefit, so it was not considered further.

Following the consideration and review of the noted mitigative segments proposed, none were added to the evaluation.

3.8 Evaluating the routes using the route evaluation model

All routes were compared against each other and evaluated with the use of criteria that represent the four perspectives. The route evaluation model (Appendix A) is used to help evaluate the routes. Route statistics are developed that allow route comparisons using substantial amounts of data.

Details of model development and route statistics are provided in Appendix A.

The full set of routes were evaluated at a workshop (Appendix A). The goal was to use the route statistics as well as professional judgement to reduce the number of routes to a set number of finalists. During the workshop it was agreed that one route (Map 3-4) was preferred.

3.9 Point of delivery discussions

The project is a customer driven project. The concerns and preferences of the customer play a role in decisions.

The next step entailed discussion with the customer to determine an agreed upon point of delivery.

Manitoba Hydro discussed our preferred route, the location of the customer station on their property, and how the line would run from the point of delivery to the customer station.

Based on these discussions, it was determined that the point of delivery would be the south termination point (Diageo B on Map 3-4).

This was decided because the space is already being utilized for buildings so there is less of an impact to land use on the property, the land to the north of the property and to the treeline to the east.

The top three routes using the southern terminus were then moved forward to preference determination.

3.10 Preference determination

Three routes (Map 3-5) were compared using the preference determination model (Appendix A). The 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). Route B received the lowest total score and was therefore selected as the preferred route.

Table 3-1: Preference determination table				
Criteria	%	ROUTE A	ROUTE B	ROUTE C
Cost	45%	1	1	1
Weighted		0.45	0.45	0.45
Risk To Schedule	7.5%	2	1	2
Weighted		0.2	0.1	0.2
Environment (Natural)	7.5%	1	2.5	3
Weighted		0.075	0.1875	0.225
Environment (Built)	7.5%	2.5	2	1
Weighted		0.1875	0.15	0.075
Community	30%	2.5	1	2.5
Weighted		0.75	0.3	0.75
TOTAL	100%	1.66	1.19	1.70
RANK		2	**1**	3

3.11 Presenting the preferred route through project engagement

The preferred route was presented for feedback through project engagement. Information received during engagement (either general comments or specific segment suggestions) may lead to minor adjustments being made to the preferred route. Generally, these adjustments are within the same land parcel, and to accommodate land use.

3.11.1 Finalizing the preferred route

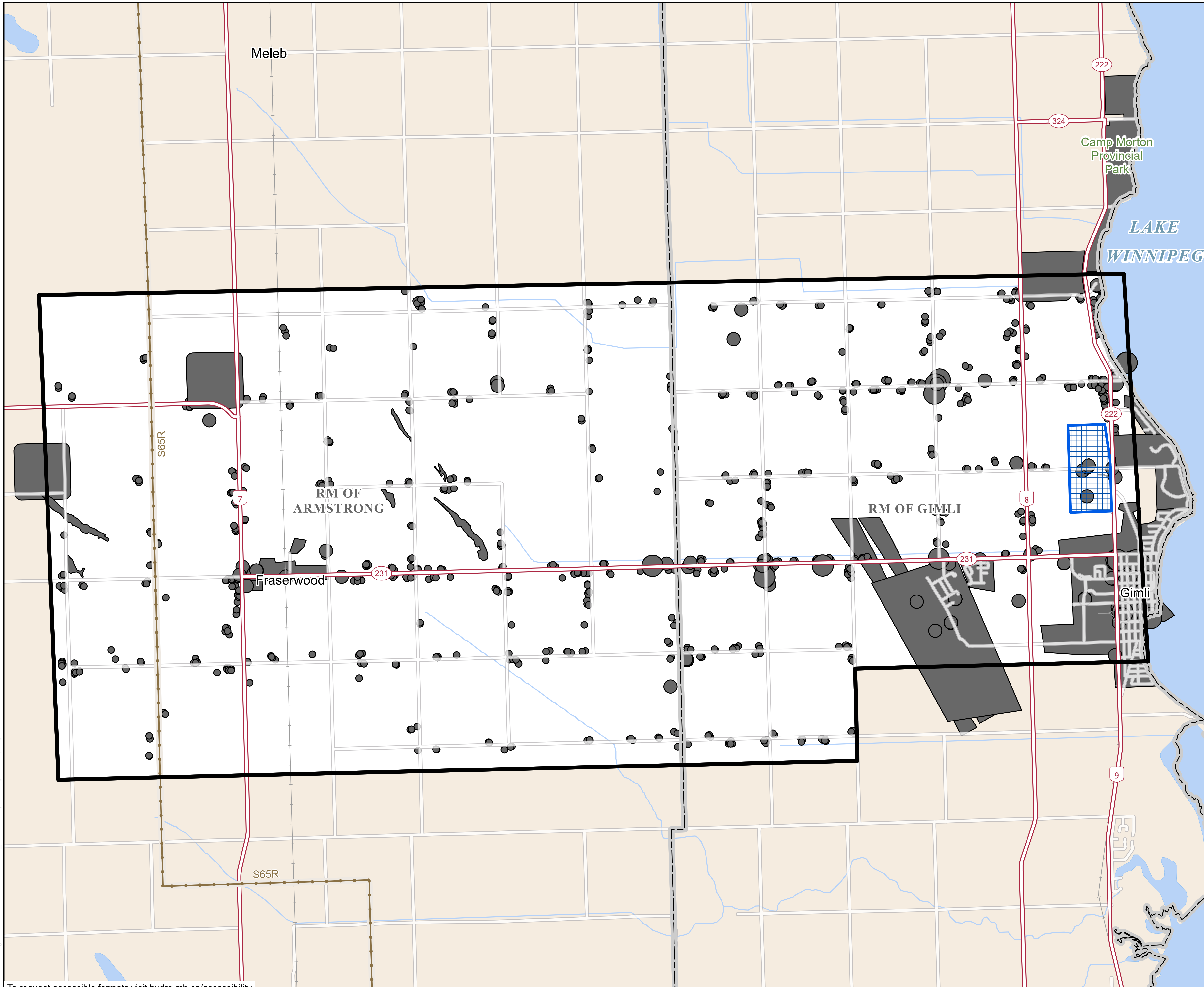
No changes were made to the preferred route.

3.12 The final preferred route

The final preferred route is shown on (Map 2-1). Table 3-2 shows the route statistics for the final preferred route as well as the minimum and maximum values for routes considered during the evaluation stage.

Table 3-2: Final preferred route – statistics

Route evaluation model criteria	FPR	Minimum	Maximum
Built			
Relocated residences	2	1	2
Proposed developments	1	1	1
Special features	4	3	6
Agricultural land use	27.63	17.52	47.57
Livestock operations	1	1	2
Natural			
Natural forest (acres)	80.19	70.01	97.39
Wetlands (acres)	0.00	0.00	2.87
Engineering			
Length (km)	18.45	17.24	20.10
Accessibility (value, lower better)	3110695	2933757	3576470



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Assessment Area
- Route Planning Area

Areas of Least of Preference
- Areas of Least Preference

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

0 1.5 3 Kilometres
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Route Planning Area

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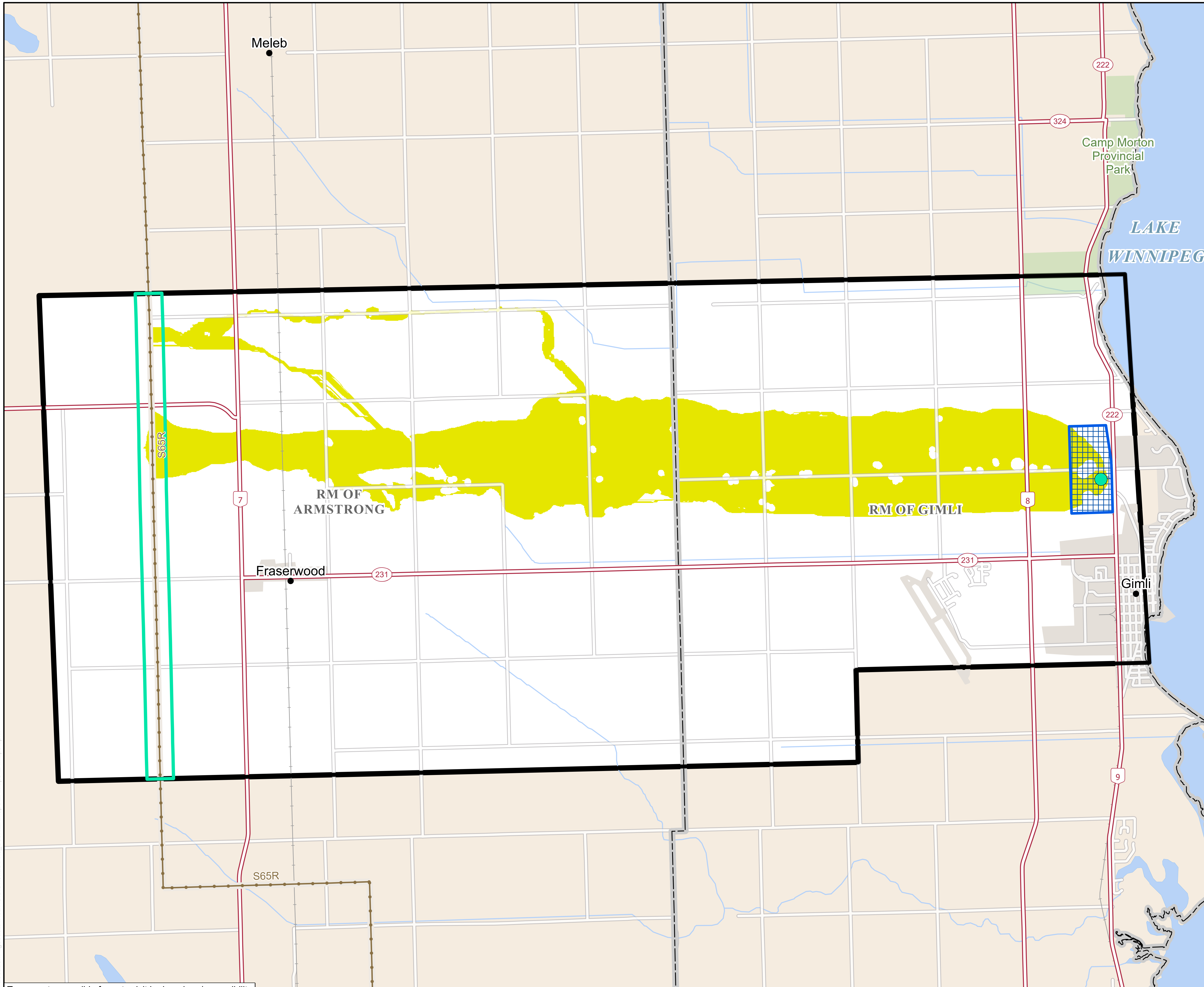
Map 3-1



Manitoba Hydro

Silver to Rosser
Tap Transmission Project

Composite Corridors
- End Point
- Start Area
- Composite Corridor

Assessment Area
- Route Planning Area

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

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0 1.5 3 Kilometres
0 0.9 1.8 Miles

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Composite Corridors

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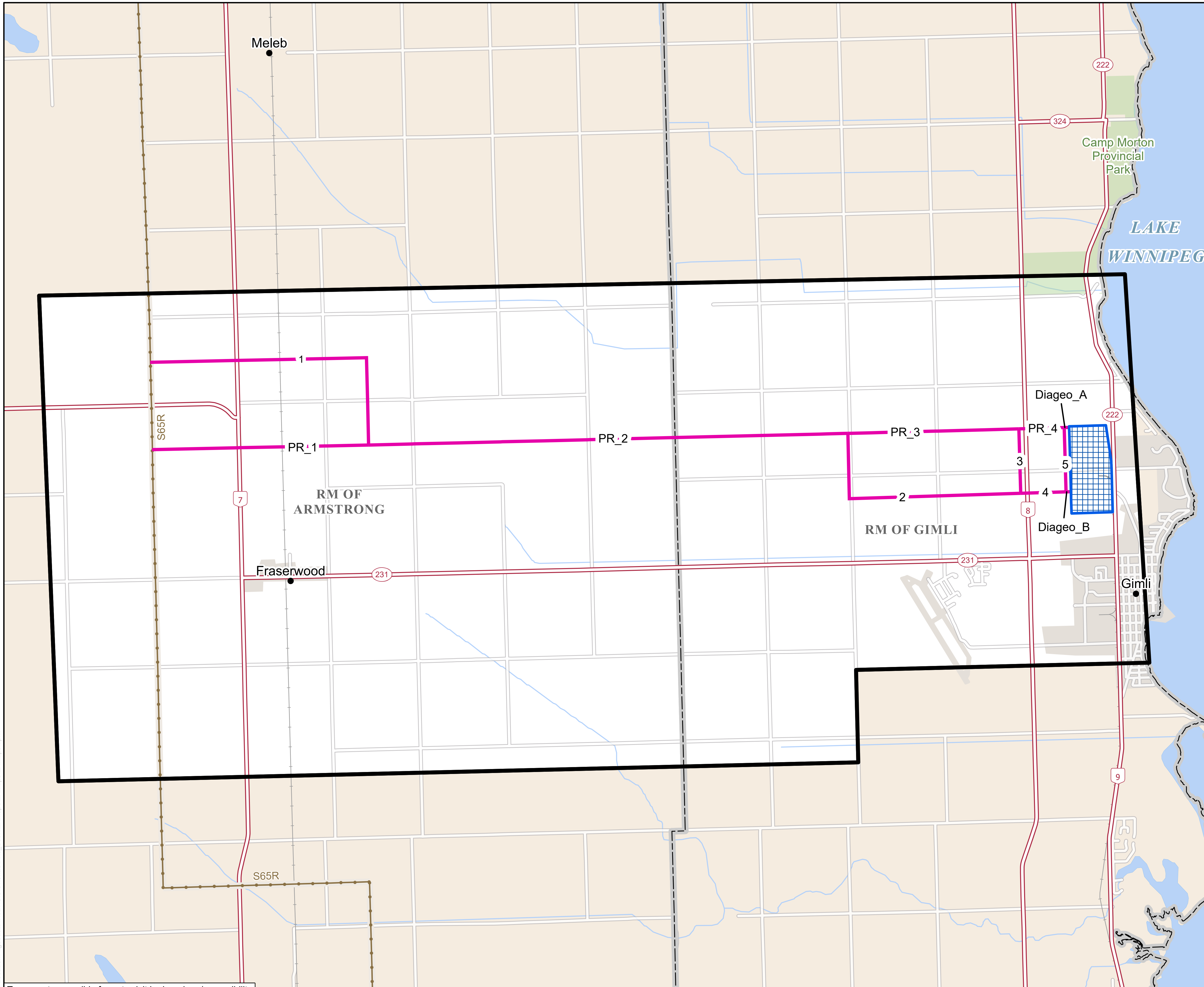
Map 3-2



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- 3 - Alternative Segment

Assessment Area

Route Planning Area

Existing Infrastructure

Diageo Gimli Distillery

Existing ≥69kV Transmission Line

Landbase

Railway

Local Road

8 Provincial Highway/Road

First Nation

Provincial Park

Wildlife Management Area

Rural Municipality

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0 1.5 3 Kilometres

0 0.9 1.8 Miles

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Alternative Route Segments

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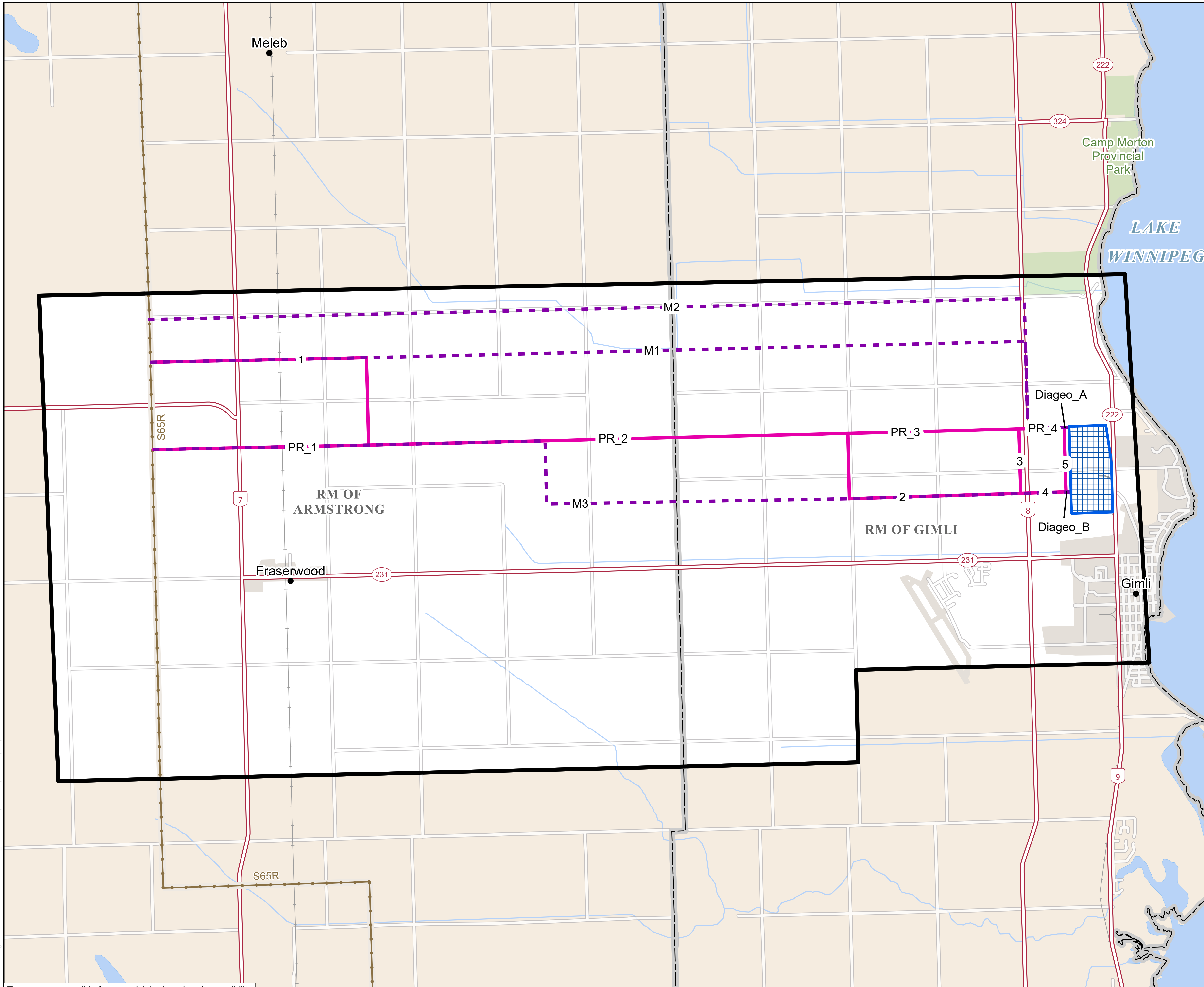
Map 3-3



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- 3 Alternative Segment
- M1 Mitigative Segment

Assessment Area

- Route Planning Area

Existing Infrastructure

- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase

- Railway
- Local Road
- 8 Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

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N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

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Mitigative Segments

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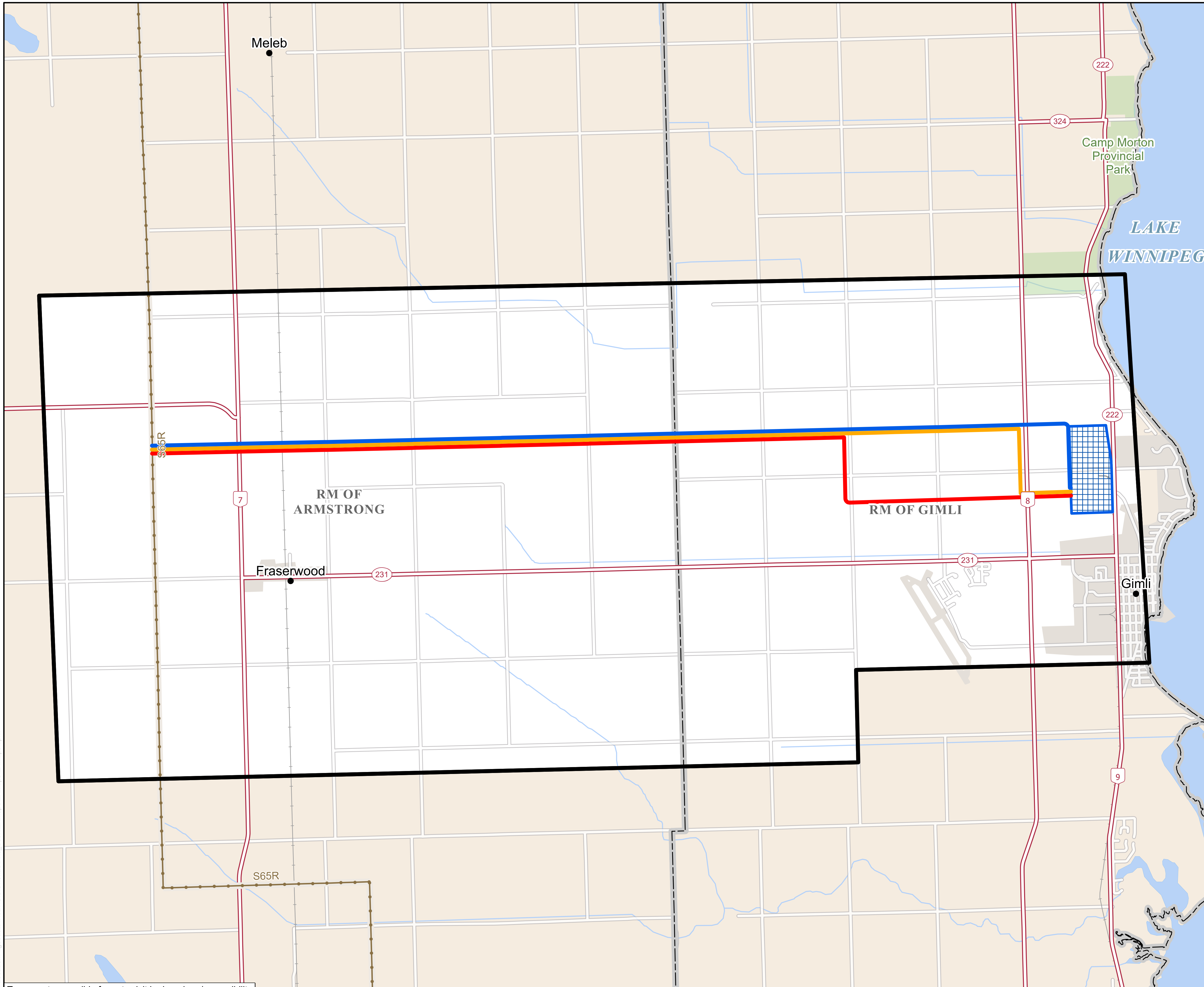
Map 3-4



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Route A
- Route B
- Route C

Assessment Area
- Route Planning Area

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

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N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

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Preference Determination Routes

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Map 3-5

4.0 Environmental assessment methods

This chapter describes the methods used for assessing the project's potential effects. Effects are changes to the environment or, socio-economic conditions and the positive and negative consequences of these changes.

The methods described herein were informed by past and ongoing Manitoba Hydro assessments and initiatives, as well as regulatory requirements. The environmental assessment approach was structured to meet the requirements of the *Environment Act* (Manitoba)'s Licensing Procedures Regulation, M.R. 163/88.

The environmental assessment approach considered engagement feedback and incorporated the following key elements:

- Identifying project components and activities that could interact with components of the existing surrounding environment.
- Predicting and evaluating potential changes to the environment and the likely effects on identified valued components (VCs).
    - Valued components are biophysical, social, cultural, and economic elements that, if altered by the project, may be of concern to regulatory agencies, Indigenous peoples, resource managers, scientists, other interested parties and/or the public.
- Proposing measures to mitigate the predicted adverse environmental effects.
- Evaluating residual effects and determining whether these residual adverse effects could be significant.
    - A residual effect is the effect of a project that is predicted to remain following the implementation of mitigation measures.
- Developing follow-up and monitoring programs if environmental inspections identify unexpected effects. Monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the environmental protection program.

Provincial environmental assessment guidelines do not require cumulative effects assessments for Class 2 developments. However, similar to the approach followed for environmental assessments of other recent Manitoba Hydro Class 2 transmission line projects, an assessment of cumulative effects is included in the assessment of project effects for each identified VC, as applicable.

The assessment progressed through the following steps:

- Scoping
    - Scoping the project (project description)

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

4.1 Scope

Scoping enables the assessment to be focused on aspects deemed important for the project and the environment.

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 the predicted project effects would be significant.

Scoping is iterative and gets 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.

4.1.1 Project scope

As described in 2.0, the proposed project consists of the following primary components:

1. Construction of approximately 18.5 km of 230-kV transmission line (the S65R Tap transmission line), starting with a tap structure off the existing S65R transmission line and terminating at the customer's property line.
2. Operation of the S65R Tap transmission line
3. Decommissioning of the S65R Tap transmission line

Primary project activities are described in Chapter 2.0 and consist of:

- Transmission line construction
    - Mobilization and staff presence
    - Right-of-way clearing

    - Vehicle / equipment use
    - Marshalling or fly yards
    - Access
    - Transmission tower construction
    - Foundation installation
    - Tower assembly and erection
    - Conductor installation (*i.e.,* stringing)
    - Implosive connectors
    - Helicopter use
    - Project wrap up and demobilization
- Transmission line operations/maintenance
    - Inspection patrols
    - Maintenance activities
    - Vegetation management
- Transmission line decommissioning
    - Preparation activities
    - Removal of facilities
    - Disposal
    - Restoration

4.1.2 Valued components

The assessment of effects presented in this report focuses on the identification and assessment of project-related environmental effects on VCs. As previously defined, VCs are elements of the biophysical, cultural, socio-economic environment that, if altered by the project, may be of concern.

Project-related environmental effects and cumulative environmental effects are assessed using a standard framework for each VC with standard tables and matrices that facilitate the detailed documentation of the evaluation.

Residual effects due to the project are characterized using specific criteria defined for each VC.

The following factors influenced the selection of VCs for this assessment:

- VCs adopted for previous environmental assessments and the feedback received for those assessments.
- Engagement feedback from regulators, First Nations and their members, the Manitoba Métis Federation and Red River Métis citizens, landowners, interested parties, and the public.

- The professional judgment of the environmental assessment team considering the project's anticipated components and activities, location, the surrounding environment, and regulatory requirements.

Based on the above factors, eight VCs were selected for this assessment.

1. Vegetation and wetlands
2. Wildlife and wildlife habitat
3. Harvesting and important sites
4. Commercial agriculture
5. Infrastructure and community services
6. Economic opportunities
7. Human health risk
8. Community well-being

4.1.3 Regulatory and policy setting

Each VC chapter includes a description of the federal and provincial regulations and policies specific to that VC, which apply to the project.

4.1.4 Engagement feedback

A VC-specific summary on engagement feedback that relates to that VC, as applicable, is included in each VC chapter and outlines how the feedback influenced the scope of the assessment.

4.1.5 Spatial boundaries

Three spatial boundaries for the assessment of potential project effects were selected based on the geographic extent over which project activities and their effects on individual VC are anticipated to occur.

4.1.5.1 Project development area

The project development area (PDA) encompasses the anticipated area of physical disturbance associated with the construction, operation, and decommissioning of the project. As such, the PDA represents the physical project footprint and includes the anticipated area of physical disturbance during construction, operations, and decommissioning of the project as described in the project description (Chapter 2.0). The PDA is the same across all VCs.

4.1.5.2 Local assessment area

The local assessment area (LAA) encompasses the area where immediate or direct effects from a project's activities and components are predicted to occur. The definition of the LAA may vary by VC and is provided for each VC.

4.1.5.3 Regional assessment area

The regional assessment area (RAA) is the area where residual environmental effects from project activities and components may interact cumulatively with the residual environmental effects of other past, present, and known, certain, or reasonably near future projects/physical activities. The definition of the RAA may vary by VC and is provided for each VC.

4.1.5.4 Summary of VC-specific spatial boundaries

Table 4-1 presents the LAA and RAA boundaries used in the effects assessments for each VC.

Table 4-1: Summary of VC-specific spatial boundaries

Valued component	LAA	RAA
Vegetation and wetlands	1 km buffer around the PDA	15 km buffer around the PDA
Wildlife and wildlife habitat	1-km buffer around the PDA	15-km buffer around the PDA
Harvesting and important sites	1 km buffer around the PDA	15 km buffer around the PDA
Commercial agriculture	1-km buffer around the PDA	administrative boundaries of the RM of Armstrong and the RM of Gimli (*i.e.*, the RMs traversed by the PDA)
Infrastructure and community services	administrative boundaries of the RM of Armstrong and the RM of Gimli	administrative boundaries of the RM of Armstrong and the RM of Gimli

Economic opportunities	administrative boundaries of the RM of Armstrong and the RM of Gimli	administrative boundaries of the RM of Armstrong and the RM of Gimli
Human health risk	1 km buffer around the PDA	administrative boundaries of the RM of Armstrong and the RM of Gimli
Community well-being	1.5 km buffer around the PDA	administrative boundaries of the RM of Armstrong and the RM of Gimli

4.1.6 Temporal boundaries

Three temporal boundaries were adopted to identify when environmental effects may occur due to specific project activities. The temporal boundaries are based on the timing and duration of project activities and the nature of the activities' interactions with each VC.

4.1.6.1 Construction

Project construction is anticipated to take four months spanning the period from winter 2025/2026 to spring 2026.

4.1.6.2 Operation

The in-service date for the project is planned for spring 2026. Once operational, the project is anticipated to last approximately 75 years based on the transmission line's design.

4.1.6.3 Decommissioning

Decommissioning would occur during a two-year period at the end of the serviceable life of the project (75 years or more into the future).

4.2 Existing conditions

The existing conditions relevant to the assessment of potential project effects are based on data collected during desktop analysis, field studies, and project engagement in relation to the spatial assessment boundaries and are described for each VC.

In many cases, existing conditions expressly or implicitly include those environmental effects that may be or may have been caused by other present or past projects or activities that are being or have been conducted. In focusing the assessment on VCs, the description of existing conditions is at a level of detail and scope that supports the assessment of environmental effects attributable to the project.

Other, non-VC specific, existing conditions relevant for the assessment (*e.g.,* atmospheric environment, geology and hydrology, aquatic environment, and communities, population, and land and resource use) are included in Chapter 6.0.

4.3 Assessment of project effects

The assessment of potential project effects is presented by VC, in Chapters 7 to 14. Each VC chapter follows a standard format, covering each of the topics discussed in Sections 4.1 to 4.6, namely:

- Scope of the assessment
- Existing conditions
- Assessment of project effects
- Assessment of cumulative effects
- Determination of significance of project and cumulative effects
- Prediction confidence
- Follow-up and monitoring
- Sensitivity to future climate change scenarios

4.3.1 Interactions between the project and valued components

The potential for interactions between project activities and each VC were considered for the construction, operation, and decommissioning phases of the project. For each VC (Chapters 7 to 14), potential interactions with project activities are assessed. Table 4-2 is an interaction matrix for the project and the selected VCs.

Table 4-2: Project valued components and project activity interactions matrix.

Project activity	Valued components							
	Vegetation and wetlands	Wildlife and wildlife habitat	Harvesting and important sites	Commercial agriculture	Infrastructure and community services	Economic opportunities	Human health risk	Community well-being
Transmission line construction								
Mobilization and staff presence	-	X	X	X	X	X	X	X
Vehicle and equipment use	X	X	X	X	X	X	X	X
Access development	X	X	X	X	X	X	X	X
Right-of-way clearing	X	X	X	-	X	X	X	X
Marshalling / fly yards	X	X	X	X	-	-	X	X
Transmission tower construction	X	X	X	X	-	X	X	X
Implosive connectors	-	X	X	-	-	X	X	X
Helicopter use	-	X	X	-	-	X	X	X
Clean-up and demobilization	-	X	X	X	X	X	X	X
Transmission line operation								
Transmission line presence	-	X	X	X	-	-	X	X
Vehicle and equipment use	X	X	X	X	X	X	X	X
Inspection patrols	X	X	X	-	-	X	X	X
Maintenance activities	X	X	X	-	X	X	X	X
Vegetation management	X	X	X	-	X	X	X	X

Table 4-2: Project valued components and project activity interactions matrix.

Project activity	Valued components							
	Vegetation and wetlands	Wildlife and wildlife habitat	Harvesting and important sites	Commercial agriculture	Infrastructure and community services	Economic opportunities	Human health risk	Community well-being
Decommissioning								
Mobilization and staff presence	-	X	X	X	X	X	X	X
Vehicle and equipment use	X	X	X	X	X	X	X	X
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	X	X	X	X	X	-	X	X
Rehabilitation	X	X	X	X	-	X	X	X
Clean-up and demobilization	-	X	X	X	-	X	X	X

Key: Interaction = X No interaction = -

4.3.2 Effects pathways

Once interactions between the project and VCs that are likely to have effects are determined, the assessment of each VC begins with a description of the mechanisms through which specific project activities could interact with the existing environment and result in an environmental effect (i.e., the effect pathways).

For each VC, the project's potential effects are identified and assessed in the context of the VC's existing conditions, as well as its biophysical or socio-economic characteristics, regulatory context, and project engagement feedback.

Once effect pathways are identified, one or more parameter(s) are selected to facilitate quantitative and qualitative assessment of residual project effects and residual cumulative effects.

Measurable parameters provide defensible and acceptable means to characterize change in a VC attributable to the project and contribute to the determination of significance for those effects.

Where practical, these parameters are measurable and quantifiable (e.g., direct habitat loss or the expected number of workers anticipated to move into the area for project construction). However, some effects lack defined parameters to measure effects and are therefore assessed qualitatively using the scientific literature, professional judgement, engagement input and past project experience. The amount of change in these measurable parameters is used to help characterize the environmental effects and to assist in evaluating their significance.

4.3.3 Mitigation of project effects

Routing, transmission tower design and placement, and administrative aspects such as timing of project activities (e.g., restricting transmission line construction to frozen ground conditions) or duration of project activities are the primary means for mitigating project effects.

Beyond the above-mentioned primary mitigations, additional mitigation measures are identified to reduce or eliminate potential adverse effects and/or enhance potential positive effects of the project on each VC. These measures include site-specific and established general protection measures and practices, compliance with legislation, regulations, and guidelines, and planning considerations applicable to the project.

Mitigation measures are identified in the VC-specific effects assessment chapters.

4.3.4 Characterizing residual effects

Residual effects are predicted remnant effects that would occur after the application of mitigation measures. Residual effects are characterized for each VC, considering how the proposed mitigation will avoid or reduce the effect. The residual effects are characterized using the following terms:

Direction: the long-term trend of the residual effect (i.e., positive, adverse, neutral).

Magnitude: the amount of change in a residual effect for a VC relative to its existing conditions (e.g., low, moderate, high).

Geographic Extent: the geographic area in which a residual effect occurs (i.e., PDA, LAA, RAA).

Duration: the time until the residual effect can no longer be measured or otherwise perceived (i.e., short-term, medium-term, long-term).

Frequency: how often the residual effect occurs and how often during the project or in a specific phase (i.e., single event, irregular events, multiple regular events, or continuous).

Reversibility: refers to whether the residual effect on a VC can be reversed once the physical work or activity causing it ceases (i.e., reversible, irreversible).

A summary of the characterization of residual environmental effects is provided in each VC chapter.

4.4 Assessment of cumulative effects

Cumulative effects are incremental effects resulting from residual project effects combined with effects from past, existing, and other reasonably near future projects and activities.

This assessment considers cumulative environmental effects that could result from the project's adverse residual effects in combination with other past, present, and reasonably near future projects or physical activities. Past, present, and reasonably foreseeable projects that may overlap spatially and temporally with those of the project are identified. The project's contribution to the cumulative effect is then evaluated.

The effects of past and current projects inherently contribute to baseline conditions upon which project effects are assessed. Two conditions must be met to initiate an assessment of cumulative effects on a VC:

- There are predicted adverse residual project effects on the VC.

- The adverse residual project effects on a VC could act cumulatively with the residual effects of other past, present, and reasonably near future projects or physical activities on the same VC.

If the two above-mentioned conditions are met, there is no expectation that the project will contribute cumulatively to residual effects, and further assessment is not warranted.

If both conditions are met, then the assessment of cumulative effects is undertaken and documented within the effects assessment chapter of the VC, following the assessment of project residual effects.

Where a cumulative effects assessment is completed for a VC, the focus is on those other projects and physical activities that could result in similar residual effects to those being considered for the project.

4.4.1 Project/activity inclusion list

The project/activity inclusion list (Table 4; Map 4-1) identifies known past, present and reasonably foreseeable future projects and physical activities with potential residual environmental effects that could overlap spatially and temporally with the project's residual environmental effects.

Reasonably near future projects are those that are publicly announced (with adequate descriptive detail), currently in a regulatory approval process, or under construction.

Table 4-3: Project/activity inclusion list

Type of Project/Activity	Select specific activities/projects	Activity/Project Timeline	Timeline for construction, if applicable/ documented
The Project			
S65R Tap transmission line	Proposed project	-	Four months spanning winter 2025 to spring 2026
Existing/Ongoing Projects and Activities			
Domestic Resource Use	Includes hunting, fishing, trapping	Ongoing since before 1870	-
Recreational Activities	Includes canoeing, snowmobiling, hiking	Ongoing since before 1870	-
Commercial resource use	Includes fishery and forestry	Ongoing since before 1870	-
Infrastructure	Includes existing rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities	Ongoing since before 1870	-
Hydroelectricity transmission and distribution lines	Silver to Rosser transmission line (45.582 km)	2006	
	Distribution lines totalling 1139.8 km: AW12-2, FBF12-2, FBF12-4, FD08-2, FD08-3, FD08-4, GW08-11, GW08-3, GW08-5, GW08-8, GW25-11, GW25-12, GW25-5, GW25-8, GW25-9, KO08-2, KO25-1, KO25-2, KO25-3, LU12-4, PP12-03, PP12-04, WBH08-4, WBH25-6, WBH25-7	1970	
Potential future projects and activities			
Crystal Spring Colony domestic wastewater lagoon	Proposed new domestic wastewater lagoon in legal land location SE 28-18-03 E1 (RM of Armstrong) that would be associated with a new colony development	-	Unknown but assumed to overlap with construction of the proposed project
Diageo Hydroelectric Station	Planned new hydroelectric station that will be built within Diageo's existing property and connected to the proposed transmission line's point of delivery. The new station would be owned and operated by Diageo.	-	April 2025 to April 2026

Table 4-3: Project/activity inclusion list

Type of Project/Activity	Select specific activities/projects	Activity/Project Timeline	Timeline for construction, if applicable/ documented
King's Park Phase 2	Development of new residential lots, northeast of the Diageo property in legal land location 28-19-04-E1	-	Anticipated to start by September 2025

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

– = Interactions between the residual effects of other projects and those of the project residual effects are not expected.

4.4.2 Pathways for cumulative effects

The assessment of each cumulative environmental effect begins with a description of the residual adverse project environmental effects and an analysis of the pathways through which such effects could interact with the residual effects from other projects and activities.

4.4.3 Mitigation of cumulative effects

Mitigation measures that can reduce the project cumulative environmental effects are described, with an emphasis on those measures that are under Manitoba Hydro's control and would help to reduce the interaction of the project effect with the effects from other projects and activities.

Manitoba Hydro will share information and knowledge with other proponents through its environmental assessment. In developing mitigation measures for adverse cumulative effects, it is typically not feasible (or appropriate) for one proponent to manage effects in an area developed by several other proponents. It is the primary responsibility of a given proponent to manage their own projects.

4.5 Determination of significance of project and cumulative effects

The determination of significance involves assessing the predicted residual and cumulative VC effects against established threshold criteria. Where residual and cumulative VC effects exceed threshold criteria, the associated effects are considered significant.

The thresholds are defined in consideration of regulatory requirements, standards, objectives, or guidelines as applicable to individual VCs. Where thresholds are not set by guidelines or regulations, a threshold is developed using the measurable parameters established for the VC, along with professional judgement and previous experience assessing project effects on the VC.

The significance determination focuses on residual and cumulative adverse effects; therefore, if positive or neutral residual or cumulative effects are identified, they are not assessed further.

The assessment also provides a determination of significance for the project's overall residual effects and cumulative effects after the implementation of mitigation measures.

4.6 Prediction confidence

The determination of significance of residual project environmental effects and residual cumulative environmental effects includes a discussion of the level of confidence in the prediction. Confidence in the prediction is based on certainty relative to:

- The quality and quantity of data used for the assessment, data limitations, and understanding of the effect pathways.
- The anticipated effectiveness of the proposed mitigation measures.

4.7 Follow up and monitoring

Manitoba Hydro's environmental protection program (Chapter 18.0) provides the framework for implementation, management, monitoring and follow-up of environmental protection measures.

Environmental protection, management, and monitoring plans (as required) will be prepared and implemented under the environmental protection framework to address environmental protection requirements in a responsible manner.

Follow-up and monitoring are intended to verify the accuracy of the environmental assessment, assess the implementation and effectiveness of mitigation and the nature of the residual effects, and to manage adaptively if required.

Follow-up and monitoring will be implemented through inspection, management, and auditing actions.

4.7.1 Inspection

Inspection is the organized and routine examination or evaluation, including observations, measurements and sometimes tests, of a construction project or activity. Inspection results are compared to pre-defined requirements or standards to determine whether an activity conforms to these requirements. Inspection provides an essential function in environmental protection and implementation of mitigation measures. Much of the success in environmental protection will be attributable to how well environmental inspections are conducted during the construction phase of a project.

Manitoba Hydro has established a comprehensive and integrated environmental inspection program to ensure effective implementation of environmental protection measures, compliance with regulatory approvals, and fulfillment of corporate environmental objectives.

Trained inspectors visit work sites and inspect for compliance with license terms and conditions, and adherence to environmental protection measures.

4.7.2 Monitoring

Monitoring refers to the continued observation, measurement, or assessment of environmental conditions at and surrounding a construction project or activity. Two main types of monitoring are typically undertaken for environmental assessments:

1) Environmental monitoring to verify the accuracy of the predictions made and the effectiveness of the mitigation measures implemented.

2) Compliance monitoring to verify whether a practice or procedure meets legislated requirements.

Monitoring determines if environmental effects occur as predicted, residual effects remain within acceptable limits, regulatory limits, criteria, or objectives are not exceeded, and mitigation measures are as effective as predicted. Monitoring also allows for adaptive management where monitoring results show there is a need for additional environmental protection or enhancement.

4.7.3 Management

Management is the control of pre-defined environmental effects, issues, and concerns through the implementation of reasoned and approved courses of action. Management plans will be prepared to address important management issues, regulatory requirements and corporate commitments identified in the environmental assessment report. Such management plans will describe the management actions, roles and responsibilities, evaluation mechanisms, updating requirements and reporting schedules. The following management plans will be prepared for the construction of the project (detailed in Chapter 18.0):The following management plans will be prepared for the construction of the project (detailed in Chapter 18.0):

- Access management plan
- Erosion and sediment control management plan
- Rehabilitation and invasive species management plan
- Waste and recycling management plan

Manitoba Hydro will prepare the above plans. They will be adjusted based on continued engagement and regulatory feedback.

4.8 Greenhouse gases and climate change

The *Environment Act* proposal report guidelines (Government of Manitoba 2023) require discussion of climate change implications including a greenhouse gas inventory calculated according to guidelines developed by Environment Canada (Environment Canada 2021) and the United Nations (IPCC 2019). Chapter 15.0 provides details on climate change and the greenhouse gas inventory for the project.

4.9 Effects of the environment on the project

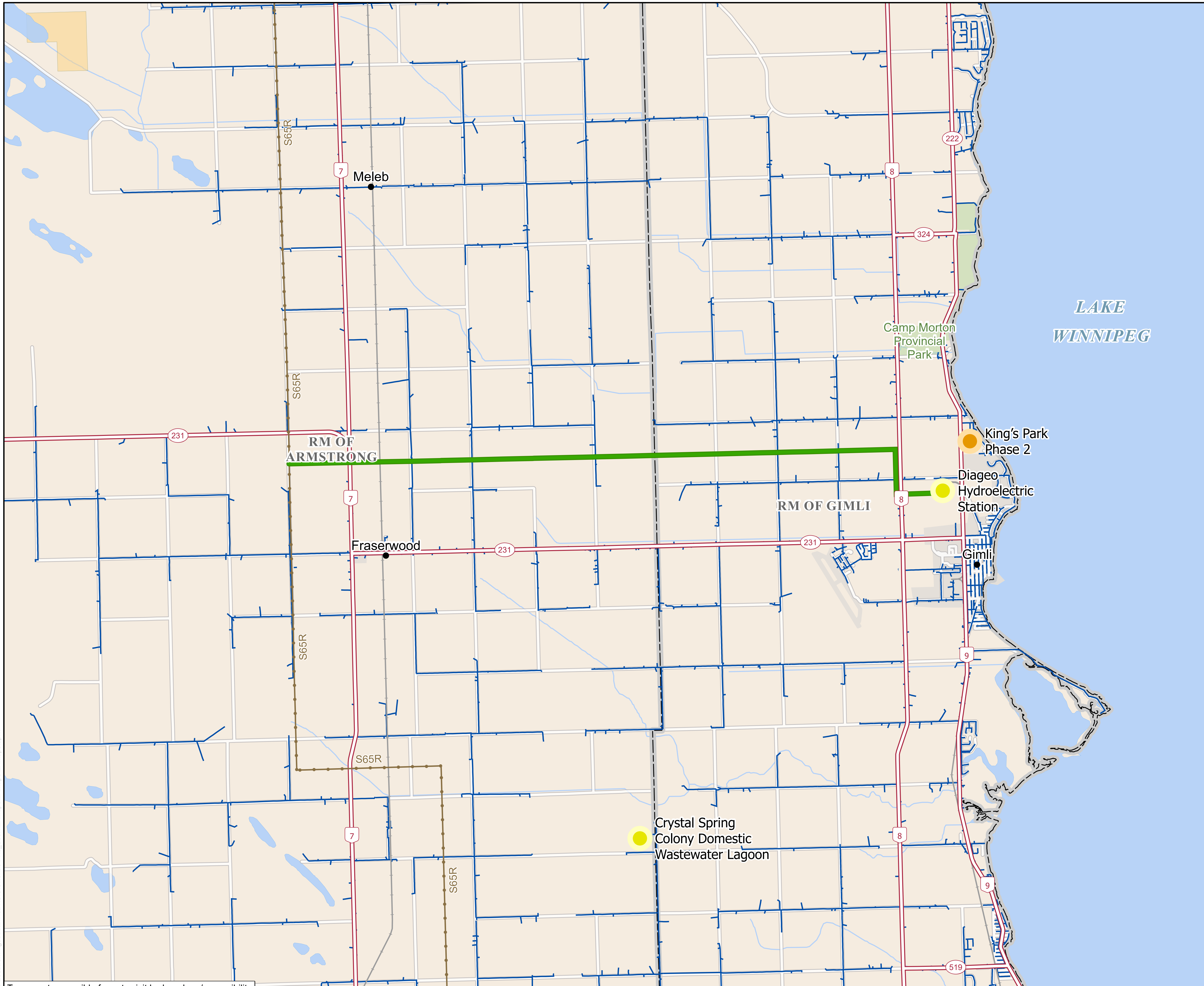
The assessment includes an evaluation of effects that may occur because of the environment acting on the project. Potential environmental changes and hazards may include wind, severe precipitation, ice storms, flooding, grass and forest fire, or tornado. The influence of such environmental changes and hazards on the 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 16.0.

4.10 Accidents and malfunctions

As part of the assessment, potential accidents, and malfunctions that might occur in connection with the project were identified and considered. This part of the assessment provides an initial basis for the development of emergency response planning for the project.

For each event considered, a possible scenario relating how the event might occur during the life of the project was developed. Details on the types of accidents and malfunctions considered and the scenarios developed are discussed in Chapter 17.0. Potential environmental effects on VCs due to accidents, malfunctions and unplanned events are assessed in a similar fashion to project environmental effects.

Potential environmental effects resulting from accidents and malfunctions 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.



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Future Projects Considered in the Cumulative Effects Assessment
- Infrastructure
- Residential

Existing Infrastructure
- Existing ≥69kV Transmission Line
- Distribution Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 2 4 Kilometres
0 1 2 Miles

1:100,000

Locations of Projects Included in the Cumulative Effects Assessment

Draft/Confidential: For Discussion Purposes Only

Map 4-1

5.0 Project engagement

This chapter provides an overview of the project engagement process Manitoba Hydro undertook for the Silver to Rosser tap transmission line and includes sections about the following topics:

- Goal and objectives of engagement
- Approach to engagement
- Engagement feedback
- Engagement results
- Ongoing engagement

We would like to thank everyone who has participated in project engagement to date. Your participation, feedback and perspectives have helped inform this environmental assessment report and have supported us in making project decisions.

5.1 Goal and objectives of engagement

Our goal for engagement on the project was to work directly with First Nations, the Manitoba Métis Federation, rural municipalities (RMs), landowners, and interested parties[1] to understand and consider concerns and interests in project decisions.

To achieve our engagement goal for the project and to maintain consistency through the public engagement process (PEP) and First Nation and Métis Engagement Process (FNMEP), both processes had similar objectives to:

- Engage audiences early and provide opportunities for ongoing engagement throughout the project.
- Keep engaged audiences informed with transparent information throughout the engagement process.
- Use multiple methods of engagement and tailor the process to the preferences of engaged audiences.

[1] Interested party: a general term used to describe an individual or group that would potentially have feedback to provide, may be affected by the project or decisions about the project, have a specific interest or mandate in the area, data to share, ability to disseminate information to membership or a general interest in the area. Interested party is used in place of the term stakeholder.

- Provide opportunities for engaged audiences to share their feedback throughout the transmission line lifecycle and work to resolve concerns that arise.
- Support participation in activities that will inform the environmental assessment process (e.g., engagement, field studies, Indigenous Knowledge studies).
- Share how feedback and knowledge influence decision making.

Each of the objectives work towards prioritizing meaningful engagement. In addition to these shared objectives, the FNMEP also had specific objectives in the pursuit of meaningful engagement 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 rights-based activities and First Nation and Métis interests.
- Encourage nations to determine how they engage in the environmental assessment, by offering funding and opportunities to develop community-specific engagement processes.
- Incorporate available First Nation and Métis knowledge in the environmental assessment.

In the context of FNMEP, we understand 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. We also recognize that what is considered meaningful may vary by audience.

Our engagement process is separate from any section 35 Crown consultation process that may be initiated by the Province of Manitoba about the project. We understand that the Crown may rely on the engagement activities and feedback generated through our engagement process to inform their consultation process. We sought to undertake a meaningful engagement process with the understanding that it may support the Province of Manitoba in fulfillment of their duty.

5.2 Approach to engagement

5.2.1 Overview

Through engagement, we worked to provide a variety of opportunities to share information and engage on the project. We recognized that different audiences have different preferences and levels of comfort with how and when they would like to be engaged.

Prior to initiating engagement, we developed an engagement plan that would remain adaptive and responsive to the feedback and preferences we learned from engaged audiences.

Our engagement approach was influenced by several legislative Acts, guidelines, principles, standards, and beneficial practices. Examples include but are not limited to: Manitoba's *Environment Act*; Canada's Principles and Guidelines for Public Engagement; Canada's Principles respecting the Government of Canada's relationship with Indigenous peoples; Articles of the United Nations Declaration on the Rights of Indigenous Peoples; Manitoba's *Path to Reconciliation Act*; as well as the International Association for Public Participation (IAP2)'s core values and public participation spectrum. Manitoba Hydro uses tools and techniques for engagement that are informed and guided by best practices, lessons learned from previous projects and input and feedback from those participating in our engagement processes.

We recognize that what is considered meaningful may vary by engagement audience. In the pursuit of meaningful engagement, we prioritized the following principles:

Respectful: Acknowledge our work has impacts and enter conversations with an open mind, not a predetermined solution. Listen to understand. Be genuine in our intentions to engage and open to adjusting plans based on input. Be sensitive to historical issues and conscious of individual backgrounds, cultures, beliefs, and traditions.

Initiative-taking: Identify engagement audiences and plan for engagement as early as possible at the outset of a decision or project. Start early to allow adequate time for meaningful engagement. Be informed, responsive, and timely in our communications.

Transparent: Be open and honest. Help engaged audiences understand the scope of the decisions and potential impacts of the decisions, so they can decide how involved they want to be. Be upfront about what engaged audiences can and cannot influence, and why.

Inclusive: Make it easy and convenient for those engaged to provide input. Be mindful of barriers to participation and find ways for the hard-to-reach or less represented to be included. Seek out and show value for diverse perspectives.

Accountable: Report back to explain how input was considered and influenced the decision. Provide rationale if input did not influence the outcome. Provide regular updates as the decision is rolled out and a direct point of contact for inquiries. Follow through on commitments made.

Trust-Building: Demonstrate genuine interest in and care for diverse perspectives. Be consistent and give those involved a reason to have confidence in the engagement and decision-making processes, even if they are not in favour of the outcome. Build relationships by creating opportunities for ongoing dialogue once specific engagement activities have ended.

Flexibility: There is no one-size-fits-all approach for engagement. Consider how different audiences want to participate and be adaptable to unique circumstances, expectations, and preferences.

Continuous Evaluation: Evaluate engagement activities and document successes and opportunities for improvement. Share internally with others who could benefit from it.

The following sections outline the engagement methods and activities we undertook to work towards the engagement objectives and achieving meaningful engagement on the Silver to Rosser tap transmission line.

5.2.2 Identification of public engagement audiences

To achieve our engagement goal, it was important that our engagement efforts reach audiences that may be affected by or interested in the project. We implemented different tools and considered different types of information to determine the audiences that would be engaged under the PEP.

Our approach to identifying public engagement audiences is partly guided by the IAP2. Public participation, as defined by IAP2, is "based on the belief that those who are affected by a decision have a right to be involved in the decision-making process". The IAP2 spectrum of public participation (Figure 5-1) helps to define the role and level of influence the public has on the overall decision-making process. This role is also to be communicated to the engagement audiences so that individuals and groups understand how their feedback and input is considered. We consider what opportunities there are for feedback to influence the decision-making process and determine which level of the spectrum is appropriate for which audiences.

IAP2 Spectrum of Public Participation

iap2 International association for public participation

IAP2's Spectrum of Public Participation was designed to assist with the selection of the level of participation that defines the public's role in any public participation process. The Spectrum is used internationally, and it is found in public participation plans around the world.

INCREASING IMPACT ON THE DECISION

	INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
PUBLIC PARTICIPATION GOAL	To provide the public with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision making in the hands of the public.
PROMISE TO THE PUBLIC	We will keep you informed.	We will keep you informed, listen to and acknowledge concerns and aspirations, and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and aspirations are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.

Figure 5-1: International Association of Public Participation's public participation spectrum

For this project, we are engaging with interested parties at the consult and involve levels. We engaged RMs and directly affected landowners at the involve level of the spectrum by working to consistently understand and consider their concerns and demonstrate how their feedback influenced project decisions. Other audiences are at the consult level of the spectrum. There were opportunities for participants to share feedback on routing options and considerations for the environmental assessment.

Manitoba Hydro undertook a preliminary interested party mapping exercise to determine the audiences for the PEP. We examined the route planning area and land survey data and identified individuals, groups, governments, organizations, and businesses who may be impacted by or interested in the project.

The outcome of the interested party mapping exercise includes a detailed list of the specific audiences identified for engagement (Figure 5-2). Our rationale for including each audience is similar for all, i.e., all may be potentially interested in or affected by the project.

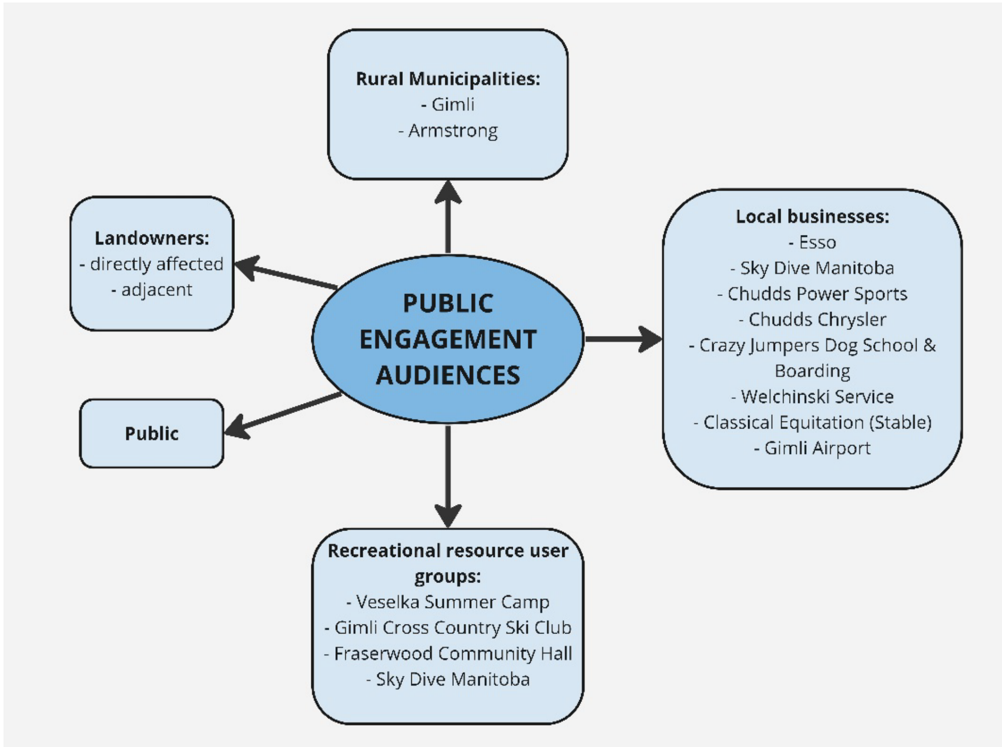


Figure 5-2: Interested party mapping of audiences identified for the PEP.

The audiences identified for the PEP included:

- Directly affected landowners & cottagers
- Adjacent landowners & cottagers
- Rural Municipality (RM) of Gimli
- RM of Armstrong
- Local businesses
- Recreational resource user groups
- Individuals not directly affected by the project but that may have an interest in the project (i.e., the public).

5.2.3 Identification of First Nation and Métis audiences

We identified First Nation and Métis audiences based on the following three criteria:

1. Known historical and/or contemporary use of the project area.
2. Anticipated inclusion in Crown consultation
3. Interest in the project based on previous projects.

For this project, we are engaging with Peguis First Nation and the Manitoba Métis Federation at the consult level of the IAP2 spectrum, which included the opportunity to participate in a community perspective workshop to help inform the selection of a preferred route. We are also engaging and sharing project information with three additional First Nations. The engagement process for each individual audience was also tailored based on their unique preferences and needs. Table 5-1 lists the audiences that we engaged under the FNMEP and the rationale for inclusion.

Table 5-1: Engaged First Nation and Métis audiences.

First Nation and Métis engagement audience	**Rationale for inclusion (criteria that apply):**
Peguis First Nation	• Known historical and/or contemporary use of the project area. • Anticipated interest in the project based on previous projects. • Anticipated inclusion in Crown consultation
Manitoba Métis Federation, the recognized government of the Red River Métis	• Known historical and/or contemporary use of the project area. • Anticipated interest in the project based on previous projects. • Anticipated inclusion in Crown consultation
Brokenhead Ojibway Nation	• Anticipated inclusion in Crown consultation
Animo-ziibiing (Lake Manitoba First Nation)	• Anticipated inclusion in Crown consultation
Fisher River Cree Nation	• Anticipated inclusion in Crown consultation

The list of engaged First Nation and Métis audiences remains adaptive throughout project engagement.

5.2.4 Role of engagement in decision making

There were three main ways that engagement feedback had the ability to influence decision-making in the route selection and environmental assessment processes:

1. Participants' preferences regarding the route options were considered in the route selection process.

2. Participant feedback helped inform the valued component selection for the environmental assessment.
3. Participant feedback helped identify mitigation measures for the project.

5.3 Communication methods

Communication methods for the project involved the following:

- 1947 postcards to residents
- Radio advertisements on CJIE-FM Winnipeg Beach/Gimli/Arborg
- Emails and letters
- Information sheets
- Project webpage, information line and email address
- Posters in local stores in Fraserwood

Copies of the information sheets, and other engagement materials, can be found in Appendix B.

5.4 Engagement methods

Project engagement included pre-engagement activities, and two rounds of engagement to inform the environmental assessment and routing processes. We offered several different methods for participants to ask questions and provide feedback on the project, including:

- Survey with 20 participants
- Interactive mapping & feedback portal
- 1 in-person public information session
- 1 in-person landowner open house
- 3 virtual information sessions
- Meetings with specific public, First Nation, and Métis audiences
- 1 community perspective routing workshop
- Project email address and hotline phone number

5.4.1 Pre-engagement

We began pre-engagement with First Nations, the Manitoba Métis Federation and RMs on January 23, 2024, by reaching out via email. We also sent formal letters to audiences identified in the FNMEP. The purpose of pre-engagement was to inform audiences about the upcoming project and begin to discuss engagement needs, preferences, and interest in participation. Pre-engagement notifications included a map of the route planning area to understand if there were any proposed developments in the area that may impact transmission line routing options.

We also contacted the planning districts and public works departments in the area to solicit feedback on any proposed developments in the route planning area on January 25, 2024. This included the RM of Gimli Public Works department, the RM of Armstrong Public Works department, Eastern Interlake Planning District, and Selkirk Community and Regional Planning. The Eastern Interlake Planning District shared information about proposed subdivisions located mostly along Lake Winnipeg. The RM of Armstrong Public Works manager shared information about two new hog barns and a Hutterite colony being set up in the general area.

Table 5-2 includes the meetings held as part of pre-engagement for the project.

Table 5-2: Pre-engagement meetings

Date	Community / organization	Location
February 13, 2024	Brokenhead Ojibway Nation	Virtual – Microsoft Teams
February 13, 2024	RM of Armstrong	Armstrong Municipal Office, Inwood, Manitoba
February 16, 2024	Peguis First Nation	Virtual – Microsoft Teams

5.4.2 Round 1 engagement

We formally announced the start of Round 1 engagement on February 22, 2024, by notifying First Nations, the Manitoba Métis Federation, landowners, RMs and interested parties via email, and launching the project webpage. We also sent formal letters to audiences identified in the FNMEP. We reached out to landowners located along or immediately adjacent to the route options via mailed letters to inform them about the project.

The purpose of Round 1 engagement was to share introductory project information, and to present the preferred route and alternative route segments for feedback and consideration. We asked for feedback to understand if there are concerns with the preferred route, if there are any preferences or concerns with the alternative route segments, as well as general interests and concerns in the project area.

We collected feedback through email, phone, information sessions, an open house, online survey, and an interactive map and feedback portal. We collected feedback on the preferred route and alternative route segments until March 31, 2024. Results of the survey can be found in Appendix B.

We held the following information sessions as part of Round 1 engagement.

Table 5-3: Round 1 information sessions

Date	Number of participants	Location
March 12, 2024	8	Virtual – Microsoft Teams
March 14, 2024	Approximately 35	Fraserwood Community Hall, Fraserwood, Manitoba
March 20, 2024	7	Virtual – Microsoft Teams

We held two virtual Round 1 information sessions through Microsoft Teams. A Manitoba Hydro representative gave a presentation about the project and about our transmission line routing process. Participants were invited to learn about the project, ask questions, voice concerns, and share feedback on the routes to help inform our routing and project plans.

We held one in-person public information session at Fraserwood Community Hall, where participants were invited to learn about the project, ask questions, voice concerns, and share feedback. The event was an open house, where participants were invited to visit at any time during the event. At the open house, we set up with three different stations around the room for participants to visit. The three stations included:

1) Storyboards with Round 1 project information
2) Printed maps, providing opportunity for participants to leave specific feedback about the route options.
3) An environmental assessment station, where participants could share their values, interests, and concerns to inform the environmental assessment process.

We also held Round 1 meetings with First Nations, the Manitoba Métis Federation and interested parties on the following dates.

Table 5-4: Round 1 engagement meetings

Date	Community / organization	Location
March 12, 2024	RM of Armstrong	Virtual – Microsoft Teams

April 4, 2024	Manitoba Métis Federation	Virtual – Microsoft Teams
April 22, 2024	Peguis First Nation	Virtual – Microsoft Teams

5.4.3 Community perspective routing tour and workshop

Following the completion of Round 1 engagement, we reached out to Peguis First Nation, the Manitoba Métis Federation, and the RMs of Gimli and Armstrong to gauge interest in helping to evaluate the transmission line route options from the community perspective.

We invited these audiences to attend a community perspective field tour and workshop on April 23, 2024. The purpose was to provide an opportunity for key audiences to directly inform and influence the routing and environmental assessment process for the project. The goal of the workshop was for participants to hear from each other, share regional perspectives on the route options, and discuss an overall community perspective on the route options. There were two representatives from the Manitoba Métis Federation, two representatives from Peguis First Nation, and two representatives from the RM of Gimli in attendance. No representatives from the RM of Armstrong were able to attend.

The workshop included a driving tour of the potential route options, a presentation to learn more about Manitoba Hydro's routing process, and the opportunity to provide feedback on route options and areas of importance. Participants also took part in a values exercise to identify values that Manitoba Hydro should consider in transmission line routing related to the environment, community, culture, and economy. Feedback on the routing options were used to inform the community perspective score for the preferred route selection process, described in more detail in Section 3.10.

5.4.4 Round 2 engagement

After a preferred route was identified, we announced the start of Round 2 engagement on June 19, 2024. We reached out to the FNMEP audiences and the RMs of Gimli and Armstrong by email and followed up with phone calls as needed to confirm receipt of information. We also sent formal letters to audiences identified in the FNMEP. Directly affected landowners and landowners immediately adjacent to the route were mailed a letter providing information on the preferred route and upcoming engagement opportunities. Other interested parties were informed of the preferred route selection by direct emails or by eCampaign to individuals who signed up to receive project updates.

The purpose of Round 2 engagement was to present the updated preferred route, to collect feedback from engagement audiences to inform final routing and design, and to solicit input on potential mitigation measures to address site-specific concerns along the preferred route. We collected feedback during Round 2 engagement to inform the environmental assessment until July 19, 2024.

We held one in-person open house for landowners and one virtual information session for members of the public as part of our engagement on the preferred route.

We held the following information sessions as part of Round 2 engagement:

Table 5-5: Round 2 information sessions

Date	Number of participants	Location
July 3, 2024	2	Virtual – Microsoft Teams
July 9, 2024	Approximately 18	Fraserwood Community Hall, Fraserwood, Manitoba

We also held the following meetings as part of Round 2 engagement:

Table 5-6: Round 2 engagement meetings

Date	Community / organization	Location
July 15, 2024	Manitoba Métis Federation	Virtual - Microsoft Teams
July 25, 2024	Peguis First Nation	Virtual - Microsoft Teams

5.5 Engagement feedback

The following section summarizes key themes and concerns we heard throughout project engagement from PEP and FNMEP audiences. Many of these themes are interconnected, and many of the feedback topics discussed may fit in more than one of the key themes identified below.

<u>Commercial agriculture</u>

Participants shared concerns about the presence of the transmission line negatively affecting the economic activity of their farms and the difficulty of navigating farming equipment around the poles. Other participants shared concerns about the safety of cattle due to extreme weather events damaging transmission infrastructure.

Community well-being

Participants shared concerns about the loss of aesthetic value due to the presence of the transmission line. They also shared concerns about the perceived impacts of electric and magnetic fields on humans and the environment and the stress that they will experience living close to a high voltage transmission line. Participants also shared concerns that since the project is customer-driven, there are a lack of benefits for the community.

Economic activities

Participants shared concerns about the lack of community benefits associated with this project. They also expressed interest in employment opportunities that may be available on the project. We also heard concerns about how the presence of the transmission line might affect future development opportunities.

Participants in the community perspective workshop also shared feedback about future energy needs of their communities.

GHG and climate

Participants shared concerns regarding the removal of treed areas and wetland habitat for the transmission line right-of-way, noting that these are carbon sinks. Participants noted that woodland provides carbon capture, and that removing treed areas would reduce carbon offsets gained by the reduction in natural gas usage at the Diageo Gimli distillery. Participants also inquired about the greenhouse gas reduction target for Diageo's operations at the Gimli distillery.

Heritage sites/cemeteries

First Nation and Métis participants shared that members / citizens use the area to practice rights-based activities and there is interest in identifying more specific sites for heritage investigations. Due to limited archaeological work conducted in the area, there is interest in conducting a heritage study for the project. We heard concerns that the Heritage Resources Act is perceived to have lower standards for archaeology than what participants would like to see. There was interest expressed in having Indigenous communities provide information on sensitive areas before a heritage permit is applied for and participation in the heritage report writing to promote meaningful collaboration between consultants and Indigenous communities.

Participants in the community perspective workshop identified areas of higher heritage potential along the preferred route and route planning area. Culture and heritage were also identified as one of the top three values that Manitoba Hydro should consider when routing the transmission line.

Human health

Related to human health, participants shared concerns about the potential noise effects during construction, operation, and maintenance of the transmission line. Participants also expressed concerns regarding electric and magnetic fields caused by the operation on the line and the human health risk of living near high voltage transmission lines.

Important sites and harvesting

Participants discussed important sites and areas for harvesting near the preferred route. We heard feedback that there are mushroom, wild raspberry, cranberry, and juniper picking areas near the preferred route, and participants shared concerns about the presence of the transmission line affecting foraging and hunting activities. First Nation and Métis participants shared that members / citizens use the area to practice rights.

At the community perspective workshop, harvesting was also identified as one of the top three values that Manitoba Hydro should consider when routing the transmission line.

Land and resource use

Related to land and resource use, participants shared concerns that the presence of the transmission line would reduce landowners' ability to undertake recreational activities such as the use of model rockets and drones. Some participants also expressed an interest in clearing their own trees on their property if the project were to receive approval.

Property

Participants had questions about how to control and manage access on private properties along the right-of-way. Participants shared concerns about trespassing and improper access resulting from the presence of the newly cleared right-of-way.

Participants also shared concerns about the presence of the line negatively impacting property values and the ability to sell their homes. Participants also asked whether compensation would be provided to cover lost opportunities, such as building a house.

Vegetation & wetlands

Participants asked questions about the vegetation management practices for the transmission line right-of-way, and shared concerns about herbicide application for vegetation management. Participants shared concerns related to the removal of vegetation and wetlands for transmission line development, and some participants expressed a preference for the transmission line to follow existing linear infrastructure and previously disturbed areas to minimize the impacts to intact habitat areas.

Wildlife & wildlife habitat

Participants expressed concerns regarding the potential impact on wildlife resulting from the removal of habitat along the line. Specifically, they highlighted concerns about the disruption to the natural habitat of certain wildlife species, notably eagles, due to the removal of mature forests. Participants in both Round 1 engagement and the community perspective workshop identified a potential nesting site for bald eagles near the Diageo distillery facility along the Round 1 preferred route. Participants shared that there have not been any eagle sightings recently, potentially due to recent construction in the area, but that the nesting site has had eagles in the past. Participants also raised concerns about the impact on other species such as red-headed woodpeckers and the eastern whip-poor-will. At the community perspective workshop, important wildlife areas were also identified as one of the top three values that Manitoba Hydro should consider when routing the transmission line.

Routing

During Round 1 engagement, participants asked us to consider a few alternate route options. Manitoba Hydro investigated the feasibility of these options, but they did not move forward for further consideration in the routing process for the following reasons:

Fish Lake Drain: Participants requested Manitoba Hydro investigate routing along the Fish Lake Drain, as participants felt that since the land has already been cleared, additional clearing would not be required. Manitoba Hydro analyzed the option following the Round 1 open house. Routing along the drain would still require a similar area of new right-of-way width given that the transmission line could not be routed right on the drain. This routing option would add line length and would affect more landowners. It was, therefore, not considered a reasonable alternative as it would be shifting the affect to more landowners and have a larger overall impact.

Meleb Drain: The Meleb Drain was also investigated as a routing option. Like the Fish Lake Drain option above, this option was longer, would still require clearing, and would affect more landowners. There were no net benefits associated with this routing option, so it was not considered to be a reasonable alternative.

Running south before Burma Road: Participants asked whether the preferred route could jog south half a mile west from Burma Road and return to the preferred route alignment at the next quarter section, to avoid running close to an occupied house. Manitoba Hydro investigated an alternative version of this alignment, where the route would run south half a mile west of Burma Road and then run towards the Diageo Gimli distillery along the ¼ mile, joining back up with alternative segments 2 and 4. This revised alignment traversed within 100m of more buildings and occupied homes than the preferred route option. Because this option did not result in a net reduction in project effects, it did not move forward for further consideration in routing.

PR 231: Participants asked why we did not consider routing the transmission line along PR231, given that it is existing linear infrastructure and would not be cutting through the back of properties. PR231 was not considered for routing the transmission line due to the large number of homes on both the north and south side of the road that would be within the 40m right-of-way if the line were to be routed directly off the road.

Paralleling Highway 8: Participants asked why Highway 8 was largely avoided for routing the transmission line. Manitoba Transportation and Infrastructure has a control zone around Highway 8, which limits future development in proximity to the highway. The line would need to be placed much further in-field to accommodate the control zone, which creates additional impacts to agricultural land use. Highway 8 also currently has sub-transmission lines running along the east side of the highway. These lines would not be able to support the new 230kV line required for Diageo's power supply needs.

Seagram Road entrance: Participants during the community perspective workshop asked why Manitoba Hydro did not use alternative segment 3 up to Seagram Road, and then route the line along Seagram Road into the distillery. On the north side of the road, there are homes that would be within the 40m right-of-way and was therefore not compatible. On the south side of the road, there are two existing lines (a 66kV sub-transmission line and a distribution line), which would need to be moved to accommodate the S65R tap line.

During the community perspective workshop, participants noted that if the impacts to the eagle's nesting area could be minimized near the Diageo Gimli distillery, the preferred route would generally be less impactful than taking alternative route segments 2, 3, 4 or 5. Participants also noted that since alternative route segment 1 traversed Crown land, it was less preferable overall than using the preferred route to tap off of the existing S65R line.

Engagement

Participants in the community perspective workshop shared the importance of undertaking projects with improved collaboration and engagement among all audiences, and that processes and decisions should be transparent.

Some participants expressed interest in holding a town hall for engagement events, so that participants could all receive the same information and hear what one another had to say. During Round 2 engagement, some participants shared concerns that they were finding out about the project for the first time and did not have the opportunity to participate in Round 1 engagement.

5.5.1 First Nation and Métis engagement feedback

The following sections include brief summaries of the feedback Manitoba Hydro has heard from the Manitoba Métis Federation and each engaged First Nation.

5.5.1.1 Manitoba Métis Federation

We have had correspondence, discussions, and meetings with the Manitoba Métis Federation throughout the engagement process. The Manitoba Métis Federation has expressed a desire to conduct their own heritage study from a Métis perspective, as well as a desire to conduct citizen engagement through interviews and meetings. To date, we have not established an agreement with the Manitoba Métis Federation to support a study and Red River Métis citizen engagement. We remain open to continuing to discuss development of a work plan with the Manitoba Métis Federation.

Our understanding of feedback that the Manitoba Métis Federation has communicated about the project to-date includes:

- Interest in distinctions-based approaches to engagement, noting that the Manitoba Métis Federation are working on a Métis specific heritage protocol, which will be shared with proponents when complete, but that in the meantime, the Manitoba Métis Federation appreciates opportunities to be involved in heritage work.
- Concerns that there are compounding impacts to Section 35 rights and the private rights of Red River Métis citizens who are also affected landowners on the project and use their own land for harvesting.
- Interest in reviewing draft environmental assessment report chapters.
- Concern that Manitoba Hydro’s timelines for project engagement do not afford the Manitoba Métis Federation enough time to allow for their citizen engagement process.

Representatives from the Manitoba Métis Federation participated in the community perspective routing workshop to help identify a preferred route.

5.5.1.2 Peguis First Nation

We have had correspondence, discussions, and meetings with representatives from Peguis First Nation throughout the engagement process. We engaged with Peguis First Nation mainly via their Consultation and Special Projects Office, as well as with representatives from the Treaty Land Entitlement office.

We understand that Peguis First Nation shared their interest in conducting interviews and traditional land use studies for this project, given that there is not much documented information about heritage resources in the project area.

Through feedback provided by Peguis First Nation during all phases of engagement, we understand Peguis First Nation's key feedback about the project to include:

- Concerns that, although the project area is advanced, there is potential to discover heritage resources given that there has not been a lot of archeological work done in the area. An area of potential concern is near the elevated ridge along the preferred route, although it is developed with agriculture and pasture lands.
- The need for and interest in participating in heritage monitoring, noting their perspective that the Historic Resources Branch (HRB) standards are the minimum, and they would like to see more robust analysis of areas of concern.

Representatives from Peguis First Nation participated in the community perspective routing workshop to help identify a preferred route.

5.5.1.3 Brokenhead Ojibway Nation

During pre-engagement, we met with a representative from Brokenhead Ojibway Nation, who requested to be kept informed on the project, noting that it would be helpful to have more experience with Manitoba Hydro's engagement process. The representative shared that given the nature of the project and the information shared, that there was not a major concern about the project having an impact on Brokenhead Ojibway Nation's cultural values or environmental impacts of concern, and that they did not anticipate undertaking an independent study.

5.5.1.4 Animo-ziibiing (Lake Manitoba First Nation)

As at the date of this report, we have not received feedback about the project from Animo-ziibiing (Lake Manitoba First Nation).

5.5.1.5 Fisher River Cree Nation

As at the date of this report, we have not received feedback about the project from Fisher River Cree Nation.

5.6 Ongoing engagement

After filing this report with Manitoba Environment and Climate Change, we will notify the engaged First Nations, the Manitoba Métis Federation, affected landowners, the RMs, and interested parties and provide a link to this report.

Following Manitoba Environment and Climate Change's decision regarding the Silver to Rosser tap transmission line, we will notify the engaged First Nations, the Manitoba Métis Federation, affected landowners, the RMs and interested parties of the outcome of the decision. If we are granted a license, we will keep our engagement audiences informed of construction schedules and activities.

We also plan to engage in further discussions about culture and heritage monitoring and other project monitoring opportunities.

Manitoba Hydro will also reach out to FNMEP participants to discuss interest in holding a ceremony or ceremonies at project milestones.

We will remain open and responsive to any questions or concerns that may arise from the PEP and FNMEP audiences through the project's construction and operation. The project webpage will continue to be updated as the project progresses through the regulatory review process and project construction, and the toll-free phone number (1-877-343-1631) and project engagement email address (projects@hydro.mb.ca) will remain available. Any feedback about the engagement process will help support the continual improvement of Manitoba Hydro's engagement efforts on future projects.

6.0 Environmental setting

This chapter provides an overview of the existing environment in the regional assessment area.

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

This chapter provides an overview of the following non-VC specific existing conditions:

- Atmospheric environment (climate, air quality, and noise)
- Geology and hydrogeology
- Aquatic environment
- Communities, population, and land and resource use
- Cultural and historic setting

6.1 Atmospheric environment

This section characterizes historic climate conditions, air quality, and noise in the project region. Projections of how climate in the area may change in the future are presented in Chapter 15.0 (Greenhouse gases and climate change).

6.1.1 Climate

The project footprint falls within the Ashern and Gimli ecodistricts of the Interlake plain ecoregion in the Boreal plains ecozone. The climate in this area is generally characterized by short, warm summers and cold winters, with mean annual precipitation that varies considerably from year-to-year with approximately one-quarter falling as snow. The mean annual temperature is 1.4°C, the average growing season is 176 days, and the number of growing-degree days is 1,540 (Smith et al. 1998).

To develop an understanding of historic climate normals and climate trends in the project area, data was reviewed from ten meteorological stations operated by Environment and Climate Change Canada (ECCC) including:

- Seven stations in the project study area (*i.e.,* Gimli stations)
- Three complementary stations in the Interlake at Arborg, Teulon, and Narcisse

Most stations have a relatively short temporal coverage, which limits the suitability of these records for long term climate studies, such as the calculation of 30-year climate normals. Only the Arborg and Narcisse stations have climate normals published for the 1981-2010 period (ECCC, 2023). Poor quality (D Code) climate normals are available for the Gimli stations (Climate ID: 5031038 & 5031039) for the 1971-2000 period.

It is anticipated that ECCC will publish climate normals for the 1991-2020 period in the summer of 2024 (Nguyen, 2024), but at the time of writing, 1981-2010 remains the most recent ECCC published normals period.

6.1.1.1 Climate normals

Monthly Climate Normals (ECCC, 2024; Hersbach et al., 2023) are illustrated in Figure 6-1 for temperature, precipitation, and wind speed.

Among all stations in the immediate project study area (i.e., within 50 km of the proposed transmission line tap), only Arborg reports climate normals for both temperature and precipitation in the 1981-2010 period. The climate normals available for this station are both classified as Code A (no more than 3 consecutive and no more than 5 total missing years of data). Climate normals in the 1971-2000 period are available in the immediate Gimli area for temperature, precipitation, and wind although all three variables are classified as Code D (at least 15 years of data).

Climate normals for the Gimli station during the 1991-2020 period would be most indicative of recent historic climate conditions. Because these normals had not yet been published at the time of this report, climate reanalysis data was obtained from ERA5 to supplement the available ECCC climate normals (Hersbach et al., 2023) and normals were calculated at the grid nearest to Gimli for the 1991-2020 period.

Figure 6-1 also shows period-of-record extremes at each ECCC station which may extend beyond the 1971-2000 (for Gimli) or 1981-2010 (for Arborg) period.

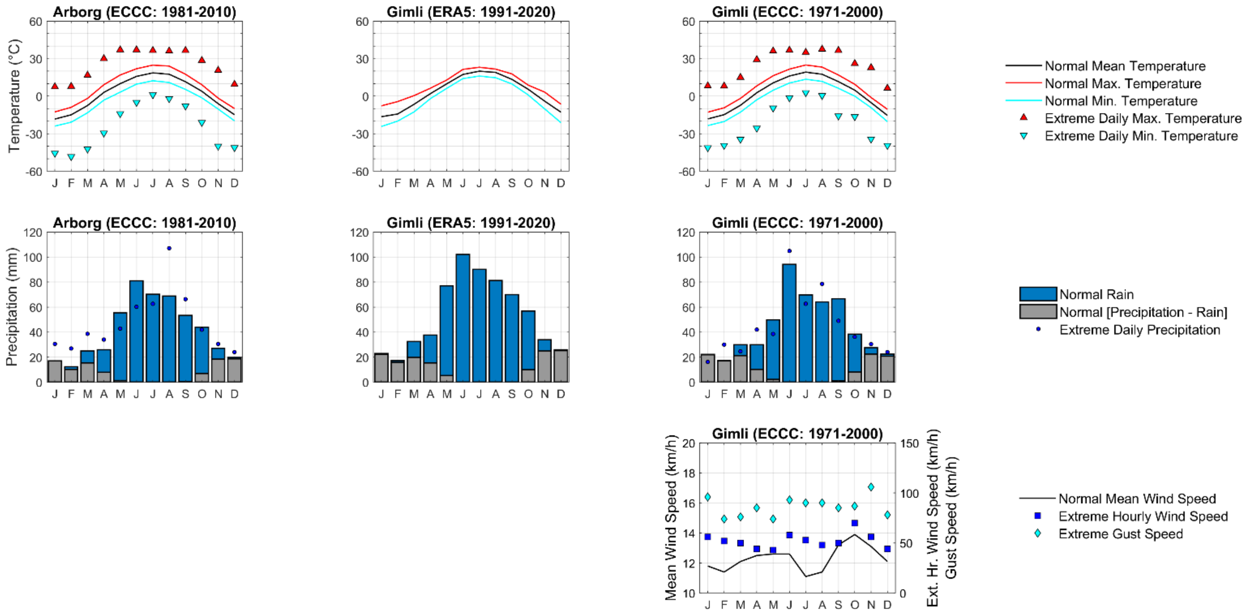


Figure 6-1: Monthly climate normals (ECCC 2024 and Hersbach et. al. 2023)

As shown in Figure 6-1, conditions and seasonal patterns are similar among the three datasets.

6.1.1.2 Trends

Adjusted and homogenized Canadian climate data (AHCCD) from ECCC are developed specifically for purposes of understanding long-term trends in climate (Vincent et al., 2020; Mekis and Vincent, 2011; Wan et al., 2010). AHCCD includes minimum temperature (Tmin), mean temperature (Tmean), maximum temperature (Tmax), rain, snow, precipitation, and wind speed.

Seasonal and annual time series from AHCCD at Gimli and Arborg are plotted in Figure 6-2 for temperature and Figure 6-3 for precipitation. Wind data presented in Figure 6-4 is based on AHCCD data at Winnipeg as this wind AHCCD data was unavailable for Gimli and Arborg. Since methods involved in generating AHCCD typically include the joining of multiple nearby stations (i.e., to reduce missing data and increase time series length), the sites presented in Figure 6-2, Figure 6-3, and Figure 6-4 may incorporate data from multiple stations.

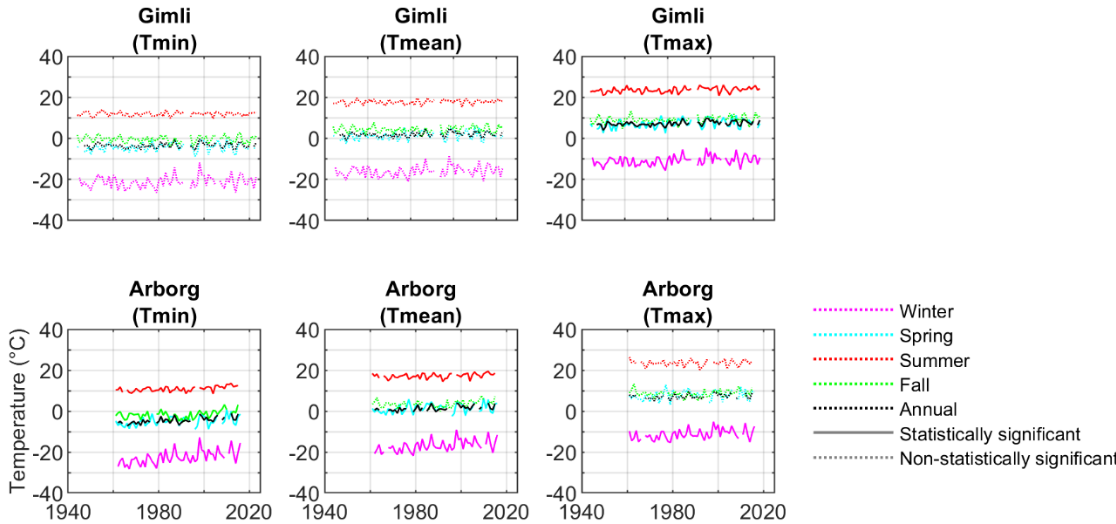


Figure 6-2: Time series of seasonal and annual temperature trends for Gimli and Arborg

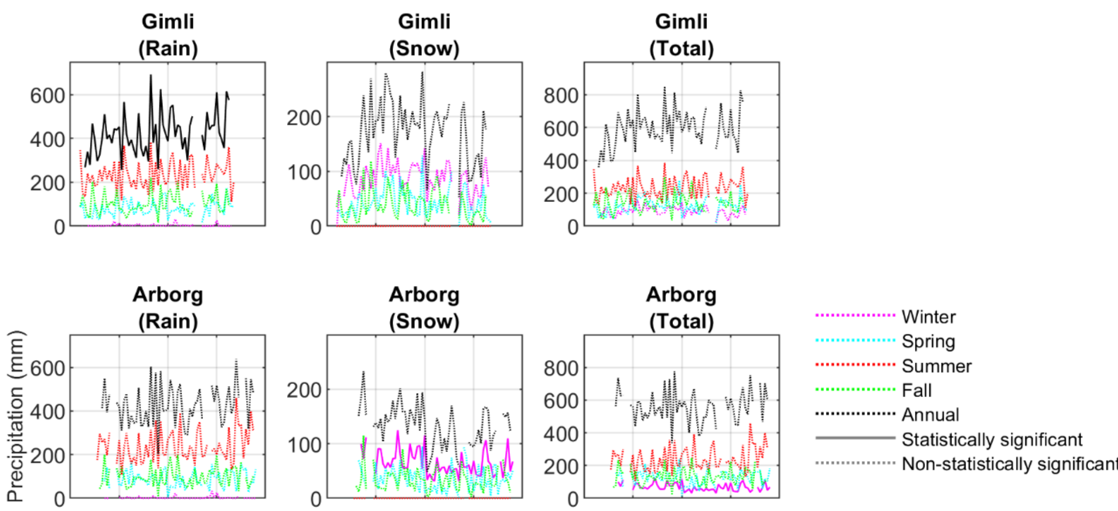


Figure 6-3: Time series of seasonal and annual precipitation trends for Gimli and Arborg

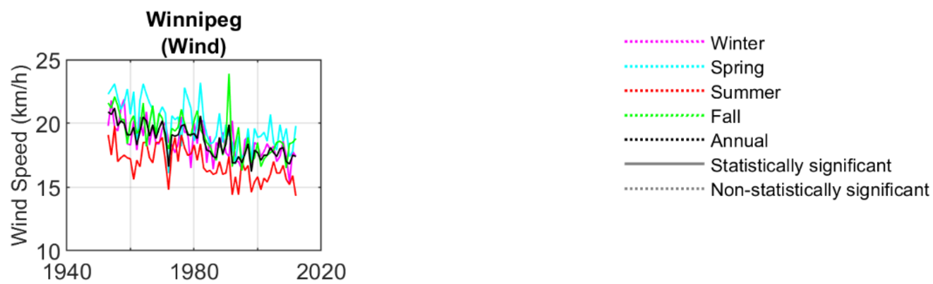


Figure 6-4: Time series of seasonal and annual wind trends for Winnipeg

Statistically significant[2] trends of note include:

- For Gimli, maximum temperature increased by 0.26 °C/decade with all seasons except for fall indicating maximum temperature increases.
    - Winter: 0.32 °C/decade
    - Spring: 0.30 °C/decade
    - Summer: 0.18 °C/decade
    - Annual: 0.26 °C/decade
- For Arborg, minimum, mean, and maximum temperatures increased annually and seasonally with the exception of the mean fall temperature trend being non-statistically significant.
    - Annual minimum temperature: 0.61 °C/decade
    - Annual mean temperature: 0.46 °C/decade
    - Annual maximum temperature: 0.22 °C/decade
- For Gimil, annual precipitation saw increases by 2.06 mm/year.
- For Arborg, seasonally winter snow and total precipitation saw decreases.

[2] Statistical significance was analyzed using the Mann-Kendall test as in Zhang et al. (2000). The slope of trends was estimated based on Kendall's rank correlation tau statistic (Sen, 1968). Generally, these tests are less sensitive to outliers compared to other commonly used methods (e.g., linear regression to estimate trend slope). It is important to recognize that trend analysis can be sensitive to the start and end dates, missing data, and the evolution of the data in AHCCD. For the purposes of this assessment, trends are analyzed for their entire period of record available in AHCCD.

- Winter snow: -0.42 mm/year
- Total precipitation: -0.41 mm/year

- For Winnipeg, wind speed saw annual decreases of -0.055 km/h/year and for all seasons.

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). Projected changes to the climate system based on future greenhouse gas scenarios, developed using climate models, are presented in Chapter Chapter 15.0.

6.1.2 Air quality

Air quality in Manitoba is generally good, with poorer air quality being attributable to wildlife smoke and transboundary pollutants from other jurisdictions. Air quality in Winnipeg, the nearest air quality monitoring station to the RMs of Armstrong and Gimli, has met the standards for air quality in recent years, as established by the Canadian Ambient Air Quality Standards. More detailed information on regional air quality can be found in Section 13.2.1.

6.1.3 Acoustics

The existing acoustic environment in the RMs of Armstrong and Gimli is characterized by sounds from residents' activities, local traffic, agricultural operations and equipment, recreational activities, and occasional aircraft flyovers. The Gimli Industrial Park Airport is a civilian airport without regularly scheduled commercial flights; however, occasional aircraft flyovers contribute to baseline ambient sounds in the regional area.

Ambient sound levels in the RMs of Armstrong and Gimli are assumed representative of levels advised in Health Canada (2017)'s noise guidance for quiet rural communities (i.e., 45 dBA Ld. daytime and 35 dBA Ln nighttime).

Noise guideline targets of 55 dBA daytime and 45 dBA nighttime have been established for the province (Province of Manitoba. n.d.). More information on acoustics and noise can be found in Section 13.2.2.

6.2 Geology and hydrogeology

The project area lies within the Manitoba Lowland physiographic region, an area underlain by gently southwestward dipping Paleozoic and Mesozoic sediments that mainly consist of carbonate rocks with some clastic and argillaceous units (Betcher and Pupp 1995). Bedrock is overlain by glacial tills and proglacial lacustrine sediments.

The RMs of Armstrong and Gimli are underlain by a bedrock aquifer that is continuous and formed by thick extensive carbonate rock beds with minor shale beds (Rutulis 1987a). Lenses of sand and gravel aquifers in till and other surficial deposits are the sand and gravel aquifers that underlie the project area (Rutulis 1987b).

6.3 Aquatic environment

The project falls within the Willow Creek sub-watershed (Map 6-1). The proposed transmission line's footprint does not cross any fish bearing watercourses (Map 6-2).

There is no interaction between the project and fish habitat, therefore fish and fish habitat were not selected as a valued component.

6.4 Communities, population, and land and resource use

The project is located in the RMs of Armstrong and Gimli, which fall within Census Division No. 18.

6.4.1 RM of Armstrong

According to Statistics Canada (2021a), in 2021, the enumerated population of the RM of Armstrong, was 1,967, which represents an increase of 9.8% compared to the 2016 population of 1,792. In 2021, the RM of Armstrong had a total of 1,056 total private dwellings of which 831 dwellings are occupied by usual residents. The land area of the RM is 1,868 square kilometres and the population density was 1.1 people per square kilometre.

The majority of the RM of Armstrong is zoned as intensive agriculture, with some portions zoned as limited agriculture and general agriculture. Beyond agriculture, other land uses include recreational activities, and various residential, commercial, light industrial, institutional and recreational uses associated with the main settlements of Inwood and Fraserwood (Fisher Armstrong Planning District, 2003).

There are six wildlife management areas (WMAs) in the RM of Armstrong: the Inwood WMA, the Clematis WMA, the Sandridge WMA, the Sharpewood WMA, the Narcisse WMA, and the Rembrandt WMA (RM of Armstrong, 2024).

The RM of Armstrong has a private campground located at the Inwood Golf & Country Club. The Narcisse Snake Dens are a tourist attraction in the region in the spring and fall, where tens of thousands of red-sided garter snakes congregate near their winter dens. The site is managed by Manitoba Conservation with assistance from the Narcisse Snake Management Advisory Group.

6.4.2 RM of Gimli

According to Statistics Canada (2021b), in 2021, the enumerated population of the RM of Gimli, was 6,569, which represents an increase of 6.3% compared to the 2016 population of 6,18. In 2021, the RM of Gimli had a total of 4,793 total private dwellings of which 3,141 dwellings are occupied by usual residents. The land area of the RM is 318 square kilometres, and the population density was 20.7 people per square kilometre.

The majority of the RM of Gimli is zoned as general agriculture rural. Most of the land along the west shore of Lake Winnipeg is zoned as Lake Residential. The airport and surrounding area are zoned as an industrial park. There is a 2-mile restricted development overlay designation around the Diago Gimli distillery, which is in place to minimize the potential for land use conflict and to limit future development to non-intensive land uses (Eastern Interlake Planning District, 2023).

One of the main economic drivers in the RM of Gimli has historically been agriculture, but the economy has diversified to include agro-industrial manufacturing, transport and equipment services, and recreation and tourism (Eastern Interlake Planning District, 2023). The RM of Gimli hosts an annual international film festival, as well as the Icelandic Festival of Manitoba. The Icelandic Festival of Manitoba has been held in Gimli since 1932 and is likely the second oldest continuous ethnic festival in North America (Icelandic Festival of Manitoba, 2024).

The RM of Gimli also includes the Rembrandt WMA, and Camp Morton Provincial Park. Camp Morton Provincial Park was developed in 1920 and originally served as a summer camp for orphaned and under privileged children. Today, the park includes cabins, yurts, campsites, group use areas and a recreational hall available for rent (Manitoba Environment and Climate Change, n.d.)

6.4.3 Town of Gimli

The Town of Gimli is an unincorporated community in the RM of Gimli on the west side of Lake Winnipeg.

According to Statistics Canada (2021c), in 2021, the enumerated population of the Town of Gimli, was 1,007, which represents a decrease of 16% compared to the 2016 population of 1,20. In 2021, the town had a total of 588 total private dwellings of which 352 dwellings are occupied by usual residents. The land area of the RM is

1,994 square kilometres and the population density was 0.5 people per square kilometre.

The Town of Gimli includes many services and employment opportunities, including business and finance, education, health, and sales and services (Eastern Interlake Planning District, 2023). The Town of Gimli also has a recreational centre, which provides programming including curling, hockey, skating, pickleball and swimming (RM of Gimli, 2024).

6.5 Cultural and historic setting

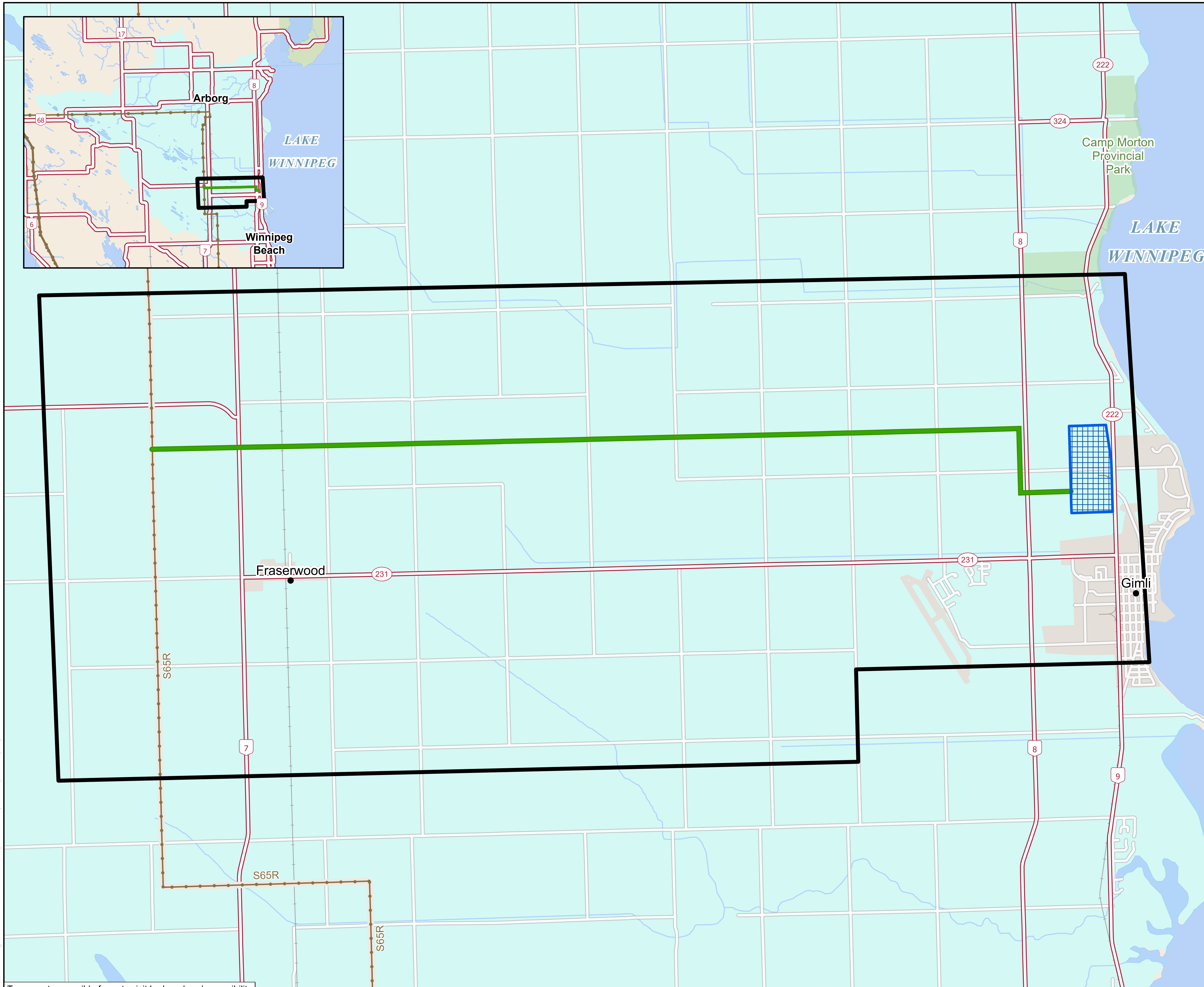
The Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

The Interlake region has changed substantially since colonialism in terms of the physical landscape and the ability of First Nations people and Red River Métis citizens to practice rights-based activities in the area. Past and ongoing projects and activities including the development of electrical transmission and distribution lines, roads, settlements, and agricultural development have drastically altered the landscape and caused disruptions to the ways in which rights-based harvesting occurs in the area.

Although the project area is now predominantly composed of private land and used mainly for agriculture as well as residential, commercial, recreational, and other uses, Manitoba Hydro acknowledges that the land in the area was once all Indigenous traditional land.

Manitoba Hydro understands that First Nations people and Red River Métis citizens have enduring connections to these lands and continue to visit the area to practice rights-based activities today, both on private land with landowner permission and on the small amount of Crown land that remains.

Chapter 9.0 includes a more detailed discussion about of the cultural history of the project area and cultural activities taking place in the project area in the past and today, informed by conversations with engaged First Nations and the Manitoba Métis Federation.



To request accessible formats visit hydro.mb.ca/accessibility

Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Route Planning Area

Watersheds
- Icelandic River/Willow Creek

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Urban Area

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

0 1.5 3 Kilometres
0 0.9 1.8 Miles

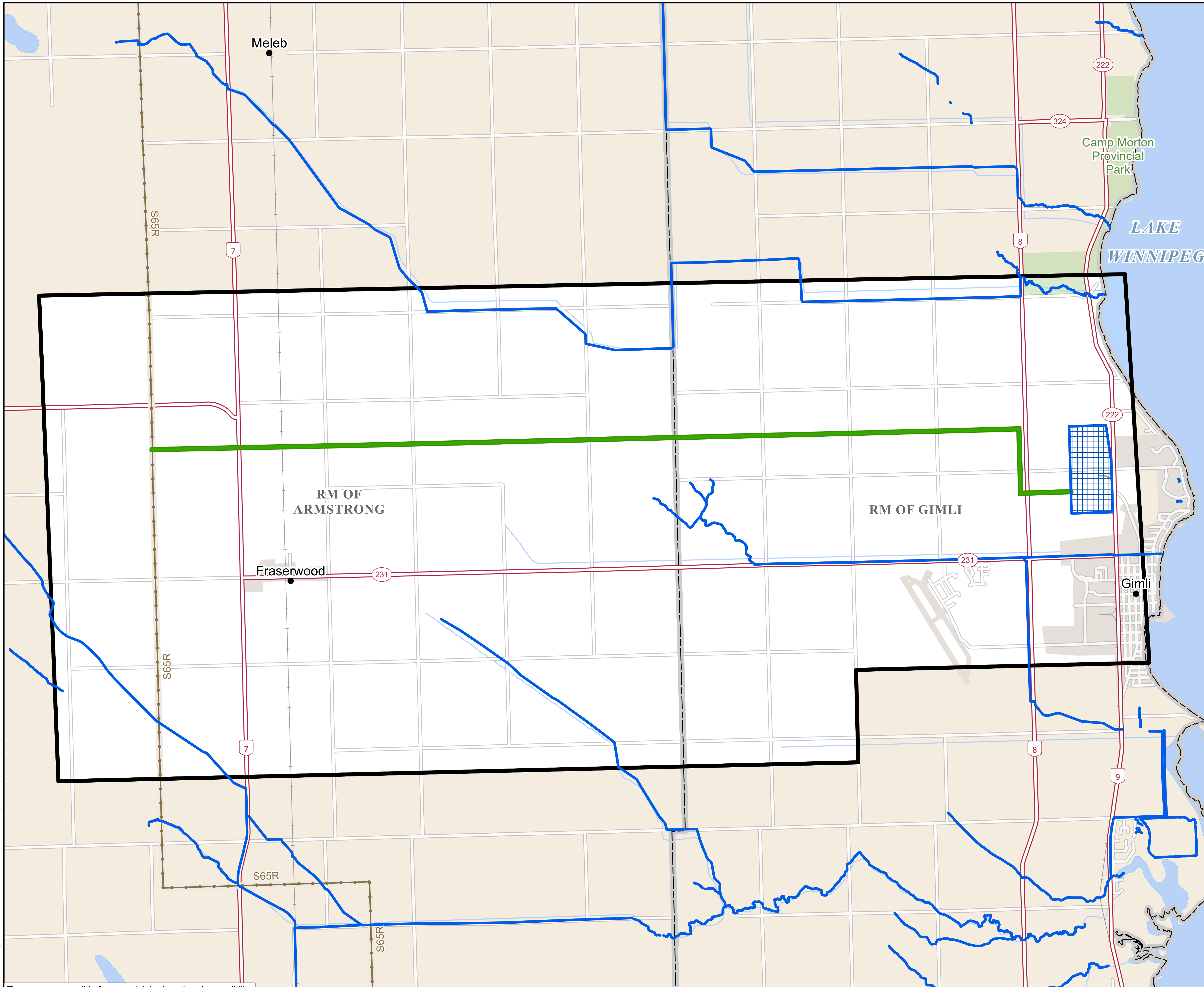
N

1:70,000

Watersheds

Draft/Confidential: For Discussion Purposes Only

Map 6-1



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Fish Bearing Streams
- Fish Bearing Stream

Assessment Area
- Route Planning Area

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

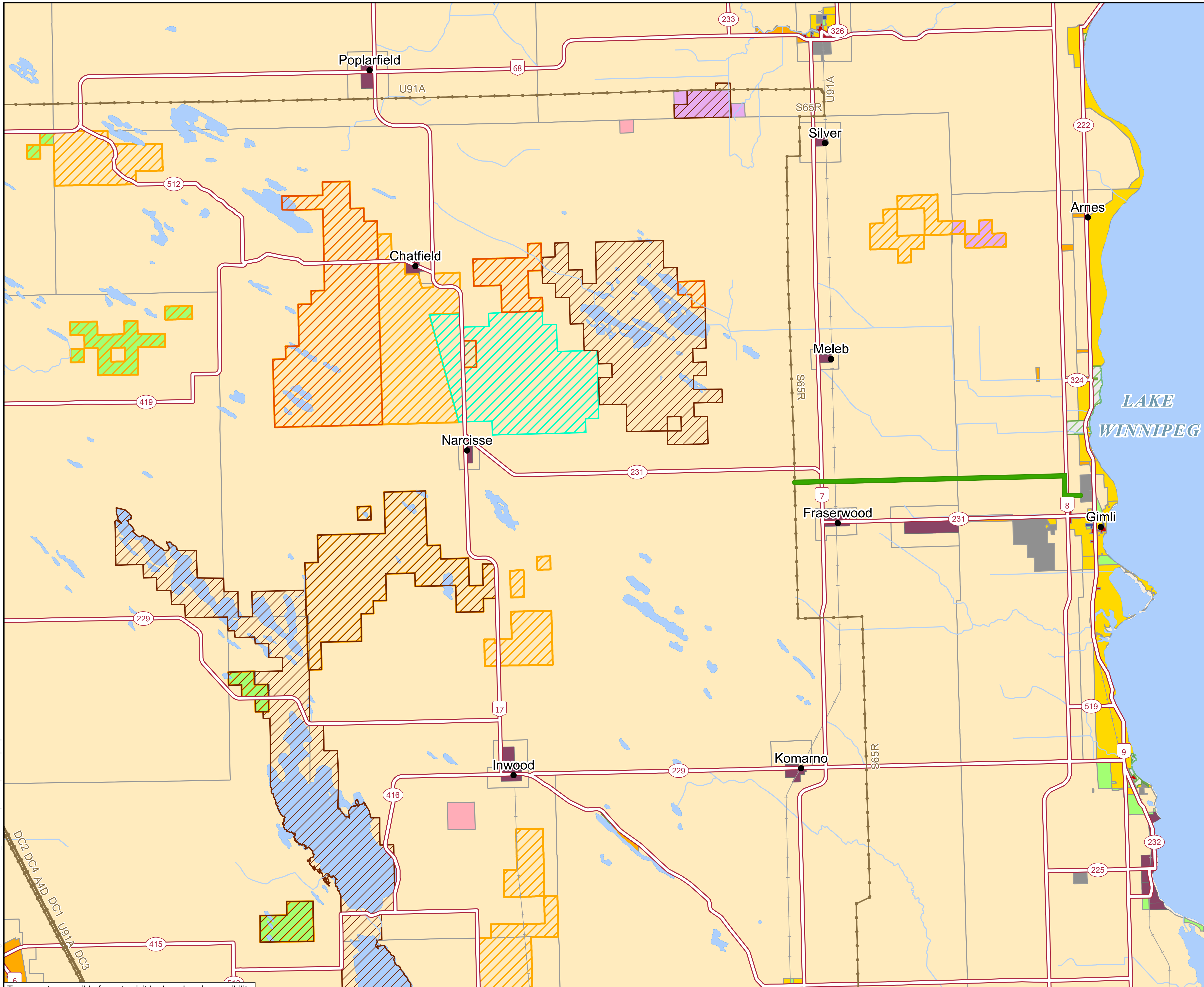
0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Fish Bearing Streams

Draft/Confidential: For Discussion Purposes Only

Map 6-2



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Designated and Protected Lands
- Area of Special Interest
- Community Pasture
- Protected Area
- Provincial Park
- Wildlife Management Area

Land Use Zoning[1]
- Commercial
- Industrial
- Institutional
- Mixed Use
- Parks, Recreation, and Open Space
- Residential
- Rural/Agricultural
- Rural Residential
- Settlement Centre
- Wildlife Management Area
- Other

Existing Infrastructure
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Provincial Highway/Road

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Source:
1. Manitoba Development Plan Designations, 2024, Province of Manitoba

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 9, 2024

N

0 5 10 Kilometres
0 3 6 Miles
1:225,000

Designated Lands and Land Use Zoning

Draft/Confidential: For Discussion Purposes Only

Map 6-3

7.0 Vegetation and wetlands

Vegetation refers to the characteristics of an area's plant cover, while wetlands refer to areas saturated with water long enough to support aquatic processes, indicated by soils lacking oxygen, dominance of wetland dependant plants, and biological activity associated with low oxygen (National Wetlands Working Group 1988; Burton and Tiner 2009).

Vegetation and wetlands provide ecological, aesthetic, recreational, and economic value, support wildlife, and are important to traditional and cultural practices of Indigenous nations. With these important functions in mind, vegetation and wetlands was selected as a valued component (VC) that may be affected by project activities.

The assessment of potential project effects on vegetation and wetlands considers both upland and wetland vegetation as well as wetland function.

Potential effects of the project on vegetation and wetlands were raised as areas of concern and interest during project engagement.

7.1 Scope of the assessment

This chapter assesses the effects of project activities during construction, operation, and decommissioning on vegetation and wetlands. An assessment of cumulative effects on vegetation and wetlands is also presented (if applicable).

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the following:

- Landscape intactness
- Vegetation community diversity and function
- Vegetation species diversity

7.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

7.1.2 Regulatory and policy setting

Effects to vegetation and wetlands are provincially and federally regulated. The following laws, and associated regulations, policies, and guidelines, as well as Manitoba Hydro's policies were considered for assessing project effects to vegetation and wetlands.

7.1.2.1 Species at Risk Act (Canada)

The federal *Species at Risk Act* (2002) protects species at risk and their critical habitat in Canada. The purpose of the *Species at Risk Act* (SARA) is to prevent the extinction or extirpation of wildlife species, provide for the recovery of endangered or threatened species, and prevent other species of special concern from becoming endangered or threatened through proper management.

Under SARA, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the status of species at risk. COSEWIC designates species at risk by listing them under Schedule 1 of SARA under the following classifications:

- Extirpated – a species that no longer exists in the wild in Canada, but exists elsewhere in the wild
- Endangered – a species that is facing imminent extirpation or extinction.
- Threatened – a species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
- 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 2021)

Species at risk and their habitats are protected under *SARA* which prohibits:

1) the killing, harming, or harassing of endangered or threatened species at risk (sections 32 and 36); and
2) the destruction of critical habitat of an endangered or threatened species at risk (sections 58, 60, and 61).

For clarification, under SARA and in relation to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the term wildlife species refers to both animal and plant species, defined as "a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and (a) is native to Canada; or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years (Government of Canada 2002).

7.1.2.2 The Endangered Species and Ecosystems Act (Manitoba)

Provincially, at risk plant and animal species native to Manitoba are designated as endangered, threatened, extinct, extirpated (no longer present in Manitoba), or special concern and protected under *The Endangered Species and Ecosystems Act* (2018) and its regulations (Province of Manitoba n.d.). In addition to designating the status of species at the provincial level, the purposes of *The Endangered Species and Ecosystems Act* (ESEA) are to ensure protection and enhance the survival of endangered and threatened species in the province and to enable the reintroduction of extirpated species into the province.

Activities that would kill, disturb, or interfere with any listed species, or damage, destroy, or remove habitat and natural resources on which a listed species depends, are prohibited by Manitoba's ESEA.

At risk ecosystems, can also be designated as threatened or endangered, and protected, under the ESEA. Two ecosystems are currently designated as endangered: alvars and native grass prairie (Province of Manitoba 2023).

7.1.2.3 The Noxious Weeds Act (Manitoba)

Non-native invasive plants are regulated under *The Noxious Weeds Act*, which categorizes noxious weed species into three tiers as follows:

- Tier 1: Species considered to have the most potential for negative effects though they may not yet be present in Manitoba.
- Tier 2: Species already established in Manitoba and observed to spread easily.
- Tier 3: All other designated species

Tier 1 species must be destroyed or eradicated immediately upon discovery. For Tier 2 species, infestations under five acres must be eradicated, while infestations larger than five acres must be controlled and kept from spreading. Tier 3 species do not require immediate control unless the spread of the occurrence poses a threat to the economy, environment, or the well-being of residents.

7.1.2.4 The Water Rights Act (Manitoba)

The provincial *The Water Rights Act* and its regulations, regulate the alteration and drainage of water in waterbodies, including wetlands, and alteration of wetland condition and wetland extent. *The Water Rights Act* and its regulation distinguishes between five classes of wetlands.

Class 1 (ephemeral) and Class 2 (temporary) wetlands may be drained without a requirement for mitigation or compensation. On Class 3 (seasonal wetlands), proponents are required to offset for proposed loss of wetland benefits. Water rights licences are only issued for projects that would impact Class 4 (semi-permanent) and Class 5 (permanent) wetlands under exceptional circumstances, in which case offset compensation from the proponent is also required (Province of Manitoba, n.d.).

The Government of Manitoba has recently revised the Water Rights Act and the *Sustainable Watersheds Act* to help conserve and improve wetlands in Manitoba.

7.1.2.5 Other legislation

Other pieces of legislation that may be relevant to the project's interactions with vegetation include:

- *The Forest Health Protection Act* (Manitoba) as it relates to forest threats including insects, diseases, and organisms, and invasive forest threats.
- *The Environment Act* (Manitoba) as it relates to the requirement for a pesticide use permit prior to implementation of an herbicide program for vegetation management.
- *The Forest Act* (Manitoba)
- *The Wildfires Act* (Manitoba)
- *The Ecological Reserves Act (Manitoba)*

7.1.3 Consideration of engagement feedback

Project engagement (Chapter 5.0) actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project.

Concerns raised during project engagement included:

- General concerns about the loss or disruption of forested areas (i.e., removal of trees) and wetlands
- The presence of specific traditional use plants and species of conservation concern in the project area
- Concerns related to the introduction of chemicals into the environment resulting from herbicide use.

7.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on vegetation and wetlands, along with effects pathways and measurable parameters are outlined in Table 7-1.

Table 7-1: Potential effects, effects pathways, and measurable parameters for vegetation and wetlands

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in landscape intactness	Direct loss or fragmentation of intact areas of native vegetation from vegetation clearing and ground disturbance	Qualitative assessment of loss of intact areas of native vegetation Density of linear features (km/km^2)
Change in vegetation community diversity and function	Direct loss or alteration of native upland and wetland vegetation communities arising from vegetation clearing, ground disturbance, and vegetation maintenance activities. Indirect alteration of upland and wetland native vegetation communities from the introduction or establishment of regulated weeds, non-native invasive species, or plant diseases and pests	Area (ha) and spatial distribution of native upland and wetland vegetation community types lost or altered. Qualitative assessment of potential for regulated weeds or non-native invasive species introduction and spread in upland vegetation communities. Qualitative assessment of altered wetland hydrology and or wetland water quality (i.e., wetland benefit)

Change in vegetation species diversity	Direct loss or alteration of plant species of conservation concern and traditional use plants from vegetation clearing, ground disturbance, and vegetation maintenance Indirect loss of plant species of conservation concern and traditional use plants from the introduction or establishment of regulated weeds and non-native invasive species	Number, abundance, and spatial distribution of species of conservation concern and traditional use plants Area (ha) of species at risk critical habitat loss or altered. Qualitative assessment of potential for regulated weeds and non-native invasive species to alter the abundance and spatial distribution of species of conservation concern and traditional use plants

7.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual and cumulative environmental effects of the project on vegetation and wetlands:

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project. The PDA is described in detail in Chapter 2.0 (Project description).

Local assessment area (LAA): includes all components of the PDA and consists of a 1 km buffer around the PDA, which is used to evaluate measurable effects on vegetation and wetlands. The total area of the LAA is 4,045.1 hectares.

Regional assessment area (RAA): includes the PDA and LAA and consists of a 15 km buffer around the PDA. The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects. The total area of the RAA is 124,073.7 ha.

Map 7-1 illustrates the spatial boundaries for the assessment of project effects on vegetation and wetlands. These spatial boundaries are consistent with the boundaries being considered in the assessments of project effects on Wildlife and wildlife habitat and Harvesting and important sites.

7.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on vegetation and wetlands are based on the timing and duration of project activities as follows:

- Construction – Four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line's design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

7.1.7 Residual effects characterization

Table 7-2 provides the definitions used to characterize the residual effects on vegetation and wetlands.

Table 7-2: Characterization of residual effects on vegetation and wetlands

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to vegetation and wetlands relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to vegetation and wetlands relative to baseline. **Neutral –** no net change in measurable parameters for vegetation and wetlands relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**No Measurable Change –** no measurable change is predicted. **Low –** a measurable change in native vegetation communities or species is predicted but it is unlikely to affect sustainability in the LAA and there are no predicted effects on listed species, wetland ecological communities of

Table 7-2: Characterization of residual effects on vegetation and wetlands

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		conservation concern, or wetland function. **Moderate –** a measurable change affecting the sustainability of native vegetation communities, species of conservation concern, traditional use plants, or wetland function in the LAA is predicted but is not predicted to extend to the RAA. **High –** a measurable change affecting the sustainability of native vegetation communities, species of conservation concern, traditional use plants, or wetland function in the RAA is predicted.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA. **LAA –** residual effects extend into the LAA. **RAA –** residual effects extend into the RAA
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –** the residual effect extends through to completion of post-construction reclamation. **Long-term -** the residual effect extends for the life of the project
Frequency	Identifies how often the residual effect occurs and	**Single event**

Table 7-2: Characterization of residual effects on vegetation and wetlands

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
	how often during the project or in a specific phase	**Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation. **Irreversible –** the residual effect is unlikely to be reversed

7.1.8 Significance definition

For this assessment, adverse residual effects on vegetation and wetlands are considered significant if, following the application of avoidance and mitigation measures, the proposed project threatens the long-term persistence or viability of upland or wetland vegetation communities or species or results in complete removal of a particular wetland function from an assessment area (PDA, LAA, or RAA).

7.2 Existing conditions

Baseline information for this assessment was gathered through field reconnaissance undertaken on May 1, 2024, site visits on June 19 and 21, 2024, feedback heard during project engagement, and a detailed review of available desktop information, including peer-reviewed literature, federal and provincial databases, and other sources.

The existing conditions described in this section focus on:

- Ecological land classification
- Natural areas and protected ecosystems
- Land cover
- Vegetation communities, including species of conservation concern, invasive species, and traditional use plants.

7.2.1 Ecological land classification

Canada has a hierarchal framework to classify ecologically distinct areas of land based on interrelationships of geology, landform, soil, water, vegetation, and human factors. The ecozone is the most generalized level of classification. Each ecozone is broken down into ecoregions and then into smaller ecodistricts. The ecodistrict is the most detailed level of ecological land classification. (Statistics Canada 2017)

The project is located entirely within the Boral Plain Ecozone and the Interlake Plain Ecoregion, and more specifically, the Ashern (87.55% of the PDA) and Gimli Ecodistricts (Smith et al. 1998).

Map 7-2 and Table 7-3 illustrate how the PDA, LAA, and RAA intersect the Canada land classification ecodistricts.

Table 7-3: Ecodistrict cover in the PDA, LAA, and RAA for vegetation and wetlands

Ecodistrict	PDA		LAA		RAA	
	Area (ha)	% cover	Area (ha)	% cover	Area (ha)	% cover
Ashern	64.694	87.55%	3432.747	84.86%	79577.944	64.14%
Gimli	9.198	12.45%	612.371	15.14%	44495.755	35.86%
Total:	73.893	100%	4045.118	100%	124073.700	100%

The regional landscape of the Interlake Plain Ecoregion is characterized as a level to ridged lake terrace complex, underlain by low relief, flat-lying Palaeozoic limestone rock. The water worked till has been smoothed over by thin, discontinuous veneers of sandy to clayey glaciolacustrine sediments as well as sandy to gravelly beach materials and boulder deposits. Soils are predominantly well to imperfectly drained Dark Gray Chernozems, with significant inclusions of well to imperfectly drained Black Chernozemic soils. Also present are Eutric Brunisols, shallow Gray Luvisols and Humic Gleysols, and Organic Mesisols occurring in peatlands.

The climate of the Interlake Plain Ecoregion consists of long, cold winters and short, warm summers. The mean annual precipitation ranges from slightly less than 500 to about 525 mm. The average growing season varies from 173 to 184 days.

The Interlake Plain is comprised of varying quality of closed-canopied trembling aspen (*Populus tremuloides*) with lesser amounts of balsam poplar (Populus balsamifera), tall shrubs and various herbs in the understory. The extreme calcareous soils often result in poor tree growth. White spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) are climax species which exhibit moderate to good growth in the ecoregion. Also occurring is jack pine (Pinus banksiana), on dry sandy sites, while poorly drained sites support black spruce (*Picea mariana*) and tamarack (*Larix laricina*) tree growth.

7.2.2 Natural areas and protected ecosystems

The RAA is located entirely within the Interlake Natural Area, which is a specific landscape for which the Nature Conservancy of Canada has developed a Natural Area Conservation Plan. The Interlake Natural Area Conservation Plan Summary 2017 – 2027 characterizes the area, its intrinsic value and benefit, and outlines desired conservation results and activities planned to pursue desired conservation results over a ten-year period (Becker, J. & C. Hamel 2017).

The Interlake Natural Area is one of the largest and most intact tracts of natural ecosystems within southern Manitoba. According to Becker and Hamel (2017), the Interlake Natural Area is known to support several species of conservation concern, species at risk, as well as both ecosystems currently designated under MESA: alvar and tall grass prairie.

The Interlake encompasses one of only two tall grass prairie remnants in Manitoba and the northernmost extent of tall grass prairie in North America (Becker and Hamel 2017). Grassland ecosystems once existed over large areas across North America (Sampson and Knopf 1994), however few undisturbed natural areas remain today, as losses to grasslands have exceeded those of other major biomes (Hoekstra et al. 2005). Although the southern Interlake includes patches of tall grass prairie, no known locations of tall grass prairie are along the PDA or within the LAA.

Alvar refers to a rare plant community, found in only a few provinces and states in North America and a few countries in Europe, which grows in 10 cm or less of soil over limestone or bedrock. Within the Manitoba Interlake, alvar can be found on ridges where soil was scraped or washed away from the limestone bedrock by glacial movement (Nature Conservancy of Canada 2013). The western reach of the RAA is near to an area north of Inwood, Manitoba known to support alvar. The LDA and PDA do not intersect alvar locations.

7.2.3 Land cover

Natural Resources Canada uses remote sensing satellite data to spatially differentiate between the land cover classifications that make up Canada’s land surface (Natural Resources Canada 2020).

Twelve cover classes occur within the RAA including native vegetation of coniferous and deciduous forest, mixed forest, marsh and fen wetland, and range and grassland. The water class includes lakes, rivers, and streams. Agricultural cropland, cultural features, roads and rail lines and exposed land are also present.

The distribution of land cover class types intersected by the project are illustrated in Map 7-3 with the area and percent cover in the PDA, LAA, and RAA shown in Table 7-3.

Table 7-3: Land cover class and type coverage for the PDA, LAA, and RAA						
Land cover class	PDA		LAA		RAA	
	Area (ha)	% cover	Area (ha)	% cover	Area (ha)	% cover
Agricultural cropland	10.927	14.79%	681.478	16.85%	7,539.388	6.08%
Bare rock, sand, and gravel	0	0%	10.800	0.27%	291.883	0.24%
Coniferous forest	0	0%	18.338	0.45%	395.411	0.32%
Cultural features	0.019	0.03%	66.600	1.65%	787.905	0.64%
Deciduous forest	26.451	35.80%	1,085.386	26.83%	25,463.457	20.52%
Forage crops	1.398	1.89%	341.897	8.45%	5,586.005	4.50%
Wetland – marsh and fens	0.250	0.34%	8.859	0.22%	7,281.691	5.87%
Mixedwood forest	0.564	0.76%	123.103	3.04%	6,496.352	5.24%
Open deciduous forest	5.732	7.76%	156.333	3.86%	1,612.773	1.30%
Range and grassland	27.164	36.76%	1,391.131	34.39%	32,164.479	25.92%
Roads, trails, and rail lines	1.387	1.88%	158.313	3.91%	2,696.181	2.17%
Water	0	0%	2.880	0.07%	33,758.174	27.21%
Total:	73.893	100%	4,045.118	100%	124,073.700	100%

Range and grassland represent the dominant land cover intersected by the PDA (27.164 ha, 36.76%), followed by deciduous forest (26.451 ha, 35.80%) with an additional 6.296 ha (8.52%) land cover from mixedwood and open deciduous forest. Agricultural cropland makes up 10.927 ha (14.79%) of the PDA, while agricultural forage crops account for 1.398 ha (1.89%).

Forest cover occupying and surrounding the study area lies within the Interlake Forest Section and Forest Management Unit 42 as defined by the Manitoba Forest Inventory classification system (Eastern Interlake Planning District 2023).

Observations during field reconnaissance on May 1, 2024, and site visits on June 19 and 21, 2024 were aligned with the desktop analysis of landcover types presented above. The landscape in the LAA was observed to be dominated by agricultural land and broadleaf (deciduous) forest.

The agricultural land is a mixture of cultivated and pasture or rangeland. The pastures consist of mixed grasses and herbaceous vegetation, with sporadic shrub cover. Some pastures exist with little to no shrub cover. Shelterbelts or windbreaks between agricultural fields are composed of mixed deciduous tree species.

The forested areas consist of multiple vegetation layers including tree canopy, tall shrubs (> 1m), low shrubs, and herbaceous ground cover. Forest stands are predominantly trembling aspen (*Populus tremuloides*) with white spruce (*Picea glauca*) and bur oak (*Quercus macrocarpa*) less common but also present. Willows (*Salix* spp.) and red-osier dogwood (*Cornus sericea*) are common shrubs occupying the forest edges.

The RAA includes Camp Morton Provincial Park. Mature forest cover here consists of white spruce, green ash (*Fraxinus pennsylvanica*), bur oak, Manitoba maple (*Acer negundo*), paper birch (*Betula papyrifera*), aspen and balsam poplar (*Populus balsamifera*) (Manitoba Government 2014). Plantations of Walker poplar (Populus x Walker) can also be found in the park.

Wetlands support plants and assemblages of plants unique from uplands and are important habitat for wildlife (National Wetlands Working Group 1997; Lichvar et al. 2012). Few wetlands were observed in the study area. Those wetlands present are classified as marshes and are dominated by tall grasses, cattails (*Typha* sp.) and other emergent reeds and bulrushes. Tall shrubs of willows (*Salix* spp.) occur along wetland edges. Marshes are surrounded by cultivated fields and aspen stands, occasionally with little open water present.

One marsh wetland is intersected by the PDA (0.25 ha) for approximately 50 m. Characteristics of this wetland indicate it would be classified as a class 2 marsh -

temporary pond (Province of Manitoba n.d.). Additional wetlands occur adjacent to the PDA, accounting for approximately 0.22% of the LAA.

Photographs taken of landcover types observed during field visits are included in Appendix C.

During project engagement, Manitoba Hydro was made aware that portions of SE 28-19-3 EPM are under a conservation agreement. Manitoba Habitat Conservancy informed Manitoba Hydro that the conservation agreement applies protections to two specifically defined wetland areas within the property that are not intersected by the PDA. Assuming there are not anticipated effects to adjacent land, following mitigation, that may impact the quality of habitat within the protected polygons, Manitoba Habitat Conservancy did not have concerns with the route alignment.

7.2.4 Vegetation communities

The RAA supports a wide range of vegetation species and ecosystems.

The documented vegetation species known to the study area include species of conservation concern, non-native invasive species or noxious weeds, and traditional use plants. Each of these important groups are discussed in detail below.

7.2.4.1 Species of conservation concern

Plant species of conservation concern considered in this assessment include all provincially (ESEA) and federally (SARA) listed species, as well as species ranked as Critically Imperilled to Vulnerable, by the Manitoba Conservation Data Centre (MB CDC 2023).

According to provincial sources, there are 132 plant species of conservation concern that can be expected to range within the Interlake Plain Ecoregion (Manitoba Government 2024a). Among species of conservation concern within the ecoregion, are 11 species listed under either ESEA, SARA, or COSEWIC as listed in Table 7-4.

Table 7-4: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

Cypripedium candidum	Small White Lady's-slipper	Endangered	Threatened	Threatened
Fraxinus nigra	Black Ash	-	-	Threatened
Pellaea gastonyi	Gastony's Cliffbrake	Endangered	-	-
Platanthera praeclara	Western Prairie Fringed Orchid	Endangered	Endangered	Endangered
Solidago riddellii	Riddell's Goldenrod	Threatened	Special Concern	Special Concern
Spiranthes magnicamporum	Great Plains Ladies'-tresses	Endangered	-	-
Symphyotrichum sericeum	Western Silvery Aster	Threatened	Threatened	Threatened
Teloschistes chrysophthalmus	Golden-eye Lichen	-	Special Concern	Special Concern
Veronicastrum virginicum	Culver's-root	Threatened	-	-

The MB CDC assigns conservation status ranks to plant and animal species in Manitoba based on their rarity along a five-point scale. S1 (critically imperilled) is assigned to species with the greatest rarity and risk of extirpation, followed by S2 (imperilled), S3 (vulnerable) for species with a moderate risk of extirpation, S4 (apparently secure), and finally S5 (secure), which is assigned to species with very low or no risk of extirpation (Nature Serve Explorer 2023).

Species of conservation concern ranked S1, S2, or S3 (or any combination) by the MB CDC but not listed under the ESEA are not protected by legislation, but they are important contributors to biodiversity in Manitoba and considered rare or uncommon in the province.

Based on a MB CDC search, there are no protected plant species listed under legislation known to occur in the PDA. There is one plant species of conservation concern known to occur within the PDA, southern milkvetch (*Astragalus australis*), which is ranked critically imperilled to imperilled (S1S2). Three additional plant species of conservation concern are known to occur within a 5 km radius of the PDA. The names and MB CDC rankings of these species are included in Table 7-5.

Table 7-5: Plant species of conservation concern occurring within the PDA and within a 5 km radius around the PDA				
Scientific name	Common name	MB CDC rank	Within PDA	Within 5 km of PDA
Astragalus australis	Southern Milkvetch	Critically imperilled to imperilled (S1S2)	✓	✓
Aralia racemose	Spikenard	Imperilled (S2)	-	✓
Corispermum villosum	Hairy Bugseed	Critically imperilled to imperilled (S1S2)	-	✓
Cypripedium arietinum	Ram's-head lady's-slipper	Imperilled too vulnerable (S2S3)	-	✓

During roadside surveys in June and July 2024, eight species of conservation concern were observed, including one imperilled species that is also listed as threatened by COSEWIC: black ask (*Fraxinus nigra*). This tree was observed along the preferred route and at Camp Morton Provincial Park. The seven other species of conservation concern are ranked as vulnerable by MB CDC but are not listed as species at risk under ESEA, SARA, or COSEWIC The species of conservation concern observed, their MB CDC rankings, and provincial or federal protection status are included in Table 7-6 below.

Table 7-6: List of species of conservation concern observed during June and July 2024 field visits			
Scientific name	Common name	MB CDC rank	ESEA, SARA, and/or COSEWIC status
Fraxinus nigra	Black Ash	Imperilled (S2)	Listed as threatened by COSEWIC
Asclepia syriaca	Common milkweed	Vulnerable (S3S4)	n/a
Iris versicolor	Harlequin blue flag	Vulnerable (S3S4)	n/a

Populus deltoides	Cottonwood	Vulnerable (S3S5)	n/a
Streptopus lanceolatus	Rosy twisted stalk	Vulnerable (S3? *)	n/a
Asclepias incarnata	Swamp Milkweed	Vulnerable (S3S4)	n/a
Lonicera involucrate	Black Twinberry	Vulnerable (S3S4)	n/a
Typha angustifolia	Narrow-leaved Cattail	Vulnerable (S3S4)	n/a

* "?" Denotes inexact numeric rank.

Photographs taken of certain species of conservation concern observed during field visits are included in Appendix C.

7.2.4.2 Traditional use plant species

A great deal of traditional knowledge concerns plants and their use as food, medicines, for handicrafts, and technology. Communities in and around the study area have long histories of living on the land with a deep knowledge and appreciation for the plants growing in their traditional areas.

Traditional use plants identified within the study area during roadside surveys included hardwood trees, tall shrubs and a variety of low shrubs and herbs. Some berry shrubs recorded were Saskatoon (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*) and highbush cranberry (*Viburnum opulus*). Other traditional plants observed were seneca snakeroot (*Polygala senega*) and sweetgrass (*Anthoxanthum hirtum*).

Through the public engagement process for the project, information was received on vegetation and important plant species in the study area. This information highlighted the value of important habitats such as wetlands, forests, and trees, and foraging for harvested plant species such as sage, wild raspberry, cranberry, juniper, and mushrooms. Concerns on the ability to gather and harvest local foods such as berries and medicines was identified through the engagement process. Concerns on biodiversity loss and disturbance to natural habitat was also received from public feedback.

According to regional vegetation descriptions (e.g., Manitoba Government 2014; Smith et al. 1998), a variety of trees, shrubs, herbs, and other traditional use plant species would be expected to occur within the study area.

7.2.4.3 Invasive Species

Invasive species have been previously recorded in this region and have been a major concern. Red bartsia (*Odontites vernus*) is an agricultural and roadside invader that was accidentally introduced to the Gimli area in the 1950's (Rural Municipality of St. Clement's 2019). The Noxious Weeds Regulation lists red bartsia as Tier 1 (Manitoba Government 2024b). While being a challenge to detect its presence due to its small size (15 to 30 cm), the reddish to purple flower clusters that form in late spring are the plants main identifier. The economic impact of red bartsia introduction in the Gimli area has been a concern for the Interlake Weed Control District. Although plant control measures were established in the late 1960's, a truly effective program was not initiated until 1999. By that time, red bartsia had already infested much of the Interlake region.

Within the Interlake Natural Area, non-native and invasive plant species are considered a threat to viability of the natural area conservation plan, which identifies strategies for species control such as monitoring and mitigation (Becker and Hamel 2017). The Manitoba Government (2014) has recognized the concern of encroachment of non-native and invasive species in small natural areas such as Camp Morton Provincial Park, which is in the RAA.

Manitoba Hydro heard general concerns about the potential introduction of weeds and invasive species resulting from establishing a transmission line right-of-way during project engagement.

During site visits in June and July 2024, several non-native and invasive plant species were recorded in ditches along the preferred route and other sites within the study area. Oxeye daisy, a quickly spreading Tier 2 noxious plant was observed at three locations. Noxious plant species can continue to persist and proliferate if left unmanaged. Other frequently occurring non-native and invasive plant species included alfalfa (*Medicago sativa*), caraway (*Carum carvi*), Canada thistle (*Cirsium arvense*), field sow-thistle (*Sonchus arvensis*), common dandelion (*Taraxacum officinale*), quack-grass (*Elymus repens*), meadow timothy (*Phleum pratense*), creeping bentgrass (*Agrostis stolonifera*), bird's-foot trefoil (*Lotus corniculatus*), foxtail barley (*Hordeum jubatum*), white sweet clover (*Melilotus albus*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*) and common buttercup (*Ranunculus acris*). and smooth brome (*Bromus inermis*).

7.3 Project interactions with vegetation and wetlands

Table 7-7 identifies, for each potential effect, the physical activities that might interact with vegetation and wetlands and result in the identified effect.

Table 7-7: Project interactions with vegetation and wetlands

Project activity	Change in landscape intactness	Change in vegetation community diversity and function	Change in vegetation species diversity
Transmission Line Construction			
Mobilization and staff presence	-	-	-
Vehicle and equipment use	-	✓	✓
Access development	✓	✓	✓
Right-of-way clearing	✓	✓	✓
Marshalling / fly yards	✓	✓	✓
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	-	✓	✓
Implosive connectors	-	-	-
Helicopter use	-	-	-
Clean-up and demobilization	-	-	-
Transmission Line Operation			
Transmission linepresence	-	-	-
Vehicle and equipment use	-	✓	✓
Inspection patrols	-	✓	✓
Other maintenance activities	-	✓	✓
Vegetation management	✓	✓	✓
Decommissioning			
Mobilization and staff presence	-	-	-
Vehicle and equipment use	-	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	-	✓	✓
Rehabilitation	✓	✓	✓

Table 7-7: Project interactions with vegetation and wetlands			
Project activity	Change in landscape intactness	Change in vegetation community diversity and function	Change in vegetation species diversity
Clean-up and demobilization	-	-	-
✓= Potential interaction			
– = No interaction			

7.4 Assessment of project effects

While effects to vegetation and wetlands could occur during construction, operation, and decommissioning, they are anticipated to be most pronounced during construction and include the following:

- Change in landscape intactness
- Change in vegetation community diversity and function
- Change in vegetation species diversity

7.4.1 Effects pathways

As illustrated in the project interactions table (Table 7-7), no effects to vegetation and wetlands are anticipated to result from certain project activities including mobilization and staff presence, the use of implosive connectors, helicopter use, transmission line presence, and clean-up and demobilization.

All other project activities have potential pathways of effect that may result in changes to landscape intactness, vegetation community diversity and function, and/or vegetation species diversity. The follow sections assess these pathways of effect, set out mitigation, and characterize residual effects.

7.4.1.1 Change in landscape intactness

Intactness refers to the degree to which an ecosystem has not been altered by human development and activities that remove habitat and increase fragmentation (Government of Canada 2013). Landscape intactness is an indicator for human effects on vegetation, wetlands, wildlife, species of conservation concern, and traditional use plants important to Indigenous nations.

The effect pathway through which the project has the potential to change landscape intactness is through the direct loss or fragmentation of intact areas of native vegetation from vegetation clearing and ground disturbance.

Analytical assessment techniques

Changes to landscape intactness are assessed by calculating and comparing linear feature density prior to the project and the predicted linear feature density following development of the PDA. The assessment is also informed through qualitative assessment of the predicted loss of intact areas of native vegetation.

Construction

During construction, the project will alter landscape intactness because the PDA will intersect patches of native vegetation and increase the prevalence of linear features. The RAA has an existing linear feature density of 1.015 km/km^2, which will be increased to 1.029 km/km^2, after construction, a 1.4% increase.

Vegetation will be removed to establish a clear 40 m right-of-way along the PDA. Clearing of forested areas will have the greatest effect on intactness. In total, approximately 33 ha of forest will require clearing within the PDA. This reflects a 2.4% reduction in forested area in the LAA (Table 8-4). Due to the existing development in the RAA, no core areas greater than 200 ha will be changed by the project.

Intact patches of native vegetation may also require clearing if new marshalling/fly yards or access are required in locations that are not already cleared.

Operation

Following construction, the right-of-way will be reclaimed. However, vegetation will be maintained in a different state than prior to construction. Vegetation maintenance activities occurring throughout the operations phase will include the periodic removal of taller vegetation regrowth, including trees and taller shrubs. Therefore, maintenance of the right-of-way will sustain the effects of the project on landscape intactness throughout operations through preventing the re-establishment of forested areas along the PDA.

During operations, an additional decrease in landscape intactness may result from windfall adjacent to the PDA. Windfall usually occurs during the first few years after clearing due to trees becoming more susceptible to exposure.

Decommissioning

During decommissioning, landscape intactness will not be adversely affected as no new vegetation clearing will be required. Conversely, effects during decommissioning are expected to be positive in relation to intactness as disturbed areas will be rehabilitated, restoring native vegetation intactness over time.

7.4.1.2 Change in vegetation community diversity and function.

For this assessment, changes in vegetation community diversity and function refer to alterations to the abundance of upland and wetland vegetation community types and the functions that vegetation communities serve, in particular wetland function.

The effect pathways through which the project has the potential to change vegetation community diversity include:

- Direct loss or alteration of native upland and wetland vegetation communities arising from vegetation clearing, ground disturbance, and vegetation maintenance activities.
- Indirect alteration of upland and wetland native vegetation communities from the introduction or establishment of regulated weeds, non-native invasive species, or plant diseases and pests

Analytical assessment techniques

Changes in community diversity and function are assessed by comparing changes in the distribution of landcover classes and cover types anticipated to result from the project and qualitatively considering potential alteration in vegetation community composition that may result from the introduction or spread of regulated weeds.

Following recommendations of Noble et al. (2011), wetland function assessment includes consideration of current wetland condition, the extent of wetlands, connectivity between wetlands, alteration of surrounding uplands potentially contributing drainage to wetlands and other associated stressors such as soil compaction and weed introduction and spread.

Construction

During construction, vegetation communities will be directly altered through clearing of the right-of-way prior to construction of the transmission line. This process will involve the removal of trees and shrubs along the PDA resulting in direct losses of vegetation. Deciduous forest will be the landcover type most affected as it intersects 34% (50 hectares) of the PDA and complete removal of trees and shrubs will be required to establish the right-of-way (Table 7-3).

Direct loss of trees and shrubs may also result from the establishment of access and marshalling/fly yards if they cannot be confined entirely to pre-disturbed areas.

Both upland and wetland vegetation communities may be directly affected by construction activities that may cause ground disturbance such as the use of vehicles and equipment, access development and marshalling/fly yards if in undeveloped areas, and transmission line tower construction. These activities can cause direct loss of plant species that are a part of each community type, altering community composition and ecology. In wetland community types, a change in composition may hinder wetland benefits. Any proposed loss of wetland benefits in Class 3 wetlands require offset under *The Water Rights Act* (Manitoba).

Construction activities may also cause indirect effects on plant community diversity through the introduction or spreading of regulated weeds and non-native invasive species, dust deposition, and edge effects. The removal of vegetation, during right-of-way clearing, and the creation of new forest edges along a disturbance zone may result in changes to forest vegetation communities adjacent to the right-of-way. Increased solar radiation exposure and a change in the microclimate along these edges may cause changes in plant community understory composition and structure. Species that prefer shaded and moist conditions may decrease in abundance while species that prefer dry conditions may increase. A reduction in growth or viability of certain plant species adjacent to transmission rights-of-way has been found in past studies. Edge effects can extend on average 20 m and up to 250 m in boreal forest ecosystems ((Harper, Macdonald, and Burton, et al. 2005); (Harper, Macdonald, and Mayerhofer, et al. 2015)). Regulated weeds and non-native species may cause changes in the upland native vegetation communities by out-competing native species and thus changing community structure from within 30 m of the PDA out to 1,000 m (Kembel et al. 2008; Henderson 2011; Rai and Singh 2020).

Operation

Following construction, the right-of-way will be reclaimed or left for natural regeneration. However, activities including inspection patrols, maintenance work, vegetation management, and the associated use of vehicle and equipment will continue to introduce pathways through which project effects on vegetation community diversity and function can occur through the operations phase.

Throughout operations, native vegetation communities will be maintained with a different community structure. Low vegetation will be allowed to recover, while vegetation management will involve periodic removal of regrown trees and shrubs not conducive to safe and reliable operation of the transmission line. The composition of retained low shrubs, forbs, graminoids and non-vascular plants may be changed from their natural state due to altered light, moisture, and temperature conditions. Shade tolerant species may decrease in abundance and light tolerant species may increase. Also, ecosystem functions could be altered as there will be fewer larger trees sequestering carbon and intercepting rainfall. During project engagement, the potential loss of carbon sinks and the carbon-capturing ability due to a reduction in forest were concerns shared by the public.

The use of vehicles and equipment for inspection, maintenance, and vegetation management through operations and decommissioning will continue to introduce pathways for indirect effects on vegetation community diversity through the potential introduction and spread of regulated weeds and non-native invasive species. Any increase in use of the right-of-way by recreational vehicles through operations creates a similar pathway.

Decommissioning

During decommissioning, the removal of transmission infrastructure is likely to result in temporary direct loss and alteration of the re-established vegetation community types along the PDA in the vicinity of tower locations because ground disturbance will be necessary to remove the infrastructure. Rehabilitation activities may restore vegetation community diversity back towards the original pre-construction state over time, acknowledging that certain potential effects such as the introduction or spread of non-invasive plant species or regulated weeds may not be reversible if they are to occur.

7.4.1.3 Change in vegetation species diversity

For the purposes of this assessment, a change in vegetation species diversity includes changes to the abundance and distribution of specific upland and wetland vegetation species including species of conservation concern and traditional use plants important to First Nations peoples and Red River Métis citizens.

The effect pathways through which the project has the potential to change vegetation species diversity include:

- Direct loss or alteration of plant species of conservation concern and/or traditional use plants from vegetation clearing, ground disturbance, and vegetation maintenance.
- Indirect loss of plant species of conservation concern and/or traditional use plants from the introduction or establishment of regulated weeds and non-native invasive species

The project activities that may affect change in vegetation species diversity are consistent with those that may affect change in vegetation community diversity as discussed in Section 7.4.1.2.

Analytical assessment techniques

Change to species diversity are assessed by evaluating potential changes to species of conservation concern and traditional use plants. Changes to known species of conservation concern occurrences are quantified and alteration of supporting cover types from the introduction and spread of regulated weeds and non-native invasive plant species are qualitatively considered. Changes to traditional use plants are assessed by quantifying the change in supporting cover types and qualitatively estimating changes to cover type conditions from the spread of regulated weeds and non-native invasive plant species.

Species of conservation and concern as well as non-native and invasive species were recorded during site visits. However, no private land access was available at the time of the surveys. Observations were made mainly along roadsides.

Construction

During construction, plant species can be affected by vehicle and equipment use, right-of-way clearing, ground disturbance at tower installation locations, marshalling/fly yard and access development if not confined entirely to pre-disturbed areas, and clean-up and demobilization.

Clearing the right-of-way involves removal of trees and shrubs to ground level. Other vegetation ground cover including low shrubs, forbs, and graminoids, may also be removed or damaged during ground disturbance. Therefore, clearing the right-of-way may result in the direct loss or alteration to the number and spatial distribution of species of conservation concern and traditional use plants present within the PDA.

The community type that will experience the greatest direct loss or alteration is the forested community type due to the complete removal of trees along the PDA, therefore species of conservation concern and traditional use plants most prevalent in forested areas are anticipated to be most affected by the project.

Vehicle and equipment use also may crush or damage species of conservation concern and traditional use plants that are not removed entirely during right-of-way clearing.

Indirectly, species of conservation concern and traditional use plants adjacent to the PDA could be lost or disturbed by the potential introduction or establishment of regulated weeds and non-native invasive species.

Vegetation clearing, ground disturbance and alteration of environmental conditions from the removal of trees and tall shrubs will increase opportunities for noxious weeds and non-native invasive species to establish and spread in the PDA and LAA.

Competition from weeds and non-native invasive species may change the abundance and distribution of plant species of conservation concern and traditional use plants with effects extending into the LAA.

Development of the right-of-way may affect indirectly affect understory species that favor growth under a forested canopy due to changes in light and moisture conditions that may be less (or more) hospitable to certain species.

Operation

During operations, low vegetation will be allowed to recover, while regenerating trees and tall shrubs will be controlled through periodic vegetation management activities to maintain a vegetation at a height allowing for safe electrical line operation. This will sustain effects of the project on species of conservation concern and traditional use species that are dependent on forested habitat through the periodic direct removal of trees and shrubs.

The use of vehicles and equipment for inspection, maintenance, and vegetation management through operations and decommissioning will continue to introduce potential pathways for indirect effects on species diversity through the potential introduction and spread of regulated weeds and non-native invasive species. Any increase in use of the right-of-way by recreational vehicles through operations creates a similar pathway.

The application of herbicides during vegetation management is an area of concern shared through engagement on this project and past projects. Common concerns related to herbicides include perceived negative effects of herbicide use on the quality of traditional use plants and on other components of the environment including waters and wildlife habitat. This effect is discussed further in Chapter 9.0 (Harvesting and important sites).

In non-agricultural areas, Manitoba Hydro uses an integrated vegetation management approach involving both mechanical techniques and herbicide application. Manitoba Hydro's goal for this approach is to establish a self-sustaining, low-growing plant community along the right-of-way consisting of bushes and shrubs that would out-compete tree seedlings for available light, nutrients and water and hinder the growth of trees that could threaten the security and operation of the transmission line.

Herbicides used by Manitoba Hydro on rights-of-way are formulated to target woody vegetation and broad-leafed plants while leaving grasses largely unaffected. In contrast, the use of mechanical equipment or manual clearing is generally non-selective and removes beneficial low-growing plants in addition to trees.

Manitoba Hydro considers that selective herbicide application is a more effective means of controlling fast-growing trees while encouraging bushes and shrubs to re-establish in the right-of-way, than the use of mechanical equipment or manual clearing (Manitoba Clean Environment Commission 2013). Over time, developing healthy communities of bushes and shrubs, coupled with the selective use of herbicides, decreases the number of tall fast-growing trees within the right-of-way. This, in turn, decreases the need for regular application of herbicide and could increase the time between required herbicide treatments to periods of 15 years or more (Manitoba Clean Environment Commission 2013).

In addition to the planned limited and infrequent use of herbicides, Manitoba Hydro has established several other herbicide application practices that limit the potential for herbicides to enter the food chain and alter the quality of traditional foods. These include not treating environmentally sensitive sites (ESSs) specifically identified as important for traditional use plant harvesting with herbicides. The project's operational environmental protection plan (Section 18.7.4.2) indicates where and when herbicides are applied.

Decommissioning

During decommissioning, the removal of transmission infrastructure and associated vehicle and equipment use is likely to result in temporary direct loss and alteration of re-established vegetation along the PDA, particularly in the vicinity of tower locations. Rehabilitation activities may restore species diversity back towards the original preconstruction state over time, acknowledging that certain potential effects such as the introduction or spread of non-invasive plant species or regulated weeds may not be reversible if they are to occur.

7.4.2 Mitigation measures

This section describes the mitigation measures identified to minimize effects on vegetation and wetlands.

7.4.2.1 Mitigation for change in landscape intactness

Potential project effects on landscape intactness have been reduced through the transmission line routing process, which identified ecological reserves, wildlife management areas, park reserves, traditional use planning areas, national and provincial parks, provincial forests, and land trusts as areas of least preference and considered forested areas and wetlands as key factors influencing routing under the natural perspective (Appendix A).

The FPR avoided alternative route segment 1, which would have resulted in the loss of a greater area of forest and the disruption of an area of wetland. The FPR also avoided preferred route segment 4, which would have intersected approximately 2.33 acres of oak forest stand. Concerns with direct impacts to wetlands and the avoided stand of oak were shared during Round 1 of project engagement.

In addition to where the transmission line was routed, Manitoba Hydro will implement the following measures to reduce effects on landscape intactness:

- The development of an access management plan, which considers the use of existing access routes where possible to further reduce fragmentation effects from the project during construction.
- Contractors will be restricted to established roads, trails, and cleared construction areas in accordance with the access management plan.
- Trees will be felled toward the middle of rights-of-way or cleared areas to avoid damaging standing trees.
- Grubbing will be limited within the right-of-way to reduce root damage, except at tower foundation sites and centerline trail.
- 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.
- Windrows of grubbed materials will be piled at least 15 m from standing timber.
- Danger trees will be flagged or marked for removal using methods that do not damage soils and adjacent vegetation.

7.4.2.2 Mitigation for change in vegetation community diversity and function

Potential project effects on vegetation community diversity and function have been reduced through the transmission line routing process, which considered forested areas and wetlands as well as considering ecological reserves, wildlife management areas, park reserves, traditional use planning areas, national and provincial parks, provincial forests, and land trusts as areas of least preference (Appendix A).

In addition to where the transmission line was routed, Manitoba Hydro will implement the following measures to reduce effects on vegetation community diversity and function:

- Rights-of-way will be cleared when the ground is frozen 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.

- 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.
- Environmental protection measures for working in and around wetlands will be reviewed with the contractor and employees prior to commencement of any construction activities.
- Grading will be directed away from wetlands. Stockpiled materials from grubbing will not block natural drainage patterns.
- Temporary berms, cross ditches or silt fences will be installed between wetlands and disturbed areas when deemed necessary by the environmental officer. Subsoil and topsoil material will be replaced, and pre-construction contours and drainage patterns will be re-established within wetland boundaries as soon as possible following construction.
- All equipment must arrive at the right-of-way or project site clean and free of soil or vegetation debris.
- Large areas identified as having invasive plant and non-native weed species occurrences prior to the start of construction will be mapped. Weed control along access roads and trails will be conducted in accordance with the Rehabilitation and Invasive Species Management Plan (Section 18.7.5.6).
- 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 Weed Act*) will be followed. Weed control along access roads and trails and marshalling/fly yards will be conducted in accordance with the Rehabilitation and Weed Management Plan.
- Disturbed areas along transmission line rights-of-way will be rehabilitated in accordance with the Rehabilitation and Invasive Species Management Plan.
- The Rehabilitation and Invasive Species Management Plan will include objectives for the restoration of natural conditions, wildlife habitat and aesthetic values, and for erosion protection, sediment control, non-native and invasive plant species management, as required.

Many of the mitigations identified to reduce effects on landscape intactness (Section 7.4.2.1) are also relevant to the reduction of effects on vegetation community diversity and function.

7.4.2.3 Mitigation for change in vegetation species diversity

Potential project effects on vegetation species diversity have been reduced through the transmission line routing process, which considered forests, wetlands, published information about species of conservation concern, and feedback shared during project engagement, including information about specific traditional use plant species in the area.

In addition to relevant mitigations identified to reduce effects on vegetation community diversity and function (Section 7.4.2.2), Manitoba Hydro will implement the following measures to reduce effects on vegetation species diversity:

- Species at risk and critical habitat will be protected in accordance with provincial and federal legislation and provincial and federal guidelines. A 30 m setback distance will be applied to known species at risk.
- If previously unidentified plant species at risk are found on the right-of-way prior to or during construction, the occurrences will be flagged for avoidance.
- Final tower siting will avoid confirmed locations of species of conservation concern and traditional use plants, where possible.
- If listed plant species are identified and avoidance is not possible, the regulators will be contacted to determine the most appropriate mitigation action. This could include harvesting seed from the PDA, salvaging and transplanting portions of sod, collecting cuttings or transplanting whole plants.
- ESSs, such as specific locations of traditional use plants identified as important harvesting locations, will be identified, and mapped prior to clearing, and are outlined in the Construction Environmental Protection Plan (Section 18.7.4.1).
- Setbacks, buffers, and sensitive sites along the right-of-way (where applicable) 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.

7.4.3 Characterization of residual effects

This section describes the residual project effects to vegetation and wetlands predicted to remain after the application of mitigation measures. Table 7-7 describes the factors used to characterize the residual effects on vegetation and wetlands.

7.4.3.1 Residual effect on landscape intactness

Predicted residual effects on landscape intactness following the implementation of mitigation measures are described below.

During construction, there will be a direct loss of approximately 33 ha of forest because of clearing the right-of-way, reflecting a 2.4% reduction in forest cover in the LAA (Table 8-4).

The development of the right-of-way will increase the density of linear features in the RAA by 1.4% from 1.015 km/km^2 to 1.029 km/km^2. In addition, no core areas greater than 200 ha will be changed by the project.

The decrease in intact vegetation may be greater if access development or marshalling yards require additional clearing.

During operations, the increase in linear density and loss of intact forest that results from construction will be sustained as the result of vegetation management activities along the PDA. Windfall adjacent to the PDA contribute a small additional decrease in landscape intactness in the few years following clearing of the right-of-way.

During decommissioning, landscape intactness will be restored over time as disturbed areas are rehabilitated.

Following the implementation of mitigation measures, residual effects for change in landscape intactness are characterized as follows:

- Direction: adverse during construction and operations
- Magnitude: low; a measurable change in native vegetation communities but it is unlikely to affect sustainability in the LAA
- Geographic extent: PDA; may extend to the LAA if marshalling/fly yards cannot be entirely confined to pre-developed areas or if windfall occurs during operations.
- Duration: long-term
- Frequency: single event during construction (clearing), continuous throughout operations
- Reversibility: reversible following decommissioning and reclamation

7.4.3.2 Residual effect on vegetation community diversity and function

Predicted residual effects on vegetation community diversity and function following mitigation are described below.

During construction, a direct loss or alteration of native upland and wetland vegetation communities in the PDA will occur because of vegetation clearing and ground disturbance related to construction activities. The predominantly affected landcover types along the PDA will be range and grass land (27.164 ha) and deciduous forest (26.451 ha), which together account for over 70% of the PDA (Table 7-3). No effects to provincially protected ecosystems (alvar, tall grass prairie) are expected.

Throughout operations, the types of vegetation communities along the PDA will differ from the pre-project state. Most greatly affected, will be areas originally supporting forest cover because the forest community types are least compatible with safe and reliable transmission line operation and are most greatly altered by vegetation management activities.

Based on experience with past transmission line projects through agricultural and forested landscapes, it has been observed that, following mitigation, introduction and spread of non-native invasive plant species may occur. With some previously developed transmission line projects, an elevated abundance of non-native invasive species has been observed on developed sites along the rights-of-way as compared to adjacent undeveloped sites.

Within the LAA, this risk is anticipated to be lower in forested areas than in agricultural areas. Although non-native species can compete with native species, few weed species can invade mature forest and abundance is typically low (Sumners and Archibold 2007).

Based on a qualitative assessment of potential effects on wetland vegetation, the project is not anticipated to affect wetland function or benefit due to avoidance of wetlands and riparian habitat through the transmission line routing process and the care taken to avoid indirect effects to wetlands outside the PDA through the application of mitigation measures.

During decommissioning, native vegetation will be restored over time as disturbed areas are rehabilitated, recognizing that restoration efforts may not exactly duplicate the original state of cover vegetation prior to development of the project.

Following the implementation of mitigation measures, residual effects for change in vegetation community diversity and function are characterized by the following:

- Direction: adverse
- Magnitude: low
- Geographic extent: LAA for potential edge effects
- Duration: long-term
- Frequency: single event during construction (clearing) and decommissioning (ground disturbance required to remove towers), irregular events throughout operations
- Reversibility: reversible

7.4.3.3 Residual effect on vegetation species diversity

Predicted residual effects on vegetation species diversity following mitigation are described below.

According to provincial sources, there are 132 plant species of conservation concern within the Interlake Plain Ecoregion (Manitoba Government 2024a) including 11 species listed under either ESEA, SARA, or COSEWIC (Table 7-5): Rough Agalinis (*Agalinis aspera*), Gattinger's Agalinis (*Agalinis gattingeri)*, Small White Lady's-slipper (*Cypripedium candidum*), Black Ash (*Fraxinus nigra*), Gastony's Cliffbrake (*Pellaea gastonyi*), Western Prairie Fringed Orchid (*Platanthera praeclara*), Riddell's Goldenrod (*Solidago riddellii*), Great Plains Ladies'-tresses (*Spiranthes magnicamporum*), Western Silvery Aster (*Symphyotrichum sericeum*), Golden-eye Lichen (*Teloschistes chrysophthalmus*), and Culver's root (*Veronicastrum virginicum*).

More specific to the project area, a MB CDC search provided that four species of conservation concern have been recorded within a 5 km radius of the PDA including southern milkvetch (*Astragalus australis*), spikenard (*Aralia racemose*), hairy Bugseed (*Corispermum villosum*), and ram's-head lady's-slipper (*Cypripedium arietinum*) with southern milkvetch having been recorded within the PDA.

During project engagement, Manitoba Hydro heard about the presence of certain traditional use plants along and adjacent to the PDA, including sage, wild raspberry, cranberry, juniper, and mushrooms. Wetlands and forests were both shared to support traditional use plants in the study area.

Within the PDA, these species will be directly affected (i.e., lost or disrupted) by the project. Effects will be most pronounced during construction, but there will also be both ongoing and periodic effects through operations which will be experienced to different magnitudes by different species.

Additional undocumented species of conservation concern and traditional use plants may also be present in the PDA, but information collected to date indicate it is unlikely that any protected plant species are present.

During decommissioning, native vegetation will be restored over time as disturbed areas are rehabilitated, recognizing that restoration efforts may not exactly duplicate the original state of cover vegetation prior to development of the project.

Following mitigation, residual effects for change in vegetation species diversity are characterized by the following:

- Direction: adverse

- Magnitude: low; project effects are not predicted to affect sustainability in the LAA and there are no predicted effects on listed species
- Geographic extent: LAA for edge effects
- Duration: long-term
- Frequency: single event during construction (clearing) and decommissioning (ground disturbance required to remove towers), irregular events throughout operations
- Reversibility: reversible

7.4.3.4 Summary of residual effects on vegetation and wetlands

Table 7-8 characterizes the residual effect on vegetation and wetlands.

Table 7-8: Project residual effects on vegetation and wetlands

Residual Effects Characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Change on landscape intactness						
Construction	A	L	PDA-LAA	LT	S	R
Operation	A	L	PDA-LAA	LT	C	R
Decommissioning	P	L	PDA-LAA	LT	C	R
Change in vegetation community diversity and function						
Construction	A	L	LAA	LT	S	R
Operation	A	L	LAA	LT	IR	R
Decommissioning	A	L	LAA	LT	S	R/IR
Change in vegetation species diversity						
Construction	A	L	LAA	LT	S	R
Operation	A	L	LAA	LT	IR	R
Decommissioning	A	L	LAA	LT	S	R/IR

7.4.4 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably near future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

For vegetation and wetlands, both conditions are met. The project is anticipated to have adverse residual effects and each of the residual effects could interact with residual effects of other past, present, or reasonably foreseeable future physical activities.

Native vegetation in the RAA has been reduced from its natural state over time by past land use activities, primarily agricultural development, settlement, and infrastructure such as roads, rail, and electrical transmission lines and stations. These developments have increased fragmentation and changed vegetation communities and species diversity over time.

7.4.4.1 Project residual effects likely to interact cumulatively.

Table 7-9 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact vegetation and wetlands. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is conducted.

Table 7-9: Potential cumulative effects on vegetation and wetlands

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Change in landscape intactness	Change in vegetation community diversity and function	Change in vegetation species diversity
Existing/ongoing projects and activities			
Domestic Resource Use (hunting, trapping, fishing)	-	-	✓

Table 7-9: Potential cumulative effects on vegetation and wetlands			
Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Change in landscape intactness	Change in vegetation community diversity and function	Change in vegetation species diversity
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	✓	✓
Commercial resource use (includes fishery and forestry)	✓	✓	✓
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	✓	✓	✓
Hydroelectric transmission lines	✓	✓	✓
Potential future projects and activities			
Crystal Spring Colony domestic wastewater lagoon	✓	✓	✓
Diageo Hydroelectricity Station	-	-	✓
King's Park Phase 2	✓	✓	✓
✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects. – = Interactions between the residual effects of other projects and those of the project residual effects are not expected.			

Ongoing and future projects in the RAA have the potential to interact cumulatively with the project's residual effects on vegetation and wetlands if their plans include development in areas of native vegetation or ground disturbance as these activities will contribute to changes in landscape intactness, vegetation community diversity and function, and/or vegetation species diversity. Since all projects identified are anticipated to involve these types of physical activities (i.e., effects pathways), the project is anticipated to interact cumulatively with all projects and activities in Table 7-9 in relation to effects to vegetation and wetlands.

7.4.4.2 Cumulative effects to landscape intactness

Pathways for cumulative effect

Ongoing commercial resource use, infrastructure, hydroelectricity lines, the future Crystal Spring Colony domestic wastewater lagoon project, and the King's Park Phase 2 residential subdivision development may interact cumulatively with project effects to landscape intactness because all are expected to involve continued or new disruption of areas of intact vegetation and/or increase linear disturbance. For the Crystal Spring Colony domestic wastewater lagoon, it is estimated that the development may involve clearing up to 8 ha of deciduous forest, based on desktop review of land cover in the southeast portion of SE 28-18-3 EPM, where the lagoon is proposed. For King's Park Phase 2, the 23 planned residential lots overlap a treed area approximately 4.5 ha in size, of which a potion would require clearing to allow for the construction of homes. However, the location is adjacent to properties that are already cleared and/or developed for residential and agricultural purposes.

It is not anticipated that the project will interact cumulatively on landscape intactness with ongoing domestic resource use or recreational activities because these ongoing physical activities on their own are not assumed to involve a clearing of vegetation that would increase fragmentation. The project is also not anticipated to interact cumulatively on landscape intactness with the future Diageo hydroelectricity station because it is planned to be developed on land that has already been predominantly cleared of native vegetation.

Mitigation measures

Project mitigation measures, including avoiding clearing additional intact vegetation to establish access or marshalling/fly yards, where possible, and reclamation of temporary disturbances will help reduce project residual effects to landscape intactness. Other future projects are expected to implement similar standard mitigation measures and avoid or minimize the loss of intact native vegetation as appropriate.

Residual cumulative effect

Project routing reduced the potential change in landscape intactness anticipated to result from the project. Many of the ongoing projects that may interact cumulatively with residual project effects on landscape intactness are in or alongside previously disturbed, modified habitats and are not likely to intersect areas of intact native vegetation.

With the implementation of mitigation measures identified for landscape intactness, this project, in combination with other ongoing and future projects, is predicted to have minor contributions to cumulative effects on landscape intactness.

7.4.4.3 Cumulative effects to vegetation community diversity and function

Pathways for cumulative effect

Ongoing recreational activities, commercial resource use, infrastructure, and hydroelectric transmission lines, and the future Crystal Spring Colony domestic wastewater lagoon, and the King's Park Phase 2 residential subdivision development may interact cumulatively with project effects to vegetation community diversity and function because each are expected to involve clearing or ongoing of vegetation management altering that state of native vegetation, and/or activities that may introduce or influence the spread of non-native invasive plants or regulated weeds such ground disturbance and vehicle and equipment use, including the use of recreational vehicles.

Mitigation measures

Project mitigation measures, including equipment arriving clean and free of soil or vegetation debris, vegetation clearing during dry or frozen conditions, and reclamation of temporary disturbances will help reduce project residual effects to native vegetation. Other future projects are expected to implement similar standard mitigation measures and avoid or minimize effects to native vegetation as appropriate.

Residual cumulative effect

With the implementation of mitigation measures identified for vegetation community diversity and function, this project, in combination with other ongoing and future projects, is predicted to have small contributions to cumulative effects that will not affect long-term sustainability of native vegetation types in the assessment area.

7.4.4.4 Cumulative effects to vegetation species diversity

Pathways for cumulative effect

Ongoing recreational activities, commercial resource use, infrastructure, and hydroelectric transmission lines, and the future Crystal Spring Colony domestic wastewater lagoon, Diageo hydroelectricity station, and the King's Park Phase 2 residential subdivision development may interact cumulatively with project effects to vegetation species diversity because each are expected to have the potential to remove, damage, or directly alter the abundance or quality (real or perceived) of species of conservation concern and traditional use plants. The pathways through which these potential residual effects are expected to occur include clearing or ongoing of vegetation management, and/or activities that may introduce or influence the spread of non-native invasive plants or regulated weeds such ground disturbance and vehicle and equipment use, including the use of recreational vehicles.

Given that the identified ongoing and future projects and activities are located within this project's RAA, there is potential for many of the same species to be affected.

Mitigation measures

In addition to mitigation measures relevant to vegetation community diversity and function (Section 7.4.2.2), conducting surveys and undertaking engagement to identify species of conservation concern and traditional use plants prior to construction will help reduce project residual effects to specific native vegetation species. Other future projects are expected to implement similar standard mitigation measures and avoid or minimize effects to native vegetation as appropriate.

Residual cumulative effect

With the implementation of mitigation measures identified for vegetation species diversity, this project, in combination with other ongoing and future projects, is predicted to have small contributions to cumulative effects that will not affect long-term sustainability of specific species of conservation concern and traditional use plants in the assessment area.

7.4.5 Determination of significance

With mitigation and environmental protection measures, the residual effects on vegetation and wetlands are predicted to be not significant.

With mitigation and environmental protection measures, the cumulative effects on vegetation and wetlands are predicted to be not significant.

The project is not anticipated to threaten the long-term persistence or viability of upland or wetland vegetation communities or species, nor is the project anticipated to result in the complete removal of a wetland function from the PDA, LAA, or RAA.

7.4.6 Prediction confidence

Prediction confidence in the assessment of effects on vegetation and wetlands is moderate to high, in part due to demonstrated success in implementing effective mitigation measures in other recent transmission projects (Manitoba Hydro 2015).

Vegetation types were mapped at a scale allowing identification of individual cover types with characteristic vegetation structure and composition. However, the mapping did not account for the age of the land cover types (e.g., forest stands) based on fire history. The mapping also supported assessment of landscape intactness and community diversity, which informed quantification of changes in landscape intactness. Field reconnaissance allowed for preliminary first-hand observations of vegetation types within the study area. However, due to the timing of the field reconnaissance (early season), the vegetation types in the study area could not be described in detail.

Effects conclusions for traditional use plants may be underestimated because limited feedback was shared during project engagement about specific traditional use plants or locations of concern and there are few published reports on Traditional Knowledge that overlap the study area.

Other limitations with data include the timing of preliminary field reconnaissance and imperfect detection of species of conservation and traditional use plants in the field.

Further, the magnitude of effects to plant species diversity can be difficult to assess because certain species may be adversely affected while other species may be positively affected by altered conditions (e.g., light) resulting from the project.

7.4.7 Follow-up and monitoring

Due to confidence in predictions and monitoring results from Manitoba Hydro's other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, if environmental inspections identify unexpected effects, monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the EPP (see Chapter 18.0).

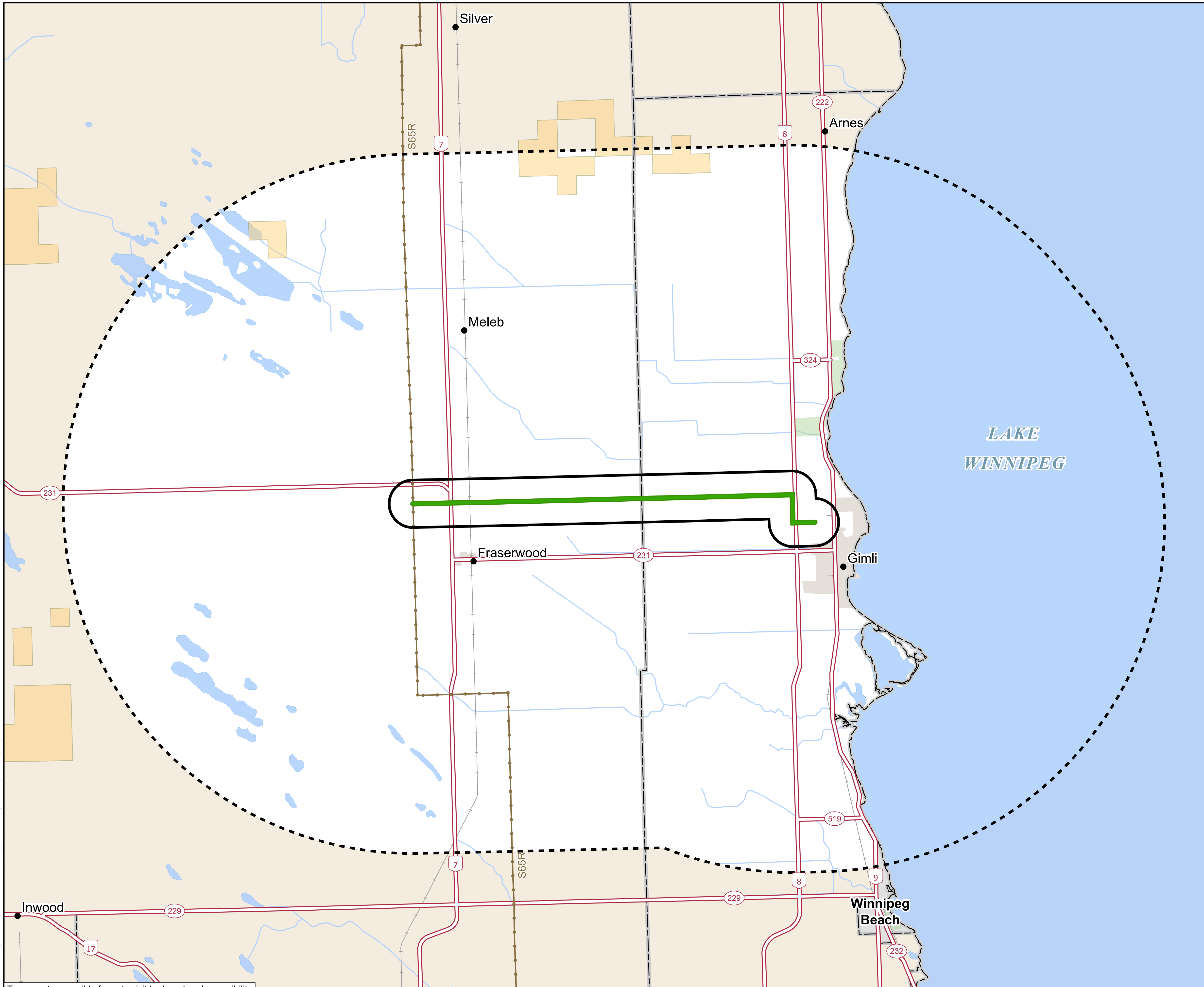
7.4.8 Sensitivity to future climate change scenarios

Effects of climate change on vegetation and wetlands are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding; (Section 15.1),).

Increases in temperature may cause changes to the frequency and impact of wildfires. These changes have the potential to significantly alter vegetation composition and age distribution.

With the increase in flooding that may result from climate change, wetland vegetation communities may experience increased pressure. Retaining and restoring wetland areas provide an efficient and effective means of resiliency to flooding, providing flood mitigation benefits that are disproportionately large in relation to their size, not only in collecting and storing water, but also reducing erosion, drought intensity, and impacts of extreme heat on water quality (Ontario Nature 2023).

During project engagement, concerns were shared about how the project may lessen the area's resiliency to climate change through reducing areas of vegetation and wetlands that capture carbon.



To request accessible formats visit hydro.mb.ca/accessibility

Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- Final Preferred Route

Assessment Area

- Vegetation & Wetlands, Wildlife & Wildlife Habitat, and Harvesting & Important Sites LAA (PDA Buffer 1km)
- Vegetation & Wetlands, Wildlife & Wildlife Habitat, and Harvesting & Important Sites RAA (PDA Buffer 15km)

Existing Infrastructure

- Existing ≥69kV Transmission Line

Landbase

- Railway
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Urban Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

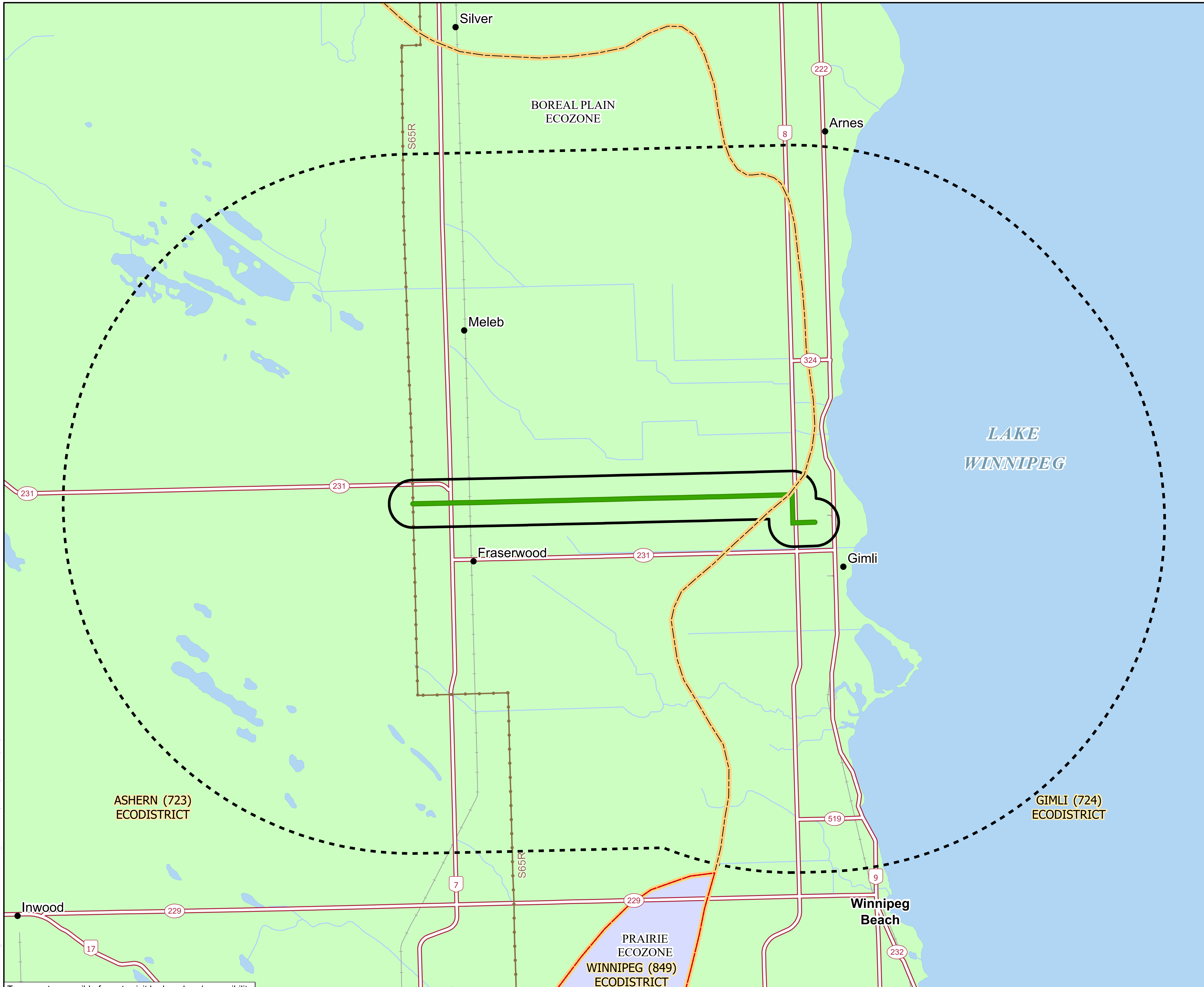
0 3.5 7 Kilometres
0 2 4 Miles

1:160,000

Spatial Boundaries for Vegetation & Wetlands, Wildlife & Wildlife Habitat, and Harvesting & Important Sites

Draft/Confidential: For Discussion Purposes Only

Map 7-1



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Vegetation LAA (PDA Buffer 1km)
- Vegetation RAA (PDA Buffer 15km)

Ecoregions and Ecodistricts
- Interlake Plain
- Lake Manitoba Plain
- Ecodistrict
- Ecozone

Existing Infrastructure
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Provincial Highway/Road
- First Nation

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

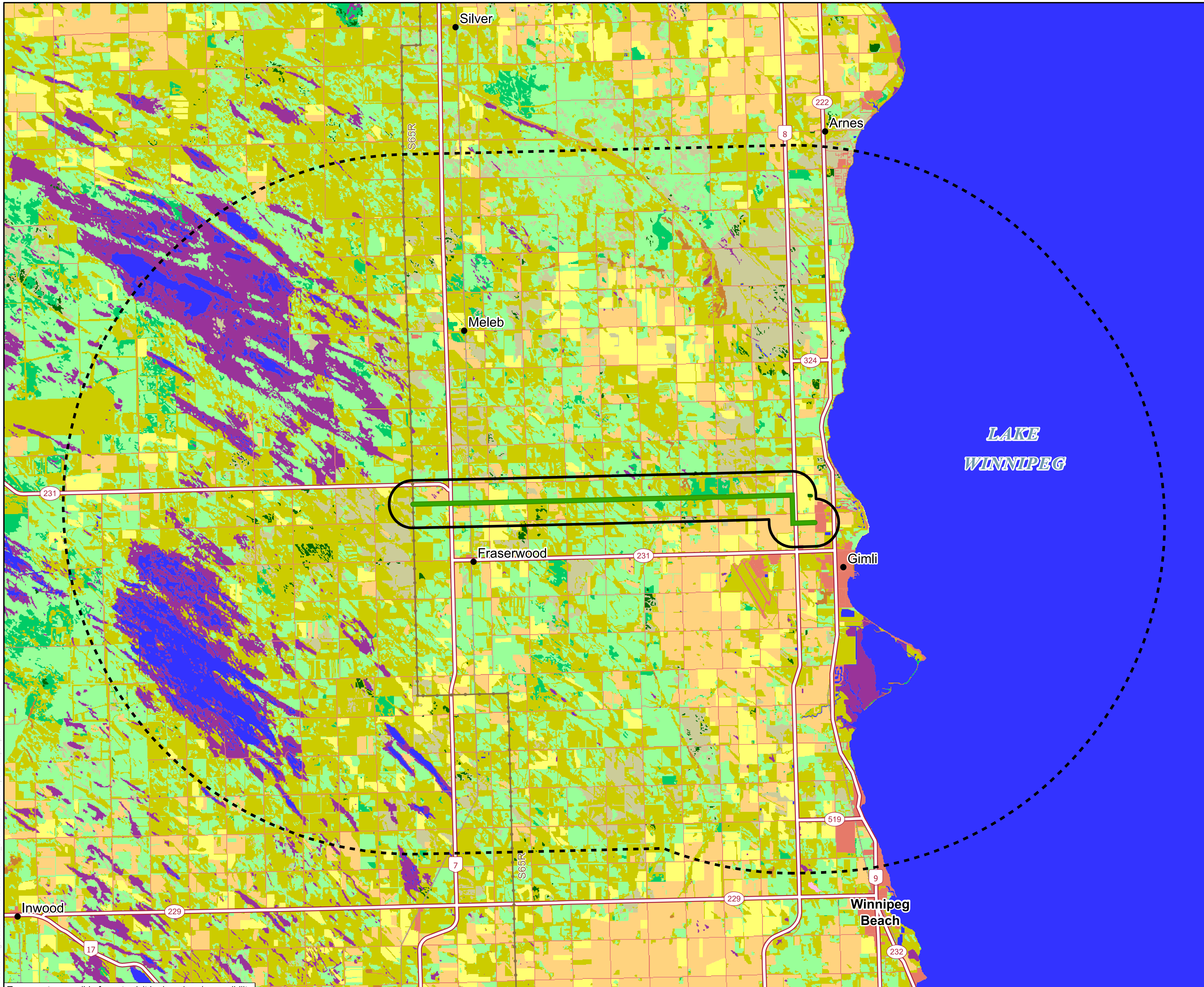
0 3.5 7 Kilometres
0 2 4 Miles

1:160,000

Ecozones, Ecoregions, and Ecodistricts

Draft/Confidential: For Discussion Purposes Only

Map 7-2



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- Final Preferred Route

Assessment Area

- Vegetation LAA (PDA Buffer 1km)
- Vegetation RAA (PDA Buffer 15km)

Land Cover

- Agricultural Cropland
- Bare Rock, Sand and Gravel
- Coniferous Forest
- Cultural Features
- Decidious Forest
- Forage Crops
- Forest Fire Burnt Areas
- Marsh and Fens
- Mixedwood Forest
- Open Decidious Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Existing Infrastructure

- Existing ≥69kV Transmission Line

Landbase

- Railway
- Provincial Highway/Road

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 3.5 7 Kilometres
0 2 4 Miles

1:160,000

Land Cover Classification

Draft/Confidential: For Discussion Purposes Only

Map 7-3

8.0 Wildlife and wildlife habitat

For this assessment, wildlife and wildlife habitat refers to animals (i.e., birds, mammals, terrestrial invertebrates, amphibians, and reptiles), and the natural environments where they live and thrive.

Wildlife are components of ecological cycles, provide economic benefits from hunting, guiding, and trapping, and provide a source of food and materials. Wildlife species in the vicinity of the project footprint include birds, small mammals, ungulates, reptiles, amphibians, and terrestrial invertebrates.

Wildlife and wildlife habitat was selected as a valued component (VC) because it is a critical part of a functioning ecosystem and plays a vital role in ecological and biological processes. Sustainable wildlife populations and intact wildlife habitat are often indicative of a healthy ecosystem since key biological processes and interactions must be in place for some key wildlife species to exist. Wildlife and wildlife habitat is important for recreational, social, economic, and cultural reasons.

8.1 Scope of the assessment

This chapter assesses the potential effects of project construction, operation, and maintenance, and decommissioning on wildlife and wildlife habitat. An assessment of cumulative effects on wildlife and wildlife habitat is also presented.

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the following:

- Change in wildlife habitat
- Change in wildlife mortality

8.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

8.1.2 Regulatory and policy setting

The following provincial laws, and associated regulations, policies, and guidelines, as well as Manitoba Hydro's policies were considered for assessing project effects wildlife and wildlife habitat.

8.1.2.1 Federal guidance

<u>Species at Risk Act (SARA)</u>

The SARA provides protection for species at risk in Canada. The legislation provides a framework to facilitate recovery of species listed as threatened, endangered, or extirpated and to prevent species listed as special concern from becoming threatened or endangered. Species at risk and their habitats are protected under *SARA* which prohibits:

3) the killing, harming, or harassing of endangered or threatened species at risk (sections 32 and 36); and
4) the destruction of critical habitat of and endangered or threatened species at risk (sections 58, 60, and 61).

A portion of the project footprint lies within designated critical habitat for the red-headed woodpecker in Canada.

<u>Migratory Birds Convention Act</u>

The Migratory Birds Convention Act and associated Migratory Birds Regulations provide for the protection of migratory birds, their eggs, and their nests. It applies to most native migratory bird species.

In addition, the regulations prohibit the destruction of pileated woodpecker nest cavities year-round unless they are deemed abandoned and unoccupied for a minimum of 36 months. Manitoba Hydro has developed a process for the identification and protection of pileated woodpecker nest cavities in trees and wood poles to comply with this legislation.

8.1.2.2 Provincial guidance

<u>The Endangered Species and Ecosystems Act (ESEA)</u>

The ESEA provides protection to threatened and endangered ecosystems and plant and animal species at risk in Manitoba. The ESEA facilitates the management and development of recovery strategies for threatened, endangered, and extirpated or extinct species to prevent further declines and promote recovery. ESEA-listed species are those that "are of ecological, educational, aesthetic, historical, medical, recreational, and scientific value to Manitoba and the residents of Manitoba."

<u>The Wildlife Act</u>

The Wildlife Act provides general provisions for regulating the activities relating to the take and trade of wild animals in Manitoba. A "wild animal" is defined as "an animal or bird of a species or type listed in Schedule A or declared by the regulations to be a wild animal", and includes select amphibian, reptile and mammal species and most bird species (including those not protected under the Migratory Birds Convention Act known to exist in Manitoba.

8.1.3 Consideration of engagement feedback

Project engagement (Chapter 5.0) actively sought to provide opportunities for concerned and interested parties to provide VC-related feedback about the project.

Engagement feedback indicated project-related concerns for wildlife and wildlife habitat including the following:

- Loss of wildlife habitat via right-of-way clearing
- Impacts to an eagle-nesting area near a potential termination point, north of the Diageo facility
- Disruption to wildlife sanctuary and biodiversity
- Impacts to red headed woodpecker and pileated woodpecker habitat in the western portion of the preferred route, east of PTH 7

8.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on wildlife and wildlife habitat, along with effects pathways and measurable parameters are outlined in Table 8-1.

Table 8-1: Potential effects, effects pathways, and measurable parameters for wildlife and wildlife habitat

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change in habitat	Direct and/or indirect loss or alteration of habitat due to vegetation clearing, ground disturbance, sensory disturbance and/or edge effects	Amount (ha) of wildlife habitat (forest) directly altered by the project, including for species of interest: • red-headed woodpecker • common nighthawk • eastern whip-poor-will Change in linear feature density (km/km^2)
Change in mortality risk	Direct change in mortality risk due to vegetation clearing activities, vehicle collisions, bird-wire collisions, human-wildlife conflicts, and indirect change in mortality risk due to predation	Total area (ha) of PDA that intersects wildlife habitat (i.e., forest) within the LAA. Change in habitat intactness (reduction in core areas greater that 200 ha)

8.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual environmental effects of the project on wildlife and wildlife habitat:

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of a 1-km buffer on either side of the final preferred route (Map 7-1), based on measurable effects of noise on wildlife (e.g., (Benitez-Lopez, Alkemade and Verweij 2010); (Shannon, et al. 2016)), while also considering maximum recommended setback distances for sensitive habitat features (Manitoba Conservation Data Centre 2024). This is also consistent with LAA boundaries used for other recent transmission line projects in Manitoba (Manitoba Hydro 2023).

Regional assessment area (RAA): includes the PDA and LAA and is a 15-km buffer of the final preferred route (Map 7-1) used to capture information on a broader scale and to provide regional context. A 15 km buffer is consistent with other recent transmission line projects in Manitoba (Manitoba Hydro 2023). The RAA is used to assess cumulative effects and the significance of project-specific effects on wildlife species (e.g., birds, mammals, amphibians, and reptiles). The RAA encompasses the home ranges or dispersal distances of most wide-ranging species potentially affected by the project, including black bear (*Ursus americanus*; 5 to 25 km^2 for female bears (Government of British Columbia 2001), white-tailed deer (*Odocoileus virginianus*; 89 km^2 [Lesage et al. 2000]), and non-migratory moose (*Alces Alces*; 97 km^2 (Hauge and Keith 1981).

The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects.

8.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on wildlife and wildlife habitat are based on the timing and duration of project activities as follows:

- Construction - four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line's design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

8.1.7 Residual effects characterization

Table 8-2 provides the definitions used to characterize the residual effects on wildlife and wildlife habitat.

Table 8-2: Characterization of residual effects on wildlife and wildlife habitat

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to wildlife and wildlife habitat relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a

Table 8-2: Characterization of residual effects on wildlife and wildlife habitat		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		direction detrimental to wildlife and wildlife habitat relative to baseline. **Neutral –** no net change in measurable parameters for wildlife and wildlife habitat relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**Change in Habitat**[1] **Negligible** – no measurable change in habitat for wildlife, including species at risk and species of conservation concern. **Low** – Project changes less than 10% of wildlife habitat in the LAA, or less than 5% of habitat for species at risk and species of conservation concern in the LAA **Moderate** – Project changes 10-20% of wildlife habitat in the LAA, or 5-10% of habitat for species at risk and species of conservation concern in the LAA. **High** – Project changes more than 20% of wildlife habitat in LAA, or more than 10% of habitat for species at risk and species of conservation concern in the LAA. **Change in Mortality Risk** **Negligible** – a measurable change in the abundance of wildlife in the LAA is not anticipated. **Low** – a measurable change in the abundance of wildlife in the LAA is not anticipated, although temporary local shifts in distributions in the LAA might occur.

Table 8-2: Characterization of residual effects on wildlife and wildlife habitat

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		Moderate – a measurable change in the abundance and/or distribution of wildlife in the LAA might occur, but a measurable change on the abundance of wildlife in the RAA is not anticipated. **High** – a measurable change in the abundance and/or distribution of wildlife in the RAA might occur.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA. **LAA –** residual effects extend into the LAA. **RAA –** residual effects extend into the RAA.
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –** the residual effect extends through to completion of post-construction reclamation. **Long-term -** the residual effect extends for the life of the project.
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously.
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation. **Irreversible –** the residual effect is unlikely to be reversed.

[1] Based on benchmarks used for other recent environmental assessments (i.e., Keeyask Hydropower Limited Partnership 2012); (Nalcor 2012); (Joint Review Panel 2014); (Manitoba Hydro 2015); (Manitoba Hydro 2023).

8.1.8 Significance definition

For this assessment, adverse residual effects on wildlife and wildlife habitat are considered significant if the proposed project:

- results in a threat to the long-term persistence or viability of a wildlife species in the RAA; and/or,
- results in effects that are contrary or inconsistent with the goals, objectives, and activities of recovery strategies, action plans, and management plans.

8.2 Existing conditions

Baseline information for this assessment was gathered through a detailed review of available desktop data including pertinent reports and peer-reviewed literature, federal and provincial databases, not-for-profit publications, and other data sources.

Information on existing conditions was also gathered through a vegetation survey within the LAA and engagement with Indigenous peoples, residents, and regulators.

For more detailed information about the vegetation field survey that took place and their findings, refer to the technical reports included in Appendix C.

The existing conditions described in this section focus on:

- occurrence, distribution, and habitat associations of wildlife
- species of conservation concern

8.2.1 Overview

The project RAA lies within the Boreal plains ecozone, located in the Ashern and Gimli Eco districts of the Interlake plain ecoregion (Smith *et al.* 1998). The region is underlain by limestone rock with well to imperfectly drained soils. The climate of the region consists of long, cold winters and short, warm summers. The mean annual precipitation ranges from slightly less than 500 to about 525 mm.

The land cover classification in the LAA consists predominantly of agricultural (60%) and forested land (34%). The agricultural land is a mixture of cultivated and pasture or rangeland. The pastures consist of mixed grasses and herbaceous vegetation, with sporadic shrub cover. Some pastures exist with little to no shrub cover. Shelterbelts or windbreaks between agricultural fields are composed of mixed deciduous tree species. The forested areas consist dominantly of trembling aspen (*Populus* *tremuloides*) with varying amounts of tall cover shrubs and shrubs along the forest edges. Mixed stands of trembling aspen with lesser amounts of white spruce (*Picea glauca*) are also present (see Appendix C).

Wetlands are uncommon in the LAA (0.2%). These are marshes surrounded by cultivated fields and or aspen stands. The marshes occasionally have little open water present and are dominated by tall grasses, cattails (*Typha sp.)* and other emergent reeds and bulrushes (see Appendix C).

8.2.2 Birds

Although native prairie is rare and not likely to be found in the RAA, cultivated, pasture, and range 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, such as America robin (*Turdus migratorius*), mourning dove (*Zenaida macroura*), bald eagle (*Haliaeetus leucocephalus*), and American crow (*Corvus brachyrhynchos*) (Artuso et. al 2014).

Wetlands can be used as nesting and foraging habitat for birds, including Canada goose (*Branta canadensis*), yellow rail (*Coturnicops noveboracensis*), least bittern (*Ixobrychus exilis*) and barn swallows (*Hirundo rustica*). There are no watercourses within the LAA (Willow Creek Integrated Watershed Plan 2012).

A noteworthy species found in the RAA is the pileated woodpecker (*Dryocopus pileatus*). As stipulated by the Migratory Birds Regulations of the Migratory Birds Convention Act, pileated woodpecker nest cavities are protected year-round unless deemed abandoned and unoccupied for a minimum of 36 months.

8.2.3 Mammals

The RAA supports a variety of mammal species that are widespread across Manitoba in natural habitat areas including forests, grasslands or rangelands, wetlands and have adapted to the agricultural land use. 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*) (Banfield 1974).

8.2.4 Terrestrial invertebrates

Terrestrial invertebrates include species living in the soil (e.g., nematodes, earthworms), on the ground (e.g., beetles, spiders), in the air (e.g., butterflies, moths, flies, bees), and within the vegetation canopy (spiders, aphids, beetles). Terrestrial invertebrates are ecologically important for their role as nutrient cyclers and decomposers (e.g., earthworms), as predators of pest species, as pollinators of flowering plants (e.g., bees) and as food for other animals (e.g., birds) (Manitoba Hydro 2012).

8.2.5 Amphibians and reptiles

Amphibians and reptiles generally prefer natural habitats such wetlands, forests, and grasslands. Other than the few wetlands and ditches adjacent to the municipal roads, there is only marginal habitat for amphibians or reptiles in the RAA. During winter months, amphibians are dormant and concentrated primarily in moist sites, specifically those located near or adjacent to watercourses and drainage ditches. Amphibians that may occur in 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*). 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 garter snake (*Thamnophis radix*), red-sided garter snake (*Thamnophis sirtalis parietalis*), and smooth green snake (*Opheodrys vernalis*) (Preston 1982) (Manitoba Hydro 2022).

8.2.6 Species of conservation concern

8.2.6.1 Birds

Eight species of conservation concern are known to inhabit the LAA (Manitoba Conservation Data Centre 2023). Yellow rail (*Coturnicops noveboracensis*), least bittern (*Ixobrychus exilis*), and western grebe (*Aechmophorus occidentalis*) prefer wetland habitats (Environment Canada 2013b, Environment Canada 2011, COSEWIC 2014b). The common nighthawk (*Chordeiles minor*) inhabits open land or forest clearings (Environment Canada 2016). The red-headed woodpecker (*Melanerpes erythrocephalus*) occurs in open deciduous forests and other sparsely treed habitats. It is the only species with designated critical habitat in the RAA (Map 8-1) (Environment and Climate Change Canada 2019). Eastern whip-poor-will (*Antrostomus vociferus*) breeds in sparse forests or forest edges, adjacent to open habitats required for foraging (Environment Canada 2015). Barn swallow (*Hirundo rustica*) traditionally nest on fissures in cliffs, rock overhangs, and caves, however in populated areas they prefer nesting in human-made structures such as buildings and bridges and forage over open spaces (COSEWIC 2021). Piping plovers' (*Charadrius melodus circumcinctus*) preferred habitat includes wide beaches; barrier island sandspits; or peninsulas in marine coastal areas (Environment Canada 2012) (Artuso *et al.* 2014).

8.2.6.2 Mammals

Among mammals, the mule deer (*Odocoileus hemionus*) is the only species of conservation concern that may occur in the project RAA (Manitoba Conservation Data Centre 2023).

Mule deer are heavier than white-tailed deer, with larger ears, and black tipped tail. They are found in habitats with early-stage plant growth in grassland vegetation communities with shrubs and forest (Banfield 1974). The project RAA is outside of the typical range of mule deer, which are typically found in the mountains, foothills, and plains of western North America and whose range extends to southeastern Manitoba (Nature Canada 2024, Canadian Biodiversity 2024).

8.2.6.3 Invertebrates

Species of conservation concern identified in the area include the monarch (*Danaus plexippus*), ashton cuckoo bumble bee *Bombus bohemicus*), and yellow-banded bumble bee *Bombus terricola*) RAA (Manitoba Conservation Data Centre 2023).

The yellow-banded bumble bee is listed by COSEWIC as Special Concern RAA (Manitoba Conservation Data Centre 2023). It is found in variety of habitats. The species is relatively abundant in the northern part of its range, including northern Manitoba. There have been recent declines of at least 34% in areas of southern Canada. Contributing factors may include pesticide use, habitat conversion, and pathogen spill over from managed bumble bee colonies (COSEWIC 2015).

The Ashton cuckoo bumble bee is listed as Endangered by SARA and COSEWIC RAA (Manitoba Conservation Data Centre 2023). The Ashton cuckoo bumble bee nests in various habitats such as montane meadows, mixed farmlands, urban areas, and open woodlands. The are generalist foragers and are associated with food plants flowering close to wooded and blueberry fields. It had an extensive range in Canada. Primary threats include decline of hosts (other bees), pesticide use, and the escape of non-native, pathogen-infected bumble bees from commercial greenhouses (COSEWIC 2014a).

The monarch butterfly is listed by SARA as Special Concern and COSEWIC as Endangered RAA (Manitoba Conservation Data Centre 2023). They rely on milkweed (*Asclepias syriaca*) for breeding habitat since their larvae feed solely on milkweed in Canada. Adult butterflies feed on a variety of wildflowers. Decline of the species is associated with degradation the Oyamel fir forests in central Mexico where these butterflies overwinter. Widespread use of pesticides is also a factor affecting the species and their breeding habitat (Environment and Climate Change Canada 2016).

8.2.6.4 Amphibians and Reptiles

The northern leopard frog is listed as Special Concern by SARA and COSEWIC RAA (Manitoba Conservation Data Centre 2023) due to population declines throughout most of western Canada. However, its population has rebounded since experiencing a sharp decline in the 1970's. The northern leopard frog uses water bodies that do not freeze solid during the winter; pools, ponds, marshes, and lakes for breeding; and moist upland meadows and native prairie during the summer (COSEWIC 2009).

The snapping turtle is listed as Special Concern by SARA and COSEWIC RAA (Manitoba Conservation Data Centre 2023). It prefers aquatic habitats with slow-moving water, a soft mud bottom, and dense aquatic vegetation, and use adjacent terrestrial habitats (Environment and Climate Change Canada 2020).

8.3 Project interactions with wildlife and wildlife habitat

Table 8-3identifies, for each potential effect, the physical activities that might interact with wildlife and wildlife habitat and result in the identified effect.

Table 8-3: Project interactions with wildlife and wildlife habitat

Project activity	Change in habitat	Change in mortality risk
Transmission Line Construction		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Access development	✓	✓
Right-of-way clearing	✓	✓
Marshalling / fly yards	✓	✓
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	✓	-
Implosive connectors	✓	-
Helicopter use	✓	-
Clean-up and demobilization	✓	✓
Transmission Line Operation		
Transmission line presence	✓	✓
Vehicle and equipment use	✓	✓
Inspection patrols	✓	✓

Table 8-3: Project interactions with wildlife and wildlife habitat		
Project activity	Change in habitat	Change in mortality risk
Other maintenance activities	✓	✓
Vegetation management	✓	✓
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓
Rehabilitation	✓	✓
Clean-up and demobilization	✓	✓
✓= Potential interaction – = No interaction		

Transmission tower construction, implosive connectors, and helicopter use are not expected to cause a change in mortality risk. Transmission tower construction will be conducted on previously cleared land and there are no pathways for tower construction to cause wildlife fatalities. Point of delivery activities do not require ground disturbance and are not expected to result in changes to habitat availability or mortality.

8.4 Assessment of project effects

While effects to wildlife and wildlife habitat could occur during construction, operation and maintenance, and decommissioning, they are anticipated to be most pronounced during construction and include the following:

- Change in habitat
- Change in mortality

8.4.1 Analytical assessment techniques

The general approach to assessing potential environmental effects on wildlife and wildlife habitat follows the sequence and methods outlined in Chapter 4.0.

Change in habitat was assessed by overlaying the PDA with existing land cover data to quantify how much wildlife habitat would be directly affected by the project and quantified by comparing direct changes in the amount of habitat available for each species to baseline conditions.

Indirect change in habitat (i.e., sensory disturbance) was assessed qualitatively as the area of reduced habitat effectiveness adjacent to the PDA. Indirect change in habitat due to edge effects and/or sensory disturbance are anticipated to occur within the LAA (i.e., up to 1 km from the PDA). Potential effects are considered as a whole, inclusive of all seasonal requirements for wildlife (e.g., calving season).

Change in mortality risk was assessed qualitatively through change in direct (i.e., total area of PDA that intersects forest, wetland, and rangeland habitat) and indirect (i.e., change in habitat intactness) parameters with potential to result in wildlife mortality through vehicle collisions, bird-wire collisions, human-wildlife conflicts, changes in predator-prey dynamics, and harvest pressure. The qualitative assessment included a combination of literature review, landscape assessment, and professional judgment to predict the mortality risks to wildlife.

8.4.2 Effects pathways

8.4.2.1 Change in habitat

Construction

During construction, vegetation clearing and grubbing of the right-of-way is the primary pathway for a direct and measurable change in wildlife habitat. Vegetation clearing and grubbing will result in the loss of some forest and edge habitats and changes in habitat structure in the PDA.

Removal of trees will reduce habitat for some forest dwelling species (e.g., red squirrel, mourning dove). Areas recently cleared of forested habitat are expected to be managed to support a modified shrubby or grass habitat, which could be beneficial to species such as white-tailed deer. Wetland habitats are expected to remain intact outside of tower footprints. Rangeland habitat will remain relatively intact outside of tower locations.

No known bat or red-sided garter snake hibernacula are present in the LAA and as a result, disturbances near these features are not anticipated.

Clearing of the right-of-way has potential to fragment habitat and create edge effects resulting in reduced connectivity between wildlife mating areas, overwintering grounds, and dispersal corridors. Habitat connections are important in maintaining local and regional wildlife movements. Fragmented forested areas (i.e., roads, rail, transmission lines) may present a barrier for some species that reduce their risk of predation by avoiding open areas (e.g., American marten (Kurki, et al. 1998), some species of mice and voles (Storm and Choate 2014). The RAA has an existing linear feature density of 1.015 km/km^2, which will be increase to 1.029 km/km^2, after construction.

Forest-dependent birds will experience habitat loss due to forest clearing. Core areas larger than 200 ha are important for bird species and ecosystem function (Environment Canada 2013a). Due to the existing development in the RAA, no core areas greater than 200 ha will be changed by the project. However, for the most common species observed in the study area, the clearing of forest habitat may result in a greater abundance of American robins (*Turdus migratorius*) and a decrease in ovenbirds (*Seiurus aurocapilla)*. Vegetation clearing can also result in the loss of bird's nests.

The bird species of conservation concern are distributed among different habitat types in the project area (i.e., forests and forest edges, rangelands, and wetlands). This suggests that abundance will not change with the clearing of the right-of-way. However, some shifts may occur in these species due to their habitat preferences.

Approximately 12 km (or 48 ha) of the PDA traverses' critical habitat for the red-headed woodpecker, as broadly defined by Environment and Climate Change Canada (2019) (Map 8-1). Red-headed woodpeckers prefer an open deciduous forest habitat for foraging and nesting in Manitoba. This habitat type consists of an open canopy of deciduous trees, with an understory of shrubs, willow, and forbs. An estimated 1.5 km (or 5.732 ha) of open deciduous forest habitat will be lost or altered within the critical habitat to a modified shrub and grassland habitat after vegetation clearing. Conversely, vegetation clearing of 4.3 km (or 16.672 ha) of deciduous forest within the defined critical habitat will create openings in the forest canopy and a modified shrub and grassland habitat. These altered habitats along the right-of-way will continue to support habitat for the red-headed woodpecker. Species such as the eastern whip-poor-will, which prefers edges, and common nighthawk, which prefers open areas, will likely continue to use habitat around the right-of-way (Manitoba Hydro 2024).

Indirect effects on habitat are those that reduce the effectiveness of existing or remaining habitat for birds. Indirect effects may occur through construction-related sensory disturbances (i.e., noise, light) causing temporary displacement of some wildlife from otherwise suitable habitat adjacent to the PDA. Such activity may be associated with right-of-way clearing, mobilizing staff and equipment (including access route and bypass trail development), watercourse crossing, transmission tower construction and conductor stringing (i.e., implosive connections, helicopter use). These activities could disrupt and displace some wildlife within the LAA.

Mitigation Measures

Selection of the final preferred route sought to take a balanced approach to reduce overlap with wildlife and wildlife habitat. The route is mostly aligned along a half mile property line, where some previous vegetation clearing, agriculture and trail development has already occurred.

Project-specific mitigation measures to avoid or reduce the potential effects of the project on wildlife and habitat during construction include the following:

- Wildlife features (i.e., mineral licks and stick nests) will be identified in the CEnvPP and mitigation applied such as buffers and/or setbacks prior to clearing.
- Clearing activities will not be conducted 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 the right-of-way in accordance with the access management plan for the project.
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing.
- Protected bird nests, including large stick nests, red-headed woodpecker nest cavities, and pileated woodpecker nest cavities will be buffered and left undisturbed until unoccupied. If required, nest removal permits will be requested from regulatory authorities, where additional mitigation measures may be required (i.e., artificial nest platform or cavity site).
- Active animal dens or burrows are encountered within the right-of-way will be buffered left undisturbed until unoccupied.
- Artificial structures for nesting may be provided if unoccupied nests must be removed.
- Natural low growing shrub and grass vegetated buffer areas of 30 m will be established around wetlands and riparian zones.
- Vehicle, equipment and machinery maintenance and repairs will be conducted in designated areas located at least 100 m from the ordinary high-water mark of a waterbody, riparian area, or wetland.
- 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.
- The contractor will follow the erosion and sediment control management plan for the project.

- Clearing wastes and other construction debris or waste will not be placed in wetland areas.
- Rehabilitation plans will include objectives for restoration of natural conditions, erosion protection, sediment control, non-native and invasive plant species management, wildlife habitat restoration and restoration of aesthetic values as required.

Operation

Disturbance or annoyance effects to wildlife during 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 from otherwise suitable habitat, during vegetation maintenance.

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.

Mitigation Measures

Project-specific mitigation measures to avoid or reduce the potential effects of the project on wildlife habitat during operation include the following:

- Natural low growing shrub and grass vegetated buffer areas of 30 m will be established around wetlands and waterbodies.
- Vegetation clearing activities will not be conducted during the reduced risk timing windows for wildlife species without additional mitigation measures such as pre-clearing nest searches.
- Vehicle, equipment and machinery maintenance and repairs will be conducted in designated areas located at least 100 m from the ordinary high-water mark of a waterbody or wetland, unless approved by a 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.

8.4.2.2 Change in mortality

Construction

Wildlife mortality could increase due to potential for project-related collisions of mammals, birds, or amphibians, 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 Chapter 11, Infrastructure, and community services). 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).

Mitigation Measures

Project-specific mitigation measures to avoid or reduce the potential effects of the project on wildlife mortality risk during construction includes the following:

- Construction activities will be restricted to established roads, trails, and the right-of-way in accordance with the access management plan.
- Clearing activities will not be conducted during reduced risk timing windows for wildlife species without additional mitigation such as pre-clearing nest searches.
- Trees containing large nests of sticks and areas where active animal dens or burrows are encountered will be buffered and left undisturbed until unoccupied.
- Artificial structures for nesting may be provided if unoccupied nests must be removed.
- To reduce the potential for collisions with wires following wire installation, bird diverters will be placed at ESSs.
- Hunting and harvesting of wildlife, or possession of firearms by staff will not be permitted while working on the project sites.

- Wildlife features (i.e., stick nests) will be identified in CEnvPP and mitigation applied such as buffers and/or setbacks prior to clearing.
- Environmentally sensitive sites, features and areas will be identified and mapped before clearing.
- 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 conducted 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.

Operation

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 project has the potential to increase bird-wire strikes due to the presence of the transmission wires in areas used by birds for breeding, feeding, and migration.

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 (Avian Power Line Interaction Committee 2012).

Another pathway for increased mortality could be nest mortality 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.

Mitigation Measures

Project-specific mitigation measures to avoid or reduce the potential effects of the project on wildlife mortality risk during operation includes the following:

- Areas where active animal dens or burrows are encountered will be buffered and left undisturbed until unoccupied.
- To reduce the potential for collisions with wires following wire installation, bird diverters will be placed at ESSs.
- Hunting and harvesting of wildlife, or possession of firearms by staff will not be permitted while working on the project sites (e.g., during inspections or vegetation maintenance).
- Vegetation clearing activities will not be conducted during the sensitive timing windows for wildlife species without additional mitigation measures such as preclearing nest sweeps.
- Vegetation maintenance and inspection vehicles will travel at reduced speeds while on right-of-way.

8.4.3 Characterization of residual effects

8.4.3.1 Change in habitat

Construction

The final preferred route for the project is primarily located within privately owned land consisting of agricultural and forested areas. The route does not traverse designated or protected lands. Where the project does encounter natural habitat, mitigation measures (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on wildlife.

Vegetation clearing along parts of the right-of-way will be conducted in the winter to reduce effects on wildlife and wildlife habitat. The density of linear features in the RAA (e.g., roads, rail, transmission lines) will increase by 1.4% from 1.015km/km^2 to 1.029km/km^2. Removal of vegetation will result in a direct, long-term change in approximately 32.747 ha of forested habitat in the PDA. The amount of forest habitat removed is approximately 2.37% of the total amount of forested habitat in LAA (Table 8-4).

Table 8-4: Change in broad land cover types used by wildlife in the LAA

Landcover type	Existing conditions				Post-construction area in the LAA		Wildlife species associated with broad land cover type
	LAA		PDA				
	Area (ha)	% Area	Area (ha)	% of PDA	Area (ha)	% Change	
Forest	1,383.160	34.18%	32.747	44.32%	1,350.413	- 2.37%	red-headed woodpecker, common-nighthawk, eastern whip-poor-will, white-tailed deer
Wetland	8.859	0.22%	0.250	0.34%	8.609	- 2.82%	waterfowl, muskrat, mink
Agricultural land (crop & range land)	2,414.506	59.69%	39.489	53.44%	2,375.017	- 1.63%	white-tailed deer
Exposed land (roads, trails, bare rock, sand, gravel)	169.113	4.18%	1.387	1.88%	169.1113	no change	n/a

Following the implementation of mitigation measures described above, residual effects for change in habitat during construction are characterized by the following:

- Direction is adverse:
    - There will be direct and indirect habitat loss or alteration during construction.
- Magnitude is low:
    - Construction of the project will result in a 2.4% change in wildlife habitat (forest) in the LAA (Table 8-4). The combined direct loss of natural wildlife habitat is low (i.e., <10% of the LAA) based on magnitude criteria presented in Table 8-5. Construction of the project will result in a 1.4 % increase in linear

feature density. In addition, no core areas greater than 200 ha will be changed by the project.

- Geographic extent is the LAA:
  - Direct habitat loss will be confined to the PDA; however, indirect effects (i.e., sensory disturbance, edge effects) will extend into the LAA.
- Timing is low sensitivity:
  - Vegetation clearing of the transmission line will occur in the winter, under frozen ground conditions, when many species are dormant or overwintering outside the RAA and will avoid the sensitive spring and summer breeding periods of most wildlife species.
- Duration is short-term to long-term (depending on habitat type and project component):
  - Direct (i.e., habitat loss) and indirect effects (i.e., fragmentation) on habitat availability due to clearing and alteration will be permanent because the effects will extend for the lifetime of the project.
  - Indirect effects on habitat availability associated with sensory disturbance from right-of-way clearing and construction of transmission infrastructure will be short-term.
- Frequency is a single and irregular event:
  - Habitat alteration will primarily occur once during right-of-way clearing.
  - Sensory disturbance associated with right-of-way clearing and construction of transmission infrastructure will occur multiple times at irregular intervals.
- Change is reversible:
  - Direct (i.e., habitat loss) and indirect effects (i.e., fragmentation) on habitat availability due to clearing and alteration are reversible after the life of the project (i.e., with natural regeneration of right-of-way vegetation).
  - Indirect effects on habitat availability associated with sensory disturbance from right-of-way clearing and construction of transmission infrastructure are reversible once activity has ended.

Operation

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 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.

Following the implementation of mitigation measures described above, residual effects for change in habitat during operation are characterized by the following:

- Direction is adverse and positive:
  - There will be an adverse indirect effect on wildlife use of right-of-way and adjacent habitat due to sensory disturbance associated with vegetation maintenance activities.
  - There will be positive direct habitat gain for forest edge, grassland, and shrubland for some wildlife species as vegetation naturally regenerates along the right-of-way.
- Magnitude is low:
  - Indirect effects of sensory disturbance on wildlife are unlikely to have a measurable effect on the abundance of wildlife in the LAA; however, temporary local shifts in wildlife distributions might occur in the PDA and adjacent areas.
- Geographic extent is the LAA:
  - Right-of-way vegetation maintenance is limited to the PDA; however, the effects of sensory disturbance can extend into the LAA.
- Timing is moderate sensitivity:
  - Operation of the project will occur during sensitive timing windows (e.g., ungulate calving season) of wildlife species in the LAA, however, potential disturbance such as vegetation management will not be scheduled during sensitive timing windows without additional mitigation measures such as pre-clearing nest searches.
- Duration is short-term to long-term:
  - Indirect effects on right-of-way and edge habitat due to sensory disturbance (i.e., avoidance) will be short-term, as most wildlife using these areas will return once sensory disturbance ceases.
  - Right-of-way vegetation will be managed as open habitat over the long-term.
- Frequency is at multiple, irregular intervals:
  - Sensory disturbance from vegetation management, right-of-way inspections, and recreational vehicle use will occur multiple times at irregular intervals.
- Change is reversible:
  - Indirect effects on right-of-way and edge habitat due to sensory disturbance (i.e., avoidance) will be short-term and reverse once activity has ended.

    - The effects of vegetation management along the right-of-way are reversible after the life of the project with natural regeneration of right-of-way vegetation.

8.4.3.2 Change in mortality

Where the project traverse's natural habitat, mitigation measures (e.g., clearing outside of bird nesting timing window, applying setbacks and buffers to denning sites, and controlling project vehicle speeds on the right-of-way) will be implemented to reduce mortality risk to terrestrial wildlife during construction.

However, clearing of the right-of-way presents some residual risk to resident wildlife, particularly small mammals with limited dispersal capabilities, and furbearers that use dens or burrows. Overall, with the implementation of mitigation measures described above the change in mortality risk for small mammals is considered low.

Mortality from vehicle collisions is not anticipated to increase because traffic volumes are expected to be within the normal variation for highways in the LAA.

<u>Construction</u>

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during construction are characterized by the following:

- Direction is adverse:
    - There will be an increase in mortality risk to wildlife during construction.
- Magnitude is low:
    - With mitigation, the change in mortality risk is anticipated to be low. The project is not anticipated to have population level effects on wildlife.
- Geographic extent is the LAA:
    - Direct change in mortality risk will be confined to the PDA; however, indirect effects (i.e., potential for increased predation) will extend into the LAA.
- Timing is low sensitivity:
    - Vegetation clearing of the project transmission line will occur primarily in the winter when many species are dormant or overwintering outside the RAA (e.g., migratory birds) and will avoid the sensitive timing windows for most wildlife species.
- Duration is short-term:
    - Wildlife mortality risk will be elevated during the construction period.
- Frequency is a multiple, irregular event:
    - Change in mortality risk will vary throughout the construction period.

- Change is reversible:
  - Increased wildlife mortality risk due to presence of project vehicles will cease once construction activity has ended.

Operation

During operation of the proposed 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., wetlands and lakes). The incremental change in mortality risk due to the project can be mitigated by adding bird flight diverters to overhead wires at high collision risk sites. Applying bird diverters to shield wires has been shown to reduce bird mortality rates by 50% to 80% (Jenkins et al. 2010; APLIC 2012).

The residual effects for operation-related change in mortality risk for wildlife are expected to be small in magnitude and reversible.

Following the implementation of mitigation measures described above, residual effects for change in mortality risk during operation are characterized by the following:

- Direction is adverse:
  - There will be increased mortality risk.
- Magnitude is low:
  - The change in predator access resulting from the project is anticipated to be low as the project will marginally contribute to the existing level of fragmentation in the RAA.
- Geographic extent is the LAA:
  - Increased mortality risk will be confined to the PDA; however, indirect effects on mortality risk (i.e., predation pressure) will extend into the LAA.
- Timing is moderate sensitivity:
  - Operation of the project will occur during sensitive timing windows (e.g., bird nesting season) of wildlife in the LAA, however, potential disturbance such as vegetation management will not be scheduled during sensitive periods without additional mitigation measures such as pre-clearing nest searches.
- Duration is long-term:
  - The mortality risk associated with increased access will persist for the life of the project.
- Frequency is continuous:
  - Change in mortality risk will occur throughout the operation period.
- Change is reversible:

- Factors contributing to a change in wildlife mortality risk are reversible after the life of the project (i.e., natural regeneration of right-of-way vegetation).

8.4.3.3 Summary of residual effects on wildlife and wildlife habitat

Table 8-5: Project residual effects on wildlife and wildlife habitat

Residual Effects Characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Change in habitat						
Construction	Adverse	Low	LAA	Short-term/ Long-term	Single event/ Irregular	Reversible
Operation	Adverse/ Positive	Low	LAA	Short-term/ Long-term	Irregular	Reversible
Decommissioning	Adverse	Low	LAA	Short-term	Irregular	Reversible
Change in mortality						
Construction	Adverse	Low	LAA	Short-term	Irregular	Reversible
Operation	Adverse	Low	LAA	Long-term	Continuous	Reversible
Decommissioning	Adverse	Low	LAA	Short-term	Irregular	Reversible

8.4.4 Cumulative effects on wildlife and wildlife habitat

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC, and
- a residual effect could interact with residual effects of other past, present, or reasonably near future physical activities.

Natural habitat in the RAA has been reduced by past land use activities, including roads, agriculture, industrial activities, housing developments and electrical transmission lines. Some of these projects and activities have fragmented habitat and changed habitat for wildlife. The project will have residual effects on wildlife and wildlife habitat, including habitat availability and mortality risk, which will act cumulatively with residual effects of other past, present, and reasonably near future physical activities.

8.4.4.1 Project residual effects likely to interact cumulatively with wildlife and wildlife habitat.

Table 8-6 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to wildlife and wildlife habitat. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is conducted.

Table 8-6: Potential cumulative effects on wildlife and wildlife habitat

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects	
	Change in habitat	Change in mortality
Existing/ongoing projects and activities		
Domestic Resource Use (hunting, trapping, fishing)	-	✓
Recreational activities (e.g., snowmobiling, hiking)	-	-
Commercial resource use (includes fishery and forestry)	-	-
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	✓	✓
Electrical transmission lines	✓	✓
Potential future projects and activities		
Crystal Spring Colony domestic wastewater lagoon	✓	✓
Diageo Hydroelectricity Station	–	–
King's Park Phase 2 residential development	✓	✓

Table 8-6: Potential cumulative effects on wildlife and wildlife habitat

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects	
	Change in habitat	Change in mortality

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.
– = Interactions between the residual effects of other projects and those of the project residual effects are not expected. Further cumulative effects assessment not required.

8.4.4.2 Cumulative effects for change in habitat availability

Pathways for cumulative effects for change in habitat availability

Some of the past and current projects and activities have contributed to a change in wildlife and wildlife habitat through clearing and conversion of natural habitat within parts of the RAA. Existing infrastructure, transmission lines, and agricultural, commercial, residential, and industrial developments have contributed to direct (i.e., habitat loss or alteration) and indirect changes (e.g., habitat avoidance due to disturbance or fragmentation) in wildlife habitat. The primary pathways of these effects are through vegetation clearing and management and/or operation-related disturbances (e.g., noise).

The new electrical station at Diageo would not interact cumulatively with the proposed transmission project in relation to change in habitat availability since the proposed location of the station is within the Diageo facility and does not provide habitat for wildlife.

The proposed Crystal Spring Colony domestic wastewater lagoon development and King's Park Phase 2 residential development have potential to interact cumulatively with the proposed project. This domestic wastewater lagoon development would be located approximately 9 km south of the PDA and its construction may involve clearing up to 8 ha of deciduous forest, based on desktop review of land cover in the southeast portion of SE 28-18-3 EPM, where the lagoon is proposed. The King's Park Phase 2 residential subdivision would be northeast of the Diageo property in 28-19-04 E. The 23 planned residential lots overlap a treed area approximately 4.5 ha in size, of which a portion would require clearing to allow for the construction of homes. However, the location is adjacent to properties that are already cleared and/or developed for residential and agricultural purposes. Potential cumulative effects on wildlife and wildlife habitat are associated with negative, direct loss in forested habitat and temporary indirect habitat loss due to sensory disturbance caused by human activity and equipment.

Mitigation for cumulative effects for change in habitat availability

Mitigation measures that will help avoid, reduce, or eliminate project environmental effects on change in wildlife habitat availability were presented in Section 8.4.2.1.

Project routing was the primary mitigation measure for reducing adverse effects to wildlife and wildlife habitat. The final preferred route parallels numerous previously cleared areas and existing roads and trails. No designated or protected lands will be affected. After construction, previously forested areas will be converted to a modified shrub and grassland habitat.

Additional mitigation measures proposed to reduce the cumulative environmental effects on change in wildlife habitat availability include the following:

- For Manitoba Hydro projects occurring in the same geographic area, an effort will be made to coordinate access requirements to reduce the need to construct additional access roads in areas of wildlife habitat.

Residual cumulative effect for change in habitat availability

Vegetation clearing is one of the key factors affecting the availability of wildlife habitat in the RAA. Approximately 63 ha of forested habitat in the LAA will be modified by the project and managed for shrubby habitat and grasslands. Residual cumulative effects of change in habitat availability will be a single event reversible upon future decommissioning of the projects.

8.4.4.3 Cumulative effects for change in mortality risk

Cumulative effects pathways for change in mortality risk

Some past and current activities have contributed to a change in mortality risk for wildlife inhabiting the RAA. Roads and highways elevate mortality risk to wildlife through wildlife-vehicle collisions, and transmission lines elevate mortality risk through bird collisions and increased access for predators. Domestic resource use (e.g., hunting, trapping, fishing) includes harvesting of wildlife in the LAA.

Currently, the future projects proposed in the RAA are not transmission projects and will likely not act cumulatively with the project with respect to bird-wire collisions.

Of the projects listed in Table 8-6, existing linear infrastructure (e.g., roads, transmission lines) in the RAA and the proposed Crystal Spring Colony domestic wastewater lagoon and King's Park Phase 2 residential subdivision have the potential to act cumulatively with the project with respect to wildlife mortality. The primary pathway for these interactions is through collision with project construction and/or operation vehicles.

Mitigation for cumulative effects for change in mortality risk

To reduce potential wildlife mortality risk, existing trails and roads will be used to access the right-of-way to the extent possible. The mitigation measures suggested for cumulative effects for change in mortality risk (Section 8.4.2.2) are also applicable for the cumulative effects for change in mortality risk.

Residual cumulative effects for change in mortality risk

The modified landscape of the RAA has already been and continues to be a source of mortality to wildlife due to ongoing agriculture, and the presence of roads, traffic, and transmission projects (e.g., bird-wire collisions). The proposed Crystal Spring Colony domestic wastewater lagoon and King's Park Phase 2 residential subdivision may elevate wildlife mortality risk due to construction activities within an area supporting wildlife habitat.

The cumulative effect for change in wildlife mortality is adverse as mortality risk will increase for some terrestrial wildlife in areas of the RAA; however, the magnitude of this effect is low as some of the projects are in disturbed areas. Residual cumulative effects of change in mortality risk will be continuous yet reversible upon future decommissioning of the projects.

8.4.4.4 Summary of cumulative effects

This section summarizes the cumulative effects analysis for change in wildlife habitat availability and change in mortality risk. Table 8-7 characterizes the cumulative environmental effects of the project and other current and future projects and activities on wildlife and wildlife habitat.

Table 8-7: Residual cumulative effects on wildlife and habitat

Residual cumulative effect	Residual cumulative effects characterization					
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility

Table 8-7: Residual cumulative effects on wildlife and habitat

Residual cumulative effect on change in habitat availability						
Residual cumulative effect	Adverse	Low	RAA	Short-term	Continuous	Reversible
Contribution from the project to the residual cumulative effect	When current and reasonably near future project effects on wildlife habitat are considered, the project's contributions to direct change in habitat availability will be low in magnitude. Contributions of indirect effects on habitat availability are also expected to be small due to clearing in frozen ground conditions. Furthermore, routing has avoided protected areas. Indirect effects on habitat resulting from construction noise and activity are expected to be localized and short-term.					
Residual cumulative effect on change in mortality risk						
Residual cumulative effect	Adverse	Low	RAA	Short-term	Continuous	Reversible
Contribution from the Project to the Residual Cumulative Effect	When current and future project effects on wildlife habitat are considered, the project's contribution to direct change in mortality risk will be low in magnitude. To reduce mortality risk to wildlife, right-of-way clearing will occur in the winter and bird diverters will be installed at ESSs. To the extent possible, existing roads and trails will be used to access the PDA during construction.					

8.4.4.5 Determination of significance

With mitigation and environmental protection measures, the cumulative effects on wildlife and wildlife habitat are predicted to be not significant. The project will result in the loss or alteration of approximately 63 ha of wildlife habitat within the LAA. The anticipated change in habitat within the LAA is predicted to result in a low magnitude effect on wildlife habitat, including for species at risk and species of interest.

Fragmentation effects are expected to be small. Indirect loss or alteration of habitat resulting from sensory disturbance and fragmentation are generally expected to be minor and limited to the LAA. Increased access and traffic during construction and operation are not expected to result measurable changes in wildlife mortality or the abundance of wildlife.

Residual effects are not expected to threaten the long-term persistence or viability of wildlife and habitat within the RAA, nor are they expected to diminish conservation efforts for the survival, management, and recovery of species at risk and species of conservation concern.

8.4.4.6 Prediction confidence

Prediction confidence in the assessment of effects on wildlife and wildlife habitat is considered high. This level of confidence is based on:

- The quantity and quality of data available
- Professional judgement and experience with similar projects
- Effectiveness of mitigation measures, which reflect best industry practices

Overall, a limited amount of wildlife habitat will be lost or modified relative to the RAA and most adverse effects on mortality risk to wildlife have been mitigated during the planning and routing process. Mitigation measures during construction and operation (e.g., timing windows, setbacks, and buffers) will be implemented to reduce adverse effects on wildlife and habitat. The level of confidence in the effectiveness of the mitigation measures is high based the results of baseline studies and past project experience (e.g., Birtle Transmission Project, Manitoba-Minnesota Transmission Project, St. Vital Complex Transmission Project, Bipole III Transmission Project).

8.4.5 Follow-up and monitoring

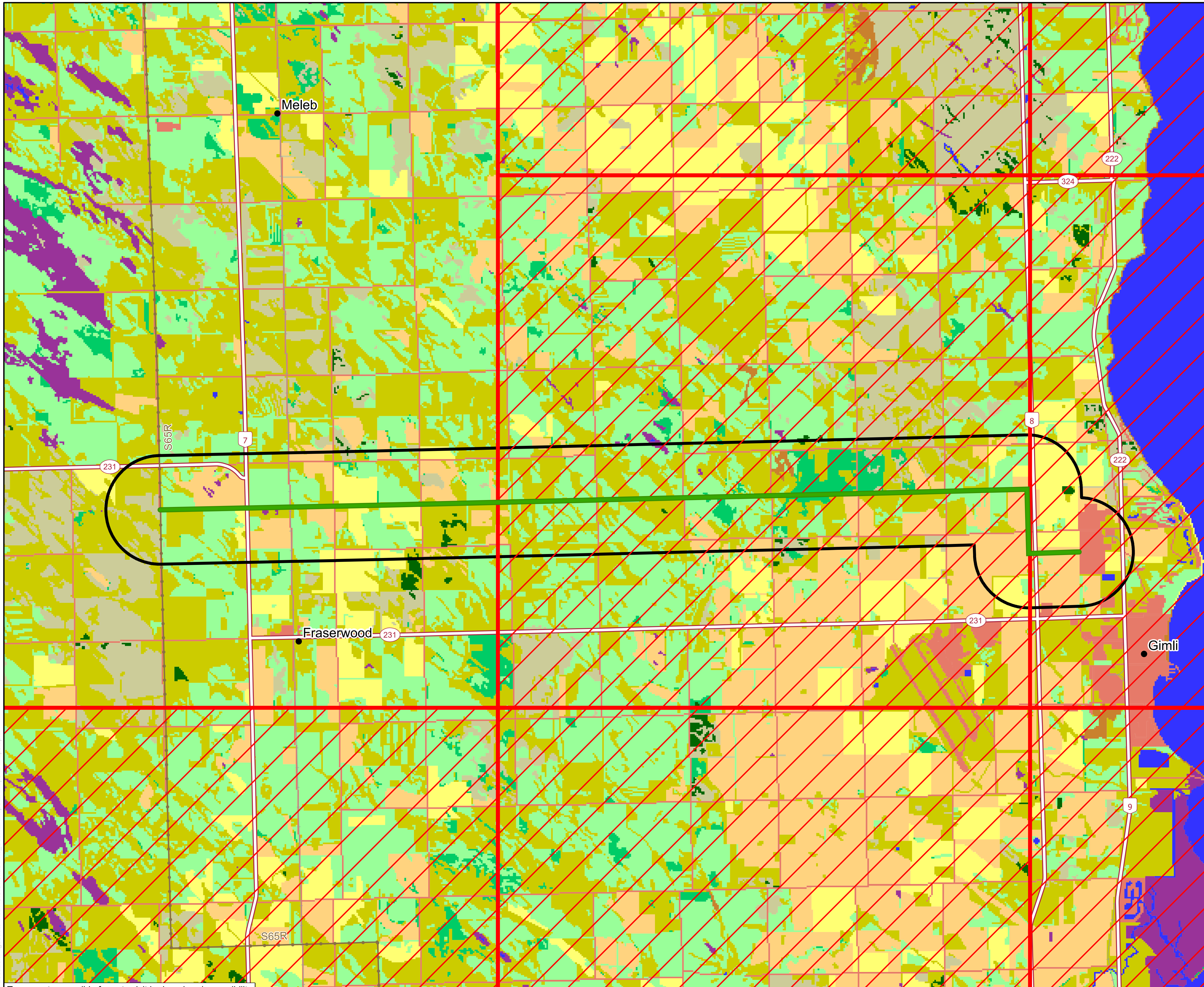
Due to limited project interactions, well-established wildlife and wildlife habitat protections and mitigations, and outcomes from similar projects, wildlife monitoring is not proposed for the project. However, should environmental inspection identify unexpected environmental effects or damage to wildlife and wildlife habitat, the project-specific environmental protection plan (Chapter 18.0) will outline monitoring steps to ensure appropriate rehabilitation and follow-up.

8.4.6 Sensitivity to future climate change scenarios

Effects of climate change on wildlife and wildlife habitat are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding; Section 15.1). 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 on habitat availability or mortality risk. 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 project on habitat availability or mortality risk.



Manitoba Hydro

Silver to Rosser
Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Wildlife LAA (PDA Buffer 1km)

Critical Habitat Area
- Red-headed Woodpecker Critical Habitat Area

Land Cover
- Agricultural Cropland
- Bare Rock, Sand and Gravel
- Coniferous Forest
- Cultural Features
- Decidious Forest
- Forage Crops
- Marsh and Fens
- Mixedwood Forest
- Open Decidious Forest
- Range and Grassland
- Water

Landbase
- Railway
- Provincial Highway/Road
- Existing ≥69kV Transmission Line

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Red-headed Woodpecker Habitat in the LAA

Draft/Confidential: For Discussion Purposes Only

Map 8-1

9.0 Harvesting and important sites

This section considers potential effects of the project on interests directly important to First Nations people and Red River Métis citizens including rights-based activities and features of heritage and cultural value within the project area.

For the purposes of this assessment, harvesting includes rights-based hunting, fishing, trapping and the gathering of traditional plants, medicines, and other natural materials.

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.

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.

For this assessment, important sites include heritage resources as defined and protected by Manitoba's Heritage Resources Act (1986) as well as a broad range of cultural sites and features understood to be important to First Nations people and Red River Métis citizens in the area.

Heritage resources refer to physical, cultural, and natural elements considered valuable and preserved for their historical, cultural, scientific, or aesthetic significance.

Heritage resources include tangible remains of human endeavor that have survived through time and provide evidence of past activity. These are non-renewable resources that may be disturbed or damaged by development activities.

Cultural sites and features important to First Nations people and Red River Métis citizens include both tangible sites and intangible cultural heritage.

Tangible important sites include sites or objects of cultural, historical, spiritual, or sacred importance. Certain land types and interests such as unoccupied Crown land and land available for Treaty Land Entitlement opportunities are also considered.

Intangible cultural heritage is defined by UNESCO to include traditions and living expressions transmitted from one generation to the next (UNESCO 2023).

This assessment, therefore, also considers the practice of ceremony, the places ceremony may occur, as well as the experiences and cultural knowledge transmission that occur through undertaking cultural practices.

Taking a broad approach to assessing project effects on heritage and culture aligns with the Manitoba Clean Environment Commission's comment related to culture and heritage in the Bipole III Transmission Project Report on Public Hearing (2013), which stated the following:

"With regard to heritage resources, it is important to keep in mind that these are by no means limited to those resources, such as archaeological sites, that have already been identified. In many cases, heritage resources are only identified because there has previously been some disturbance, such as building of roads, that has turned up artifacts. It is also important to remember that the landscape itself is a heritage resource, providing visual cues for storytelling and memory. Alteration of the landscape can, by itself, have an impact on heritage." (Manitoba Clean Environment Commission 2013)

Manitoba Hydro chose to use harvesting and important sites as a valued component (VC) because it can broadly capture the diverse ways by which different cultural groups may practice rights-based activities, as well as locations and features of the land that are of heritage or cultural value.

During project engagement, participants at the community perspective routing workshop identified harvesting, and culture and heritage, as two of the three top themes identified as important to consider during routing.

There may be other chapters of this assessment report that are of relevance and interest to rights-bearing communities.

9.1 Scope of the assessment

This section assesses the effects of project activities during construction, operation, and decommissioning on harvesting and important sites. An assessment of cumulative effects on harvesting and important sites is also presented.

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in southern Manitoba (e.g., the Pointe du Bois to Whiteshell (PW75) Transmission Project, Dorsey to Wash'ake Mayzoon Transmission (D83W) Project, and Manitoba-Minnesota Transmission Project (MMTP). The assessment considers the following:

- Changes to harvested resources
- Changes to important sites
- Changes in access to harvesting areas and important sites
- Changes in the experience of harvesting and visiting important sites

9.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

9.1.2 Regulatory and policy setting

The following federal and provincial laws, and associated regulations, policies, and guidelines, as well as Manitoba Hydro's policies are considered in the assessment of project effects on harvesting and important sites:

- The Constitution Act (Canada)
- Manitoba Hydro's Indigenous Relations Commitment Statement
- The Heritage Resources Act (Manitoba)

9.1.2.1 Manitoba Hydro's Indigenous Relations Commitment Statement

In 2023, Manitoba Hydro released an Indigenous Relations Commitment Statement. Commitments within the statement that are relevant to the assessment of project effects on harvesting and important sites include the following:

- We will work collaboratively with Indigenous communities to address the adverse impacts of our projects and operations.
- We will collaborate with Indigenous communities to understand and be guided by their Indigenous Knowledge as it relates to our projects (Manitoba Hydro 2023).

9.1.2.2 The Constitution Act (Canada), section 35, Part II (1982)

Section 35 of *the Constitution Act*, 1982, recognizes and affirms the existing Aboriginal and treaty rights of the Indigenous peoples of Canada, which include rights that have been recognized by Canadian courts as inherent Indigenous rights.

Aboriginal and treaty rights are collective rights of Indigenous groups, which vary from group to group depending on historic use and occupation of the land, customs, practices, and traditions that form part of their distinctive cultures.

Generally, Aboriginal and treaty rights include:

- the right to harvest, including Indigenous hunting, trapping, fishing, and gathering resources for subsistence and cultural purposes
- rights relevant to important sites, including rights to practice one's culture and spiritual traditions and rights to lands, territories, and resources (Government of Canada 2018)

Rights-based activities and practices discussed in this assessment of project effects on harvesting and important sites reflect traditional activities and practices that the courts have expressly recognized as constitutionally protected under section 35 of the Canadian Constitution Act, 1982.

The authors of this environmental assessment did not try to distinguish whether activities, customs and practices shared through project engagement met the test to be constitutionally protected. If an activity, practice, or custom was shared with Manitoba Hydro and understood to be important to a potentially affected First Nation or the Manitoba Métis Federation, it was considered relevant to this assessment.

Manitoba Hydro's project engagement process (Chapter 5.0) is separate from the section 35 Crown consultation process that may be initiated by the Province of Manitoba.

9.1.2.3 The Heritage Resources Act (Manitoba)

Heritage resources are non-renewable resources that provide a tangible cultural link between the past and present. In Manitoba, heritage resources are protected under The Heritage Resources Act (1986) and 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". In addition to the Act, Manitoba's "Policy Respecting the Reporting, Exhumation and Reburial of Found Human Remains" (1987) provides instruction on protecting non-forensic human remains, or 'found human remains'. Found human remains refer to burials that occur outside of a registered cemetery, which may consist of unregistered burial grounds and isolated human elements.

Heritage sites are recorded in a provincial registry and are managed by the Historic Resources Branch of the Department of Sport, Culture and Heritage. This registry includes the following categories:

- Archaeological sites
- Provincial sites
- Municipal sites
- Commemorative plaques

Municipal Sites are sites designated by individual municipalities. Provincial commemorative plaques are registered through the Manitoba Heritage Council. Because they are commemorative, these plaques may not be located at the actual site of an event.

The provincial registry does not specifically recognize cultural sites; therefore, does not offer protection unless they can be captured and registered as an archaeological site. Examples of cultural sites that may be registered as archaeological sites include culturally modified trees or trees with prayer flags/tobacco ties. The provincial registry is protected under the Act and is not available to the public.

If it is in the opinion of the Minister of Manitoba Sport, Culture and Heritage that heritage resources may be affected by development, the Minister can order an archaeological study or other protection measures.

9.1.2.4 Provincial and federal historic site registries

In conjunction with the information held by the Historic Resources Branch (HRB), the Manitoba Historical Society (MHS) maintains a public online database, Historic Sites of Manitoba, which contains information on the following heritage site types:

- Cemeteries
- Monuments
- Buildings
- School buildings or districts
- Centennial Farms

Federally designated sites are registered in the Canadian Register of Historic Places (CRHP). This is an online directory of historic places in Canada which have been formally recognized for their heritage value by a federal, provincial, territorial or municipal authority.

9.1.3 Consideration of engagement feedback

Project engagement (Chapter 5.0) actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project. During project engagement, key topics of concern and interest relating to harvesting and important sites included:

- Feedback about specific resources that are, or may be, harvested in the area, including plants, berries, medicines, other natural materials
- Feedback that Indigenous peoples visit the area to practice rights-based activities, which may take place on both private land and Crown land

- Interest in involvement in heritage work and understanding the methodology for heritage work on the project

This assessment of project effects on harvesting and important sites also draws information from engagement on past projects and a review of publicly available information about First Nation and Red River Métis traditional and contemporary land use and interests throughout and sometimes beyond the regional assessment area.

9.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on harvesting and important sites, along with effects pathways and measurable parameters are outlined in Table 9-1.

Table 9-1: Potential effects, effects pathways, and measurable parameters for harvesting and important sites

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Changes to harvested resources	Direct loss or alteration to the availability or quality of harvested wildlife, fish, traditional use plants, and medicines resulting from development and maintenance of the right-of-way Disrupted and altered distribution or movement of harvested species and resources due to project activities and presence of the transmission line	Residual effect conclusions from the assessments on vegetation and wetlands (Chapter 7.0) and wildlife and wildlife habitat (Chapter 8.0). Qualitative assessment of predicted effects to harvested resources based on feedback from project engagement and past transmission line projects.
Changes to important sites	Disturbance of heritage resources from the in-situ context or surface structures through project activities, particularly those involving ground disturbance Disturbance of cultural sites or features important to Indigenous peoples through project activities	Number of heritage sites that could be altered/lost because of project activities. Instances of encountering heritage resources and other cultural resources during pre-construction field work or construction activities. Qualitative assessment of feedback related to potential project impacts to important sites shared through project engagement.

Change in access to harvesting areas and important sites	Direct loss of access to the footprint of transmission tower structures Direct loss of access to the right-of-way during construction, and intermittently through operations, due to access restrictions Increased or altered access to the area resulting from the presence of the cleared right-of-way	Presence of known harvesting areas and travel routes within or proximal to the PDA Duration of disruptions to access (e.g., length of construction period, frequency of maintenance activities) Qualitative assessment of predicted effects on access based on feedback from project engagement and past transmission line projects
Change in the experience of harvesting and visiting important sites	Direct loss or alteration of opportunities for the transmission of Indigenous Knowledge that occurs through harvesting and visiting important sites Decreased preference or enjoyment of harvesting and visiting important sites or cultural sites resulting from project activities and presence of the transmission line	Qualitative assessment of predicted effects to the experience of harvesting and visiting important sites based on feedback from project engagement and past transmission line projects. Qualitative assessment of sensory (visual and auditory) conditions resulting from the project, including consideration of the residual effect conclusions from the assessment of project effects on community well-being (Chapter 14)

Characterizing the potential effects of the project on harvesting and important sites will rely on the identified parameters in Table 9-1 to evaluate each type of predicted effect. Ideally, these parameters are measurable and quantifiable, but some effects on harvesting and important sites lack defined parameters for measurement and are therefore evaluated qualitatively, or through a combination of quantitative and qualitative measures, based on understandings learned through project engagement, past transmission projects, and professional judgment.

Through engagement on this project and past transmission line projects, Manitoba Hydro has heard about the importance of considering the environment holistically when assessing project impacts. Manitoba Hydro has heard that environmental assessment approaches primarily relying on Eurocentric science can miss considering project effects related to important connections in the environment by separating the environment into small pieces and assessing them as if they function in isolation.

In response to this feedback, this assessment of project effects on harvesting and important sites considers interconnectivity between different aspects of the environment by drawing from the residual effects conclusions of other valued components that directly influence harvesting and important sites, such as vegetation and wetlands, wildlife and wildlife habitat, and community well-being.

9.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual and cumulative environmental effects of the project on harvesting and important sites:

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of a 1 km buffer around the PDA, which is intended to capture the area within which direct effects to harvesting and important sites may occur because of project activities.

Regional assessment area (RAA): includes the PDA and LAA and consists of a 15 km buffer around the PDA. The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects.

The spatial boundaries for the assessment of effects to harvesting and important sites are the same as those used for the assessment of effects to vegetation and wetlands (Chapter 7) and wildlife & wildlife habitat (Chapter 8) and are shown in Map 7-1.

9.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on harvesting and important sites are based on the timing and duration of project activities as follows:

- Construction – four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be seventy-five years based on the transmission line's design.

- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

Although project effects will be described in relation to the project lifecycle, the assessment considers past, current, and future use of lands within the project's spatial boundaries. Current use is defined as occurring 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 perspectives considered in this assessment. Future use considers the ability for First Nations people and Red River Métis citizens to continue to occupy and use lands and resources beyond the life of the project.

The temporal boundaries for discussing archaeological sites is broad, beginning from when the land was deglaciated and no longer inundated by glacial Lake Agassiz, approximately 8,000 years ago, to potentially as recent as 50 years ago. The most recent boundary is more flexible and based largely on historical significance.

9.1.7 Residual effects characterization

Table 9-2 provides the definitions used to characterize the residual effects on harvesting and important sites.

Table 9-2: Characterization of residual effects on harvesting and important sites

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to harvesting and important sites relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to harvesting and important sites name relative to baseline. **Neutral –** no net change in measurable parameters for harvesting and important sites relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC	**No Measurable Change –** no measurable or perceivable change to harvesting and no disturbance of important sites is predicted

Table 9-2: Characterization of residual effects on harvesting and important sites

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
	relative to existing conditions	**Low –** a measurable or perceived change is predicted, but the ability to undertake right-based activities is not expected to be diminished or there is no anticipated loss to heritage resources **Moderate –** a measurable or perceived change is predicted in which there will be short-term implications to the ability to undertake rights-based activities and/or limited damage to heritage resources and/or cultural sites. Any encounters with undiscovered sites during construction would have at least a moderate magnitude of effect on the site; an assessment by a professional archaeologist would be required to evaluate the magnitude. **High –** an objectively clear change is predicted, resulting in long-term implications including long-term diminishment in the ability to undertake rights-based activities and the loss / damage of heritage resources, and the knowledge they provide)
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA –** residual effects extend into the LAA **RAA –** residual effects extend into the RAA
Duration	The time required until the measurable parameter or the VC returns to its existing	**Short-term –** the residual effect is restricted to the construction phase

Table 9-2: Characterization of residual effects on harvesting and important sites

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
	condition, or the residual effect can no longer be measured or otherwise perceived	**Medium-term –** the residual effect extends through to completion of post-construction reclamation **Long-term -** the residual effect extends for the life of the project
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule **Multiple regular event –** occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

9.1.8 Significance definition

For this assessment, adverse residual effects on harvesting and important sites are considered significant if the proposed project results in any of the following outcomes:

- A long-term loss or alteration to harvested resources and/or important sites, to a point where the ability to undertake rights-based activities is critically diminished or eliminated
- The destruction of a cultural resource or archaeological site

The destruction of a heritage object or site is at the extreme end of the spectrum of potential effect severity. Once a heritage object or site is destroyed, no further information can be learnt about that heritage resource.

In addition to irreversible damage to the heritage resource, substantive penalties under *The Heritage Resources Act* (1986) may also apply. Longer term, such an adverse effect can impact the cultural history of the relevant nations and communities as well as the overall cultural heritage of the province.

The severity of the project's residual effects on rights-based activities, cultural features, and intangible culture will be experienced differently by different Indigenous nations and individuals. Different Indigenous nations, communities, and individuals use the land differently, have different connections to different places, and view future use of the area differently.

It is important to note that even if effects to individual components of the environment are deemed not significant, there could still be effects to harvesting and important sites due to the presence of the project and associated perceived effects or stress.

9.2 Existing conditions

Baseline information for this assessment was primarily gathered through a detailed review of engagement feedback and past projects, available desktop data, and a literature review including, but not limited to, technical memos assessing vegetation and wetlands (Appendix C), heritage site registries, archival materials, historical maps, and local history books in the project area.

The existing conditions of the RAA described in this section focus on the following:

- Natural environment
- Land-based attributes
- Cultural and historical setting
- Registered heritage sites
- Cultural sites, features, and contemporary cultural land use

9.2.1 The natural environment

The physical environment is composed of climate, landscape, soils, hydrology, local and regional topographic relief and the geological processes that created the landscape. These factors not only assist with contextualizing heritage resources within an area, but also in determining areas within the PDA that have moderate to high heritage potential.

The RAA is situated in the Interlake region of Manitoba within the Interlake Plain Ecoregion (155). Soil materials were deposited during the time of glacial Lake Agassiz. Smith et al. (1998) characterizes the ecoregion by low relief Paleozoic limestone rock with glacial outwash and ground slopes very gently leading to Lake Winnipeg. The PDA spans two ecodistricts – the Ashern (723) and Gimli (724) ecodistricts (Table 7-3). Following the retreat of the continental glacier, the surface of this till plain was modified by scouring drumlinoid or ridges. Soils in the Ashern Ecodistrict consist of Dark Gray Chernozems developed on extremely to very strongly calcareous, very cobbly to gravelly, loamy to clay loam water-worked glacial till. Significant areas of poorly drained peaty Gleysolic soils and shallow, slightly to moderate decomposed organic soils occur in the swales.

Vegetation consists of stands of trembling aspen with associated species of balsam poplar and white spruce. Poorly drained areas have willow, sedge and meadow grass vegetation. Much land has been cleared for agriculture, but some has reverted to shrub vegetation or is used as pastureland. More detailed information about vegetation in the project area is included in Chapter 7 (Vegetation and wetlands) and Appendix C.

The Gimli Ecodistrict lies along the southwestern shore of the south basin of Lake Winnipeg. Most of the soils are poorly drained Peaty Gleysols and shallow organic soils. Areas where drainage has not been improved or where the soils are too cobbly and stony to cultivate are used for native pasture and hay (Smith et al. 1998).

Local relief is under 3 metres and slopes are generally less than 2 percent. Surface drainage throughout the area is through Willow Creek, the Fish Lake Drain and associated tributary ditches which flow into Lake Winnipeg.

9.2.2 Land-based attributes

The Interlake was not habitable for human populations until around 8,000 years ago or at the time that glacial Lake Agassiz had diminished to the extent that successional vegetation and wildlife were established. Lake Winnipeg and Lake Manitoba are the remnants of Glacial Lake Agassiz. These lakes changed in size and shape until today's present configuration (Figure 9-1). These processes have created or left-behind physical features which may have been utilized by ancient peoples.

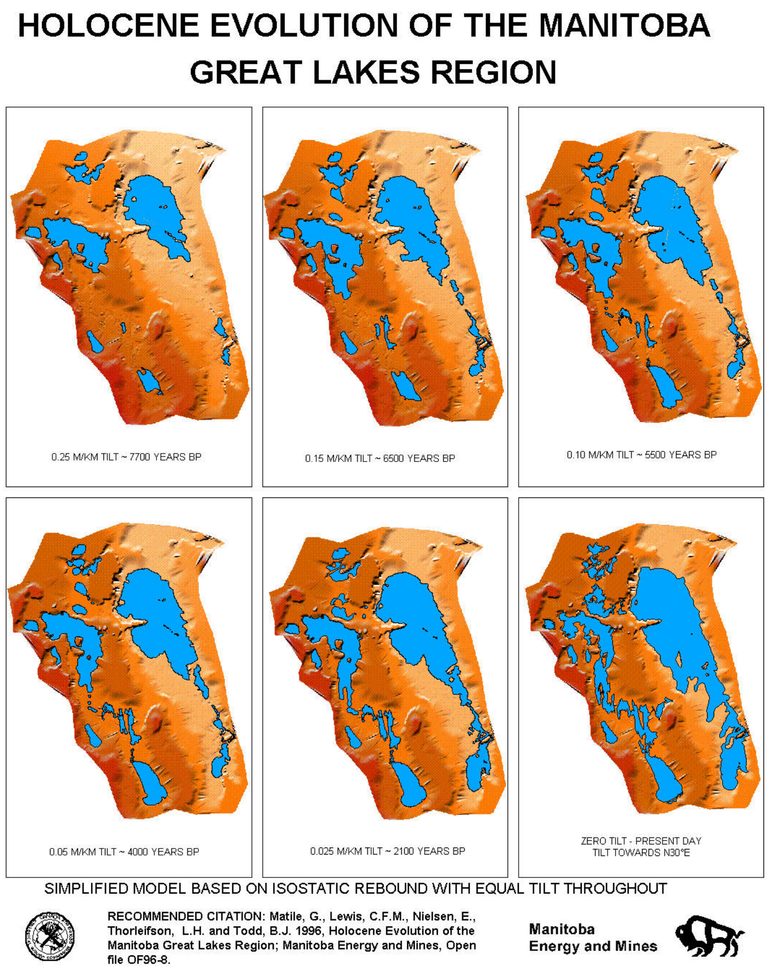


Figure 9-1: Evolution of the Manitoba Great Lakes Region

Through examining various land-based features, it is possible to identify potential areas of interest or areas with greater probability of archaeological artifact presence. A desktop study was undertaken to bolster understanding of the project area from an archaeological perspective. The objectives of the desktop review were:

- To describe the existing environment of heritage resources in the project area
- To identify the potential effects of the project on known and unknown heritage resources
- To assist in determining areas within the PDA with moderate to high potential for heritage resources, which may require pre-construction assessment or monitoring during construction

Exploration maps from the mid-1850s and the first township plans, compiled from Dominion Land Surveys during the 1870s to early 1900s, were examined for pertinent historical data such as cart trails and homestead structures. Cart trails used by settlers were usually pedestrian routes that had been used for several millennia by local Indigenous peoples. Archaeological sites, particularly burials, have been recorded near several trails (McLeod 2000).

A branch of the Colonization Road to Gimli crosses over one segment of the proposed route at the junction of the south half of 36-19-2 EPM and the north half of 25-19-2 EPM. This has been identified as an area of concern due to proximity to the trail as well as its proximity to an elevated beach ridge. The location of the Gudmundson burial, a provincially registered archaeological site (EeLh-001Y), is generally assumed to be in a section traversed by the Colonization Road.

The use of LiDAR imagery overlaid onto the study area allowed for visual examination of relict channels, elevated ridges or outcrops along the PDA and alternative route options presented during project engagement. This was followed by a windshield survey of portions of the PDA that were accessible via roadways. Overall, the survey noted that the area has generally level terrain consisting of marginal pastureland and agricultural fields with pockets of marshland, scrub forest.

Information about areas that may have elevated heritage potential was also learned through project engagement. At the community perspective workshop held on April 23, 2024, with representatives from the Rural Municipality of Gimli, Peguis First Nation and the Manitoba Métis Federation, Manitoba Hydro heard about the presence of a relic stream bed, an old beach ridge, and a relic lakebed along the PDA as well as a relic stream bed in the LAA (along alternative route segment #1).

The analysis identified land-based features of interest along the PDA. A total of five areas of heritage concern were identified, including relict channels, elevated terrain features and a possible relict lakebed. These features may have the potential for heritage resources on or along their margins.

9.2.3 Cultural and historical setting

To understand the archaeological record, or to predict the potential locations of heritage resources or sites, the social and physical environments were studied as they influenced how human populations survived and adapted. By learning about the lives of past humans, cultural history was considered through both spatial and temporal records to establish keystones of change and of continuity.

The cultural history for Manitoba is complex and covers a period of approximately 8,000 years from the receding of the glaciers to present day (Klassen 1983:108). The following is a summary of cultural history in Manitoba. The chronology comprises two major periods: the Indigenous Period and the Indigenous/European Period.

9.2.3.1 The Indigenous period

The Indigenous Period is further broken up into the three periods discussed below:

1. Early Indigenous Period (ca. 12,000 – 8,000 B.P.[3])

   The earliest period, known as the Palaeo (or Early) Period, begins around ca. 12,000 years Before Present (B.P.). to ca. 8,000 B.P. However, during this time, glaciers covered most of Manitoba including the study area and prevented the spread of people. During this time, the Wisconsin Ice Sheet had begun its retreat north, opening up an environment capable of supporting plants and megafauna. This time period has been subdivided into three successive cultures based on projectile point typologies: Clovis, Folsom, and Plano. These large lanceolate projectile points were hafted at the ends of thrusting or throwing spears. People subsisted by hunting now-extinct giant mammals, such as mammoth. Palaeo peoples, Clovis and Folsom traditions especially, are only represented archaeologically in the southwest portion of the province.

2. Intensive Diversification (or Middle) Period (8,000 to 2,000 B.P.)

   The Intensive Diversification (or Middle) Period represents a time of technological shift reflected by atlatl darts and side-notched projectile points, and a shift in subsistence strategies from megafauna to small-scale hunting. As the glaciers receded, people were exposed to changing environmental conditions and adapted their subsistence strategies to better take advantage of local resources. The first direct evidence of mortuary practices and burials appear during this time. The major cultural complex occupying central Manitoba during the Middle Period is the Shield Archaic, which may have developed out of the Plano complex of southern Keewatin District and eastern Manitoba (Wright 1995:261). Shield Archaic technology is characterized by bifacially flaked stone knives, side-notched and lanceolate projectile points, and large end scrapers. Another characteristic of the Shield Archaic is the manufacturing of tools and ornaments from native copper. Most of this copper was obtained from sources in the upper Great Lakes region around the shores of Lake Superior. However, there are sources in the Northwest Territories that may have also been used. Because this culture has largely been identified in the Boreal Forest it has been inferred that their hunting strategy was oriented

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[3] B.P. "Before Present" – a dating technique based on the number of years before 1950 A.D., the date that is used as the base for radio-carbon dating.

to caribou combined with fishing, and that canoes, snowshoes and toboggans were used as forms of transportation (Wright 1995).

3. The Woodland (or Late) Period (2,000 to 300 B.P.)

   In the southern portion of the province, the Intensive Diversification Period was followed by the Woodland (or Late) Period, which is characterized by pottery manufacture, maize cultivation, elaborate burial mound construction, and the use of the bow and arrow. Rock art, in the form of petroforms, pictographs, and petroglyphs, also becomes prominent throughout the landscape during this period. Two distinct cultural complexes form the basis for this period: Laurel and Blackduck. The stone tools consist of side-notched and triangular projectile points, a variety of scrapers, bifaces, bone and woodworking tools, net sinkers, modified cobbles, and hammer stones. Tools were also made of bone, antler and shell. Native copper was used for beads, pendants, chisels, fishhooks and knives. Subsistence was on a wide range of resources including fish, large and small mammals, wildfowl, shellfish and turtles.

During the Indigenous Period, subsistence systems were based on a hunting-gathering technology and seasonal rounds of specific activities. These subsistence systems were further characterized by the merging of several culturally distinct family units at strategic summer fisheries followed by the dispersal of the smaller, distinct family units into the boreal forest during the winter months (Cleland 1966; Belanger 2000). Traditionally, large game, including moose, caribou, bear and beaver, smaller game such as hare and muskrat, fish and plants were utilized. Ancient Indigenous settlements and associated trade and travel routes became well known cart trails and allowed for expansion by explorers, fur traders, bison hunters, and settlers in the Indigenous/European Period.

Artifacts relating to ancient land use of the Interlake region have been found to date back thousands of years (Bryan 1991, Riddle & Pettipas 1992, Lenius & Olinyk 1990, Syms 1977). A spear point of the Old Copper Culture (4,000 B.P.) was found in the Eastern Interlake Planning District (Watson 1972). Laurel ceramics from the early Woodland Period (2050 B.P. and 1050 B.P.) were also discovered in the Interlake region, indicating a period of extended regional occupancy (Syms 1977).

Research has provided evidence of Indigenous Period connections between the east side of Lake Winnipeg and Lakes Manitoba and Winnipegosis based on comparison of selected metric and non-metric attributes of ceramics (Moravetz and Jezik 1994). The Interlake region would be the pathway to connect these major waterbodies. Evidence of Indigenous Period sites were found at The Narrows, approximately 32 km southwest of Ashern, MB, which contained Middle and Late Indigenous period ceramics. Several kilometres west of The Narrows, a Thunderbird Nest is located near the shore of Lake Manitoba.

9.2.3.2 Indigenous/European period (c.a. 300 B.P. to present)

This area was traditionally occupied by the Anishinaabeg and Cree peoples before and at the time of European settlement and is also the homeland of the Red River Metis. While the archaeological record is sparse and does not provide direct evidence of cultural identity, the Laurel and Blackduck Pottery recorded in the area are thought to be associated with the Anishinaabe or Ojibwe culture. Despite this, it is acknowledged that there are longstanding cultural and spiritual connections with the land throughout the territory stemming from the ancestors of this territory to present day.

The earliest accounts of Europeans exploring the interior of the country can be found in the writings of Henry Kelsey, who in 1691 accompanied a party of Indigenous people into the prairies. His account, written in poetic format and spatially vague, suggests that he wintered to the north and west of the Interlake Region. The Interlake Region became known to Europeans early in the fur trade and exploration periods.

The first European explorer in southern Manitoba was Pierre Gaultier de La Vérendrye. It was La Vérendrye's sons, Jean-Baptiste and Pierre, who were the first to reach Lake Winnipeg in the summer of 1733, following the Winnipeg River northwest to its mouth, where they explored the shoreline of the vast lake. In 1734, they constructed a fort on the Red River, about 5 miles north of the present-day city of Selkirk that they named Fort Maurepas. They later founded another fort by the same name near Pine Falls, later to be called Fort Alexander - now Sagkeeng (Crouse, 1928).

Between 1741 and 1743, Pierre La Vérendrye pushed far to the north, into the Interlake district of Manitoba, founding forts on Lake Winnipegosis, Cedar Lake, the northern tip of Lake Winnipeg, and the Saskatchewan River.

With the arrival of Europeans and the introduction of mercantile capitalism and a wage economy, the traditional subsistence economy evolved to accommodate these changes. As a result, a hybrid or mixed-subsistence economy emerged in which aspects of both parent economies were blended. A mixed subsistence economy continued to allow for freedom of movement, in which Indigenous peoples followed a seasonal round of activities. Activities mainly centered on hunting and fishing for personal consumption and trapping and fishing for trade goods and supplies (Petch 1998).

One source of information on Indigenous land use patterns in the Interlake is a report by Henry Youle Hind describing the results of the Canadian Red River exploring expedition of 1857 and the Assiniboine and Saskatchewan exploring expedition of 1858 (Hind 1971). Two important activities are identified, fishing and camping, with several mentions of fishing stations at river mouths or at locations not far upstream from river mouths. With specific reference to the Interlake, Hind's journal notes:

> Near the mouth of Little Saskatchewan (Dauphin) River "...we met an Indian family journeying in a small canoe towards the mouth of the Red River...The father was born on the shores of Lake Winnipeg, and had never travelled east of that lake." (Hind 1971)
>
> "…indeed the Indians report the whole of the country between Lake Winnipeg and Lake Winnipegosis as one vast "muskeg" – the great moose-hunting grounds of the Swampys [Cree]" (Hind 1971).

Reverend Abraham Cowley's journals from his time posted in Fairford record that the Saulteaux frequently utilized campsites along waterways during both the summer and the winter (Belanger 2000).

Large-scale commercial fisheries, such as those occurring on Lake Winnipeg, were protested by First Nations around the lake as early as the 1890's, but no action was taken. By the 1920s, the fishery on Lake Winnipeg was dangerously on the verge of collapse (Petch 1994).

In 1875, the Canadian Government granted a group of Icelandic immigrants a 'reserve' in what is now the Gimli area. The settlers selected an area extending 57.9 km (36 miles) along the western shore of Lake Winnipeg from Boundary Creek near Winnipeg Beach to north of the White Mud River, which was renamed the Icelandic River. The reserve also included Big Island, now Hecla Island, and became known as 'New Iceland' (Gimli Community Web, 2005). The government surveyed a road 36 miles long and 25 feet wide the entire length of 'New Iceland', following the lakeshore. Icelandic settlers were employed in clearing and building what became known as the colonization road, which eventually extended from Riverton along the lakeshore to join a road already built from the south as far as Netley Creek.

The Federal Government failed to acknowledge that there were First Nations people already living in the region. The Icelandic settlers wrote about their first meeting with the local Indigenous population at the Icelandic River, and specifically a man named John Ramsay. Ramsay indicated that the lands north of the Icelandic River was part of their territory (Gimli Women's Institute 1974). During the difficult early years of their settlement period, the Icelanders were assisted by the local Indigenous peoples from the area who brought them dried moose meat and milk. Ramsay taught the

Icelanders how to build wind-proof cabins, make leakproof boats, and how to hunt and fish (Gimli Women's Institute 1974). Indigenous presence in the Gimli area lessened to where Indigenous peoples were only seen travelling between Fisher River Reserve and Selkirk-St. Peters via the gravel ridge, stopping only seldomly to trap (Ewanchuk 1977).

During 1876-1877, a smallpox epidemic swept through New Iceland claiming 102 lives, mostly children and young people and the entire Icelandic settlement was put under quarantine (Laxdal and Somerville 1950). John Ramsay's wife and three of his four children also died in the epidemic and are buried alongside the Icelandic settlers at Sandy Bar, where he placed a marble tombstone to mark their graves. The suffering through epidemics, floods, and frustration by the rocky, unproductive land, lead to 150 of the 200 original families leaving the settlement.

Figure 9-2: 'A Souteaux Indian travelling with his family in winter near Lake Winnipeg' – painting by Peter Rindisbacher, circa 1825

By the late 1890s, it became apparent that the whole region originally allotted to the Icelanders would not all be settled by them. Accordingly, the west part of New Iceland was opened up for immigrants from Central European countries who were arriving in Canada in vast numbers (Laxdal and Somerville 1950). Unoccupied odd-numbered sections of Township 18, Range 3 East and Township 19, were released for the European settlers.

The Canadian Pacific Railway arrived in 1906 bringing city dwellers who came to enjoy the lakeshore and who built summer homes. In 1943, under the British

Commonwealth Air Training Plan, originally called the Royal Canadian Air Forces Station Gimli, an airbase was built as a flying training school to prepare air crews for WWII and post-war efforts. It closed in 1971 and became the Gimli Business Park. The former living quarters have been converted to condominiums and there are still some original buildings (Gimli Community Development Corporation 2024). This area has been given an archaeological Borden number, EdLg-002.

In 1967, the House of Seagram planned to establish a distillery in Manitoba to serve Western Canada and chose Gimli because of its unlimited supply of water from the flowing artesian wells. This is now the Diageo plant which spans 360 acres of property one mile north of Gimli, and which will be the termination point of the project.

9.2.4 Registered heritage sites

A review of the provincial and municipal designated sites and commemorative plaques indicated a total of 1 provincial site, 14 municipal sites and 44 plaques as being in the RAA. A list of the designated provincial and municipal sites can be found in Table 9-3.

Table 9-3: Designated provincial and municipal sites located within the RAA	
Name	Site type
Gimli Public School	Municipal
Ukrainian Catholic Church of the Blessed Virgin Mary	Municipal
Gimli Unitarian Church	Municipal
Jonasson House	Municipal
Gimli Dance Pavillion	Municipal
H.P. Tergesen and Sons General Merchant	Provincial
St. Michael's Ukrainian Catholic Church	Municipal
St. Michael's of Archangels Roman Catholic Church	Municipal
St. Mary's Ukrainian Catholic Church	Municipal
Sts. Cyril and Methodius Roman Catholic Church	Municipal
Icelandic Pioneer Cemetery	Municipal
Thorson Cottage	Municipal
Davidson-Wigg Cottage	Municipal
Goodman-Wolstencroft Cottage	Municipal
Maryville Cottage	Municipal

The HRB provided a dataset of historic cart trails in Manitoba. Of interest, and close to the study area, is the 'Colonization Trail' which runs parallel to the shoreline of Lake Winnipeg.

The overall archaeological record of the RAA is not well documented, mainly due to lack of research and limited studies in the area. The provincial site registry listed nine registered archaeological sites within the RAA (Table 9-4). These sites are primarily near the shores of Lake Winnipeg.

Table 9-4: Provincially registered archaeological sites located within the RAA

Site	Site type	Description
EdLf-003	Precontact	Surface collected scraper found on lakeshore
EdLf-004	Precontact	Isolated find of an antler harpoon on lakeshore
EdLf-001	Precontact	Isolated find of a Besant/Sonata projectile point
EdLf-002	Precontact	A poorly recorded site on lakeshore
EdLf-Y1	-	Isolated find, poorly recorded
EdLg-001	Historic	Isolated find of a tobacco pipe
EeLf-001	-	Isolated find, poorly recorded
EdLg-002	Historic	Property associated with air force base
EeLh-001Y	Precontact	Ancestral remains, 16 perforated bear canines

Four of the registered archaeological sites were identified as Precontact (Indigenous Period) with one site containing a Besant/Sonota project point, and another site containing an antler harpoon.

There are two Indigenous European period sites consisting of a single find of an early historic tobacco pipe, and the WWII Flying Training School, the Royal Canadian Air Forces Station Gimli.

One site consists of ancestral remains which were observed in a gravel pit by the Geological Survey of Canada's R.T.D. Wickenden in 1935. The remains were found associated with 16 perforated bear canines. Correspondence with the curator of Western Archaeology at the Canadian Museum of History indicated that they do not have any record that these remains were collected, and no description was provided. Their catalogue lists that the perforated bear canines are in their collections.

The two remaining archaeological sites are poorly recorded and identified as isolated finds with limited information and no cultural association provided.

All known sites found in the RAA are small or isolated occurrences found in disturbed contexts. Therefore, our understanding of the human use and occupation of the region is limited. Since few previous archaeological surveys have occurred within the RAA, it is difficult to determine the range of site types and temporal affiliations that could be expected to occur.

9.2.5 Cultural sites, features, and contemporary land use

Although the physical landscape and access permissions have been highly altered over time, the RAA continues to house culturally important sites, support harvested resources, and provide opportunities for First Nations people and Red River Métis citizens to undertake rights-based activities.

9.2.5.1 Cultural sites and features

Through engagement on this project and past projects, Manitoba Hydro understands that both Crown and private lands are used for practicing rights-based activities.

Crown land is highly valued as it is available for First Nations people and Red River Métis citizens to use for rights-based activities without permission. In the Manitoba Métis Federation's Manitoba-Minnesota Transmission Project (MMTP) Métis Interests Report (2016), the Manitoba Métis Federation explains the importance of unoccupied Crown land as "…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." (Manitoba Métis Federation 2016)

The preferred route does not traverse any Crown land. There is one parcel (quarter section) of Crown land partially within the LAA, approximately 800 metres north of the new transmission line route. The LAA is approximately 0.33% Crown land, while approximately 9.94% of the land in the RAA is Crown land.

With landowner permission, private lands also provide areas for First Nations people and Red River Métis citizens to undertake rights-based activities. During project engagement, the Manitoba Métis Federation shared that they have received concerns about the project from Red River Métis citizens, who are also landowners in the area.

Based on past engagement on transmission lines in southern Manitoba, Manitoba Hydro also understands that both Crown and private land can contribute to the fulfillment of Treaty Land Entitlement (TLE) agreements. TLE agreements have been negotiated between certain First Nations and the federal government to fulfill outstanding land-related treaty obligations (Indigenous Services Canada 2017a). Although there are currently not any TLE selections in the RAA, both Brokenhead

Ojibway Nation and Peguis First Nation, who are being engaged about the project, have TLE settlement agreements that are not yet entirely fulfilled. Both nations' TLE agreements include an amount of provincial Crown land to be selected as well as an amount of land to be acquired from private landowners who are willing to sell (Indigenous Services Canada 2017b).

In addition to these broad types of land and interests in land, other important sites identified during project engagement mainly included locations of high heritage concern to engaged nations. At the community perspective workshop, participants identified locations of high heritage concern within the LAA, including relic stream beds, a relic lakebed, and an old beach ridge. Peguis First Nation shared that Willow Island, which is located in the RAA, was likely used historically, and that a cache of stone knives was found in the area. Peguis First Nation also shared the perspective that there has not been a lot of archaeological work completed in the area, suggesting that information about known heritage sites may be limited.

Manitoba Hydro also learned about an island of trees west of Diageo's facility, which was identified as an eagle nesting area during project engagement. Participants in both the public and First Nation and Métis engagement process expressed concerns about how removal of these trees would impact eagles. Eagles, flying highest and closest to the Creator, are culturally important and considered sacred to Indigenous peoples. Eagle feathers are commonly used in ceremonies (CBC 2021).

9.2.5.2 Contemporary land use

Rights-based harvesting activities that may occur in the RAA include hunting, trapping, and gathering traditional use plants, medicines, and other natural materials. The potential for disturbance to these activities, or the loss of access and resources that support these activities, are concerns frequently shared by First Nations people and Red River Métis citizens when new transmission lines are planned.

During engagement, Peguis First Nation shared that many community members utilize the area, specifically mentioning hunting and trapping as rights-based activities being undertaken. During the landowner open house on July 9, 2024, Manitoba Hydro also heard that private farmlands provide hunting grounds that are used to feed some participants' families. Species hunted and trapped in the area were not specified.

The project area is within the Métis Recognized Harvesting Area. Citizens of the Manitoba Métis Federation abide by the Laws of the Harvest as well as provincial regulations concerning hunting seasons. The Métis Laws of the Harvest are focused on being conservation minded and include the right to harvest food and domestic use (rather than commercial purposes) accompanied by rules about how to do so appropriately (Manitoba Métis Federation 2013).

In terms of gathering, Manitoba Hydro heard, during project engagement, that plants and medicines harvested near the preferred route include mushrooms, wild raspberries, cranberries, juniper, and sage. According to a literature review of regional vegetation descriptions, it is expected that a variety of traditional use plant species would occur throughout the area. During roadside surveys conducted in June and July 2024, traditional use plants identified within the study area included hardwood trees, tall shrubs and a variety of low shrubs and herbs. Some berry shrubs recorded were saskatoon, chokecherry, and highbush cranberry. Other traditional plants observed included seneca, snakeroot and sweetgrass. Traditional use plants are also discussed in Chapter 7.0 (Vegetation and wetlands) and the technical memo in Appendix C.

During project engagement, Manitoba Hydro also heard that bones are gathered for Indigenous crafts.

Manitoba Hydro recognizes that a lack of information regarding important sites does not necessarily represent a lack of cultural use or importance of the area. Even where specific important sites were not shared through project engagement, Manitoba Hydro assumes that they are potentially present within the project region. Further, Manitoba Hydro understands that the area is of broad cultural importance to engaged First Nations and the Manitoba Métis Federation who have maintained enduring relationships with the land in the area for generations.

9.3 Project interactions with harvesting and important sites

Table 9-5 identifies, for each potential effect, the physical activities that might interact with the harvesting and important sites and result in the identified effect.

Table 9-5: Project interactions with harvesting and important sites

Project activity	Changes to harvested resources	Changes to important sites	Changes in access to harvesting areas and important sites	Changes in the experience of harvesting and visiting important sites
Transmission Line Construction				
Mobilization and staff presence	✓	–	–	✓
Vehicle and equipment use	✓	✓		✓

Table 9-5: Project interactions with harvesting and important sites

Project activity	Changes to harvested resources	Changes to important sites	Changes in access to harvesting areas and important sites	Changes in the experience of harvesting and visiting important sites
Access development	✓	✓	✓	✓
Right-of-way clearing	✓	✓	✓	✓
Marshalling / fly yards	✓	✓	✓	✓
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	✓	✓	✓	✓
Implosive connectors	✓	–	–	✓
Helicopter use	✓	–	–	✓
Clean-up and demobilization	✓	✓	–	✓
Transmission Line Operation				
Transmission line presence	✓	–	–	✓
Vehicle and equipment use	✓	✓		✓
Inspection patrols	✓	–	✓	✓
Other maintenance activities	✓	✓	✓	✓
Vegetation management	✓	✓	✓	✓
Decommissioning				
Mobilization and staff presence	✓	–	–	✓
Vehicle and equipment use	✓	✓		✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	✓	✓
Rehabilitation	✓	–	✓	✓
Clean-up and demobilization	✓	–	–	✓

✓= Potential interaction
– = No interaction

9.4 Assessment of project effects

While effects to harvesting and important sites could occur during construction, operation, and decommissioning, they are anticipated to be most pronounced during construction and include the following:

- Changes to harvested resources
- Changes to important sites
- Change in access to harvesting areas and important sites
- Change in the experience of harvesting and visiting important sites

The assessment draws on information shared by rights-bearing nations and individuals during project engagement and the residual effects characterizations related to other valued components assessed throughout this report with connections to harvesting and important sites.

The following sections assess the pathways for each effect, describe mitigation measures to reduce potential effects, and characterize residual effects following the application of mitigation measures.

9.4.1 Effects pathways

9.4.1.1 Changes to harvested resources

Harvested resources refer to wildlife, birds, fish, plants, medicines, and other natural materials that may be acquired through harvesting activities like hunting, trapping, fishing, and gathering. The pathways through which harvested resources may be affected by the project include:

- Direct loss or alteration to the availability of harvested wildlife, traditional use plants, and/or medicines due to development and maintenance of the transmission line right-of-way
- Disrupted and altered movement of wildlife and bird species due to project activities and presence of the transmission line

The project has the potential to change harvested resources available in the project area during construction, operation, and decommissioning.

<u>Analytical assessment techniques</u>

Changes to harvested resources are assessed by considering predicted residual project effects on vegetation and wetlands (Chapter 7) and wildlife and wildlife habitat (Chapter 8), which are understood to be directly connected and relevant to a holistic discussion about effects to harvesting, as well qualitatively considering feedback related to harvested resources from project engagement and past projects.

Construction

Vegetation clearing and grubbing to establish the 40 m right-of-way is a pathway to a direct change to harvested resources through the removal or alteration of vegetation in the PDA, which may include traditional use plants and medicines. Through project engagement, Manitoba Hydro heard that mushrooms, wild raspberries, cranberries, juniper, and sage are harvested in the LAA.

If located along the PDA, right-of-way establishment would result in a loss of these traditional use plants and medicines as well as any others that may be present. Along certain portions of the PDA, vegetation clearing will also result in the removal of habitats, which support harvested bird and wildlife species, altering habitat availability in the LAA and RAA.

In total, approximately 33 ha of forest will require clearing within the PDA. This reflects a 2.4% reduction in forested area in the LAA (Chapter 8, Table 8-4).

Physical damage or a decrease in the quality of traditional use plants can also result from equipment and vehicle movement during mobilization, demobilization, and the establishment of marshalling yards.

Heavy equipment and vehicle use may alter vegetation communities due to soil compaction, rutting, and admixing. These activities also 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 traditional use plants.

Construction activities that create noise or dust (i.e., sensory disturbances), including mobilization, vehicle use, clearing of the right-of-way, tower assembly, and conductor stringing (e.g., implosive connectors, helicopter use), may also temporarily disrupt the abundance of harvested birds and wildlife in the RAA.

Wildlife tend to avoid areas where active construction is taking place, subsequently influencing their abundance and availability in preferred and/or predictable harvesting locations. Wildlife and bird species important to harvesters may alter their movement or breeding patterns within the RAA to avoid the PDA during active construction. Displacement of wildlife from the area, associated impacts to hunting, and broader impacts to biodiversity were concerns shared during project engagement.

Although dust may have a temporary physical effect on traditional use plants close to the construction area (via smothering), it is not anticipated to result in a meaningful change in the quality of traditional use plants.

Operation

During operations, the project may continue to have effects on harvested resources due to the ongoing presence of the line and due to temporary disturbances associated with periods of inspection and maintenance, including vegetation management.

Following construction, the right-of-way will be managed in a manner that allows a patchwork of shrubs, willows, grasses, and other short growing vegetation to re-establish, but not trees or tall shrubs. The presence of a cleared right-of-way can affect different species in different ways, potentially increasing movement and presence along the PDA for species that prefer shorter vegetation and increasing avoidance of the PDA by others. With alterations to wildlife movement (e.g., between mating areas, overwintering grounds, and dispersal corridors), there is potential to alter predator-prey relationships and increase the spread of diseases. The presence of the transmission line (towers and conductors) may lead to an increase in the mortality of some birds and small mammals by providing perching areas for predatory birds and introducing a risk of bird-wire collisions.

Changes in environmental conditions (e.g., light, soil moisture) in previously forested areas along the PDA, may also alter the abundance of plants important to First Nations people and Red River Métis citizens. Some plants may decrease in abundance, while others may increase.

Project effects on harvested resources may be elevated on a short-term basis during isolated periods of inspection and maintenance activities including vehicle and equipment use, inspections, vegetation maintenance, and maintenance work on the transmission line as the need arises.

Vegetation management is likely to have a direct effect on harvested resources through the periodic removal of vegetation along the PDA that may include traditional use plants and provide habitat for harvested wildlife species. Concerns about the use of herbicides and the potential effects on plants, animals, and humans who harvest and consume those plants and animals are commonly shared during First Nation and Métis engagement on transmission projects.

Manitoba Hydro's integrated approach to vegetation management seeks to establish a self-sustaining, low-growing plant community along the right-of-way. Herbicides are used to target tall growing species, leaving shorter species to flourish. Herbicides are not applied indiscriminately. By encouraging lower growing plants to re-establish along the transmission line right-of-way, taller trees are less likely to grow and affect the transmission line. A typical vegetation management cycle is approximately 5 to 10 years.

Manitoba Hydro has established several other herbicide use and application practices that limit the potential for herbicides to alter the quality of traditional foods. These include not treating environmentally sensitive sites (ESS) with herbicides. Environmentally sensitive sites may include areas identified through project engagement or Indigenous Knowledge reports as being used for gathering berries or harvesting other traditional use plants or medicines. If specific locations of concern are shared, we can consider additional measures under the environmental protection program (EPP) to protect locations, features, areas, activities, or facilities that are ecologically, socially, or culturally important or sensitive sites from herbicide use.

Other effects on harvested resources during maintenance activities include displacement or disruption of harvested wildlife and traditional use plant species that may result from sensory disturbances and ground disturbance associated with the periodic use of vehicles and equipment.

Decommissioning

During decommissioning, harvested resources may be affected though pathways like the construction phase. Mobilization and presence of staff, vehicle and equipment use, removal of transmission line infrastructure, rehabilitation, and clean-up and demobilization may disrupt harvested wildlife and bird species through sensory disturbances and increased mortality risk and harvested traditional use plants and medicines through ground disturbance.

9.4.1.2 Changes to important sites

Important sites, including heritage resources and cultural sites or features important to First Nations people and Red River Métis citizens, may be changed by the project through the following pathways:

- Disruption of heritage resources during activities involving ground disturbance such as clearing and grubbing, temporary access trails
- Disturbance of surface cultural sites or features important to First Nations peoples or Métis citizens

Important sites, including heritage resources and other tangible cultural sites or features present in the soil or on the landscape in the project area, are primarily vulnerable to project activities involving ground disturbance. Less common is disturbance of heritage resources located on the surface because they are easier to detect prior to project activities. This would also include spaces used for ceremony or other cultural purposes, such as trees with prayer flags.

Analytical assessment techniques

Changes to important sites are assessed by predicting the project's potential to encounter heritage sites and/or resources and other culturally important sites and features.

In relation to heritage resources, the likelihood of an area to contain heritage resources is known as the archaeological potential. Archaeological potential within the project areas was assessed by reviewing archival maps, photos, LiDAR, information gathered during project engagement, input from the HRB, and mapping potential locations (e.g., types of landforms, nearness to documented heritage resources, proximity to water) in relation to the project footprint.

Because registered archaeological sites or heritage resources are protected under *The Heritage Resources Act*, maps of these locations cannot be made public and are not provided in this assessment.

The assessment of possible effects on cultural sites, features, and practices qualitatively draws on information shared through First Nation and Métis engagement and experience in the protection of these sites on past projects with the involvement of the archaeological community and Indigenous nations.

Construction

During construction, the primary project activities that may result in disruption of heritage resources and tangible cultural sites or features are those that involve ground disturbance or clearing of vegetation including the use of vehicles and equipment, right-of-way clearing, access routes, marshalling/fly yards, and transmission tower construction.

Review of available heritage resources information determined that there is only one recorded heritage site near the PDA. Five areas with elevated heritage potential were identified (include reference to existing conditions section).

During project engagement, a likely relic stream bed, a relic lakebed, and an old beach ridge were identified as areas with elevated heritage potential along the PDA.

During engagement on past transmission line projects, we have heard feedback on the importance of having specific plans in place that indicate how heritage findings must be addressed if found during construction. There is concern that work crews constructing the project may not be able to identify or notice heritage resources or other cultural sites if they see them and may damage them unknowingly. The Cultural and Heritage Resources Protection Plan (CHRPP) seeks to respond to these concerns and outlines what steps staff and contractors must take in the event of an accidental discovery during construction.

Peguis First Nation shared that their largest concerns about the project relate to impacts to heritage. Peguis First Nation shared concerns about *The Heritage Resources Act*, including the perspective that the legislation sets lower standards for archaeology than what Peguis First Nation would like to see. Peguis First Nation shared that interpretations of heritage differ between western science and Indigenous knowledge. Peguis First Nation shared concerns related to the eastern edge and western side of the project area as being areas of high potential for historical use in the area. As such, Peguis First Nation's perspective is that these areas have higher potential for tangible heritage resources.

Peguis First Nation expressed interest in involvement in the heritage resource impact assessment (HRIA) process, providing input into heritage methodologies, involvement in report writing related to culture and heritage, and having opportunities for First Nations and the Manitoba Métis Federation to provide information on sensitive areas before a heritage permit is applied for. Acknowledging the overlapping nature of traditional territories, Peguis First Nation also suggested the idea of establishing a regional Indigenous heritage committee.

Operation

During operations, the potential for the project to disturb important sites is substantially diminished because ground disturbance is anticipated to be low. Potential effects during operations are generally related to maintenance activities, including vehicle and equipment use for repairs and vegetation management.

New information that may be learned about important sites in the area during construction may highlight new pathways to potential effect relevant to operations.

Decommissioning

During decommissioning, important sites may be affected through pathways similar to the construction phase.

Decommissioning activities such as vehicle and equipment use, disassembly and removal of transmission line infrastructure, and rehabilitation require ground disturbances. Effects would primarily be limited to previously undisturbed areas.

However, it is possible that new important sites for rights-based activities could be established between construction and decommissioning of the project.

9.4.1.3 Changes in access to harvesting areas and important sites

The project has the potential to affect access to harvesting areas and important sites during construction, operation, and decommissioning. Access, in this context, refers to whether and how people can physically visit an area.

The pathways through which access to harvesting areas and important sites may be affected by the project include:

- Direct loss of access to the footprint of transmission tower structures
- Direct loss of access to the right-of-way during construction, and intermittently through operations, due to access restrictions
- Increased or altered access to the area resulting from the presence of the cleared right-of-way

Analytical assessment techniques

Changes in access to harvesting areas and important sites are assessed by considering the presence of known areas visited for rights-based activities, the anticipated duration of disruptions to access, and qualitatively assessing feedback related to access during project engagement and on past projects.

Construction

Effects on access will primarily occur during construction because access to the PDA (right-of-way) is prohibited for the duration of active construction. Physical barriers (i.e., gates, fences) may be in place during this time to deter access to the area. These access restrictions are intended to protect human health and safety while construction activities are underway. However, the restrictions also prevent access to harvesting areas, important sites, and access points that may be located along the PDA.

During project engagement, Manitoba Hydro heard that there are harvesting areas and important sites within the project area, including along the PDA, which illustrates that restrictions to access may directly affect the ability to practice rights-based activities during construction.

Based on engagement on this project and past projects, Manitoba Hydro understands that the temporary loss of access to harvesting areas along the right-of-way during construction may result in First Nations people and Red River Métis citizens having to travel further and spend more time and energy to access locations where they can practice rights-based activities. The access restrictions may also contribute to alienation from the land in the PDA and interrupt opportunities for Indigenous Knowledge transmission that occurs through harvesting and other cultural activities.

There is the possibility that there could also be temporary traffic disruptions that affect access to areas adjacent to the right-of-way, within the LAA, during construction.

Operation

Through operations, the area of tower footprints will be permanently inaccessible due to physical occupation by the transmission towers.

Aside from the tower footprints, access permissions on the PDA will be like those in place prior to construction. In other words, if an area traversed by the project was previously accessible to rights-holders, it will again be accessible during the operational phase. There is no Crown land along the PDA. Therefore, construction of the project is not predicted to result in a decrease in access to areas that can be freely accessed by First Nations people and Red River Métis citizens for rights-based activities without permission. In areas of private land along the PDA, where landowners may currently grant permission for individuals to use their property to undertake rights-based activities, those areas would be inaccessible during construction.

During vegetation management and maintenance activities, there will be intermittent and short-term disruptions to access along the PDA. These restrictions are intended to protect human health and safety when crews are actively performing work on the transmission line or right-of-way.

During operations, another pathway through which access may be altered is through increased access by people who may not have previously visited the PDA resulting from the presence of the cleared project right-of-way. Aside from access by Manitoba Hydro crews for inspection, the potential of the project to increase the number of people accessing the area is anticipated to be negligible given that the project is proposed entirely on private land on which landowner permission is required for lawful access.

Decommissioning

During decommissioning, access restrictions like those in place during construction would apply to the PDA during the disassembly and removal of transformers, towers, foundations, conductors, and associated equipment as well as during rehabilitation of the right-of-way. During this time, physical barriers (i.e., gates, fences) may be in place to deter access to the area. These access restrictions are intended to protect human health and safety while construction activities are underway.

Following decommissioning, access restrictions to the PDA would revert to those in place prior to the project. After removal, the locations of tower footprints would no longer be permanently inaccessible.

9.4.1.4 Changes in the experience of harvesting and visiting important sites

The project has the potential to change the experience of harvesting and visiting important sites. Experience, in this context, refers to how the area looks, sounds, and feels to different individuals and communities.

It is important to acknowledge that changes to harvested resources, changes to important sites, and changes in access to harvesting areas and important sites discussed above inherently effect the experience of harvesting and visiting important sites. This section focuses on additional pathways through which the experience of the area may be affected by the project including:

- Direct loss or alteration of opportunities for the sharing of Indigenous Knowledge that occur through harvesting and visiting important sites
- Disruption to aspects of intangible cultural heritage or cultural experiences due to changes in sensory experience and sense of place
- Decreased preference or enjoyment undertaking rights-based activities in the area

Analytical assessment techniques

Changes in the experience of harvesting and visiting important sites are assessed qualitatively through consideration of feedback from project engagement, feedback from past transmission projects, and the residual effect conclusions related to community well-being (Chapter 14), specifically those related to sensory (visual and auditory) conditions resulting from the project.

Construction

During construction, the project may affect intangible cultural heritage and the experience of important sites through project activities that cause noise, changes to visual aesthetics, or a decreased sense of place and well-being when visiting the project area.

Throughout construction, there will be an increase in noise or change in the types of noise in the project area resulting from activities like mobilization of staff presence, vehicle and equipment use, right-of-way clearing, and tower construction. Auditory disturbances from construction activities are expected to be localized to the area under active construction except for the potential use of helicopters and the use of implodes for conductor splicing, which creates a noise similar to a shotgun.

During construction, changes in visual aesthetics are primarily the result of vegetation clearing and grubbing, but are also affected by transmission line tower erection, conductor stringing, and the presence of staff, vehicles, and equipment.

Dust generated during construction activities may also diminish the experience and enjoyment of harvesting and visiting important sites near the PDA. Dust generation is expected to be minimal, localized, and short-term in nature.

Operation

During operations, the experience of harvesting and visiting important sites may continue to be affected by auditory changes, visual changes, and perceived stress or concerns arising from the presence of the transmission line.

Noise generated by the project is expected to be less during operations than during construction. The auditory experience at important sites very close to the transmission line may be altered from their current state due to the potential presence of corona discharge, which causes a hissing or crackling noise that sometimes occurs with high voltage transmission lines. Audible noise from corona discharge along the edge of the right-of-way is expected to be approximately 23 dBA during medium to fair-weather conditions (Exponent 2015b). This is less than the typical ambient noise level of 45 dBA for a quiet rural area (Health Canada 2017). Therefore, corona discharge is only anticipated to potentially alter noise in areas underneath or very close to the transmission line. Some individuals may choose to no longer use a harvesting area because they find the sound unpleasant.

Other sources of noise during operations will be specific to maintenance activities and would be intermittent, temporary, localized, and contained mostly within the PDA.

The visual experience in the vicinity of the project will also change due to the presence of new cleared right-of-way and the transmission line. Following construction, the right-of-way will be reclaimed. However, vegetation will be maintained in a different state than before construction. Based on published literature, presence of a new 230 kV transmission line is not anticipated to strongly attract visual attention beyond 4 – 8 km away, at which point the transmission line is likely considered to be in the near background ((Sullivan, et al. 2014); (Palmer 2016)). 14.0 (Community well-being) considered potential project effects on tranquility, including visual and aural factors.

First Nations people and Red River Métis citizens have shared that alterations to the land and sensory disturbances, both visual and auditory, can change traditional experiences and decrease preference for harvesting or undertaking other rights-based activities, such as ceremony, on lands around transmission lines.

Changes to aesthetic conditions resulting from the project may affect First Nations people's and Red River Métis citizens' sense of place and their emotional and spiritual attachment to culturally important places. To experience a sense of place it is critical to have the ability to enjoy the surroundings without sensory disturbances, stress, or harassment (Cedar LNG Partners LP 2022).

The experience of the area for First Nations people and Red River Métis citizens may also be altered by real or perceived health concerns and stress associated with the presence of the project. Some individuals may choose to avoid areas near the transmission line because of concerns about safety related to corona discharge, herbicide use, and electromagnetic fields (EMF).

A loss or diminishment of the experience of harvesting or visiting important sites, through the pathways described, may have long-term implications on cultural vitality of First Nations people and Red River Métis citizens due to diminished opportunity for the intergenerational transmission of Indigenous Knowledge that occurs through participating in cultural practices (i.e., intangible cultural heritage). Impacts to heritage resources, and the potential associated loss of history, may also contribute towards a loss of cultural continuity.

In the Clean Environment Commission's hearing report related to the Bipole III transmission project, the Commission stated that "It is important to realize that many activities carried out in the environment, such as trapping, hunting, fishing, and resource harvesting, are as much cultural practices as they are economic activities. As a result, then, anything that disrupts these activities also disrupts culture." (Manitoba Clean Environment Commission 2013)

Decommissioning

During decommissioning, all activities have the potential to affect the experience of harvesting and visiting important sites in the LAA. The pathways to effect are like those during construction. Any activities changing the sensory experience have the potential to effect tranquility and sense of place, disrupting aspects of intangible cultural heritage or cultural experiences, and may lead to decreased preference or enjoyment visiting the area to undertake rights-based activities. Any disruption to cultural experiences may result in a direct loss in opportunities for sharing Indigenous Knowledge, including the use of Indigenous language, and effect long-term cultural continuity and the vitality of Indigenous languages.

9.4.2 Mitigation measures

Potential effects can be avoided through implementation of effective mitigation measures including general environmental protection measures, beneficial management practices, standard operating procedures, environmental protection plans, and environmental restoration plans.

This section describes mitigation measures that have been identified to reduce effects on harvesting and important sites.

9.4.2.1 Mitigation for changes to harvested resources

Potential project effects on harvested resourced have been reduced through the transmission line routing process, which considered areas that support harvested resources such as ecological reserves, wildlife management areas, park reserves, traditional use planning areas, national and provincial parks, provincial forests, and land trusts as areas of least preference (Appendix A). The routing process also considered forests, wetlands, published information about species of conservation concern, and feedback shared during project engagement, including information about specific traditional use plant species in the area.

The FPR avoided alternative route segment 1, which would have resulted in the loss of a greater area of forest and the disruption of an area of wetland. The FPR also avoided preferred route segment 4, which would have intersected approximately 2.33 acres of oak forest stand, shared to provide a nesting area for eagles, identified during project engagement.

In addition to mitigation measures identified to reduce project effects on vegetation and wetlands (Chapter 7) and wildlife and wildlife habitat (Chapter 8), project-specific mitigation measures to avoid or reduce the potential effects of the project on harvested resources are described below.

- Right-of-way clearing will take place when the ground is frozen when plants are dormant and less sensitive to activity, 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.

- Manitoba Hydro will provide notifications to engaged First Nations, the Manitoba Métis Federation, and relevant interested parties prior to starting construction and prior to starting implosive connector use, given the potential for temporary disturbance of harvested species.
- Engaged First Nations and the Manitoba Métis Federation will be given opportunities to identify sensitive sites to help inform the environmental protection program for the project.
- Sensitive locations specifically identified in the environmental protection plan may be subject to special mitigations such as avoidance of herbicide use at specific locations used for gathering berries and harvesting other types of traditional use plants and medicines.
- Areas identified for selective clearing (e.g., buffer zones, sensitive sites) will be flagged prior to clearing.

9.4.2.2 Mitigation for changes to important sites

Known important sites and areas with high potential for heritage resources were considered during the transmission line routing process.

Manitoba Hydro considered the prevalence of Crown land, which is understood to be highly valued by First Nations in southern Manitoba and the Manitoba Métis Federation, and TLE selections and Additions to Reserve selections. TLE selections are identified as areas of least preference during the transmission line routing process. No part of the PDA crosses a TLE selection, Additions to Reserve selection, or Crown land, thereby mitigating impacts to these types of important sites.

A Heritage Resources Impact Assessment (HRIA) study will be conducted prior to construction activities to identify heritage resources within the PDA and then mitigate the potential effects. The implementation of the CHRPP during the construction phase within areas of high archaeological potential is meant to mitigate any heritage resources disturbed during that phase of the project. These are standard measures applied to other Manitoba Hydro projects and have been successful in avoiding the significance threshold.

Project-specific mitigation measures to avoid or reduce the potential effects of the project on important sites are described below.

- Pre-construction survey of areas with heritage potential. A total of five areas of heritage concern have been identified, including relict channels, elevated terrain features and a possible relict lakebed. These features may have the potential for heritage resources on or along their margins. Areas to be surveyed prior to or during construction have been determined by:

    - reviewing archival maps, photos, LiDAR, mapping potential locations (e.g., types of landforms, nearness to documented heritage resources, proximity to water),
    - reviewing information gathered during project engagement; and examining input from the HRB.
- Mitigation for the protection of heritage sites or objects is outlined in the CHRPP. 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.
- Manitoba Hydro will work to notify engaged First Nations and the Manitoba Métis Federation about archaeological finds.
- Manitoba Hydro remains open to engaged First Nations and the Manitoba Métis Federation in identifying sensitive sites to help inform the environmental protection program for the project.
- Identified cultural and heritage sites will be marked for protection prior to construction.
- Existing access roads, trails or cut lines will be used to the extent possible.

9.4.2.3 Mitigation for changes in access to harvesting areas and important sites

Project-specific mitigation measures to avoid or reduce the potential effects of the project on access to harvesting areas and important sites are described below.

- Contractors will be restricted to established roads and trails and cleared construction areas in accordance with the Access Management Plan.
- Through ongoing project engagement processes, engaged First Nations, the Manitoba Métis Federation and relevant interested parties will be notified about when/where construction is occurring.
- Hunting and harvesting of wildlife, or possession of firearms by project staff will not be permitted while working on project sites.

9.4.2.4 Mitigation for changes in the experience of harvesting and visiting important sites

Through engagement on past projects, Manitoba Hydro has learned about the importance of providing people working on projects, particularly those who are non-local, with Indigenous cultural awareness training prior to work taking place. First Nations have also shared perspectives about the importance of incorporating ceremony into projects to show respect for the spirits and peoples that may be affected by a project. These recommendations provide opportunities for cultural continuity and education.

Project-specific mitigation measures to avoid or reduce the potential effects of the project on the experience of harvesting and visiting important sites are described below.

- Manitoba Hydro will provide notification to engaged First Nations and the Manitoba Métis Federation and relevant interested parties prior to construction start and prior to starting implosive connector use.
- Mud, dust, and vehicle emissions will be managed in a manner that will allow safe, continued activities near construction sites.
- Herbicides will not be used for right-of-way clearing. For maintenance of the right-of-way, an integrated vegetation management program will be used. Manitoba Hydro will consider nonchemical vegetation management in clearly identified sensitive sites that contain plants that are of importance to rights-based harvesters.
- Passive or active techniques to control noise, e.g., construction of barriers or noise cancellation in areas of prolonged noise generation, will be implemented where possible.
- Indigenous Cultural Awareness Training will be required for project workers (i.e., both Manitoba Hydro staff and contractors) before their participation in project work.
- Manitoba Hydro will reach out to engaged First Nations and the Manitoba Métis Federation to determine interest in arranging a ceremony or ceremonies at times that would work for those interested in participating.

9.4.3 Characterization of residual effects

This section describes the residual project effects to harvesting and important sites that are predicted to remain after the application of mitigation measures. Table 9-2 provides the definitions used to characterize the residual effects.

9.4.3.1 Residual effect on harvested resources

After mitigation, predicted residual effects on harvested resources include:

- Changes in the abundance and types of harvested resources available due to residual effects of the project on vegetation and wetlands (Chapter 7) and wildlife and wildlife habitat (Chapter 8).
  - Residual project effects to vegetation and wetlands are characterized as low for all potential effects (change in landscape intactness, community diversity, and species diversity (includes traditional use plants)) during both construction and operation.
  - Residual project effects to wildlife and wildlife habitat are also characterized as low during construction and operation for both changes in wildlife habitat and changes in wildlife mortality.
  - During construction, there will be a direct loss of approximately 33 ha of forest because of clearing the right-of-way, reflecting a 2.4% reduction in forest cover (i.e., wildlife habitat) in the LAA (Chapter 8, Table 8-4). The project will result in measurable changes to vegetation and wetlands, but the changes are unlikely to affect sustainability in the LAA.
- A potential decline in harvesting success rate and an increase in the amount of time and effort by required by harvesters due to changes in the availabilities of harvested resources during active construction and isolated maintenance activities during operations.

Following the implementation of mitigation measures, residual effects for changes to harvested resources are characterized by the following:

- Direction: Adverse
- Magnitude: Low, elevated but still low during construction and isolated periods of maintenance activities
- Geographic extent: PDA for traditional use plants and medicines, extending to the RAA for certain harvested wildlife and bird species during project activities causing sensory disturbances
- Duration: long-term
- Frequency: continuous during construction and decommissioning; during operations, irregular events and continuous for some types of harvested resources
- Change: reversible

9.4.3.2 Residual effect on important sites

Heritage resources and objects are non-renewable and once disturbed or destroyed can never be returned to their original context, losing key information. A potential adverse effect on heritage sites is disturbing them from their *in-situ*[4] condition. Disturbance may range from displacement from the original context to complete destruction. If a disturbed heritage resource gets displaced from its in-situ context, some to all information about the heritage object can be lost. A heritage resource disturbed to a minor extent can retain information such as typology and association with a complex or culture. However, detailed information such as association with other heritage objects from the area and stratigraphic deposition can be lost. At the extreme, disturbing a heritage object can result in the destruction of the object. When a heritage resource is destroyed, no further information can be collected.

For intangible cultural sites and features important to First Nations people and Red River Métis citizens, the potential range of adverse effects is aligned with the range identified for heritage resources, from loss of integrity and/or information about the site or object to complete destruction. Where intangible cultural heritage or cultural experiences may be disrupted, the potential adverse effects are expected to vary broadly based on the unique relationships that different Indigenous nations and individuals have with the area in terms of cultural practices, experiences, and perspectives.

Following the application of mitigation measures, there is still potential for the project to encounter important sites throughout the PDA and potentially decrease the number or quality of heritage resources and other important sites and features.

Residual effects for changes to important sites are characterized by the following:

- Direction: Adverse
- Magnitude: Moderate during construction and decommissioning, low during operation
- Geographic extent: PDA
- Duration: Long-term
- Frequency: Multiple irregular events for most effects to important sites, but effects to intangible cultural heritage may be continuous through operations due to the ongoing presence of the project
- Change: Irreversible

[4] 'In situ' – in the natural or original place of deposition

9.4.3.3 Residual effect on access to harvesting areas and important sites

Following the implementation of mitigation measures, predicted residual effects on access to harvesting areas and important sites include:

- Access restrictions to the PDA during construction, which is anticipated to span four months between winter 2025 and spring 2026
- Intermittent localized access restrictions to the PDA during maintenance activities.
- The need for harvesters to travel further and spend more time and energy to access harvesting locations and recreational areas during periods of restricted access along the PDA.
- Increase in the number of people accessing the LAA including Manitoba Hydro crews and others who may be drawn to the area due to the presence of the newly cleared right-of-way.

Effects to access are not anticipated to extend beyond the LAA (1km from the PDA). There is only one parcel of Crown land in the LAA. Although First Nations people and Red River Métis citizens may access private land for right-based activities with permission, project effects to access to harvesting areas and important sites will affect only those who are landowners or who specifically obtain permission to use private land within the LAA. Therefore, the project is expected to affect access to harvesting areas and important sites for a small number of individuals. During project engagement, Manitoba Hydro heard that land owned by Red River Métis citizens along the PDA is used for rights-based harvesting and acknowledges that certain individuals directly affected may experience an elevated level of disruption to access.

Following the implementation of mitigation measures described above, residual effects for changes in access to harvesting areas and important sites are characterized by the following:

- Direction: Adverse
- Magnitude: Low; elevated but still low during construction, decommissioning, and isolated periods of maintenance activities
- Geographic extent: LAA
- Duration: Long-term throughout construction and decommissioning; During operation, short-term as it relates to access restrictions to the PDA during maintenance activities and long-term as it relates to access changes related to the presence of the cleared right-of-way
- Frequency: Continuous (during construction, decommissioning, and during operations due to presence of the line) and irregular events when maintenance activities take place
- Change: Reversible

9.4.3.4 Residual effect on the experience of harvesting and visiting important sites

Following the implementation of mitigation measures, predicted residual effects on harvesting and recreational experiences include:

- Changes to the visual appearance of the project area resulting from the presence of the project.
- Increased noise or change in auditory experience resulting from project activities and the ongoing presence of the transmission line.
- Decreased preference for and/or diminished enjoyment of harvesting and visiting important sites due to the presence of the line and perceived health risks of the project (e.g., EMF, herbicide use, and the safety of foods harvested in the PDA).
- Potential effects to Indigenous Knowledge transmission and cultural continuity resulting from disruptions to right-based activities.

Following the implementation of mitigation measures, residual effects for changes in the experience of harvesting and visiting important sites are characterized by the following:

- Direction: Adverse
- Magnitude: Low
- Geographic extent: LAA
- Duration: Long-term
- Frequency: Continuous
- Change: Irreversible
    - While sensory related impacts (i.e., noise and visual) could be considered reversible, Manitoba Hydro realizes that potential impacts to Indigenous Knowledge transmission and cultural continuity may not be reversible.

9.4.3.5 Summary of residual effects on harvesting and important sites

Table 9-6 characterizes the residual effect on harvesting and important sites.

Table 9-6: Project residual effects on harvesting and important sites

	Residual Effects Characterization					
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility

Changes to harvested resources						
Construction	A	L	PDA-RAA	LT	C	R
Operation	A	L	PDA-RAA	LT	IR/C	R
Decommissioning	A	L	PDA-RAA	LT	C	R
Changes to important sites						
Construction	A	M	PDA	LT	IR	IR
Operation	A	L	PDA	LT	IR/C	IR
Decommissioning	A	M	PDA	LT	IR	IR
Changes in access to harvesting areas and important sites						
Construction	A	L	LAA	LT	C	R
Operation	A	L	LAA	LT/SH	C/IR	R
Decommissioning	A	L	LAA	LT	C	R
Changes in the experience of harvesting and visiting important sites						
Construction	A	L	LAA	LT	C	IR
Operation	A	L	LAA	LT	C	IR
Decommissioning	A	L	LAA	LT	C	IR

9.4.4 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably foreseeable future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

For harvesting and important sites, the two conditions are both present.

The RAA and broader surrounding region have changed substantially since colonialism in terms of the physical landscape and the ability of First Nations people and Red River Métis citizens to practice rights-based activities in the area. Past and ongoing projects and activities including the development of hydroelectric transmission and distribution lines, roads, settlements, and agricultural development in the RAA have drastically altered the landscape and caused disruptions to the ways in which rights-based harvesting occurs in the area. The land in the area was all once Indigenous traditional lands.

Manitoba Hydro understands that views on how to understand and describe cumulative effects may differ based on cultural backgrounds and preferences. Different nations, or individuals may place different values on different rights-based activities, and it would not be appropriate to assume that the residual effects will impact all First Nations people and Red River Métis citizens in a similar manner.

9.4.4.1 Project residual effects likely to interact cumulatively

Table 9-7 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact infrastructure and services. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 9-7: Potential cumulative effects on harvesting and important sites

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	On harvested resources	On important sites	On access	On the experience
Existing/ongoing projects and activities				
Domestic Resource Use (hunting, trapping, fishing)	✓	-	-	✓
Recreational Activities (Canoeing, Snowmobiling, Hiking)	✓	✓	✓	✓
Commercial resource use (includes fishery and forestry)	✓	✓	✓	✓
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	✓	✓	✓	✓
Hydroelectricity transmission lines	✓	✓	✓	✓
Potential future projects and activities				

Table 9-7: Potential cumulative effects on harvesting and important sites

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	On harvested resources	On important sites	On access	On the experience
Crystal Spring Colony domestic wastewater lagoon	✓	✓	-	✓
Diageo Hydroelectricity Station	✓	✓	-	✓
King's Park Phase 2	✓	✓	✓	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.
– = Interactions between the residual effects of other projects and those of the project residual effects are not expected.

9.4.4.2 Cumulative effects on harvesting and important sites

Pathways for cumulative effect

Ongoing and future projects in the RAA have the potential to interact cumulatively with the project's residual effects on harvesting and important sites if their plans include activities involving ground disturbance, clearing of forested areas, or activities that will create noise and/or access disruptions. Effects related to noise and access will only be additive if the activities causing noise or disruptions in access to harvesting areas and important sites occur concurrently and close to one another.

By pathways like the proposed project, the construction, operation, and decommissioning of the Crystal Spring Colony domestic wastewater lagoon, the Diageo Hydroelectricity Station, and the King's Park Phase 2 subdivision development could adversely affect harvesting and important sites.

The Crystal Spring Colony domestic wastewater lagoon development would be located approximately 9 km south of the PDA and its construction would require ground disturbance and may involve clearing up to 8 ha of deciduous forest, based on desktop review of land cover in the southeast portion of SE 28-18-3 EPM, where the lagoon is proposed. Development of the lagoon is also anticipated to result in noise during construction activities that may contribute to disruptions to certain harvested wildlife species in the area. It is not anticipated that development of the lagoon would interact with project effects on access to harvesting areas and important sites because the lagoon development is restricted to a single parcel of private land located outside of the projects LAA, which is the area within which residual effects to access are anticipated.

The King's Park Phase 2 residential subdivision would be approximately 1km northeast of the Diageo property in 28-19-04 EPM. The 23 planned residential lots overlap a treed area approximately 4.5 ha in size, of which a portion would require clearing to allow for the construction of homes. Therefore, the development is anticipated to interact cumulatively with the project's residual effects on certain harvested resources that may be present in forested areas, such as certain traditional use plants and harvested wildlife species. However, the location is adjacent to properties that are already cleared and/or developed for residential and agricultural purposes. Development of homes and related infrastructure within this subdivision will involve ground disturbance through a portion of the 4.5 ha development area.

The Diageo electric substation is anticipated to interact cumulatively with project effects on harvesting and important sites as it will create noise immediately adjacent to the PDA and will involve ground disturbance. Although the site of ground disturbance will occur within the existing developed footprint of Diageo's property, Manitoba Hydro understands that limited archaeological work has occurred during past development in the area and there will be a potential for the project to encounter heritage resources. It is not expected that work on the Diageo electric substation will result in cumulative effects to access to harvesting areas and important sites because the site of the hydroelectricity station is already unavailable for use for rights-based activities.

Cumulative effects can affect both important sites and the resolution and fidelity of archaeological knowledge. Small impacts may degrade and potentially destroy the integrity of important sites over time, even though the effect of each individual impact is limited. As archaeological sites provide only a small sample of past cultural activity, losing one or more archaeological sites in a region can significantly reduce the archaeological knowledge of a region.

Ongoing activities that have the potential to disturb the ground have the potential to damage or destroy important sites.

Mitigation measures

Project mitigation measures will help reduce project residual effects to harvesting and important sites.

Other proponents in the project area are responsible for reporting project activities to Manitoba Environment and Climate Change and the Historic Resources Branch and may adopt mitigation measures to mitigate their own projects' effects, or they may be required as permitting conditions. The 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 related to heritage resources are addressed by the provincial regulators as they determine whether future projects will require heritage investigations.

Other mitigation measures proposed to reduce cumulative effects on harvesting and important sites include the following:

- For Manitoba Hydro projects and activities occurring in the same geographic area, Manitoba Hydro will make efforts to coordinate access requirements to reduce the need to construct additional access roads.
- Manitoba Hydro will continue to consider feedback related to mitigation for how the project contributes cumulatively to effects to harvesting and important sites in the RAA.

Residual cumulative effect

Residual cumulative effects on harvested resources, access to harvesting areas and important sites, and the experience of harvesting and visiting important sites are predicted to be adverse in direction. Magnitude is predicted to be low based on experience with transmission line projects, consideration of the identified mitigation measures, the residual and cumulative effects characterizations for vegetation and wetlands (Chapter 7.0) and wildlife and wildlife habitat (Chapter 8.0), and feedback heard during project engagement.

Geographic extent of predicted cumulative effects would be the RAA. Cumulative effects resulting from noise and changes in access are likely to be more temporary in nature and only interact cumulatively during periods of overlapping activity. On the other hand, effects related to the disruption of native vegetation (i.e., habitat) and ongoing presence of the projects, are considered long-term until individual projects no longer contribute effects on harvesting and important sites (i.e., until rehabilitation).

While some cumulative effects on harvesting and important sites may be reversible following decommissioning of the projects contributing to effects, Manitoba Hydro understands that effects resulting in the interruption of opportunities for Indigenous Knowledge transfer and cultural continuity that occurs through harvesting and visiting important sites are not reversible.

9.4.5 Determination of significance

With mitigation and environmental protection measures, the residual effects and the cumulative effects on harvesting and important sites are predicted to be not significant.

Manitoba Hydro acknowledges that individuals and communities may experience effects to harvesting and important sites in unique ways. Therefore, effects may be felt to different magnitudes depending on the individual, and some individuals may deem effects as substantive. With this variation in mind, the project is not anticipated to affect harvesting and important sites to a point where the ability to undertake rights-based activities is critically reduced or eliminated long-term based on qualitative assessments of indicators of the potential effects, literature review, engagement feedback, and professional judgment.

9.4.6 Prediction confidence

Prediction confidence in the assessment of effects on harvesting and important sites is moderate.

This prediction confidence assignment reflects the available information regarding rights-based harvesting by engaged First Nations people and Red River Métis citizens, a review of publicly available literature on rights-based harvesting and important sites in the project area, experience with applying and monitoring mitigation measures on past transmission line projects, and the assessments of other VCs of relevance throughout this assessment.

In relation to heritage resources, this prediction confidence reflects the limited number of land-based features of interest and low potential terrain, but also recognizes the limited number of archaeological studies in the area. The prediction confidence of smaller, ephemeral sites and burials is lower. The location decisions for these heritage resources are more specific and thus harder to predict. Chance find policies, as described in the CHRPP, are built around this understanding and outline reporting procedures if heritage resources are encountered in the study area.

Manitoba Hydro is aware that there may be rights-based activities occurring and important cultural sites and features present in the RAA that we are not aware of and have considered this assumption in this assessment.

Given the qualitative and subjective nature of assessing potential effects to harvesting and important sites, specifically to the experience of harvesting and visiting important sites and enjoyment of place, the views of First Nations people and Red River Métis citizens may differ from the findings of this assessment.

9.4.7 Follow-up and monitoring

Due to confidence in predictions and monitoring results from Manitoba Hydro's other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, if environmental inspections identify unexpected effects, monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the EPP (Chapter 16.0).

Manitoba Hydro will continue to work with interested First Nations and the Manitoba Métis Federation to mitigate the above noted effects. The 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 remain open to First Nations and the Manitoba Métis Federation identifying additional sensitive sites to help inform the EPP.

9.4.8 Sensitivity to future climate change scenarios

Effects of climate change on harvesting and important sites are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding), all of which will impact harvested resources and the experiences of rights-based harvesters.

Indigenous communities have cultural and historical ties to the land. Climate change can impact traditional activities (e.g., hunting, fishing, and gathering), affecting food security and cultural practices. Changes to the frequency and impact of wildfires may impact harvested wildlife through changes in habitat and access to food, and traditional use plants and medicines. Wetland vegetation communities may experience increased pressure with increased flooding. Retaining and restoring wetland areas, which provide flood mitigation benefits, is important in anticipation of these climate change scenarios.

As First Nation and Red River Métis harvesters adjust their ways of undertaking rights-based activities in response to climate change, there may be disruptions to cultural vitality and knowledge transmission.

If heritage resources or cultural sites and features are located on the surface, the major risk with climate change is forest fires. Hotter and drier spring and summer weather will contribute to this. Subsurface heritage resources are less effected by fires. However, since charcoal from fires can diffuse into soil, fires may contaminate soil and make dating of subsurface heritage resources difficult. Droughts could expose previously underwater heritage resources, cultural sites, or features, while flooding could result in the disappearance of previously exposed heritage resources, cultural sites, or features.

10.0 Commercial agriculture

Commercial agriculture refers to for-profit production of crops and livestock and is the dominant agricultural practice in the project area. Given the location of the project and the wide range of agricultural land uses reported in the region, project components and activities could affect commercial agriculture.

Concerns were raised about the potential for project effects on commercial agriculture during project engagement (e.g., during discussions with landowners at virtual and in-person information sessions, and through key person discussions with provincial government staff and producer representative organizations).

Commercial agriculture was selected as a valued component because unmitigated effects from project activities during construction like right-of-way clearing, tower construction, and the presence of the project could reduce the amount of land available for agriculture, degrade the quality of land used to support agriculture, and interfere with agricultural activities.

Agricultural land use activities within the project area include:

- production of annual and perennial crops (i.e., row crops, other specialty crops, grains, oil seeds, hay, and forages),
- application of fertilizers, manure, and pesticides,
- raising of livestock (i.e., hogs and pigs, dairy cattle, beef cattle, horses, sheep, bison, and poultry), and livestock grazing, and
- production of honey.

This chapter assesses the potential effects of project construction, operation and maintenance, and decommissioning activities on commercial agriculture. An assessment of cumulative effects on commercial agriculture is also presented.

10.1 Scope of the assessment

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the following:

- Loss or degradation of agricultural land, and
- Conflict with agricultural activities

10.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

10.1.2 Regulatory and policy setting

The following provincial laws, and associated regulations, policies, and guidelines, as well as Manitoba Hydro's policies were reviewed and considered for assessing project effects to commercial agriculture.

- *The Noxious Weeds Act*
- Provincial biosecurity protocols
- Manitoba Agriculture's Agricultural Considerations for Hydro Transmission Projects in Agro-Manitoba
- Municipal guidance
- Manitoba Hydro policies and procedures regarding biosecurity and landowner compensation

10.1.2.1 The Noxious Weeds Act

The Noxious Weeds Act categorizes plant species as noxious weeds and specifies that they must be eradicated or controlled. The Act is relevant to this assessment of project effects because noxious weeds could be introduced to previously unaffected agricultural lands because of project activities. The listed weeds are designated into one of three tiers based on prevalence, distribution, and invasiveness. Tier 1 species are those that are considered to have the most potential for negative effects though they may not yet be present in Manitoba. Under the Act, Tier 1 species must be destroyed or eradicated immediately upon discovery. Tier 2 includes those species that are already established in Manitoba and have been observed to spread easily. Tier 2 species infestations under five acres must be eradicated while infestations larger than five acres must be controlled and kept from spreading. Tier 3 species are all other designated species that do not require immediate control unless the spread of the occurrence poses a threat to the economy, environment, or the well-being of residents.

There is no legislation directly governing biosecurity with respect to clubroot and other soil-borne diseases. However, section 5(10) of the Act which requires the cleaning of equipment following the use of that equipment in an area where a noxious weed is present, reduces the transfer of soil-borne diseases like clubroot in addition to noxious weeds.

10.1.2.2 Provincial biosecurity protocols

In pursuit of reducing the movement of pests in crop production areas, Manitoba Agriculture developed biosecurity protocols for different end users, including landowners, agricultural service providers, utility companies, and researchers (Manitoba Agriculture, n.d.[a]). Biosecurity Management on Agricultural Land for the Energy and Transportation Industries is the protocol that applies to transmission line projects. This protocol's objective is to prevent the spread of soil-borne pests such as weeds, protists, and nematodes in agricultural soils by limiting soil movement between fields and across right of ways (Manitoba Agriculture, n.d.[b]).

The biosecurity protocols are relevant to this assessment of project effects because they show the importance of biosecurity for agricultural operations and provide strategies for maintaining and enhancing biosecurity.

10.1.2.3 Agricultural Considerations for Hydro Transmission Projects in Agro-Manitoba

Manitoba Agriculture's Agri-Ecosystems and Land Management Section developed a document entitled "*Agricultural Considerations for Hydro Transmission Projects in Agro-Manitoba*" which outlines agricultural considerations for hydro transmission projects in agricultural areas of the province (Manitoba Agriculture & Resource Development 2021). In the noted document, the following potential impacts to and concerns for agricultural land and activities due to hydro transmission projects are outlined.

- The footprint of transmission towers removes land from agricultural production. This loss of land may be considerable over the length of the transmission line and may impact production economics, especially in areas of high value crop production. In municipalities where livestock production is dominant and the land base for manure application is limited, the loss of land to the tower footprint can have a negative impact on manure management planning.

- Hydro transmission development on agricultural lands can affect land management activities including a landowner's ability to:
    - irrigate high value crops (e.g., potato acres, vegetables)
    - use aerial application for weed and pest management.
    - access fields with farm equipment
    - apply liquid manure (including limiting the total area of land available to spread manure)
- There is some concern with liability and financial obligation if damage to towers result from machinery hooking onto or hitting the tower during normal farming practices.
- Additional management considerations are necessary for the tower footprint including weed control and preventing the spread of noxious weeds.
- The spread of disease (crop and animal) and noxious weeds is of greatest concern during the construction and maintenance phases of transmission line projects as equipment and personnel move from tower to tower and field to field. Proper sanitation of equipment before entering another farm unit is critical.
- The spread of clubroot which affects canola is of particular concern given the longevity of the clubroot pathogen in soil (i.e., 10 to 20 years in the absence of a canola crop).
- Noxious weeds can also be spread when plant material and soil containing weed seeds are transported from field to field.
- For livestock operations with earthen and/or liquid manure storage, manure application can involve use of a dragline system where manure is pumped from the storage structure across fields through a conduit (pipe) and applied with equipment to surrounding fields. With boosters in place, a drag line system can apply manure within an area of up to five-mile radius. Having hydro towers on fields where manure is being applied adds additional obstructions manure applicators will have to work around.
- Livestock biosecurity is of concern to livestock producers due to the potential spread of disease via equipment and people moving from field to field. Proper equipment and personal clothing and equipment sanitation is necessary to limit the spread of disease. Biosecurity protocols should be in place to minimize potential for disease spread.
- There are also producer concerns regarding the potential for stray voltage to contact livestock barns or surface water sources used to water barns.
- Potential for damage on leased agricultural Crown lands where infrastructure investments and improvements have been made, e.g., fencing and hay crops, where personnel may be crossing to construct new transmission lines or when conducting maintenance type activities.

The agricultural considerations for hydro transmission projects in Agro-Manitoba are relevant to this assessment of project effects because they outline potential impacts to and concerns for agricultural operations due to transmission line construction and operation.

10.1.2.4 Municipal guidance

Land use planning in the rural municipalities traversed by the project is guided under provincial land use policies and governed under *The Planning Act*. Each of the rural municipalities traversed by the project has a zoning by-law that regulates the development and use of the land, buildings, and structures (including agricultural uses).

10.1.2.5 Manitoba Hydro's agricultural biosecurity policy and procedure

Manitoba Hydro understands that compromised biosecurity is of concern to agricultural producers across the province. The corporation recognizes that its staff and contractors have the potential to affect agricultural biosecurity through construction and maintenance activities that require access to agricultural land. Our agricultural biosecurity policy addresses the need to prevent the introduction and spread of diseases, pests and invasive plant species on agricultural land and livestock operations (Manitoba Hydro 2023a).

Manitoba Hydro's agricultural biosecurity standard operating procedure (SOP) (Manitoba Hydro 2023b) includes the following:

- Training of Staff and Contractors - all employees, subsidiaries and contractors who are required to perform work in livestock and agricultural settings are trained in Manitoba Hydro's agricultural biosecurity policy and the biosecurity SOP. Employees must be trained in this procedure every three years.
- Guidance for working in livestock settings and crop settings including assessing biosecurity risks, where a landowner or producer does not have an established protocol.

Like the provincial Biosecurity Management on Agricultural Land for the Energy and Transportation Industries protocol (Manitoba Agriculture, n.d.[a]), the biosecurity SOP seeks to prevent the spread of soil-borne in agricultural soils by limiting soil movement between fields and across rights of way and provides mitigation measures that are focused on cleaning techniques and reducing exposure to biosecurity risk (*e.g.,* not working under very wet conditions). Manitoba Agriculture (n.d.[a]) presents multisector biosecurity guidance while the Manitoba Hydro SOP is specific to how our activities may interact with agricultural lands.

10.1.2.6 Landowner compensation

Where property easements need to be acquired, Manitoba Hydro seeks to identify, contact, and communicate with the landowner in a timely manner. Effects to landowners may include temporary and permanent loss of land, damage to crops and property, ongoing nuisance to farmers, and direct and indirect effects on property use. Landowners and producers are compensated for these residual effects.

Four types of compensation are available to affected landowners.

Land compensation

Land compensation is a one-time payment to landowners for granting of an easement for a transmission line right-of-way. It is based on the following:

- total land area (acres) of easement required,
- current market value of the land (per acre), and
- easement compensation factor, which is determined based on the location of the infrastructure (i.e., whether underground or above-ground). For above ground hydro or gas transmission line rights-of-way, Manitoba Hydro's compensation factor is 150% of current market value. For underground hydro or gas transmission lines, Manitoba Hydro's compensation factor is 100% of current market value.

Construction damage compensation

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.

If crops were in place prior to construction of the transmission line, the crop owner will be compensated for monetary loss due to damage. This compensation generally considers the most recent average value of the harvested crop reported by Manitoba Agricultural Services Corporation.

Structure impact compensation

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

- lands permanently removed from production as determined by the type of structure constructed on the land.
- reduced productivity in an area of overlap around each tower structure
- additional time required to manoeuvre farm machinery around each structure.
- double application of seed, fertilizer and weed control in the area of overlap around each tower structure.

Ancillary damage compensation

Ancillary damage compensation is a one-time payment that applies where Manitoba Hydro's use of the right-of-way directly or indirectly affects property use. Ancillary damage compensation is negotiated. Landowners may be compensated for:

- agricultural effects (e.g., effects on irrigation and aerial spraying activities)
- constraint effects, such as restricted access to adjacent lands

10.1.3 Consideration of engagement feedback

Project engagement () actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project.

Key person discussions were also conducted with agricultural producer representative groups and relevant provincial staff to focus the review of the project and its potential effects on commercial agricultural operations in the project region.

Feedback related to commercial agriculture during project engagement included the following:

- Concerns about the presence of transmission line towers over the life of the project and their interference with or disruption of agricultural land use
- Concern about the transmission line impacting farming business
- Feedback that aerial application occurs in the project area
- Question whether the proposed alternative routes traversed any Crown lands.
- Comment that an alternative route option presented in Round 1 of engagement would affect farmers' productivity as it travels through actively farmed land instead of bush and grassland.

In addition to the broad project engagement program, project information was shared directly with the following producer representative organizations and provincial government staff from whom project-related feedback was also requested:

- Dairy Farmers of Manitoba
- Keystone Agricultural Producers
- Manitoba Beef Producers
- Manitoba Beekeepers Association
- Manitoba Bison Association
- Manitoba Chicken Producers
- Manitoba Egg Farmers
- Manitoba Forage and Grassland Association
- Manitoba Pork
- Manitoba Sheep Association
- Manitoba Agriculture - Land Use and Ecosystem Resilience Branch
- Manitoba Agriculture – Crop Production Extension

Feedback received from producer representative organizations and provincial government staff included the following:

- Through written feedback, Manitoba Beef Producers (2024) indicated primary concerns related to biosecurity, disruptions to livestock operations during critical periods such as calving, and negative impacts on production, such as loss of land needed for pasture, forage, or crop production.
    - Regarding biosecurity, they emphasized the importance of Manitoba Hydro and its project contractors adhering to strict biosecurity protocols to help reduce the risk of disease transmission to livestock, or the transfer of noxious weeds, soil-borne pathogens and other soil-borne pests to lands used by beef producers. Of concern to them were soil disturbance activities that could result in the digging up of anthrax spores, posing a serious health threat to cattle as anthrax results in swift death for the affected animals. They indicated that the presence of anthrax has led to cattle losses in several areas of Manitoba, including notable losses sustained in the rural municipalities of Armstrong and Rockwood in 2007. Part of the proposed project will traverse the RM of Armstrong.
    - Given that it is not known where anthrax spores could be present in the project area, Manitoba Beef Producers recommended that any parties working on this project operate from the assumption that the anthrax spores could potentially be present and to plan accordingly when tillage and excavation activities are taking place.

- They also noted that sporulated anthrax organisms are highly resistant to cold and may be active during the winter months.
- Manitoba Beef Producers also noted that Manitoba Hydro has addressed the possibility of anthrax being present for past projects (e.g., Manitoba-Minnesota Transmission Project) and implemented project-specific biosecurity management plans.
- The Manitoba-Minnesota Transmission Project's biosecurity management plan stated that the focus of management activities should be to reduce the risk of contact between construction activities and livestock, and that approaches be implemented during project construction to reduce the risk of compromised biosecurity including:
  - Project staff will meet the requirements of established farm-level biosecurity measures that an operation has in place.
  - Avoiding access where there is a concentration of livestock.
  - Where construction activities can interfere with field activities, discussions with the landowners or producers will be held to move livestock/equipment during those activities.
- The Manitoba-Minnesota Transmission Project's biosecurity management plan also indicated the need for Manitoba Hydro to undertake biosecurity risk identification activities prior to project construction, including: meetings with landowners to identify site-specific biosecurity concerns; pre-construction weed surveys for determination of location and type (i.e., tier 1, tier 2, or tier 3) of weed concerns; pre-construction inventory of livestock operations to identify risk areas associated with livestock and manure; and so on.
- Manitoba Beef Producers recommended that Manitoba Hydro and its contractors review past best practices with respect to biosecurity and agricultural operations and adhere to them for this proposed project.

- Through written feedback, the Manitoba Forage and Grassland Association (2024) noted that the proposed transmission line route will go across farm fields and through mostly low population areas. They indicated concern for the affected properties and expressed hope that priority would be put on discussions with those individual farms and farmers to ensure the footprint of the transmission line minimizes disruption for those farm operations.
  - Like the Manitoba Beef Producers, Manitoba Forage and Grassland Association's main concern was regarding the potential for anthrax spores to be activated during the soil disturbance associated with the proposed project, and they mentioned how part of the project area has seen previous

anthrax outbreaks, most recently in 2007. They recommended that Manitoba Hydro continues to keep farmers in the project areas informed.

- Provincial staff supporting agricultural land use planning, Crown land management, and apiculture were engaged to discuss agricultural land use within the project region and potential project impacts to commercial agriculture.
  - Logan (2024, pers. comms.) indicated the presence of one Crown land parcel in the vicinity of the project footprint (legal land description: SE 34-19-2 EPM) that is leased for agricultural land use (i.e., pasture or hay). The final preferred route is approximately 800 m south of the noted parcel of Crown land and the project's construction and presence is not anticipated to disrupt agricultural land use of the Crown land parcel.
  - While there are honey-producing apiary (i.e., bee keeping) operations in the RMs of Armstrong and Gimli, Micholson (2024, pers. comms.) indicated that leaf cutter bees, which are solitary bees (i.e., not part of a colony) and typically utilize pasture lands, may be more susceptible to impacts of transmission line construction and operation. They recommended the planting of native plants within the right-of-way to offset potential project impacts to bees in and near the project footprint.

10.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on commercial agriculture, along with effects pathways and measurable parameters are outlined in Table 10-1.

Table 10-1: Potential effects, effects pathways, and measurable parameters for commercial agriculture

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Loss or degradation of agricultural land	Loss or degradation of agricultural land due to clearing of the right-of-way, creation of access routes, traffic movement, set-up of marshalling/ fly yards or tower presence.	Extent of agricultural land loss (ha) – permanent and temporary Land capability class for agriculture
Conflict with agricultural activities	Conflict with agricultural activities due to clearing of the right-of-way, creation of access routes, set-up of marshalling/ fly yards, presence of the project, (e.g., towers, EDF, or stray voltage), biosecurity risk, and removal of agricultural buildings/structures.	Interference with agricultural activities (e.g., relocation of livestock facilities, increased access distances)

10.1.5 Spatial boundaries

Three spatial boundaries (Map 10-1) are used to assess residual and cumulative environmental effects of the project on commercial agriculture:

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of a 1-km buffer around the PDA. The LAA covers an area that generally will encompass the basic field management unit most used within the project region – the quarter section, or an area of land 800 m × 800 m. The LAA represents the area where direct and indirect effects on commercial agriculture are likely to be most pronounced or identifiable and encompasses the locally affected commercial agricultural land uses or activities. Project effects that are experienced across the entire field management unit will generally be considered within the boundary of the LAA.

Regional assessment area (RAA): includes the PDA and LAA and is defined by the boundaries of the municipalities that are traversed by the PDA. From west to east, the municipalities that make up the RAA are the RM of Armstrong and RM of Gimli. The area defined by the boundaries of the municipalities that are traversed by the project were chosen as the RAA because it represents the region that encompasses the communities within which changes in socio-economic parameters attributable to project effects on commercial agriculture might occur. The RAA is the area in which cumulative effects are assessed. It is anticipated that other projects or activities occurring within the same municipality as the project could act cumulatively with the project.

10.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on commercial agriculture are based on the timing and duration of project activities as follows:

- Construction - four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line’s design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

10.1.7 Residual effects characterization

Table 10-2 provides the definitions used to characterize the residual effects on commercial agriculture.

Table 10-2: Characterization of residual effects on commercial agriculture

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to commercial agriculture relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a

Table 10-2: Characterization of residual effects on commercial agriculture		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		direction detrimental to commercial agriculture relative to baseline. **Neutral –** no net change in measurable parameters for commercial agriculture relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**No Measurable Change –** no measurable change in the effect can be noted. **Low** – small but measurable change in the capacity for agriculture. Land loss, land degradation or conflict with activities has a measurable effect on production levels, however production can continue at or near pre-disturbance levels. **Moderate** – a change that is greater than low but will not result in an impairment of commercial agricultural capacity. Land loss, land degradation or conflict with activities has a measurable effect on production levels, that may influence production at the field management unit level. **High** – a change that can result in an impairment of commercial agricultural capacity. Land loss, land degradation or conflict with activities influences production such that production cannot continue at or near pre-

Table 10-2: Characterization of residual effects on commercial agriculture		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		disturbance levels and will impact production at the RM level.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA. **LAA –** residual effects extend into the LAA. **RAA –** residual effects extend into the RAA
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –** the residual effect extends through to completion of post-construction reclamation. **Long-term -** the residual effect extends for the life of the project and or beyond
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation. **Irreversible –** the residual effect is unlikely to be reversed

10.1.8 Significance definition

For this assessment, adverse residual effects on commercial agriculture are considered significant if the proposed use of the land for the project:

- results in a loss of commercial 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) or cannot be adequately compensated; or,
- results in interference with or disruption that restricts agricultural operations and activities such that existing agricultural operations and activities cannot continue at current levels for extended periods of time (beyond construction phase) or cannot be adequately compensated.

10.2 Existing conditions

Land use in the RAA is predominantly rural/agricultural and agriculture is a key contributor to the local and provincial economies. According to Statistics Canada (2021), there were 217 farms within the RAA in 2021, which represents approximately 1.5% of the reported farms in the province.

The existing conditions presented in this section were gathered through a detailed review of available desktop information, feedback from engagement and key person discussions, as well as wind-shield surveys of the project area, and include:

- Land cover
- Agricultural capability
- Agricultural crop type distribution
- Livestock operations
- Risk to biosecurity

10.2.1 Land cover

Based on existing land cover data, approximately 40% of the RAA is under agricultural land use (see Map 10-2). As shown in Table 10-3, the proportion of agricultural land use is higher for the LAA and PDA, at approximately 60% and 53%, respectively.

Table 10-3: Land cover types within the commercial agriculture RAA, LAA and PDA

Land Cover Class	**RAA (ha)**	**%**	**LAA (ha)**	**%**	**PDA (ha)**	**%**
Agricultural Cropland	14,329	6.38	681.478	16.85	10.927	14.79
Bare Rock, Sand and Gravel	322	0.14	10.800	0.27	-	-
Coniferous Forest	617	0.27	18.338	0.45	-	-

Table 10-3: Land cover types within the commercial agriculture RAA, LAA and PDA						
Land Cover Class	**RAA (ha)**	**%**	**LAA (ha)**	**%**	**PDA (ha)**	**%**
Cultural Features	5,606	2.50	224.913	5.56	1.406	1.90
Deciduous Forest	76,987	34.3	1,085.386	26.83	26.451	35.80
Forage Crops	10,938	4.87	341.897	8.45	1.398	1.89
Forest Fire Burnt Areas	0.09	0.00004	-	-	-	-
Marsh and Fens	24,039	10.7	8.859	0.22	0.250	0.34
Mixedwood Forest	8,270	3.68	123.103	3.04	0.564	0.76
Open Deciduous Forest	10,714	4.77	156.333	3.86	5.732	7.76
Range and Grassland[1]	64,226	28.6	1,391.131	34.39	27.164	36.76
Treed and Open Bogs	11	0.005	-	-	-	-
Water	8,551	3.81	2.880	0.07	-	-
Total	224,610	100	4,045.118	100	73.893	100

[1] Range and grassland is assumed to be predominantly for agricultural purposes (i.e., under agricultural land use) and may include seeded and non-seeded pasture fields.

10.2.2 Agricultural capability

The capability of land for agriculture is determined using the Canada Land Inventory (CLI) interpretive system for assessing the effects of climate and soil characteristics on the limitations of land for growing common field crops (CLI 1969). The system classifies mineral soils from Class 1 to Class 7 with decreasing potential and increasing limitations (Table 10-4). Classes 1 to 3 represent prime agricultural land, Class 4 land is marginal for sustained cultivation, Class 5 land is capable of perennial forages and improvement is feasible, Class 6 land can produce native forages and pasture, but improvement is not feasible, and Class 7 land is considered unsuitable for dryland agriculture (Land Resource Unit 1999a).

Table 10-4: Agriculture capability classes

Agriculture capability class	Degree of limitation
Class 1	Soils in this class have no notable limitations in use for crops
Class 2	Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices
Class 3	Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices
Class 4	Soils in this class have severe limitations that restrict the range of crops or require special conservation practices or both
Class 5	Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible
Class 6	Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible
Class 7	Soils in this class have no capability for arable culture or permanent pasture
Class 0	Organic soils, which are not rated for agricultural capability

Source: Canada Land Inventory (1969)

Map 10-3 shows agricultural capability for the RAA, LAA, and PDA.

Class 4 soils are the dominant soil type for approximately 53% of the RAA (Table 10-5). The remainder of the RAA consists of soils that predominantly belong to agricultural capability Class 6 (16%), organic soils which are not rated for agricultural capability (10%), as well as Class 5 (7%), Class 2 (6%), Class 3 (4%), and Class 7 (2%), as well as unclassified soils which cover 2% of the RAA (Table 10-5).

Table 10-5: Agricultural capability in the RAA

Agricultural Capability Class	RAA	
	Extent (ha)	Proportional Extent (%)
1	118	0.05
2	13,497	6.01
3	9,195	4.09
4	119,396	53.2
5	14,811	6.59
6	36,270	16.1
7	3,935	1.75
Organic	23,011	10.2
Unclassified[1]	4,377	1.95
Total[2]	224,610	100

[1] Includes developed lands (disturbed, urban, etc.) and open water, and lands which are not assigned an agricultural capability class.
[2] Values might not sum to totals shown because of rounding.

Similar to the RAA, within the LAA, the most common agricultural capability class is Class 4 (62%), followed by Class 2 (14%) (Table 10-6). Smaller portions of the LAA are covered by Class 6 (7%), Class 3 (7%), and Class 5 (6%) soils. Organic soils make up 3% of the LAA and are not rated for agricultural capability.

Table 10-6: Agricultural capability in the LAA

Agricultural Capability Class	LAA	
	Extent (ha)	Proportional Extent (%)
1	-	-
2	561	13.87
3	285	7.05
4	2518	62.24
5	255	6.31
6	297	7.35
7	-	-
Organic	129	3.18
Unclassified[1]	-	-
Total[2]	4045	100

[1] Includes developed lands (disturbed, urban, etc.) and open water, and lands which are not assigned an agricultural capability class.
[2] Values might not sum to totals shown because of rounding.

Like the LAA and RAA, within the PDA, the most common agricultural capability class is Class 4 (71%). Smaller portions of the PDA are covered by Class 2 (11%), Class 3 (6%), Class 6 (4%), and Class 5 (4%) soils. Organic soils make up 4% of the PDA and are not rated for agricultural capability (Table 10-7).

Table 10-7: Agricultural capability in the PDA

Agricultural Capability Class	PDA	
	Extent (ha)	Proportional Extent (%)
1	-	-
2	7.940	10.75
3	4.759	6.44
4	52.585	71.16
5	2.617	3.54
6	2.902	3.93
7	-	-
Organic	3.090	4.18
Unclassified[1]	-	-
Total[2]	73.893	100

[1] Includes developed lands (disturbed, urban, etc.) and open water, and lands which are not assigned an agricultural capability class.
[2] Values might not sum to totals shown because of rounding.

10.2.3 Agricultural crop type distribution

According to the federal spatial distribution of crops data, in 2023, agricultural crops (including annual crops, natural hayland, and seeded hayland) covered approximately 49%, 63%, and 71% of land within the RAA, LAA, and PDA, respectively (Map 10-4).

Considering the land reported to be under agricultural cropping in 2023, within the RAA (see Table 10-8), cereal/oilseed cropland covered 11%, row cropland covered 6%, natural hayland covered 73%, and seeded hayland covered 9%.

Table 10-8: Crop type distribution within the RAA, LAA, and PDA

Crop Type	RAA		LAA		PDA	
	Area (ha)	%	Area (ha)	%	Area (ha)	%
Cereal/Oilseed[1]	12,528	11	733	28.78	15.003	28.47
Natural Hayland[2]	80,431	73	1280	50.24	26.833	50.91
Row Crops[3]	6,851	6.2	154	6.04	1.274	2.42
Other Crops[4]	128	0.12	2	0.07	-	-
Seeded Hayland[5]	10,305	9.3	379	14.87	9.594	18.20
Total agricultural crop cover:	110,243	100	2,547	100	52.705	100

[1] Cereal/oilseeds – include cereals, canola, flaxseed, peas, fallow buckwheat, canary seed, millet.
[2] Natural hayland – includes grasslands.
[3] Row crop – includes corn, potatoes, soybeans, sunflower.
[4] Other crop types – include beans, hemp, lentils, mustard, and vegetables, and are included in this category due to low reported acreages.
[5] Seed hayland – includes forage crops and greenfeed.

Of the land reported to be under agricultural cropping in 2023 within the LAA, natural hayland covered 50%, row cropland covered 6%, cereal/oilseed cropland covered 29%, and seeded hayland covered 15%.

Within the PDA, of the land reported to be under agricultural cropping in 2023, natural hayland covered 51%, seeded hayland covered 18%, cereal/oilseed crops covered 28%, and row crops covered 2%.

10.2.4 Livestock operations

The project region is host to a wide range of livestock operations including but not limited to:

- beef cattle ranching and farming, including feedlots.
- hog and pig farming
- dairy cattle and milk production
- chicken egg production, broiler, and other meat-type chicken production

- beekeeping for honey production
- horse and other equine production

As reported by Statistics Canada (2021), the RM of Armstrong is host to 70 beef cattle farms, two dairy cattle and milk production farms, two hog and pig farm, two poultry and egg farms, two sheep farms, two apiculture farms, three horse and other equine production farms, and six animal combination farms.

The RM of Gimli has 10 beef cattle farms, two dairy cattle and milk production farms, four poultry and egg production farms, four apiculture farms, two horse and other equine production farms, and one animal combination farm (Statistics Canada 2021).

As illustrated in Map 10-5, there are seven livestock operations present in the LAA.

10.2.5 Agricultural Crown lands

The project footprint falls within Crown Land District #50 which covers the eastern part of the Interlake Region. The province encourages sustainable use of Crown land for multiple uses. Crown lands suitable for agricultural use may be leased for grazing, haying or annual cropping, depending on the authorized use and capability of the land.

The project footprint is in the vicinity of one parcel of agricultural Crown land (legal land description: SE 34-19-2-EPM) that is leased for pasture or hay production (Logan 2024, pers. comms.).

10.2.6 Communal agricultural operations

Communal agricultural operations occur throughout southern Manitoba and their origins are rooted in Hutterite biblical beliefs. On a typical operation, on average, 15 families live and work communally, producing crops, livestock, and manufactured goods for sustenance (Hutterian Brethren, no date).

Based on desktop review, there are currently no communal agricultural operations within the RAA. However, a new communal agricultural development (i.e., Crystal Spring Hutterite Colony) is anticipated in the RM of Armstrong and would be located about 10 km southwest of Gimli and 10 km south of the new transmission line.

10.2.7 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 that are 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 important to producers in the project regional area. Manitoba Hydro has a corporate policy and standard operating procedure which provide guidance and direction to staff and contractors for the management of agricultural biosecurity risks through diseases, pests, and invasive species which pose a risk to agricultural operations.

10.2.7.1 Cropland biosecurity

Like most of southern Manitoba, the primary disease of concern for field crops within the project region is clubroot, which affects canola and can substantially reduce canola seed quality and oil content, 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. Reported cases of clubroot have been increasing in Manitoba, and Manitoba Agriculture maintains a growing database of soil analytical results for clubroot. What makes clubroot particularly concerning for Manitoba producers is that the pathogen can survive for 10 to 20 years in the absence of a canola crop (Manitoba Agriculture, n.d.[b]). There are no economical 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 2022 clubroot distribution map (Figure 10-1), the two rural municipalities traversed by the project footprint (i.e., RMs of Armstrong and Gimli) have had positive cases of clubroot, with soil sample concentrations ranging from 1,000 to 10,000 spores per gram of soil. However, no fields in these municipalities were found to exhibit apparent symptoms of clubroot.

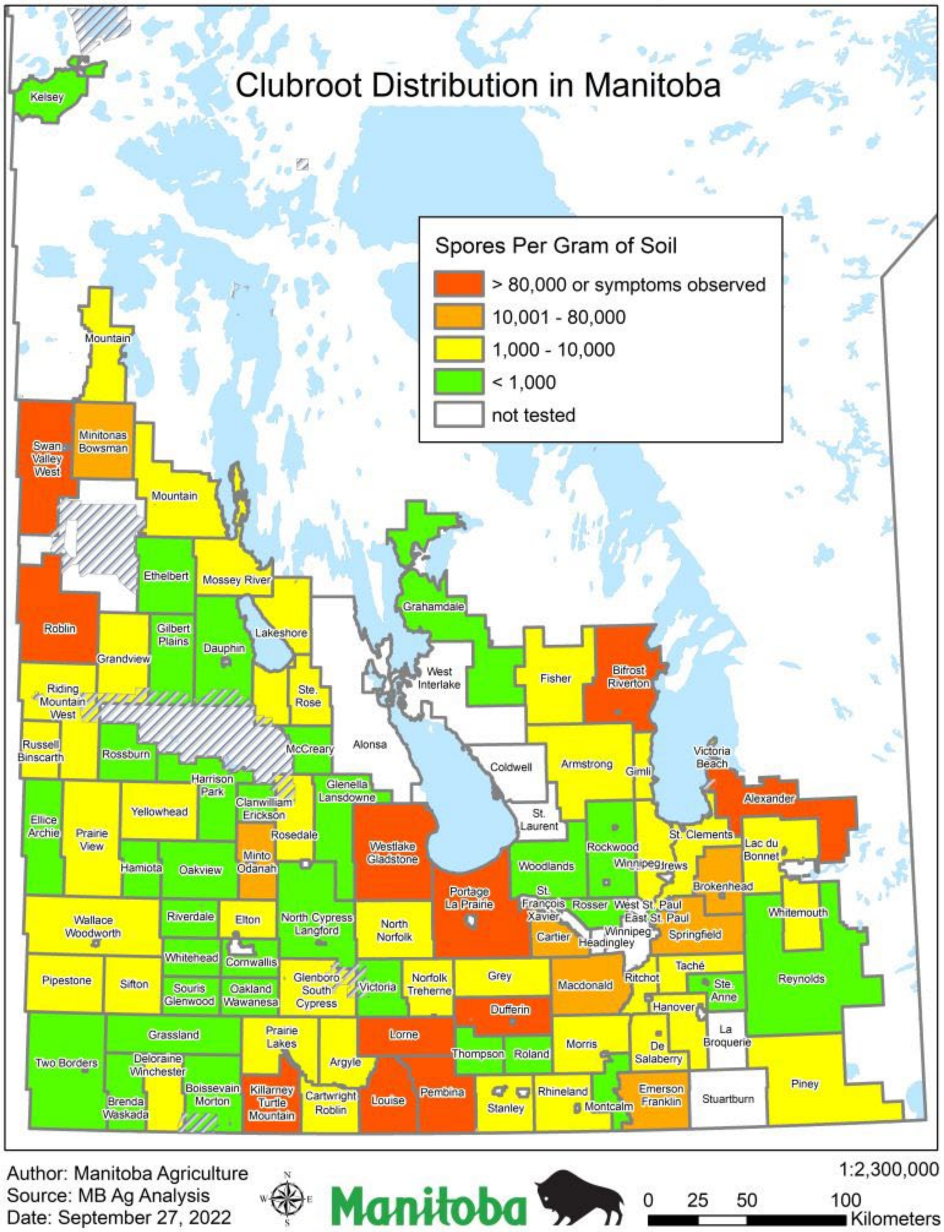


Figure 10-1: Clubroot distribution in Manitoba (2022)

10.2.7.2 Livestock biosecurity

Pests and diseases can have lasting adverse impacts on livestock operations through a reduction in livestock health and higher production costs from increased input needs and management costs.

With a wide range of agricultural operations in the project area, risk to biosecurity is a concern for livestock operations, particularly for beef cattle and other grazing animal operations as was raised during project engagement. During project engagement, Manitoba Beef Producers and Manitoba Forage and Grassland Association expressed concerns about how soil disturbance activities during project construction could result in the digging up of anthrax spores, posing a serious health threat to cattle as anthrax generally results in swift death of affected animals. Anthrax can also affect 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[c]). 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[c]).

Manitoba Agriculture (no date[c]) recommends that livestock producers in high-risk areas (including the Interlake region where the project will be located) should vaccinate their animals every year, about a month before moving them onto pasture, as prevention is the best course of action.

10.3 Project interactions with commercial agriculture

Table 10-9 identifies, for each potential effect, the physical activities that might interact with commercial agriculture and result in the identified effect.

Project activities have the potential to result in temporary and permanent loss of commercial agricultural land during construction and decommissioning, and operation, respectively. Degradation of soil quality could occur during construction, operation, and decommissioning, which could lead to a reduction in land capability for agriculture. Project activities also have potential to conflict with commercial agricultural activities during construction, operation, and decommissioning. Conflict with commercial agricultural activities could occur because of multiple pathways (e.g., effects on farm equipment operation and manure application, effects on livestock and animal health, and compromised biosecurity for crops and livestock).

Temporary land loss is anticipated to occur during construction and decommissioning, after which most of the affected land will be returned to the previous agricultural land use. Permanent land loss will occur for the lifetime of the project (i.e., during operational phase) under and immediately around tower structures. Standard mitigation measures will be followed to reduce soil degradation during construction and decommissioning. While conflict with agricultural activities will occur during construction, operation, and decommissioning, route selection considerations such as design mitigation and landowner/producer engagement will help reduce the extent and severity of such conflicts. Manitoba Hydro will pay compensation for lost land and productivity as outlined in Section 10.1.2.

Table 10-9: Project interactions with commercial agriculture

Project activity	Loss or degradation of agricultural land	Conflict with agricultural activities
Transmission Line Construction		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Access development	✓	✓
Right-of-way clearing	–	–
Marshalling / fly yards	✓	✓
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	✓	✓
Implosive connectors	–	–
Helicopter use	–	–
Clean-up and demobilization	✓	✓
Transmission Line Operation		
Transmission line presence	✓	✓
Vehicle and equipment use	✓	✓
Inspection patrols	–	–
Other maintenance activities	–	–
Vegetation management	–	–
Decommissioning		
Mobilization and staff presence	✓	✓
Vehicle and equipment use	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓
Rehabilitation	✓	✓
Clean-up and demobilization	✓	✓

✓= Potential interaction

– = No interaction

During transmission line operation, inspection patrols are not anticipated to conflict with cropland activities because these routine and planned inspections are expected to occur outside the agricultural crop growing season. Vegetation management (tree control) is not anticipated to result in loss or degradation of land or conflict with agricultural activities as these activities will be scheduled to accommodate farming schedules. The presence of the transmission towers will interact with agricultural activities.

10.4 Assessment of project effects

While effects to commercial agriculture could occur during construction, operation, and decommissioning, they are anticipated to be most pronounced during construction and include the following:

- Loss and/or degradation of agricultural land due to transmission towers 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
- Concerns related to potential impacts to livestock and bees due to transmission line-induced EMF and tingle voltage

10.4.1 Effects pathways

10.4.1.1 Loss and/or degradation of land

<u>Analytical assessment techniques</u>

Temporary land loss is associated with the construction phase of the project (i.e., four months spanning winter 2025 to spring 2026) while permanent land loss pertains to the operational phase of the project. The potential for conflict with agricultural activities applies to both project construction and operation.

Temporary land loss and degradation estimation

Estimates for areas of temporary land loss during the construction phase assume that the entire right-of-way will be unavailable to agricultural land use and activities during the construction period. Considering the anticipated construction schedule, temporary loss of land for agriculture within the right-of-way is anticipated to affect landowners during one growing season.

Permanent land loss estimation

Permanent land loss refers to the area occupied by project structures or permanently disturbed footprints and unavailable for continued agricultural land use through the operation and maintenance phase of the project.

Permanent land loss was estimated by determining the sum of the area under project structures and permanently disturbed footprints as given in the project description (Chapter 2).

For transmission line structures, the estimated number of towers placed on commercial agricultural land was determined based on an average tower interval of 230-250 m. A 2-m buffer was applied to anticipated structure footprints for the estimates for permanent land loss.

Potential for conflict with agricultural operations

Manitoba Hydro conducted windshield surveys of the project area in November 2023 and identified some of the agricultural land use types through these surveys.

Issues and concerns about potential conflict between the project and commercial agriculture were also identified through key person interviews and other engagement feedback. Compared to the assessment of temporary and permanent loss of land from commercial agriculture, the assessment of conflict with agricultural activities was more qualitative.

Assessment of loss and or degradation of agricultural land

During project engagement, landowners, producer representative organizations, and provincial staff raised concerns on how the proposed transmission line could result in the loss and degradation of commercial agricultural land.

Construction

During construction of the transmission line, activities such as mobilization and staff presence, vehicle and equipment use, right-of-way clearing, establishment of marshalling/fly yards and tower construction can result in the loss and or degradation loss of agricultural land. The timing and the duration of the construction activities will determine the extent of potential effects to agricultural land.

It is assumed that temporary loss of commercial agricultural land will affect the entire agricultural portion of the PDA for the duration of construction. Of the whole PDA area of 73.893 ha, 39.49 ha (approximately 53%) is under agricultural land use (Table 10-3). The area of PDA under agricultural land use predominantly falls under Class 4 agricultural capability (71%), and with an appreciable portion under Class 2 agricultural capability (11%) (Table 10-7).

Potential effects from construction activities that could result in the degradation of agricultural land would be limited to the PDA and include soil compaction, rutting, admixing, and erosion. 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. Use of heavy equipment on saturated soils increases the potential for compaction (Wolkowyski and Lowry, 2008). Soil that becomes exposed due construction activities can be susceptible to erosion by water and wind, leading to a change in soil thickness and crop productivity.

Operation and maintenance

The presence of transmission line structures will result in less than 0.1 ha of agricultural land being lost because of tower footprints on land that is currently cultivated. The area of agricultural land lost due to the presence of the towers comprises less than 0.14% of the entire transmission line right-of-way (*i.e.,* PDA).

There is also the potential for soil disturbance / degradation to occur during operations and maintenance when vehicles and equipment are 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.

Decommissioning

Decommissioning of the project will result in the recovery of land previously lost to tower footprints and such land could be returned to agricultural use. While temporary loss of land would result from decommissioning activities, such loss would be short-lived. Degradation of land during project decommissioning is anticipated to occur via mechanisms like those described for project construction but would be to a smaller extent.

Mitigation for loss and degradation of land

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.

- Compensation will be provided to landowners and agricultural Crown land lessees, according to the Manitoba Hydro Landowner 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 18.0.
- 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, and installation of the transmission structures. 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, 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. Compensation will be provided to agricultural landowners according to Manitoba Hydro's Land Compensation Program for land permanently removed from agriculture due to structure presence.

As part of design mitigation for the project:

- Manitoba Hydro chose gulf port towers for use in agricultural land, reducing the extent of permanent land loss.

- Manitoba Hydro has provided opportunities to discuss and identify areas of concern and potential tower spotting preferences with potentially affected landowners.

10.4.1.2 Assessment of conflict with agricultural activities

During project engagement, landowners, producer representative organizations, and provincial staff raised concerns on how the proposed transmission line could cause conflict with commercial agricultural land activities during project construction and operation.

The project has the potential to result in conflict with agricultural activities during construction, and operation and maintenance, and decommissioning due to:

- damage to, or interference with, agricultural infrastructure (e.g., buildings, barns, grain bins, manure application and water-supply systems)
- interference with the use of field equipment
- increased potential for stray (or tingle) voltage and electric and magnetic field (EMF) effects on livestock
- increased management effort due to:
    - additional operational costs and inconveniences associated with increased management effort due to presence of project structures, including:
        - overlap of farm input application (e.g., seed, fertilizer, pesticides) in proximity to project structures resulting in inefficiencies and excess input usage
        - inefficiencies of field operations due to working around project structures resulting in excess fuel usage and equipment depreciation
    - a split in farm management units (e.g., due to in-field placement of towers, diagonal crossings, or angled placement of tower).
    - increased biosecurity risk for crops and livestock
    - changes in access routes to farm properties and to areas of agricultural activities (e.g., rotational paddocks, watering facilities, wintering sites, cropping fields).
    - restricted field accessibility for manure spreading equipment.
    - removal of vegetation that provides pollen for bees.

Most interactions between the project and commercial agriculture are similar between construction, operation and maintenance, and decommissioning phases. However, the nature, degree and extent of interactions differ between the phases in some cases.

Construction

During construction, project activities could interfere with agricultural operations and activities through access and right-of-way establishment on fields used for pasturing cattle or crop production.

Such interference might result in inconvenience, increased time and increased monetary costs to farming. The degree and extent of construction interactions will depend highly on timing of construction, with less interaction during the winter than during the spring, summer, and fall. Construction activities may be a concern in terms of biosecurity of crop and livestock operations, and may result in interference with, or damage to, infrastructure.

Interference with or damage to agricultural infrastructure

Right-of-way preparation, including clearing for the project, has the potential to affect agricultural buildings and structures (e.g., grain bins, fencing, storage sheds, barns, and livestock corrals). Interactions would be limited to the right-of-way, and buildings and structures within the PDA would have to be removed or relocated. There are currently no known agricultural buildings located within the PDA.

The planned construction of the transmission line during frozen ground conditions along with the absence of large areas under intensive high-value crop production will limit the extent of conflict between commercial agricultural activities and the project.

Livestock operations

Right-of-way clearance might reduce natural shelter for livestock through removal of clumps of trees. Construction activities could also impact cattle movement during the grazing season and calving activities. Some landowners with agricultural land in the LAA may grow hay for their own cattle operations and apply manure as a nutrient source for the hay.

The PDA traverses through and near lands used for cattle pasture, manure application, and hay production. Livestock related activities and equipment can be disturbed or damaged by the establishment of a right-of-way or other construction activities (e.g., tower foundation installation). Some livestock operations may also use groundwater for livestock production. Construction activities might interfere with the infrastructure associated with these water withdrawals, for example, if above ground watering systems (e.g., pipes, watering station) are located within the PDA. If present, this minor infrastructure will likely have to be re-located.

Increased biosecurity risk

During project engagement, landowners, producer representative organizations, and provincial staff raised concerns on how the proposed transmission line could increase biosecurity risk for commercial agricultural lands in the project area. Increased biosecurity risk would be more pronounced during construction than operations and decommissioning.

Soil transport is an important mechanism for the spread of weeds and soil-borne diseases from one field or region to another. 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.

Of concern to beef cattle and other grazing animal producers, are soil disturbance activities during project construction that could result in the digging up of anthrax spores, posing a serious health threat to livestock as anthrax generally results in swift death of affected animals.

Operation and maintenance

Effects associated with the operation and maintenance phase of the project are related primarily to project presence. They include nuisance, inconvenience and increased production costs associated with farming around structures (e.g., overlapping seed, fertilizer, and pesticide application), farm management unit splits, interference with livestock movement and access to pasture, biosecurity concerns for livestock and croplands, interference with infrastructure and specific operations, and restricted future expansion of agricultural operations.

Increased management effort

Farmers will face challenges related to nuisance, inconvenience and increased production costs associated with navigating around the tower structures (e.g., around towers in field, and in between the project right-of-way and other boundaries, including property boundaries) with farm equipment during various agricultural field operations.

Farming around towers presents several challenges to producers. Crop production is reduced within the immediate vicinity of the tower due to overlap around each structure (Prairie Agriculture Machinery Institute 2015); there are increased costs associated with the time it takes to farm around transmission towers, the application of seed, fertilizer, and chemicals in overlap areas around each structure and decreased weed control around the towers.

A study undertaken by Prairie Agriculture Machinery Institute (2015) estimated total lost crop production value by easement acre based on different scenarios using transmission line configuration, crop, and equipment width variables. For straight-line transmission line configurations, the study found that, for straight-line transmission lines composed of either H-frame or steel towers, route placement along the quarter section edge (*i.e.,* in field) was optimal when compared to transmission lines placements parallel to roads or on a diagonal. In-field placement was found to result in the least percentage of easement area affected by the presence of the transmission line and the least loss in value to the producer (between 1.6% and 2.6% for wheat).

Extra management effort is required to work around structures and there are risks inherent with operating farm machinery in proximity to the structures. The presence of structures must be considered when planning and executing field operations. Since the responsibility is on farmers and operators to avoid structures while operating wide equipment, working around structures requires more attention.

The growth of weeds around tower bases is a concern to agricultural producers. Because of the presence of towers, some areas may not be sprayed during typical field operations (i.e., immediately adjacent to and directly under tower footprints, areas between towers and other features that preclude a sprayer pass), and weeds may grow, allowing weed seeds to disperse into adjacent field areas and creating a nuisance for producers.

Farm management units, or field areas managed as a single management unit, may be split by the project PDA. An example of where this may occur is if the PDA is not located along the edge of the field or along the half mile line for quarter section field management units, or if it is located along a half mile line and it dissects a half section field management unit. These situations may result in multiple management units being needed for a field that was previously managed as a single unit and would likely increase management effort and production costs. However, it is unknown if the project will result in field management unit splits, and it is anticipated that these situations would only occur in rare circumstances.

The scheduling of transmission line construction for frozen ground conditions for four months spanning late 2025 to spring 2026 will substantially reduce the potential for project activities to interfere with the operation of farming equipment for crop operations during the growing season.

Increased biosecurity risk

During the operation and maintenance phase of the project, there will be potential for soil disturbance and for soil to be transferred from field to field when maintenance vehicles and people are moving between fields. Through these situations, pests could be introduced and spread in previously non-affected areas.

The introduction and spread of pests would largely be of concern during spring, summer, and fall, which are associated with the growing season and cropping activities. However, because routine transmission line maintenance in agricultural areas is typically completed during winter periods and under frozen soil conditions there is a minimal risk for biosecurity, and the potential for compromised biosecurity will be reduced.

For livestock operations, especially on pasture/grazing lands, there is potential for the introduction of disease during maintenance and repair activities. This potential for biosecurity risk would be greater where transmission line maintenance intersects areas of multiple operations with different livestock types. Pests and diseases have lasting adverse production value (reductions in yield and livestock health) and production cost (increased input and management costs) effects.

Interference with farm infrastructure and operations

The presence of project structures has the potential to interfere with farm infrastructure and farm operations for the lifetime of the project.

The presence of project towers will affect the use of equipment during field operations (e.g., tillage, fertilizer application, seeding, ground application of crop protection and harvesting). Project structures will also create problems for turning field machinery and maintaining efficient fieldwork patterns. As part of design mitigation to reduce inconvenience and increased cost to producers, this project will predominantly involve Gulfport towers, which have a relatively small footprint and limit the effect on agricultural structures and operations and (Chapter 2.0, Project description).

Given that some producers in the LAA may apply cattle manure to their fields for hay production, the presence of project towers may interfere with manure spreading. The presence of project structures could limit the area to which manure can be applied to, the direction of application, the maneuvering requirements and time and labour requirements.

Interference with other farm infrastructure such as corrals, rotational grazing and access to gates may cause inconvenience to livestock producers managing and moving livestock. However, these situations are anticipated to be rare, and effects may be reduced through tower spotting following discussions with landowners during easement negotiations.

Concerns of for livestock due to EMF and stray (tingle) voltage

Electromagnetic field (EMF) can induce exceptionally low currents in anything capable of conducting electricity, including human beings and animals. However, these currents are too weak to be perceptible. Transmission line-induced electromagnetic field (EMF) can potentially have effects on livestock and bees but the scientific research on this is not conclusive. Some studies suggest potential adverse effects while others have not found conclusive evidence of notable harm caused by transmission line-induced EMFs on livestock or bees.

Some studies have shown that exposure of bees to EMF can disrupt bee navigation and foraging abilities, leading to difficulties in returning to the hive and potentially impacting the overall health of the colony (Shepherd et al., 2019; Shepherd et al., 2018). However, some of these studies' findings (e.g., Shepherd et al. 2019 and Shepherd et al. 2018) were based on, laboratory-based sting extension response and intruder assay experiments, and simulated 400-kV transmission line conditions, respectively that may not may not be reflective of actual field conditions. For example, prior to their use in the Shepherd et al. (2019) experiments, bees were exposed to levels of EMF that corresponded to 0 (control), 100 μT, and 1,000 μT for 17 hours before undergoing sting extension response trials. Also, since the project will consist of a 115-kV transmission line, which is much lower than the 400-kV capacity in which conditions were simulated by Shepherd et al. (2018), the extent of impacts on bees due to transmission line EMF for the project could be less. While EMF effects on livestock and bees were not raised as a concern by individual landowners, agricultural producers and agricultural producer representative organizations, EMF concerns for livestock and bees have been raised on previous transmission projects. Manitoba Hydro has engaged with the provincial apiarist in pursuit of understanding whether the reported adverse EMF effects on bee behaviour and honey production have been observed and or reported by beekeepers who place some their hives within transmission rights-of-way in Manitoba (Micholson 2024, pers. comms). Per Micholson (2024), while findings of EMF effects to bees from controlled-environment experiments (e.g., Shepherd et al. 2018 and Shepherd et al. 2019) should not be dismissed, they do not present adequate real-world proof of effects and have typically been based on small-scale studies.

Decommissioning

Decommissioning activities will be like those for construction but would be done in reverse order to facilitate removal of project infrastructure and are anticipated to result in smaller-scale effects. During the decommissioning process, there may be a slight increase in management efforts and biosecurity risks, along with potential interference with farm infrastructure.

Ultimately, the removal of project infrastructure will eliminate increased management effort around structures, biosecurity risk from maintenance activities, interference with farm infrastructure and operations, and potential for livestock exposure to EMF.

Mitigation for conflict with agricultural activities

Mitigation for interference with farm operations or damage to infrastructure includes the following:

- Transmission line routing considered effects on existing agricultural buildings (e.g., barns). In the alternative route evaluation model, proximity to buildings and structures was one of the criteria for route evaluation under the built environment perspective, which was concerned with limiting socio-economic effects.
- The transmission line has been routed to parallel field boundaries (e.g., edge of road rights of way, half-mile lines) and avoid/reduce diagonal crossings as much as practical.
- Manitoba Hydro will pay compensation to landowners and agricultural Crown land lessees 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 damage compensation could be provided for:

- Damage to infrastructure, including that for manure application, hay baling and livestock watering.
- Prior to construction, if producers indicate the presence of watering infrastructure, they will be considered when tower siting, where possible, to reduce local effects.

Mitigation for increased need for management effort includes the following:

- Manitoba Hydro applied design mitigation to reduce project effects on the increased need for management effort due to project presence. Transmission lines were aligned in straight lines and diagonal crossing of agricultural lands was avoided, wherever feasible.
- Construction will be timed to avoid overlap with growing season. Where this is not feasible, Manitoba Hydro will pay compensation pursuant to the Landowner Compensation Program.
- Construction damage compensation is offered to landowners who experience damage to their property due to the construction, operations, and maintenance of

the transmission line. It will be provided to 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.

- Structure Impact Compensation is a one-time payment to landowners for each transmission tower placed on land classed as agricultural. Structure Impact Compensation will cover:
  - reduced productivity in an area of overlap around each tower structure
  - additional time required to maneuver farm machinery around each structure.
  - double application of seed, fertilizer and weed control overlap around each tower structure.
- Ancillary damage compensation is a one-time payment when Manitoba Hydro's use of the right-of-way directly or indirectly affects the use of the property. It will be provided for:
  - constraint effects such as restricted access to adjacent lands
  - traditional effects such as highest and best use of land

Mitigation for increased biosecurity risk includes the following:

- Manitoba Hydro sought to reduce the potential interaction between the project and croplands and livestock operations during route selection.
- Manitoba Hydro staff and contractors will follow and implement the Manitoba Hydro corporate policy on biosecurity and agricultural biosecurity standard operating procedure, respectively, during construction and operation and maintenance activities. Measures to be implemented in line with general considerations of the agricultural biosecurity standard operating procedure (Manitoba Hydro 2023) 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 such as wet, or frozen)
    - If existing farm level biosecurity measures exist, Manitoba Hydro 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 the ground freezes.
  - avoiding access through areas that may contain manure.
  - schedule activities to occur when ground conditions are more favourable, if possible
  - make sure that proper care and attention is paid to cleaning equipment and footwear prior to leaving the site if activities cannot be rescheduled.

- fine clean equipment to remove remaining soil using pressure washing to rinse off remaining soil or manure. Such fine cleaning should be done at the field approach, preferably, but can be completed offsite. Vehicles must be cleaned before being taken to a different area. Use safety footwear that can be easily cleaned. Use a brush to remove visible soil or manure and disinfect footwear when leaving the field:
  - disinfectants such as 1% Virkon may be carried in a household spray bottle or a larger container if required.
  - When washing footwear with disinfectant in the field, make sure wastewater is contained and appropriately disposed of offsite.
  - fill out the Vehicle and Equipment Cleaning Record and submit it with the Biosecurity Checklist
- Where construction or maintenance activities have the potential to interfere with field activities, discussions with the landowner or producers will be held to move livestock/equipment during those activities.
- Asking producers or landowners to avoid spreading manure or pasturing livestock in the transmission line right-of-way prior to construction.
- All equipment will arrive at the right-of-way or project site clean and free of soil or vegetative debris (including weed seeds).

Regarding concerns for impacts to livestock and bees due to EMF and stray voltage, Manitoba Hydro attempts to alleviate landowner and producer concerns by implementing the following mitigation to limit exposure of livestock to perceived EMF and stray (tingle) voltage:

- Through routing, Manitoba Hydro sought to reduce the interaction between the project and livestock operations.
- Manitoba Hydro will continue engaging with livestock producers, beekeepers, and relevant provincial government staff regarding EMF and stray voltage concerns.

10.4.2 Characterization of residual effects on commercial agricultural

10.4.2.1 Loss and or degradation of land

With the implementation of mitigation measures, including compensation, residual effects from the project due to temporary loss or degradation of agricultural land are anticipated to be adverse and confined to the PDA (i.e., site of construction or maintenance activities).

Within the PDA, the temporary loss of agricultural land during construction would result in a small but measurable change in the capacity for agriculture (i.e., low magnitude).

The change in land capability class for agriculture and extent of lands affected by compaction could result in a change greater than that for temporary land loss but one that will not affect the sustainability of the capacity for agriculture (i.e., moderate magnitude) within the PDA.

Residual effects due to degradation of land will be extremely sensitive to timing. Construction during the growing season will result in more pronounced effects while construction under frozen conditions will largely reduce the potential for soil degradation.

Residual effects from temporary land loss will be limited to the construction phase (short-term) while those for degradation of land due to compaction will extend beyond the construction phase (medium term) because if compaction effects occur, they could persist for a few years following remedial action. Temporary land loss will occur once during construction. In contrast, the frequency of events leading to degradation of soil is considered irregular because there could be multiple activities occurring at irregular intervals during construction and operation that could trigger a compaction effect. Because land temporarily removed from agricultural use within the right-of-way during construction will be returned to agricultural use after construction, the residual effects of temporary land loss and degradation of land on agricultural productivity are considered reversible.

With the implementation of mitigation measures (primarily through design mitigation and landowner compensation), the residual effects of the project on permanent loss of land during operation and maintenance are anticipated to be adverse and confined to the PDA, specifically to tower footprint locations. Although tower footprints will result in an area of land removed from production, the area permanently taken up is less than 0.1 ha. Residual effects on soil degradation are not anticipated during normal operation and maintenance. Within the PDA, the permanent loss of agricultural land will result in a small but measurable change in the capacity for agriculture (i.e., low magnitude). The land area affected by the presence of the project will be minor compared to that currently used for agriculture in the PDA and LAA. While the overall effect of permanent land loss is small, permanent land loss is an important consideration at the individual farm level. Manitoba Hydro understands that even though overall project effects will affect a small proportion of the RAA, local effects can have a large effect on individual operations, particularly where there are multiple utilities in one field. Residual effects of permanent land loss on agricultural productivity are a one-time event and permanent because the loss will persist for the lifetime of the project. Permanent loss of agricultural land is deemed reversible because the affected land can be returned to agricultural use following decommissioning.

10.4.2.2 Conflict with agricultural activities

Following the application of mitigation, while the potential for conflict with agricultural activities remain, the magnitude of these effects and the extent over which they are experienced will be reduced. Additionally, communications with landowners prior to construction and land access for maintenance activities may result in additional site-specific mitigation further reducing the potential conflict with agricultural activities. Compensation will be provided (see Section 10.1.2.6) to address the residual potential conflict with agricultural activities and damages that may be caused during construction. Residual effects due to conflicts with agricultural activities will be extremely sensitive to timing for those conflicts that are associated with growing season activities (e.g., tillage, harvesting) but timing will be non-applicable for those activities that occur all year round (e.g., livestock production).

A summary of residual environmental effects that are likely to occur on commercial agriculture because of the project is provided in Table 10-10.

Table 10-10: Project residual effects on commercial agricultre

Project Phase	Residual Effects Characterization					
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Loss and/or degradation of agricultural land						
Construction	A	L-M	PDA	ST-MT	S-IR	R
Operations and Maintenance	A	L	PDA	MT-LT	S-IR	R
Conflict with agricultural activities						
Construction	A	L-M	LAA	ST-MT	IR	R
Operations and Maintenance	A	L	LAA	MT-LT	R-C	R

10.4.3 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably near future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

For commercial agriculture, both conditions apply.

10.4.3.1 Project residual effects likely to interact cumulatively.

Table 10-11 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact commercial agriculture. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is conducted.

Table 10-11: Potential cumulative effects on commercial agriculture

Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects	
	Loss and or degradation of land	Conflict with agricultural activities
Existing/ongoing projects and activities		
Domestic Resource Use (hunting, trapping, fishing)	-	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	-
Commercial resource use (includes fishery and forestry)	-	-
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	✓	✓

Table 10-11: Potential cumulative effects on commercial agriculture

Other projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects	
	Loss and or degradation of land	Conflict with agricultural activities
Hydroelectricity transmission and distribution lines	✓	✓
Potential future projects and activities		
Crystal Spring Colony domestic wastewater lagoon	✓	✓
Diageo Hydroelectricity Station	–	–
King's Park Phase 2 residential development	✓	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

– = Interactions between the residual effects of other projects and those of the project residual effects are not expected.

The existing projects and activities in Table 10-11, including domestic resource use, commercial forestry, agricultural production, domestic resource use, recreational activities, and road and highway infrastructure, have been occurring since Europeans arrived in the Interlake area in the late 1600s. There are also operational transmission and distribution lines in the RAA (e.g., the Silver to Rosser transmission line and the 66-kV transmission that currently supplies hydroelectricity to the Diageo facility).

There are three potential future projects within the RAA, namely, the Crystal Spring Colony domestic wastewater lagoon, Diageo planned new hydroelectricity station, and Kings Park Phase 2 residential development.

Of these three future projects, the Crystal Spring Colony domestic wastewater lagoon and King's Park Phase 2 residential development are anticipated to interact temporally or spatially with the project to result in cumulative effects on commercial agriculture. As the Diageo hydroelectricity station will be built within Diageo's already developed property, interactions are not anticipated between the proposed project and the Diageo station in relation to commercial agriculture.

10.4.3.2 Cumulative effect pathways for loss or degradation of commercial agricultural land

As shown in Table 10-12, past and present projects that were identified as having potential cumulative effects with the effects of this project on commercial agriculture are primarily power transmission and distribution developments. These developments have contributed to agricultural land loss throughout the RAA. Other existing linear developments that involve above-ground infrastructure that preclude all or portions of the development footprints to be returned to agricultural production following construction (e.g., highways) have also contributed to land losses affecting commercial agriculture in the RAA.

Based on desktop review, a portion of the land to be used for the King's Park Phase 2 residential development appears to be used for hay production implying that this development will interact with the project and result in cumulative loss or degradation of commercial agricultural land. The Crystal Spring Colony domestic wastewater lagoon will be part of a new colony development that will be constructed on land that is currently not developed. As the colony is anticipated to include a farm-based operation at the proposed site that includes light manufacturing and livestock production (Burns Maendel Consulting Engineers Ltd. 2023), this development will increase land used for agricultural land use and reduce the cumulative loss and or degradation of land used for agriculture.

Mitigation for cumulative effects of loss or degradation of commercial agricultural land

The implementation of mitigation measures described in Section 10.4.1.2 will reduce the effects on agriculture from the project and the project's contribution to cumulative effects on agriculture.

Additional mitigation measures proposed to reduce the cumulative environmental effects on loss or degradation of agricultural land include the following:

- Manitoba Hydro will continue to evaluate design mitigation, including tower types, tower spacing, and tower placement to reduce agricultural land loss as much as feasible.
- 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 existing and future projects on conflict with agricultural activities.

Residual cumulative effects for loss or degradation of agricultural land

A portion of land capable of supporting commercial agriculture in the RAA has already been disturbed due to previously constructed and operational linear projects, including transmission lines.

With the addition of the proposed project's effects and those of other projects, cumulative effects on loss of agricultural land are anticipated to be low in magnitude. While the project will result in land loss that is considered permanent, it will be reversible upon the decommissioning of the project at some future date. The project's contribution to land loss will be small relative to losses from past projects and is not expected to measurably affect the capacity for commercial 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.

10.4.3.3 Cumulative effect pathways for conflict with agricultural activities

Past and present projects in the RAA (Table 10-12) have the potential to interact cumulatively with the project on agricultural activities if their plans included the development of facilities in areas under agricultural use. These developments have contributed to conflict with agricultural activities throughout the RAA.

As a portion of the land to be used for the King's Park Phase 2 residential development appears to be used for hay production, this development will interact with the project and result in cumulative conflict with agricultural activities. Since the Crystal Spring Colony development will include a new livestock operation (Burns Maendel Consulting Engineers Ltd. 2023), this development will not act cumulatively to increase conflict with agricultural operations, and its construction and operation will reduce adverse effects to commercial agriculture in the RAA.

Mitigation for cumulative effects of conflict with agricultural activities

The implementation of mitigation measures will reduce the effects on agricultural activities from the project and the project's contribution to cumulative effects on agricultural activities.

Additional mitigation measures proposed to reduce the cumulative environmental effects on conflict with agricultural activities include the following:

- 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 support studies to understand the effects of its projects on commercial agricultural land use and use study outcomes to reduce effects of existing and future projects on conflict with agricultural activities.

Residual cumulative effects for conflict with agricultural activities

With the addition of project effects and those of other projects, cumulative effects on conflict with agricultural activities will be low 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 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 and current 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 project's contribution to cumulative environmental effects is not expected to measurably affect the capacity for commercial agriculture within the RAA.

10.4.3.4 Summary of residual cumulative effects

A summary of residual cumulative effects that are likely to occur on commercial agriculture due to project activities is provided in Table 10.

Table 10-12: Residual cumulative effects on commercial agriculture

Residual cumulative effect	Residual cumulative effects characterization					
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Residual cumulative effect of loss or degradation of land						
Residual cumulative effect	A	L	RAA	LT	IR	R
Contribution from the project to the residual cumulative effect	The project will result in temporary and permanent land losses for agricultural land uses throughout the life of the project. Permanent land losses will be limited in extent to a small portion of the PDA.					

Table 10-12: Residual cumulative effects on commercial agriculture

Residual cumulative effect	Residual cumulative effects characterization					
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Residual cumulative effect of conflict with agricultural activities						
Residual cumulative effect	A	L	RAA	LT	R	R
Contribution from the project to the residual cumulative effect	The project will result in conflict with agricultural activities throughout the life of the project. These effects will be limited in extent to the PDA for some types of conflicts (e.g., ground operations for seeding, harvesting) and to the LAA for others (e.g., manure application, restricted movement of livestock).					

10.4.4 Determination of significance

With mitigation and environmental protection measures, the residual effects on commercial agriculture are predicted to be not significant.

With mitigation and environmental protection measures, the cumulative effects on commercial agriculture are predicted to be not significant.

10.4.5 Prediction confidence

There is a moderate to high degree of confidence in the predicted effects of construction, operation, and maintenance, and decommissioning of the project on commercial agriculture. The prediction confidence is based on the information compiled during desktop-based data compilation, data analyses and understanding project activities, location, and schedule as well as information gathered from key person discussions and other project engagement feedback. Windshield surveys were also conducted to gather and confirm additional information on agriculture-related buildings as well as livestock operations in the area. While some of the available desktop data are limited in scale (e.g., the AAFC crop inventory data which is based on remote sensing and are not field validated), and completeness (e.g., agricultural operation type and location information was not provided by most industry association groups), the environmental effects mechanisms are well understood.

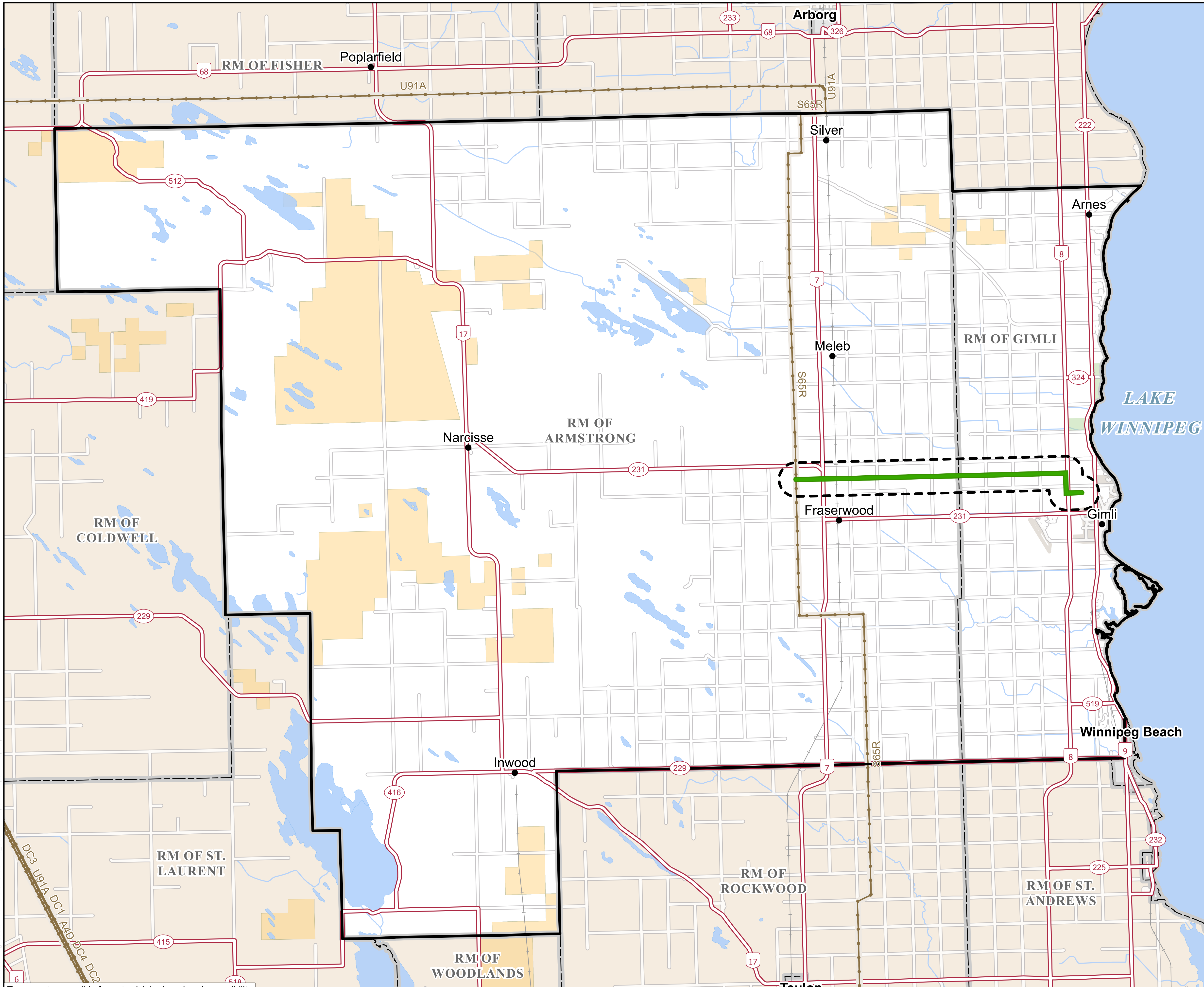
The mitigation measures identified in this chapter are standard practice and have been implemented on previously completed transmission projects. Finally, the significance conclusion is based upon a well-founded understanding of the commercial agriculture context within the project RAA.

10.4.6 Follow-up and monitoring

Due to confidence in predictions and monitoring results from Manitoba Hydro's other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, if environmental inspections identify unexpected effects, monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the environmental protection program (see Chapter 18).

10.4.7 Sensitivity to future climate change scenarios

Effects of climate change on commercial agriculture are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding). However, the predicted climate change scenarios would not change the significance determinations of this assessment.



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Commercial Agriculture LAA (PDA Buffer 1km)
- Commercial Agriculture RAA

Existing Infrastructure
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

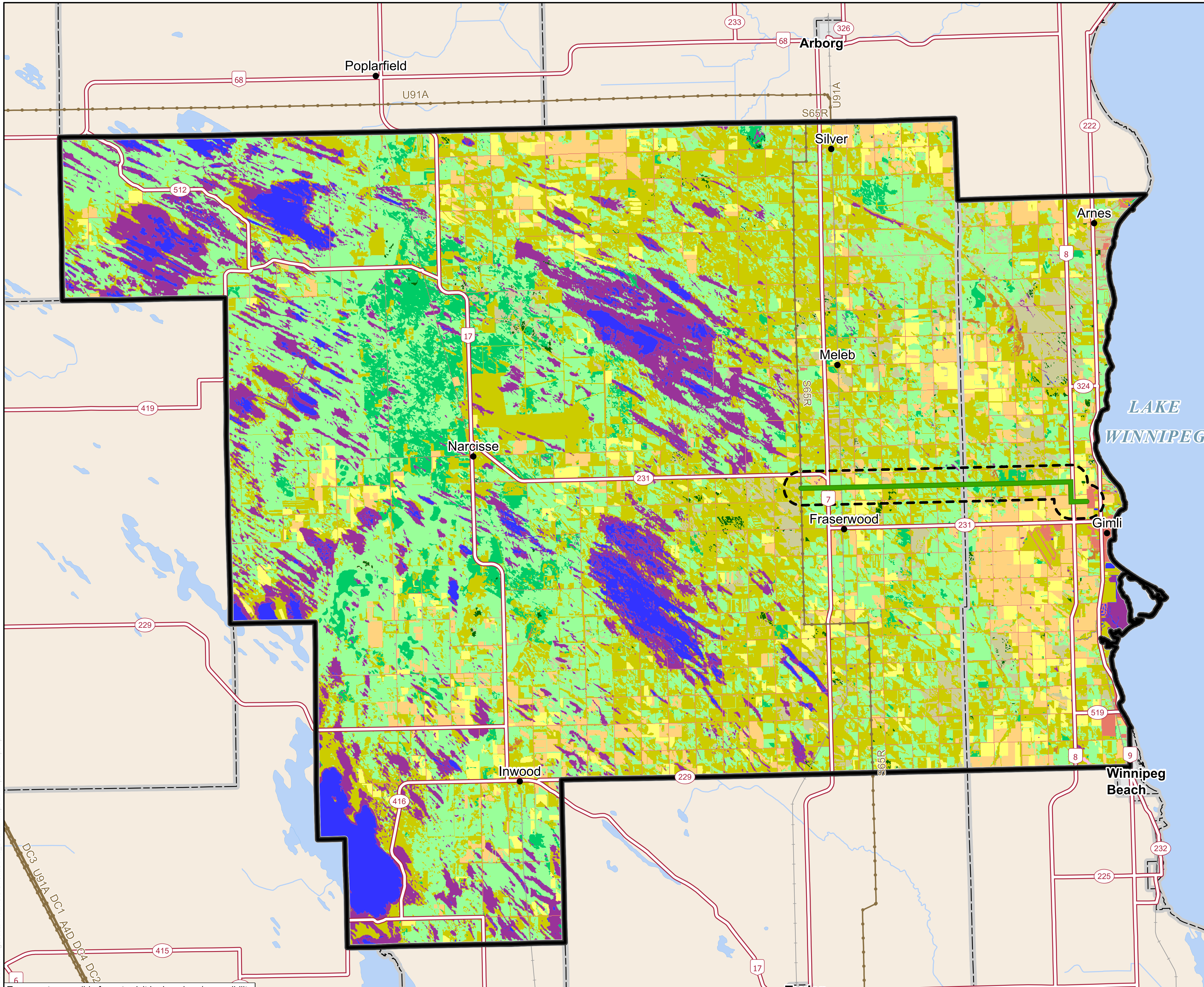
0 5 10 Kilometres
0 3 6 Miles

1:225,000

Spatial Boundaries for Commercial Agriculture Assessment Areas

Draft/Confidential: For Discussion Purposes Only

Map 10-1



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- Final Preferred Route

Assessment Area

- Commercial Agriculture LAA (PDA Buffer 1km)
- Commercial Agriculture RAA

Land Cover

- Agricultural Cropland
- Bare Rock, Sand and Gravel
- Coniferous Forest
- Cultural Features
- Decidious Forest
- Forage Crops
- Forest Fire Burnt Areas
- Marsh and Fens
- Mixedwood Forest
- Open Decidious Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Existing Infrastructure

- Existing ≥69kV Transmission Line

Landbase

- Railway
- Provincial Highway/Road
- First Nation
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

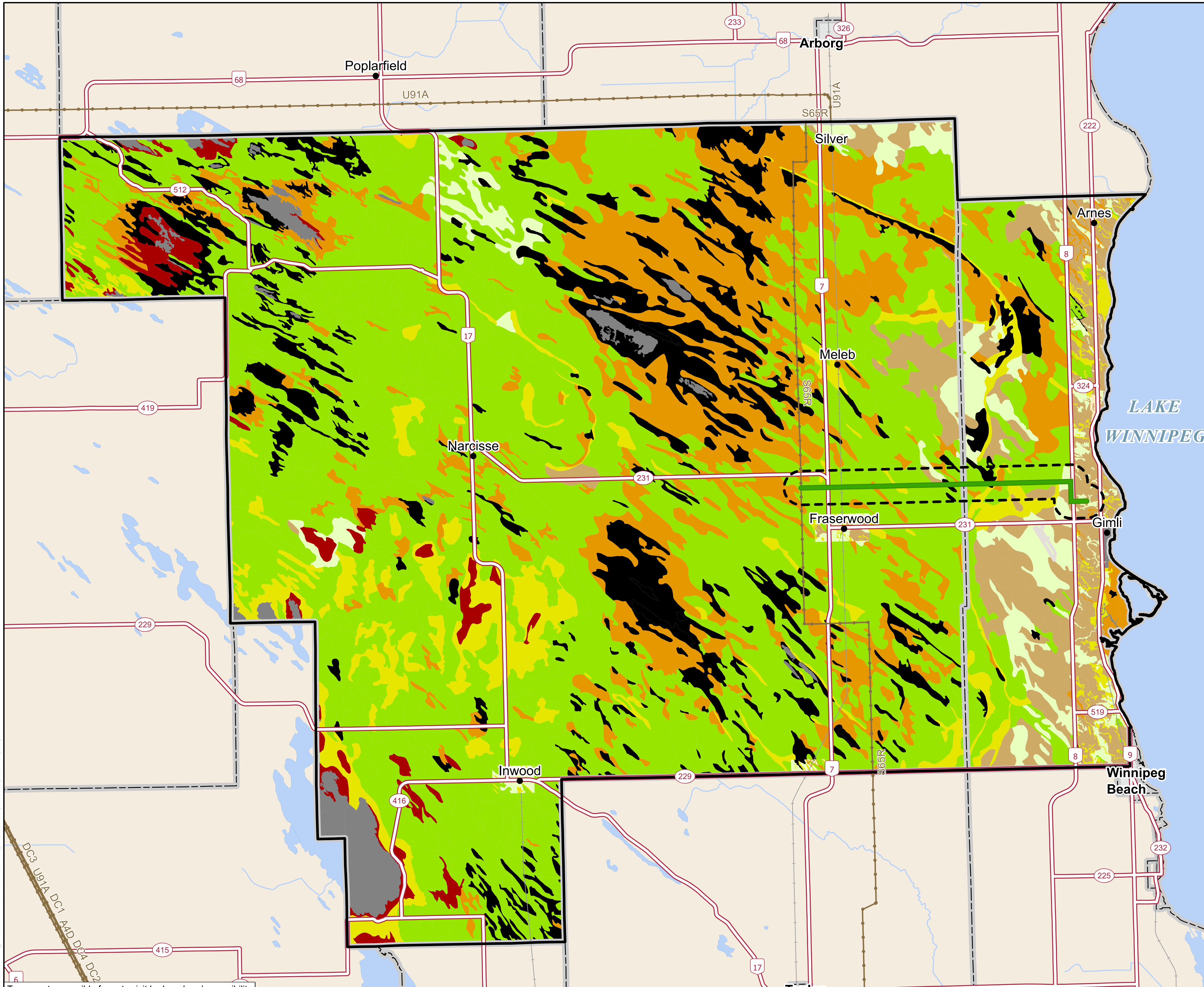
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

0 5 10 Kilometres
0 3 6 Miles
1:225,000

Land Cover in the Commercial Agriculture Assessment Areas

Draft/Confidential: For Discussion Purposes Only

Map 10-2



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Commercial Agriculture LAA (PDA Buffer 1km)
- Commercial Agriculture RAA

Agriculture Capability
- Class 1
- Class 2
- Class 3
- Class 4
- Class 5
- Class 6
- Class 7
- Unclassified
- Organic

Existing Infrastructure
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Provincial Highway/Road
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

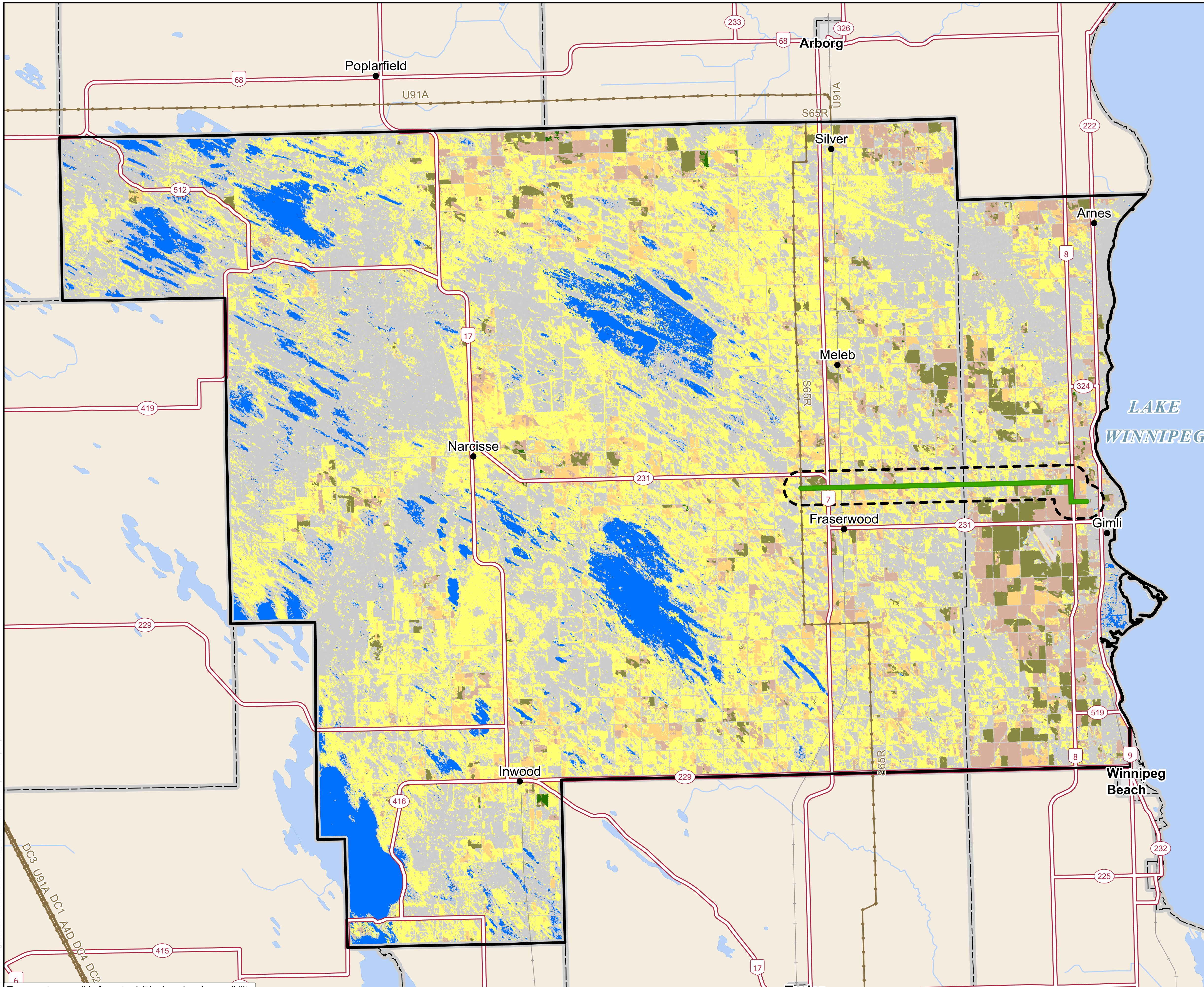
N

0 5 10 Kilometres
0 3 6 Miles
1:225,000

Agriculture Capability in the Commercial Agriculture Assessment Areas

Draft/Confidential: For Discussion Purposes Only

Map 10-3



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- Final Preferred Route

Assessment Area

- Commercial Agriculture LAA (PDA Buffer 1km)
- Commercial Agriculture RAA

Crop Type Distribution

- Cereal/Oilseed
- Natural Hayland
- Non-Agriculture
- Other Crops
- Row Crops
- Seeded Hayland
- Water

Existing Infrastructure

- Existing ≥69kV Transmission Line

Landbase

- Railway
- Provincial Highway/Road
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

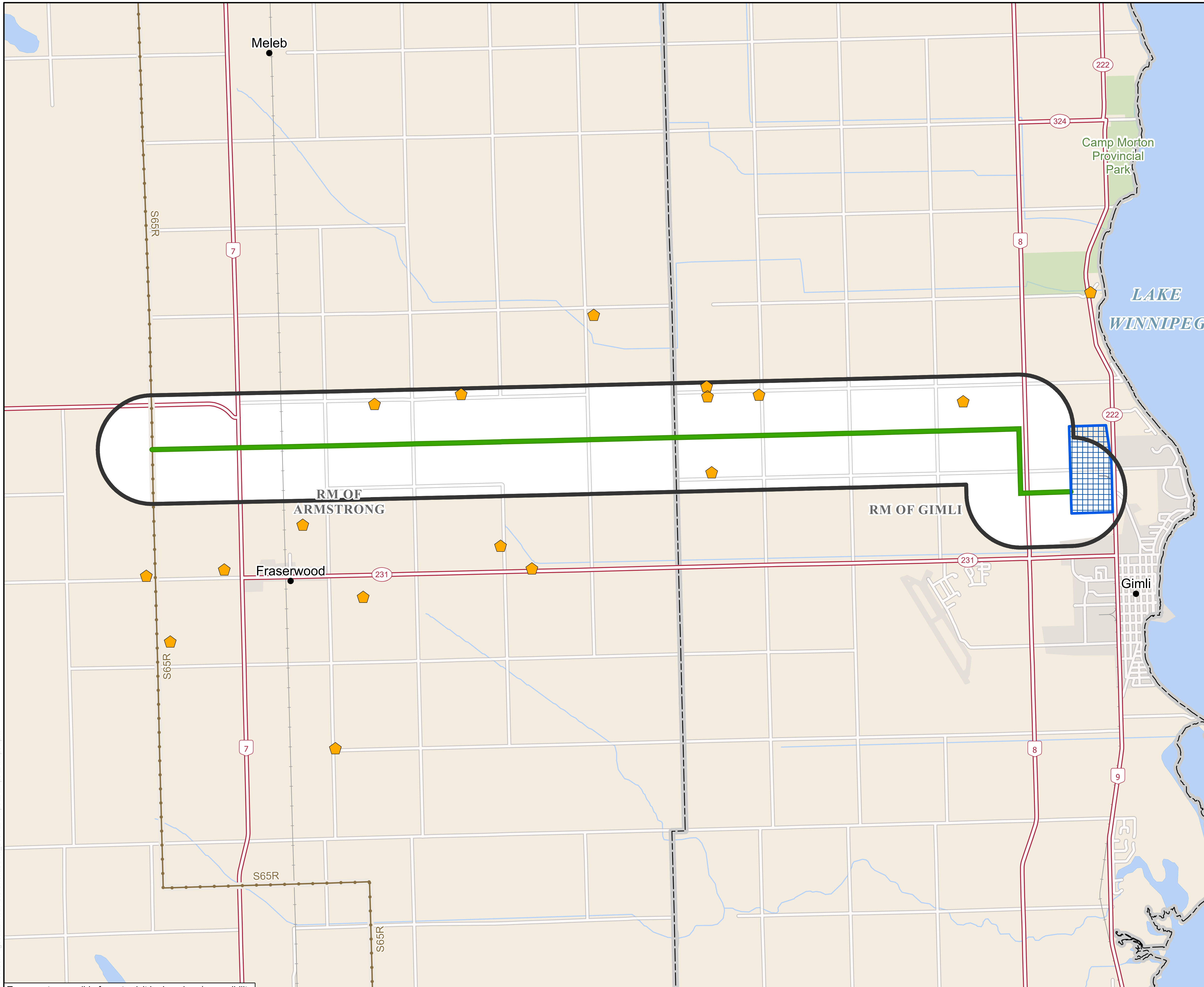
0 5 10 Kilometres
0 3 6 Miles

1:225,000

Crop Type Distribution in the Commercial Agriculture Assessment Areas

Draft/Confidential: For Discussion Purposes Only

Map 10-4



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Livestock Operations
- Livestock Operation

Assessment Area
- Commercial Agriculture LAA

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Livestock Operations

Draft/Confidential: For Discussion Purposes Only

Map 10-5

11.0 Infrastructure and community services

Infrastructure and community services refer to the physical structures and facilities (e.g., highways, railways, water, and wastewater) and services (e.g., emergency response and health care) needed for the operation of communities.

Infrastructure and community services was selected as a valued component (VC) because the project has the potential to increase the demand for, or interfere with, local and regional infrastructure and services.

This chapter assesses the potential effects and cumulative effects of project construction, operation and maintenance, and decommissioning activities on infrastructure and community services.

11.1 Scope of the assessment

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the following:

- Short-term accommodations
- Traffic and transportation
- Health and emergency response services
- Solid waste management facilities

11.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

11.1.2 Regulatory and policy setting

The following provincial legislation, regulations, policies, and agreements are considered in the assessment of effects for infrastructure and services:

- *The Manitoba Hydro Act* (R.S.M. 1987, c. H190)
- *The Traffic and Transportation Modernization Ac*t (S.M. 2018, c. 10)
- *The Dangerous Goods Handling and Transportation Act* (C.C.S.M. c. D12)
- *The Planning Act* (C.C.S.M. c. P80)
- Applicable municipality by-laws

11.1.2.1 The Manitoba Hydro Act

The purposes of *The Manitoba Hydro Act* are to:

"…provide for the continuance of a supply of power adequate to the needs of the province and to engage in and to promote economy and efficiency in the development, generation, transmission, distribution, supply and end-use of power and, in addition, are (a) to provide and market products, services and expertise related to the development, generation, transmission, distribution, supply and end-use of power, within and outside the province; and (b) to market and supply power to persons outside the province on terms and conditions acceptable to the board" (*The Manitoba Hydro Act*, C.C.S.M. c. H190).

Section 23(1) of the Act allows Manitoba Hydro to construct, operate, and maintain its infrastructure anywhere on, under, over, across, or along public highways, streets, lanes, or other public places. This Act supersedes municipal level powers granted under legislation such as *The Planning Act* (C.C.S.M. c. P80) and *The Municipal Act* (C.C.S.M. c. M225).

11.1.2.2 The Traffic and Transportation Modernization Act

The Traffic and Transportation Modernization Act is administered by Manitoba Transportation and Infrastructure and regulates provincial highway and road infrastructure and traffic, roadway speed limits, vehicle registration and license plates, license requirements for highway driving, vehicles and equipment standards, and prohibitions, offences, and penalties. Through this Act:

- Manitoba Transportation and Infrastructure reviews all applications for development permits on provincial roadways, and reviews speed limit changes on all provincial roadways.
- Local governments (i.e., municipalities and First Nations) can change speed limits on municipal and First Nation roads.

11.1.2.3 The Dangerous Goods Handling and Transportation Act

The *Dangerous Goods Handling and Transportation Act* and associated regulations outline the conditions and standards relating to the generation, handling, storage, transport and disposal of dangerous goods or hazardous waste. This Act and regulations will be applicable to the transportation and disposal of project hazardous wastes.

11.1.2.4 The Planning Act and Provincial Planning Regulation

Administered in cooperation by Manitoba Municipal Relations and the associated municipal councils, *The Planning Act* (C.C.S.M. c. P80) provides a framework for land use planning strategies at the provincial, regional, and local scale. The Provincial Planning Regulation, M.R. 81/2011 provides a framework to guide development planning. Requirements of the Act and its regulations do not apply to the Crown or Crown agencies. Manitoba Hydro notes that, as a Crown Corporation, it is not directly subject to the legislative provisions and is generally exempt from them in terms of development planning.

Municipal jurisdictions must adopt development plans and zoning by-laws to guide land and resource use planning decisions within their respective boundaries under *The Planning Act* (C.C.S.M. c. P80). A development plan is a by-law that outlines the long-term vision and goals of a community to guide development within the planning area of a municipality or planning district. A zoning by-law is a tool used by the planning authority to implement development plan policies and typically represents what is on the ground. Zoning by-laws are guided by and conform to the development plans. Zoning regulates the use of land and locations of buildings and structures (Government of Manitoba, 2015). Municipal jurisdictions have a variety of development controls in place along the proposed ROW. Land use development controls based on applicable development plans and zoning by-laws are described further in Section 6.3.2.1.

Manitoba Hydro is cognizant that neither *The Planning Act* (C.C.S.M. c. P80), nor its regulations, apply to the Crown or Crown agencies. However, it does seek to work cooperatively with the municipalities when planning, designing, constructing, and operating and maintaining its projects to limit the extent of possible interactions with their developments and plans.

11.1.2.5 Municipal by-laws

By-laws of interest in the affected municipalities include:

- RM of Gimli: *By-Law No. 23-0011, Short Term Rental By-Law:* provides the licensing and regulation of short-term rentals in the RM of Gimli.
- RM of Gimli: *By-Law No. 18-0018, Solid Waste By-Law:* Regulates the storage and collection of solid waste, and includes regulations around illegal dumping, suitable containers for solid waste, placement of containers, and details around warning, orders and enforcement of the by-law.
- RM of Gimli: *By-Law No. 18-0022, Traffic By-Law:* Regulates the traffic, parking, and use of streets, roads and sidewalks in the RM of Gimli, to promote their safe use by motorists and pedestrians.
- RM of Gimli: *By-Law No. 12-0015, By-Law to Regulate Water and Sewer Activity:* Regulates the connections, water meters, water conservation, fire protection and boiler use in the RM of Gimli, and outlines fines for violating any provisions of the by-law.

11.1.3 Consideration of engagement feedback

Project engagement (Chapter 5.0) actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project.

Feedback received during in-person and virtual information sharing events for the project primarily related to:

- Questions regarding accommodation and housing for construction crews, including whether any temporary accommodation camps would be set up.
- Opportunities for employment or contracting opportunities for residents.
- Required setbacks from the Gimli Airport for safe operation of aircraft in proximity to transmission lines

11.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on infrastructure and community services, along with effects pathways and measurable parameters are outlined in Table 11-1.

Table 11-1: Potential effects, effects pathways, and measurable parameters for infrastructure and community services

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Reduced availability of accommodations	Influx of workers during construction and operations may increase demand for accommodations in the regional area, affecting inventory levels for residents and tourists May have positive effects for accommodation owners who can rent during the low tourist season	Availability of accommodations (e.g., inventory levels for hotels, motels) Vacancy rates
Increased traffic and strain on transportation infrastructure	Construction and operation of the project may increase demand on traffic infrastructure in the region, including road and air, potentially increasing travel times, affecting road conditions, and causing (or being involved in) collisions	Current capacity of local and regional highways and roads Daily road traffic volume, incidents, and air traffic volumes Change in conditions of roads and highways due to heavy loads carried by trucks

Strain on health and emergency response services	Demand for health services and emergency response services may be affected by project activities and project-related influx of workers, especially during construction	Number of workers for each phase (construction, operations, and decommissioning) Capacity of health care and emergency response services
Strain on solid waste management facilities	Increased pressure on solid waste facilities that may be caused by project activities	Tonnage of waste materials generated by the project that will be disposed in local / regional facilities

11.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual and cumulative environmental effects of the project on infrastructure and community services (Map 11-1).

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of the administrative boundaries of the Rural Municipality (RM) of Armstrong and the RM of Gimli. This area is to encompass the communities for which infrastructure and community services could be impacted due to the project.

Regional assessment area (RAA): the RAA is the same as the LAA and deemed to encompass a sufficiently broad area for assessing cumulative effects, including the incremental effects of the project. The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects.

11.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on infrastructure and community services are based on the timing and duration of project activities as follows:

- Construction – four months spanning winter 2025 to spring 2026.

- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line's design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

11.1.7 Residual effects characterization

Table 11-2 provides the definitions used to characterize the residual effects on infrastructure and community services.

Table 11-2: Characterization of residual effects on infrastructure and community services

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to infrastructure and community services relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to infrastructure and community services relative to baseline. **Neutral –** no net change in measurable parameters for infrastructure and community services relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions	**Negligible –** no measurable change in the effect on infrastructure and community services can be noted. **Low –** a measurable change to infrastructure and community services capacity, but services can

Table 11-2: Characterization of residual effects on infrastructure and community services

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		take place at similar levels as under baseline conditions. **Moderate –** measurable change in infrastructure and services capacity, where services are under strain but can take place at similar levels as under baseline conditions. **High –** measurable change in infrastructure and services capacity, where services and capacity are strained to a point that they cannot take place at similar levels as under baseline conditions.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA **LAA/RAA –** residual effects extend into the LAA/RAA
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase **Medium-term –** the residual effect extends through to the operation phase **Long-term -** the residual effect extends for the life of the project
Frequency	Identifies how often the residual effect occurs and	**Single event**

Table 11-2: Characterization of residual effects on infrastructure and community services

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
	how often during the project or in a specific phase	**Multiple irregular event –** occurs at no set schedule **Multiple regular event –** occurs at regular intervals **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation **Irreversible –** the residual effect is unlikely to be reversed

11.1.8 Significance definition

An adverse residual effect on infrastructure and community services is considered significant if, even with the application of mitigation and management measures, it widely disrupts, restricts, or degrades present infrastructure and community services to a point where activities cannot continue at or near baseline levels.

11.2 Existing conditions

Baseline information for this assessment was gathered through a detailed review of available desktop data. The existing conditions described in this section focus on:

- Communities within the LAA and RAA
- Short-term accommodations
- Transportation infrastructure
- Healthcare, emergency, and social services
- Waste management

11.2.1 Communities

The LAA/RAA for the project falls within the rural municipalities (RMs) of Gimli and Armstrong.

11.2.1.1 RM of Gimli

The RM of Gimli was historically known as New Iceland, as it was an Icelandic ethnic block settlement in the 1870s. The area currently has the largest concentration of people of Icelandic ancestry living outside of Iceland. In the 2021 Census, the RM of Gimli had a population of 6,569 (Statistics Canada, 2023b). The RM of Gimli includes the communities of Arnes, Camp Morton, Gimli, Husavik, Sandy Hook, and Silver Harbour. Tourism is a large industry in the RM of Gimli, and cottages located along Lake Winnipeg are used by thousands of visitors in the summer.

11.2.1.2 RM of Armstrong

The RM of Armstrong has a population of 1,967, according to the 2021 census (Statistics Canada, 2023a). The RM of Armstrong includes the hamlets of Chatfield, Fraserwood, Inwood, Komarno, Malonton, Meleb, Narcisse, Neveton, Rembrandt, Sandridge and Silver. Immigrants from Ukraine, Poland, Sweden, Denmark, Norway, France, Iceland, English, Scotland and Ireland settled in the area following the expansion of the Canadian Pacific Railway and road network in the late 1890s (RM of Armstrong, 2024a).

11.2.2 Short-term accommodations

According to Airbnb, as of July 2024 there are approximately 210 listings in the LAA/RAA, mostly focused around Gimli and Lake Winnipeg (Airbnb, 2024). There are also six listings on Trip Advisor for hotels, motels, and bed and breakfasts in the LAA/RAA, as well as approximately 34 vacation rentals (Trip Advisor, 2024).

11.2.3 Transportation infrastructure

11.2.3.1 Road transportation

There are several provincial trunk highways (PTHs) and provincial roads (PRs) that traverse the LAA/RAA, including:

- PTH 7: RTAC (Roads and Transportation Association of Canada) route, travels north-south through the LAA/RAA in the RM of Armstrong
- PTH 8: RTAC route, travels north-south through the LAA/RAA in the RM of Gimli
- PTH 9: Class B1 provincial route, travels north-south through the LAA/RAA in the RM of Gimli
- PTH 17: Class B1 provincial route, travels north-south through the RM of Armstrong

- PR 229: Class B1 provincial route, travels east-west on the southern boundary of the LAA/RAA
- PR 231: Class B1 provincial route, travels east-west through the LAA/RAA, connects PTH 7, PTH 8, PTH 9 and PTH 17
- PR 416: Class B1 provincial route, located in the southwest corner of the LAA/RAA and connects onto PTH 17
- PR 419: Class B1 provincial route located in the west of the LAA/RAA, connects PTH 6 and PTH 17

Route designations are based on maximum gross vehicle weight limits. PTH 7 and PTH 8 are RTAC routes, which have a weight restriction of 62,500 kg. The other roads in the LAA/RAA are Class B1 routes, which have a weight restriction of 47,630 kg (*The Highway Traffic Act*, C.C.S.M. c. H60). Table 11-3 includes current daily traffic volumes for provincial trunk highways and provincial roads at monitoring sites located in the LAA/RAA.

Table 11-3: Current traffic volumes on provincial trunk highways and provincial roads

Road or highway	Highway section / location	Current volume of vehicles/day for annual average daily traffic
PTH 7	North of PR 229	1,250 - 1,320
PTH 8	North of PR 231	2,290 – 2,670
PTH 9	4.8km south of Gimli	2,570 – 2,780
PTH 17	North of PR 231	560 – 670
PR 229	West of PTH 8	490 – 760
PR 231	East of PTH 8	3,020 - 3,370
PR 416	West of PTH 17	110 – 120
PR 419	East of PR 512	20 – 30

Source: University of Manitoba and Manitoba Infrastructure, 2019

11.2.3.2 Rail transportation

There is a shortline railway that runs between Selkirk and Gimli, operated by the Lake Line Railroad Inc. (Manitoba Transportation and Infrastructure, n.d.). This line services the Diageo Gimli distillery.

11.2.3.3 Air transportation

There are two airports in the LAA/RAA: the Gimli Industrial Park Airport, and the Fraserwood/Tribble Ranch Field Aerodome. The Gimli Industrial Park airport is a civilian airport and former military field. Current tenants of the airport include: Gimli Motorsports Park, Gimli Cadet Flight Training Centre, 182 GM Stefnusfastur Squadron - Royal Canadian Air Cadets; Skydive Manitoba, Prairie Helicopters Incorporated, and Interlake Aviation Flight School & Charter Service. The Fraserwood/Tribble Ranch Field Aerodome is a private airport operated by Joachim De Smedt (SkyVector, 2023).

11.2.4 Healthcare and emergency services

The RM of Gimli has the Gimli Community Health Centre, which provides emergency and out-patient services, diagnostic imaging and lab services, chemotherapy, dialysis, EMS and ambulance service, palliative care, acute care, physiotherapy services, occupational therapy services, adult day program and pharmacy services.

There are homecare health services based out of Teulon and Gimli, which service communities in the LAA/RAA including Gimli, Arnes, Fraserwood, Inwood and Komarno (Interlake-Eastern Regional Health Authority, 2024).

The Royal Canadian Mounted Police (RCMP) provide policing services in the LAA/RAA. There is an RCMP detachment in Gimli, and the Stonewall detachment also services some areas of the LAA/RAA. The services provided at the Gimli detachment include the following:

- Criminal records check
- Document verification
- Fingerprints
- General information
- Non-emergency complaints
- Online crime reporting
- Report a crime
- Vulnerable sector check

The general service hours of the RCMP Gimli detachment are Monday to Friday, 8am to 4pm (RCMP, 2023).

The RM of Armstrong has two fire departments, one located in Inwood and one located in Fraserwood (RM of Armstrong, 2024b). In the RM of Gimli, Fire Protection Services are provided by the RM of Gimli Volunteer Fire Department. The Gimli Fire Department is equipped with two pumper trucks, an aerial truck, a water tanker truck, a rescue van, and jaws-of-life equipment (RM of Gimli, 2024).

11.2.5 Water supply and waste management

The following waste management facilities are in the LAA/RAA:

- Arnes landfill site in the RM of Gimli
- Household hazardous waste site at the Gimli Industrial Park
- Chatfield Transfer Station in the RM of Armstrong
- Inwood Transfer Station in the RM of Armstrong
- Meleb Waste Disposal Grounds in the RM of Armstrong, which provides construction waste drop off and electronics recycling

Municipal water services are available in the RM of Gimli in the Urban Centre of Gimli, Aspen Park, Industrial Park, Pelican Beach, Gimli Business Park, and in the Autumnwood subdivision. Gimli residents that are not connected to municipal water / sewer have private wells and private sewage disposal systems which are governed by the province (RM of Gimli, 2024b).

11.3 Project interactions with infrastructure and community services

Table 11-4 identifies, for each potential effect, the physical activities that might interact with infrastructure and community services and result in the identified effect.

Table 11-4: Project interactions with infrastructure and community services

Project activity	Reduced availability of short-term accommodation	Increased traffic and strain on transportation infrastructure	Strain on health and emergency response services	Strain on solid waste management facilities
Transmission Line Construction				

Table 11-4: Project interactions with infrastructure and community services				
Project activity	Reduced availability of short-term accommodation	Increased traffic and strain on transportation infrastructure	Strain on health and emergency response services	Strain on solid waste management facilities
Mobilization and staff presence	✓	✓	✓	✓
Vehicle and equipment use	-	✓	✓	-
Access development	-	-	-	✓
Right-of-way clearing	-	-	-	✓
Marshalling / fly yards	-	-	-	-
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	-	-	-	-
Implosive connectors	-	-	-	-
Helicopter use	-	-	-	-
Clean-up and demobilization	-	-	-	✓
Transmission Line Operation				
Transmission line presence	-	-	-	-
Vehicle and equipment use	-	✓	-	-

Table 11-4: Project interactions with infrastructure and community services

Project activity	Reduced availability of short-term accommodation	Increased traffic and strain on transportation infrastructure	Strain on health and emergency response services	Strain on solid waste management facilities
Inspection patrols	-	-	-	-
Other maintenance activities	-	-	-	✓
Vegetation management	-	-	-	✓
Decommissioning				
Mobilization and staff presence	✓	✓	-	✓
Vehicle and equipment use	-	✓	-	-
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	-	-	-	✓
Rehabilitation	-	-	-	-
Clean-up and demobilization	-	-	-	-

✓= Potential interaction

– = No interaction

11.4 Assessment of project effects

Effects to infrastructure and community services are anticipated to occur during construction, operation, and decommissioning. However, they are anticipated to be most pronounced during construction, and include the following:

- Reduced availability of short-term accommodations due to influx of project-related workforce
- Increased traffic volumes and strain on transportation infrastructure
- Strain on health and emergency response services
- Strain on solid waste management facilities

11.4.1 Effects pathways

11.4.1.1 Reduced availability of short-term accommodation

<u>Analytical assessment techniques</u>

Project-related changes to the availability of short-term accommodations are assessed by considering pre-project inventory levels for temporary accommodations in the LAA/RAA and their vacancy rates in relation to the number of project workers who may require accommodations.

<u>Construction</u>

The assessment of effects on accommodations considers change in the availability of accommodations in the LAA/RAA. The influx of project workers and contractors during construction may increase the demand for short-term accommodations through patronage and in so doing reduce the availability of temporary accommodations available for local and non-local individuals (e.g., tourists) in the LAA/RAA. However, because construction activities are anticipated to occur in the winter months (i.e., in frozen ground conditions), there will likely be fewer tourists in the LAA/RAA than during the summer months.

As discussed in Section 11.2.2, there are approximately 250 temporary accommodations in the LAA/RAA, indicating sufficient available accommodation for the workforce in the area, which is estimated to be 35-40 workers at peak construction.

<u>Operation</u>

The availability of accommodations may also be reduced during the operation phase of the project during maintenance and inspection activities. This would occur if maintenance and inspection activities require more than one day, and workers must stay in the LAA/RAA overnight.

Decommissioning

The availability of accommodations may also be reduced during decommissioning as the result of the mobilization and presence of staff and contractors working on decommissioning activities. The workforce during the decommissioning phase is anticipated to be smaller than during the construction phase, so the potential demand for short-term accommodations during decommissioning is anticipated to be less than during construction.

11.4.1.2 Increased traffic and strain on transportation infrastructure

Analytical assessment techniques

Project-related increases to traffic and strain on transportation infrastructure are assessed by quantitative consideration of the current capacity of local and regional highways and roads, daily traffic volumes, and incidents in relation to increases in traffic that will result from project activities, and though the qualitative consideration of the conditions of existing roads and highways and the manners in which the project vehicles and equipment travelling in the area may change those conditions.

Construction

The assessment of potential project effects on traffic and transportation infrastructure focuses on the movement of workers, materials, and equipment to and from the project site along PTHs and PRs discussed in Section 11.2.3.1. PTH 8, PTH 7 and PR231 will likely be utilized by construction crews to access the right-of-way, given that the FPR is largely located on the half-mile and does not parallel existing infrastructure.

Project construction is anticipated to directly increase road traffic due to the presence of up to 35 project-related vehicles (e.g., cars, pickup trucks, and heavy trucks and equipment) per day, which will be needed to transport people (i.e., project workers/contractors and service providers), materials, and equipment. Adverse impacts on road infrastructure could occur due to:

- An increase in vehicles on the road from project-related traffic
- A change in the type and weight of vehicles that will be on the road (e.g., heavy trucks with construction materials and equipment)
- An increase in utilization (e.g., wear and tear) of roads

Operation

Given the small workforce and infrequent activities during the operation phase of the project, maintenance and inspection activities are anticipated to have a negligible effect on traffic and transportation infrastructure.

Decommissioning

The effects of the project on traffic and strain on transportation infrastructure during the decommissioning phase are anticipated to be like, but less than, the construction phase given the smaller workforce anticipated during decommissioning.

11.4.1.3 Increased strain on health and emergency response services

The assessment of potential effects on health services and emergency response focuses on the potential for an increase in the demand for, and strain on the capacity of, health and emergency response services. Strain on local health and emergency response services would result from the influx of project-related workers. It is assumed that some of the workforce will be hired locally and therefore would already be accessing local health care facilities and emergency response services.

Analytical assessment techniques

Project-related increases to strain on health and emergency services are assessed by considering the number of workers that project will bring to the area across the construction, operations, and decommissioning, and the current capacity of health care and emergency services in the LAA/RAA.

Construction

There is the potential for the presence of the temporary workforce to place additional demand on available capacity of local health and emergency response facilities in the LAA/RAA. As discussed in Section 11.2.2, there are an anticipated 35-40 workers that will be employed during peak construction.

Operation

Given the small workforce and infrequent activities during the operation phase of the project, maintenance and inspection activities are anticipated to have a negligible effect on health and emergency services.

Decommissioning

There is the potential for the workforce during the decommissioning phase to place additional demand on the capacity of local health and emergency response facilities in the LAA/RAA like the construction phase, but to a lesser extent given the smaller workforce.

11.4.1.4 Increased strain on solid waste management facilities

Analytical assessment techniques

The assessment of potential for strain on solid waste management facilities focuses on the potential for an increase in the quantity (weight) of waste materials generated by the project that will be disposed in local/regional facilities.

Construction

During the construction phase, the project will cause an influx of workers and contractors, materials, and equipment to the LAA/RAA which in turn will result in increased consumption of goods and materials and associated waste generation that could strain the existing waste management facilities.

The generation of hazardous wastes due to the project is anticipated to be related to accidents and malfunctions (e.g., hydrocarbon spills) and such hazardous wastes would be disposed of at appropriate licensed facilities.

Operation

Given the small workforce and infrequent activities during the operation phase of the project, maintenance and inspection activities are anticipated to have a negligible effect on the strain on solid waste management facilities.

Decommissioning

The decommissioning phase is anticipated to have similar effects to the construction phase of the project, through the influx of workers, materials and equipment. In particular, the removal of transformers, disassembled towers, foundations, conductors, and associated equipment is likely to generate waste that may be disposed of in the LAA/RAA and increase the strain on existing waste management facilities.

11.4.2 Mitigation measures

11.4.2.1 Mitigation for reduced availability of short-term accommodations

The following mitigation measures will be implemented to reduce demands on temporary accommodations due to the project:

- Workers will be hired locally or regionally, whenever possible.
- Mobile construction camp(s) may be used to house workers where temporary accommodations within communities are not available.
- As part of project engagement, Manitoba Hydro will continue to engage with and share project information with local governments, service providers, and/or businesses.

11.4.2.2 Mitigation for increased traffic and strain on transportation infrastructure

The following mitigation measures will be implemented to reduce adverse road traffic effects of the project:

- Group transportation (e.g., buses, crew vans) will be utilized to transport workers between camp(s) and the worksites, and between temporary accommodations in nearby communities and the worksites.
- Manitoba Hydro will work with local authorities to address any damages to roads that occur because of the project.
- All materials transported by truck will be compliant with any weight restrictions or permits, spring road restrictions, or geometric constraints set out by Manitoba Transportation and Infrastructure or municipal governments.
- Vehicles transporting dangerous goods or hazardous products will display required placards and labeling in accordance with provincial legislation and Manitoba Hydro guidelines.

In addition to mitigation through transmission line routing, the following mitigation measures will be implemented to reduce interference with transportation and utility infrastructure:

- The project design will meet or exceed standards for setbacks and overhead clearance, including:
- CAN/CSA-C22.3 No. 1-10 “Overhead Systems” which outlines electrical and safety clearances including road, pipeline, and rail crossing clearances.

- CAN/CSA 22.3 No. 60826-10 "Design Criteria for Overhead Transmission Lines" for structural and mechanical design.
- CAN/CSA-22.3 No. 6-M9I "Principles and Practices of Electrical Coordination between Pipelines and Electrical Supply Lines".

Manitoba Hydro will obtain permits, as required, from the following entities:

Manitoba Transportation and Infrastructure: Permits are required for any construction above or below ground that falls within 250 feet of a PTH or 150 feet of a PR.

Pipeline and railway companies: Crossing agreements are required for transmission line crossings of pipelines and railways.

Manitoba Hydro will continue to engage with the entities responsible for underground infrastructures, roads, railways to identify areas where tower placement could interfere with underground infrastructures, maintenance activities, or plans for expansion. This information will be used to inform the selection of final tower locations during the engineering analysis and design phases.

Manitoba Hydro will provide information for conducting aeronautical assessments, as required by Transport Canada/NAV Canada regulations, to identify potential interferences with airports/airstrips. Such assessments are typically required for structures/lines greater than 90 m high or within 4 km of a known airport/airstrip location.

11.4.2.3 Mitigation for strain on health and emergency response services

The following mitigation measures will be implemented to reduce adverse effects on health and emergency response services:

- As part of project engagement, Manitoba Hydro will continue to engage with and share project information with local governments, service providers, and/or businesses.
- An Emergency Response Plan will be developed. As part of the development and implementation, Manitoba Hydro will work with local emergency responders to maintain appropriate emergency response times.
- Project personnel will be made aware of the plan and designated staff will receive training. Among other elements, the plan will address handling and storage of materials, driving safety, animal encounters, emergency response communications, spill response, personnel injury response, and vehicle collisions.
- Project Contractors will have first aid at project sites and camps to provide services to project workers/contractors.

11.4.2.4 Mitigation for strain on waste management facilities

The following mitigation measures will be implemented to reduce adverse effects on community infrastructure and services:

- Subject to suitable soil conditions and drainage, and compliance with *The Public Health Act* and/or *The Environment Act*, wastewater will be transported to an appropriate wastewater facility.
- Manitoba Hydro and its contractors will utilize Waste and Recycling Management Plans to manage waste and recycling in accordance with *The Public Health Act* and *The Dangerous Goods Handling and Transportation Act*. This plan will outline policies related to reducing the amount of solid waste generated; facilitating recycling wherever possible; and storing, transporting, and disposing of solid wastes at appropriate facilities.

11.4.3 Characterization of residual effects

11.4.3.1 Reduced availability of short-term accommodations

The potential for reduced availability of short-term accommodations is anticipated to be most pronounced during construction, as this phase will be associated with the highest number of project workers and contractors. Given that short-term accommodation supply in the LAA/RAA is anticipated to exceed the project-related demand, there will likely be inappreciable adverse residual effects on accommodation. As well, as most of the project's labour force would be involved in transmission line construction during frozen ground conditions (typically non-peak tourist season) this will further ameliorate the availability of short-term accommodations.

Considering the implementation of mitigation measures, the residual effects of the project on the availability of short-term accommodation are predicted to be:

- Direction: Adverse
- Magnitude: Negligible (during operations) to low (during construction and decommissioning)
- Geographic extent: LAA/RAA
- Duration: Short-term (during construction and decommissioning) and medium-term (during operation)
- Frequency: Multiple irregular
- Reversibility: Reversible

11.4.3.2 Increased traffic and strain on transportation infrastructure

The potential for increased traffic is anticipated to be most pronounced during construction because this phase will be associated with the highest number of workers and equipment traveling to and from the project site.

As stated in Section 11.4.1.2, considering that there could be the up to 35 project-related vehicles (or 70 daily trips to and from site) on the roads and highways at peak construction, which will be during frozen ground conditions when the bulk of the labour force would be working on the project. However, given the mitigation that crews will be transported by groups in vans and/or buses, there will likely be less than 35 project related vehicles per day using roadways in the LAA/RAA. In addition, crews will be working at several work sites so project traffic would be dispersed, rather than concentrated at any one site. Also, project work will be spread out temporally, lessening project-related traffic at any given time.

After the application of mitigation measures, the residual effects of the project on traffic and strain on transportation infrastructure are predicted to be:

- Direction: Adverse
- Magnitude: Negligible (during operations) to low (during construction and decommissioning)
- Geographic extent: LAA/RAA
- Duration: Short-term (during construction and decommissioning) and medium-term (during operation)
- Frequency: Multiple irregular
- Reversibility: Reversible

11.4.3.3 Strain on health and emergency response services

The potential for strain on health and emergency response services is anticipated to be most pronounced during construction as this phase will be associated with the highest potential number of project workers and contractors accessing these services in the LAA/RAA. After the implementation of mitigation measures, the residual effects on health and emergency response services that are predicted to be:

- Direction: Adverse
- Magnitude: Negligible (during operations) to low (during construction and decommissioning)
- Geographic extent: LAA/RAA
- Duration: Short-term (during construction and decommissioning) and medium-term (during operation)

- Frequency: Multiple irregular
- Reversibility: Reversible

11.4.3.4 Strain on waste management facilities

The potential for strain on waste management facilities is anticipated to be most pronounced during construction as this phase will be associated with waste generation from the highest potential number of project workers as well as use of materials in the LAA/RAA. Considering the mitigation measures that will be implemented, the project will result in inappreciable residual effects on waste management facilities that are predicted to be:

- Direction: Adverse
- Magnitude: Negligible (during operations) and low (during construction and decommissioning)
- Geographic extent: LAA/RAA
- Duration: Short-term (during construction and decommissioning) and medium-term (during operation)
- Frequency: Irregular (during operations) to continuous (during construction and decommissioning)
- Reversibility: Reversible

Table 11-5 characterizes the residual effect on infrastructure and community services.

Table 11-5: Project residual effects on infrastructure and community services

Residual Effects Characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Availability of short-term accommodations						
Construction	A	L	LAA/RAA	ST	C	R
Operation	A	N		MT	IR	
Decommissioning	A	L		ST	C	

Traffic and strain on transportation infrastructure						
Construction	A	L	LAA/RAA	ST	IR	R
Operation	A	N		MT	IR	
Decommissioning	A	L		ST	IR	
Strain on health and emergency response services						
Construction	A	L	LAA/RAA	ST	IR	R
Operation	A	N		MT	IR	
Decommissioning	A	L		ST	IR	
Strain on waste management services						
Construction	A	L	LAA/RAA	ST	C	R
Operation	A	N		MT	IR	
Decommissioning	A	L		ST	C	

11.4.4 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably foreseeable future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

11.4.4.1 Project residual effects likely to interact cumulatively

Table 11-6 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact infrastructure and community services. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is carried out.

Table 11-6: Potential cumulative effects on infrastructure and community services

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	Reduced availability of short-term accommodations	Increased traffic and strain on transportation infrastructure	Strain on health and emergency response services	Strain on waste management facilities
Existing/ongoing projects and activities				
Domestic Resource Use (hunting, trapping, fishing)	-	-	-	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	-	-	-
Commercial resource use (includes fishery and forestry)	-	-	-	-
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	-	-	-	-

Table 11-6: Potential cumulative effects on infrastructure and community services

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects			
	Reduced availability of short-term accommodations	Increased traffic and strain on transportation infrastructure	Strain on health and emergency response services	Strain on waste management facilities
Hydroelectricity transmission lines	-	-	-	-
Potential future projects and activities				
Crystal Spring Colony domestic wastewater lagoon	✓	✓	✓	✓
Diageo Hydroelectricity Station	✓	✓	✓	✓
King's Park Phase 2	✓	✓	✓	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

The existing conditions described in Section 11.2.3 consider the workforce and traffic volumes associated with the existing/ongoing activities and projects in Table 11-6. For this reason, these existing/ongoing activities and projects are not considered to have the potential to interact with the project to create new, cumulative effects on infrastructure and services.

The potential future projects and activities all can interact cumulatively with the project due to the presence of temporary workforces.

11.4.4.2 Reduced availability of short-term accommodations

Pathways for cumulative effect

The construction of the potential future projects and activities could lead to an increase in short-term accommodation demand due to the influx of workers into the LAA/RAA. No information is available on the proposed accommodation for workers on the other future projects. If there are no temporary accommodation camps built for other project construction teams, there may be additional strain on the availability of short-term accommodations.

Mitigation measures

Manitoba Hydro will follow the mitigation measures outline in Section 11.4.2.1 which will likely reduce the project's effects on the availability of short-term accommodations. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effect

Given that short-term accommodations are likely to be utilized primarily during the construction phase, the cumulative effects on availability of short-term accommodations are anticipated to be temporary and will be reversible once the project and potential future projects and activities are operational.

11.4.4.3 Increased traffic and strain on transportation infrastructure

Pathways for cumulative effect

The work force required for the project in combination with the anticipated workforces for the potential future projects and activities may adversely change traffic volumes and transportation infrastructure in the LAA/RAA through:

- Increased traffic due to project-related vehicles
- A change in the type of vehicles on the road, including heavy load vehicles
- Increased road and highway utilization, resulting in wear and tear

In addition, once the King's Park Phase 2 development is in operation, there may be an increase in traffic due to additional residents living in the LAA/RAA. This potential increase in residential traffic will only interact cumulatively with project increases to traffic and strain on transportation infrastructure if the King's Park Phase 2 development is in operation while the project is still under construction.

Mitigation measures

Manitoba Hydro will follow the mitigation measures outlined in Section 11.4.2.2 which will likely reduce the project's effects on the increased traffic and strain on transportation infrastructure. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effect

Given that construction of the project may overlap with the construction timelines for the other future projects and activities, and that construction will be restricted to frozen ground conditions for the project (i.e., low season for tourism), the magnitude of project-related cumulative effects is predicted to be low and short-term in duration. The geographic extent for cumulative impacts is the LAA/RAA. The effect may or not be reversible if the King's Park Phase 2 development results in an ongoing increase in traffic due to additional residents living in the LAA/RAA.

11.4.4.4 Strain on health and emergency response services

Pathways for cumulative effect

There is the potential for the influx of workers for the project in combination with the labour force for the potential future projects and activities to affect the capacity of local health and emergency response services in the LAA/RAA.

In addition, once the King's Park Phase 2 development is in operation, there may be an increase in residents living in the LAA/RAA who will be accessing health and emergency response services.

Mitigation measures

Manitoba Hydro will follow the mitigation measures outline in Section 11.4.2.3 which will likely reduce the project's effects on the strain on health and emergency response services. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effect

Residual cumulative effects could be adverse if the increase in service demands strain the available capacity of the health care system. The direction is adverse. Magnitude is predicted to be low to moderate for easily treatable health conditions (e.g., colds, flus) if the other projects have a similar workforce size to the project, but for serious injuries, magnitude could range from high if using local facilities, to low if serious cases are transported to Winnipeg.

The effect may or may not be reversible, if the King's Park Phase 2 development results in an ongoing increase in residents living in the LAA/RAA that require access to healthcare and emergency services. However, the project would only interact cumulatively with this increased demand to a small extent once the project is in operation because workforce numbers will be much lower than during construction.

11.4.4.5 Strain on waste management facilities

Pathways for cumulative effect

There is the potential for the influx of workers for the project in combination with the labour force for the potential future projects and activities to affect the capacity of local waste management facilities in the LAA/RAA. In addition, once the King's Park Phase 2 development is in operation, there may be an increase in residents living in the LAA/RAA who will be generating waste and increasing the strain on waste management facilities.

Mitigation measures

Manitoba Hydro will follow the mitigation measures outline in Section 11.4.2.4 which will likely reduce the project's effects on the strain on waste management facilities. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effect

The residual cumulative effect is likely to be adverse if other potential projects and activities are also generating waste and disposing of it using local waste management facilities. The effect may or not be reversible, if the King's Park Phase 2 development results in additional residents living in the LAA/RAA that require access to waste management services.

11.4.5 Determination of significance

With mitigation and environmental protection measures, the residual effects on infrastructure and community services are predicted to be not significant.

11.4.6 Prediction confidence

Prediction confidence is based on the information compiled during desktop-based data compilation, engagement feedback, and an understanding of project activities, location, and schedule.

There is a moderate degree of confidence in the assessment predictions for accommodation, traffic and transportation, and health and emergency services based on the data collected for this assessment and understanding of project pathways and effects from comparable projects.

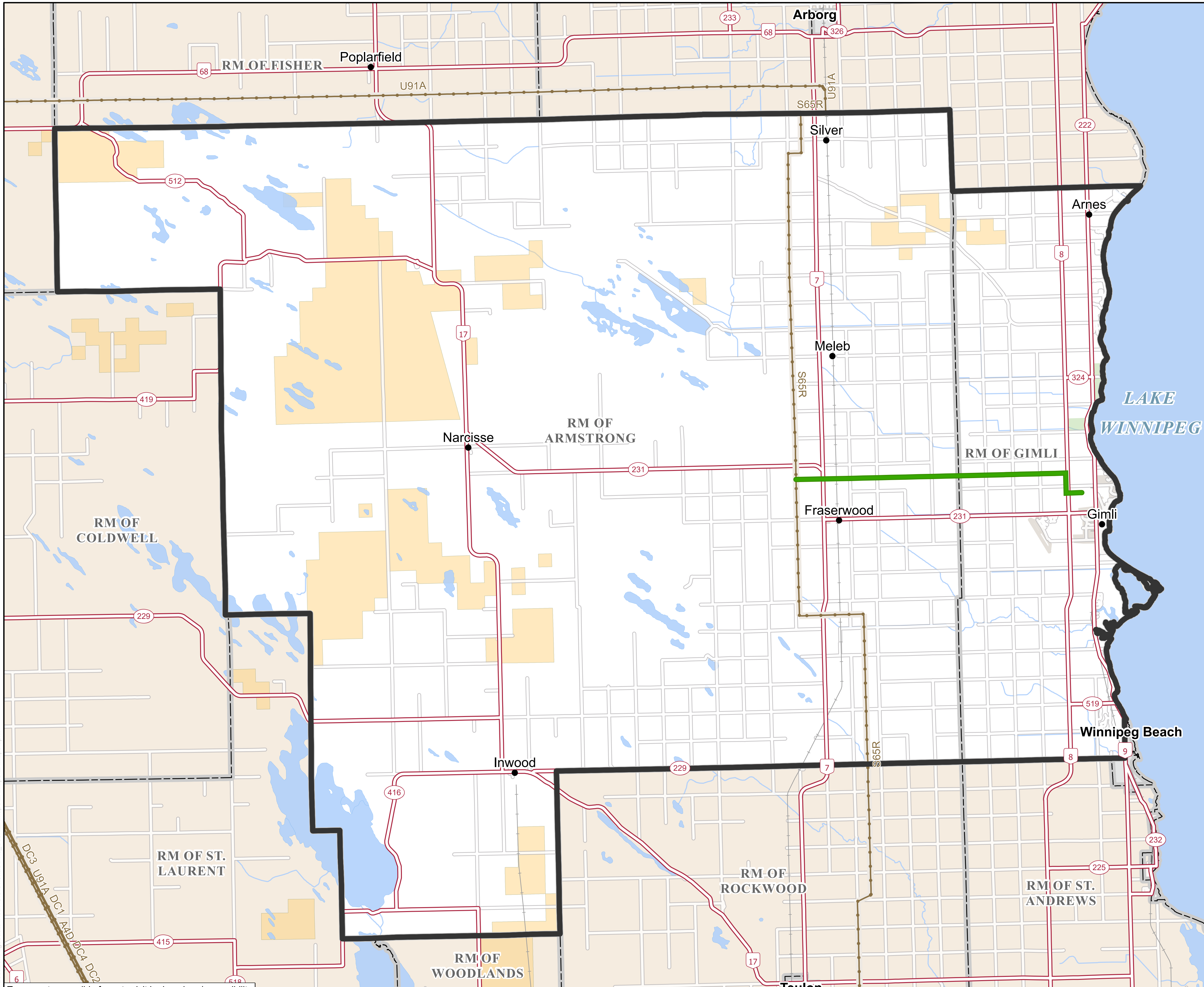
11.4.7 Follow-up and monitoring

Due to confidence in predictions and monitoring results from other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, if environmental inspections identify unexpected effects, monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the EPP (see Chapter 18).

11.4.8 Sensitivity to future climate change scenarios

Effects of climate change on infrastructure and community services are expected to relate to the anticipated increase in temperature and associated extreme weather events (e.g., flooding).

However, the potential project effects on infrastructure and services would not be altered by the above climate change scenarios.



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

Final Preferred Route

Assessment Area

LAA/RAA for Economic Opportunities and Infrastructure and Community Services

Existing Infrastructure

Existing ≥69kV Transmission Line

Landbase

Railway

Local Road

Provincial Highway/Road

First Nation

Provincial Park

Wildlife Management Area

Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 5 10 Kilometres
0 3 6 Miles

1:225,000

Economic Opportunities and Infrastructure and Community Services

Draft/Confidential: For Discussion Purposes Only

Map 11-1

12.0 Economic opportunities

Economic opportunities refer to unique business situations or community circumstances that enhance the economic state of individuals and or communities by providing a stimulus to the growth and or retention of commerce and industry. Economic opportunities were selected as a valued component (VC) because of its importance to local and provincial residents, business owners, communities, and governments.

This chapter assesses the potential effects and cumulative effects of project construction, operation and maintenance, and decommissioning activities on economic opportunities.

12.1 Scope of the assessment

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in Southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the following:

- Regional employment – employment opportunities for local and regional labour forces through construction, operation and maintenance, and decommissioning
- Regional business – subcontracting opportunities and increased demand for goods and services from local and regional businesses
- Regional economy – estimates of government tax revenue and contributions to gross domestic product (GDP) into the regional, provincial, and federal economies.

12.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

12.1.2 Regulatory and policy setting

There are no provincial laws, and associated regulations, policies, and guidelines that were deemed relevant for the assessment of project effects to economic opportunities.

12.1.3 Consideration of engagement feedback

Project engagement actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project.

Feedback received during in-person and virtual information sharing events for the project primarily related to:

- Concerns about the transmission line having no benefits for the community, and
- Concerns about the transmission line's impact commercial crop production and livestock operations.

During the community perspective workshop, participants shared feedback related to long-term economic benefits, including future economic development potential, jobs for local communities, and the importance of long-term development and sustainability. Participants also shared feedback regarding future energy needs that may be required to support economic development in the area.

12.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on economic opportunities, along with effects pathways and measurable parameters are outlined in Table 12-1.

Table 12-1: Potential effects, effects pathways, and measurable parameters for economic opportunities

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Increase in regional employment	Project demand for labour during construction, operation and maintenance, and decommissioning will create job opportunities.	Direct, indirect, and induced employment, labour force availability
Increase in regional business	Required purchase of goods and services during project construction, operation and maintenance, and decommissioning.	Procurement of goods and services ($)
Increase in regional economy	Tax revenue generated through construction, operation and maintenance, and decommissioning.	Estimated government revenue ($) Estimated GDP ($)

12.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual environmental effects of the project on economic opportunities (Map 11-1).

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of the administrative boundaries of the Rural Municipality (RM) of Armstrong and the RM of Gimli. This area is to encompass the communities for which economic opportunities could be impacted due to the project.

Regional assessment area (RAA): the RAA is the same as the LAA and deemed to encompass a sufficiently broad area for assessing cumulative effects, including the incremental effects of the project. The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects.

12.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on economic opportunities are based on the timing and duration of project activities as follows:

- Construction – four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line's design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

12.1.7 Residual effects characterization

Table 12-2 provides the definitions used to characterize the residual effects on economic opportunities.

Table 12-2: Characterization of residual effects on economic opportunities

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect.	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to economic opportunities relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to economic opportunities relative to baseline. **Neutral –** no net change in measurable parameters for economic opportunities relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions.	**Negligible –** no measurable change in the effect on economic opportunities can be noted. **Low –** a measurable change to economic opportunities that is not

Table 12-2: Characterization of residual effects on economic opportunities		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		substantial compared to other existing economic opportunities and contributors. **Moderate –** a measurable change to economic opportunities that is comparable to other existing economic opportunities and contributors. **High –** a measurable change to economic opportunities that is substantial compared to other existing economic opportunities and contributors.
Geographic Extent	The geographic area in which a residual effect occurs	**PDA –** residual effects are restricted to the PDA. **LAA/RAA –** residual effects extend into the LAA/RAA.
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –** the residual effect extends through to the operation phase. **Long-term -** the residual effect extends for the life of the project.
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase	**Single event** **Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously.

Table 12-2: Characterization of residual effects on economic opportunities

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases.	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation. **Irreversible –** the residual effect is unlikely to be reversed.

12.1.8 Significance definition

For this assessment, a significant adverse residual effect for economic opportunities is defined as follows:

- The effects are distinguishable from current economic conditions and trends for the region and cannot be managed or mitigated through adjustments to programs, policies, or plans, or through other mitigation measures.

The residual effects assessment considers both positive and adverse effects after mitigation and other management measures are implemented. However, a significance determination is provided only for adverse effects.

12.2 Existing conditions

Baseline information for this assessment was gathered through a detailed review of available desktop data. The existing conditions described in this section focus on:

- Regional economy
- Regional employment

The data used to understand regional employment comes from the 2021 Census. Statistics Canada noted that the total non-response rate for the short-form census for the RM of Gimli (5.2%) and the RM of Armstrong (8.5%) were both higher than the provincial average (3.5%). The long form census non-response rates were also higher in the RM of Gimli (7.6%) and the RM of Armstrong (11.2%) than the provincial average (5.6%).

12.2.1 Regional economy

There are a handful of economic development organizations in the LAA/RAA: the Gimli Chamber of Commerce, the Gimli Community Development Corporation, and Community Futures East Interlake. Community Futures East Interlake encompasses the LAA/RAA, as well as four other RMs and three First Nations (i.e., Peguis First

Nation, Fisher River Cree Nation, and Kinonjeoshtegon First Nation). The goal of Community Futures East Interlake is to strengthen communities in the region through innovative business and community economic development support services (Community Futures East Interlake 2024).

12.2.2 Regional employment

The LAA/RAA for the project includes the administrative boundaries of the RMs of Armstrong and Gimli.

As of 2021, the RM of Gimli had an unemployment rate (10.7%) that is slightly higher than the provincial average (8.3%), while the RM of Armstrong had a comparable unemployment rate (8.4%).

Table 12-3 shows the labour force characterization for communities in the LAA/RAA for 2021.

Table 12-3: Labour force characterization for communities in the LAA/RAA for 2021

	Rural Municipality of Armstrong	Rural Municipality of Gimli	Manitoba
Total - Population aged 15 years and over by labour force status	1,670	5,730	1,058,415
In the labour force	950	2,905	681,505
Employed	870	2,595	625,115
Unemployed	80	310	56,390
Not in the labour force	720	2,825	376,905
Participation rate (%)	56.9	50.7	64.4
Employment rate (%)	52.1	45.3	59.1
Unemployment Rate (%)	8.4	10.7	8.3

Source: Statistics Canada 2023a, b, c

The main occupational field in the RM of Armstrong is trades, transport, and equipment operators, followed by natural resources and agriculture, and sales and services (Statistics Canada 2023a). In the RM of Gimli, the main occupational field is sales and service, followed by trades, transport and equipment operators, and education, law and social, community and government services.

Table 12-4 shows the occupational classification for communities in the LAA/RAA for 2021.

Table 12-4: Occupational classification for communities in the LAA/RAA for 2021

	Rural Municipality of Armstrong	Rural Municipality of Gimli	Manitoba
Total - Labour force aged 15 years and over by occupation	950	2,905	681,505
All occupations	925	2,825	665,880
Legislative and senior management	0	40	6,440
Business, finance, and administration	125	330	106,520
Natural and applied sciences and related	25	105	39,030
Health	60	270	57,585
Education, law and social, community and government services	90	385	91,725
Art, culture, recreation, and sport	0	50	15,375
Sales and service	150	695	160,900
Trades, transport, and equipment operators and related	235	625	124,140

Natural resources, agriculture, and related production	175	225	29,805
Manufacturing and utilities	55	100	34,355

Source: Statistics Canada 2023a, b, c

12.3 Project interactions with economic opportunities

Table 12-5 identifies, for each potential effect, the physical activities that might interact with economic opportunities and result in the identified effect.

Table 12-5: Project interactions with economic opportunities

Project activity	Increase in regional employment	Increase in regional business	Increase in regional economy
Transmission Line Construction			
Mobilization and staff presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Access development	✓	✓	✓
Right-of-way clearing	✓	✓	✓
Marshalling / fly yards	–	–	–
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	✓	✓	✓
Implosive connectors	✓	✓	✓
Helicopter use	✓	✓	✓
Clean-up and demobilization	✓	✓	✓
Transmission Line Operation			
Transmission line presence	–	–	–
Vehicle and equipment use	✓	✓	✓
Inspection patrols	✓	✓	✓
Other maintenance activities	✓	✓	✓
Vegetation management	✓	✓	✓
Decommissioning			

Table 12-5: Project interactions with economic opportunities

Project activity	Increase in regional employment	Increase in regional business	Increase in regional economy
Mobilization and staff presence	✓	✓	✓
Vehicle and equipment use	✓	✓	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	–	–	–
Rehabilitation	✓	✓	✓
Clean-up and demobilization	✓	✓	✓

✓= Potential interaction
– = No interaction

Table 12-5 indicates which project activities will have an impact on regional employment, regional business, and regional economy. For the purposes of the assessment, mobilization and staff presence is intended to capture the effects of the project on economic opportunities through the general employment and subsequent business and economy opportunities associated with each project phase. Other project effects (e.g., right-of-way clearing, access development) have also been identified if they have the potential to generate additional local employment and business opportunities.

12.4 Assessment of project effects

Effects to economic opportunities are anticipated to occur during construction, operation, and decommissioning. However, they would be most pronounced during construction, and include the following:

- Increase in regional employment
- Increase in regional business
- Increase in regional economy

While increases in regional employment, business, and economy are expected to occur during operations, these effects are anticipated to be less prominent than construction given the smaller workforce required for operations. As a result, the assessment of project effects is mostly focused on the construction phase of the project.

12.4.1 Effects pathways

As discussed in Section 12.1.4, there are three main effect pathways for economic opportunities:

- Project demand for labour, creating job opportunities
- Required purchase of goods and services
- Tax revenue generated through project activities

12.4.1.1 Demand for labour

<u>Analytical assessment techniques</u>

The assessment of project-related effects to labour demand considers direct, indirect, and induced employment opportunities resulting from the project and labour force availability.

<u>Construction</u>

Project construction will generate employment opportunities for the local and regional labour force. Direct employment opportunities may include management and supervisory roles, inspection services, equipment operators, health and safety, trades, and semi-skilled and unskilled labour.

Project spending during construction will also 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.

The demand for labour related to the project has the potential to result in employment opportunities in the LAA/RAA through direct and indirect jobs. Direct effects can be created through the employment of workers who live in the LAA/RAA. Indirect effects can result from an increased workforce in the area, placing additional demands on existing businesses and leading to more employees being hired to meet this increased demand.

<u>Operation</u>

The operation and maintenance phase of the project will also generate a demand for labour, but on a smaller scale. Employment opportunities will include staff positions, operators, electrical technicians, mechanical technicians, and maintenance utility workers. There may also be opportunities for contractors to be employed for operation and maintenance activities.

Decommissioning

The decommissioning phase of the project will also generate a demand for labour, but at a smaller scale compared to construction. Direct employment opportunities may include management and supervisory roles, inspection services, equipment operators, health and safety, trades, and semi-skilled and unskilled labour.

12.4.1.2 Purchase of goods and services

Analytical assessment techniques

Project-related effects on the purchase of goods and services are assessed by considering the types goods and services that project activities will require and the availability/opportunity for goods and services to be procured from businesses within the LAA/RAA.

Construction

Project spending will generate subcontracting opportunities and the demand for goods and services from local and regional businesses. Such opportunities could include the provision of accommodations, parts supply, and vehicles and equipment for project activities.

The procurement of equipment, goods, and services from businesses in the LAA/RAA during construction will generate direct and indirect opportunities for local and regional businesses. This increased business revenue could in turn support capital investment and hiring, thereby increasing capabilities and capacity within the LAA/RAA. Spending of wages by direct and indirect workers will contribute to positive effects on local businesses, primarily within the service sector, resulting in indirect economic benefits to businesses in the LAA/RAA.

Operation

On a smaller scale, there will also be the purchase of goods and services to support project operation. These opportunities would come from routine inspection and maintenance activities, and if there were any damages to the transmission line that would require repairs.

Decommissioning

Like construction but at a smaller scale, project decommissioning-related spending will generate subcontracting opportunities and the demand for goods and services from local and regional businesses. Such opportunities could include the provision of accommodations, parts supply, and vehicles and equipment for project activities.

The procurement of equipment, goods, and services from businesses in the LAA/RAA during decommissioning will generate direct and indirect opportunities for local and regional businesses. This increased business revenue could contribute towards capital investment and hiring, thereby increasing capabilities and capacity within the LAA/RAA. Spending of wages by direct and indirect workers will contribute to positive effects on local businesses, primarily within the service sector, resulting in indirect economic benefits to businesses in the LAA/RAA.

12.4.1.3 Tax revenue

Government tax revenue generated through project activities will contribute to the regional economy. Project spending and employment will contribute to the regional, provincial, and national economies. It will also contribute to federal, and provincial government revenue through taxation on income and on goods and services procured for the project.

Analytical assessment techniques

Tax revenue is based on estimates of government tax revenue and contributions to the GDP resulting from the project.

Construction

Project expenditures during construction will result in increased economic activity in the form of employment and procurement, as discussed in previous sections. The project's contribution to provincial and federal economies is measured through GDP (value added after the cost of intermediate goods and services). In addition to GDP contributions, the project and its workers will be subject to varying levels of taxation which will contribute to government revenues.

Operation

Any project-related spending during the operation phase of the project will also support tax revenue for the regional, provincial, and national economies, but the tax revenue would be less than that generated during construction.

Decommissioning

Similar to the construction phase but at a smaller scale, decommissioning-related expenditures will result in increased economic activity, primarily via employment and procurement. In addition to GDP contributions, the project and its workers will be subject to varying levels of taxation which will contribute to government revenues.

12.4.2 Mitigation measures

Facilitation of economic and employment opportunities include the following, which apply to each of the potential effects for employment and economy:

- Manitoba Hydro will contact local municipal authorities prior to project start-up.
- Manitoba Hydro will contact First Nation and the Manitoba Métis Federation representatives prior to project start-up.
- Manitoba Hydro will collaborate with the contractors through the contracting process to promote participation of Manitoba businesses in the project.
- Continue to provide information to communities in the RAA on training, employment and business opportunities associated with project construction.
- Contract measures will promote opportunities for Indigenous people and businesses including employment and training opportunities, and incentives to encourage Indigenous business and supplier participation.

12.4.3 Characterization of residual effects

12.4.3.1 Demand for labour

Project construction, operation and maintenance, and decommissioning will generate direct and indirect employment opportunities for the local and regional labour force.

Across the three project phases, the workforce for the construction phase is anticipated to be the largest. During transmission line construction, we anticipate a direct onsite workforce ranging from 35 to 40 persons. As transmission line construction will occur during frozen ground conditions, the number of people directly employed on the project will be largest in the winter.

Construction and decommissioning activities typically require 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 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 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.

Based on previous experience, Manitoba Hydro anticipates that the decommissioning workforce size will be less than that needed for construction. Typical employment opportunities associated with decommissioning include management and supervisory personnel, equipment operators, trades and apprenticeships, semi-skilled and unskilled labour, and health and safety.

As of 2021 in the LAA/RAA, there were 130 workers employed in natural and applied sciences, 950 workers in trades, transport, and equipment operation, and 155 workers in manufacturing and utilities. These occupations seem applicable to construction-related activities, and it is assumed that some of the skilled workforce required for the project will be filled by locals in the LAA/RAA. It is likely that a portion of the project's workforce will be comprised of non-local workers; in particular, specialized labour.

Other factors, including contractor(s) use of preferred labour and the degree to which workers choose to seek employment with the project will also affect the final composition of project workforces. It is likely that employment benefits related to the project will be highly skewed toward the existing skilled trades workforce with most construction positions comprised of skilled trades positions filled by people identifying as men.

After the application of mitigation measures, the residual effects of the project on the demand for labour are predicted to be:

- Direction: Positive
- Magnitude: Low
- Geographic Extent: LAA/RAA
- Duration: Short-term (for construction and decommissioning) to medium-term (for operations)
- Frequency: Continuous
- Reversibility: Reversible

12.4.3.2 Purchase of goods and services

Where project expenditures occur locally, positive effects on regional businesses are expected. During construction, contracts to clear the transmission line right-of-way and for tower assembly could result in short-term opportunities for businesses in the LAA/RAA. Technically complex components and tower structures will be designed and manufactured outside the RAA. In addition to direct and indirect contracting, service sector businesses operating in communities near the project will experience induced economic benefits from the purchase of meals, fuel, and accommodations by workers. Incidental purchases of repairs and parts for construction vehicles and equipment, as well as the purchase of some materials required for construction will also result in economic benefits in nearby communities.

During operations, maintenance activities could include short-term contracts for maintaining the transmission line right-of-way. Decommissioning is expected to result in indirect and induced contracting opportunities for local and regional businesses and would also be expected to result in induced opportunities through consumer spending.

After the application of mitigation measures, the residual effects of the project on the purchase of goods and services are predicted to be:

- Direction: Positive
- Magnitude: Low
- Geographic Extent: LAA/RAA
- Duration: Short-term (for construction and decommissioning) to medium-term (for operations)
- Frequency: Continuous
- Reversibility: Reversible

12.4.3.3 Tax revenue

Quantitative estimates of GDP contributions are not available. However, considering the low magnitude characterizations associated with the project phases on employment and business, the project's contribution to the GDP of the local economy is deemed to be low in magnitude. At the provincial and federal level, the project's GDP contribution is negligible in magnitude. In terms of taxes, increases to regional government revenue would only be realized where additional property taxes are realized because of changes in the assessed value of lands traversed by the project. Although the final preferred route of the transmission line is routed entirely on private land, the amount of land being taken up by the transmission is not anticipated to have a measurable effect on regional government revenue.

Benefits to provincial and federal tax revenues would occur where the taxable income of workers increases, resulting in increased income tax revenue, and through PST and GST collected on goods and services used on the project. Given the size of the workforce and duration of work, project effects on provincial and federal tax revenues are anticipated to be negligible in magnitude.

After the implementation of mitigation measures, the residual effects of the project on tax revenue are predicted to be:

- Direction: Positive
- Magnitude: Negligible
- Geographic Extent: LAA/RAA
- Duration: Short-term (for construction and decommissioning) to medium-term (for operations)
- Frequency: Continuous
- Reversibility: Reversible

Table 12-6 characterizes the residual effect on economic opportunities.

Table 12-6: Project residual effects on economic opportunities

Residual Effects Characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Change in regional employment						
Construction	P	L	LAA/RAA	ST	C	R
Operation	P	L	LAA/RAA	MT	C	R
Decommissioning	P	L	LAA/RAA	ST	C	R
Change in regional business						
Construction	P	L	LAA/RAA	ST	C	R
Operation	P	L	LAA/RAA	MT	C	R
Decommissioning	P	L	LAA/RAA	ST	C	R
Change in regional economy						
Construction	P	NC	LAA/RAA	ST	C	R
Operation	P	NC	LAA/RAA	MT	C	R
Decommissioning	P	NC	LAA/RAA	ST	C	R

12.4.4 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably near future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities. Because the project is not expected to have a residual *adverse* effect on regional employment, business, or economy, further assessment of cumulative effects is not warranted.

12.4.5 Determination of significance

As discussed in Section 12.1.8, a significance determination is only made if the project is anticipated to have adverse residual effects. As summarized in Table 12-6, after the application of mitigation measures, there are no adverse residual effects predicted for economic opportunities and therefore a determination of significance is not required.

12.4.6 Prediction confidence

Prediction confidence in the assessment of effects on economic opportunities is moderate to high, based on professional judgment, quality of publicly available data, and the past effectiveness of proposed mitigation measures.

12.4.7 Follow-up and monitoring

Due to confidence in predictions and monitoring results from Manitoba Hydro's other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project.

12.4.8 Sensitivity to future climate change scenarios

Effects of climate change on economic opportunities are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding). Infrastructure damage may occur because of higher temperatures, extreme weather events, and changes in precipitation patterns. This may create the need for more frequent repair and maintenance work on the transmission line, resulting in increased economic opportunities related to employment and business demands.

13.0Human health risk

For the purposes of this assessment, human health risk refers to health risks to individuals and communities due to project activities. Human health risk was selected as a valued component (VC) because it was identified as a prominent issue during project engagement and has been assessed as part of other effects assessments for similar projects in the region.

This chapter is focused on potential changes to environmental conditions attributable to the project that can influence quantifiable measures of the health risk of individuals and communities. Perceived health effects, including stress related to health concerns and stress related to changes in tranquility, are discussed under community well-being in Chapter 14.0.

13.1 Scope of the assessment

This chapter assesses the effects of project activities during construction, operation, and decommissioning on human health risk from project activities. An assessment of cumulative effects on human health risk is also presented.

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in Southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the human health risk associated with the following:

- Change in air quality
- Change in noise
- Change in shallow groundwater quality
- Change in exposure to electric and magnetic fields (EMF)
- Change in harvested food quality

Harvested food refers to foods harvested from the land that can also be referred to as country foods, wild foods, or foraged foods. Examples of harvested foods found in the project area that were said to be harvested during project engagement are mushroom, juniper, and berries.

13.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

13.1.2 Regulatory and policy setting

The following provincial laws and associated regulations, as well as policies, and guidelines were considered for assessing project effects to human health risk.

- Canadian Ambient Air Quality Standards
- Manitoba Ambient Air Quality Guidelines and Objectives
- Health Canada noise guidance
- Manitoba Guidelines for Sound Pollution
- Guidelines for Canadian Drinking Water Quality
- Manitoba Drinking Water Quality Standards
- International Commission on Non-Ionizing Radiation Protection
- International Committee for Electromagnetic Safety
- Pest Controls Products Act
- Pesticide and Fertilizers Control Act

13.1.2.1 Canadian ambient air quality standards

The Canadian Council for Ministers of the Environment has developed the Canadian Ambient Air Quality Standards (CAAQS) for fine particulate matter, ozone, nitrogen dioxide and sulfur dioxide. The CAAQS have four management levels (green, yellow, orange, red) for the four pollutants and set out recommended management actions to control pollutant levels (Canadian Council of Ministers of the Environment n.d.). The CAAQS are established as air quality objectives under the *Canadian Environmental Protection Act, 1999*.

13.1.2.2 Manitoba Ambient Air Quality Guidelines and Objectives

Regulatory requirements are in place for assessing potential project-related change to air quality. Air quality is regulated by Manitoba Environment and Climate Change based on the Manitoba Ambient Air Quality Guidelines and Objectives (Government of Manitoba 2005).

13.1.2.3 Health Canada Noise Guidance

Although Health Canada does not have noise guidelines or enforceable noise thresholds or standards, they do consider noise-induced endpoints as health effects. These include noise-induced hearing loss, sleep disturbance, interference with speech comprehension, complaints, and change in the percentage of the population at a specific receptor location who become highly annoyed (Health Canada 2010). Health Canada advises different assessment approaches depending on the project phase, duration of noise-producing activities, and range of noise levels (Health Canada 2010; Health Canada 2017). Health Canada has also produced a guidance document for evaluating the human health impacts of noise through the environmental assessment process (Health Canada 2017).

13.1.2.4 Manitoba guidelines for sound pollution

Manitoba's guidelines for sound pollution specify outdoor environmental sound level objectives for residential, commercial, and industrial areas and include maximum acceptable noise levels for the protection of human health (Province of Manitoba 1992). These guidelines are not used for enforcement but is a reference document for noise monitoring.

These guidelines are applied in the assessment of potential impacts to health and safety to determine whether predicted levels of noise due to the project are above the acceptable thresholds and to determine whether additional mitigation measures may be needed to reduce or control noise levels.

13.1.2.5 Guidelines for Canadian drinking water quality

Health Canada has developed guidelines for drinking water based on health effects, aesthetic effects, and operational consideration. Guidelines are established for water quality for contaminants that meet the following criteria:

1. Exposure to the contaminant could lead to adverse health effects in humans.
2. The contaminant is frequently detected or could be expected to be found in several drinking water supplies throughout Canada; and
3. The contaminant is detected, or could be expected to be detected, in drinking water at a level that is of possible human health significance.

Health Canada regularly reviews and updates these guidelines to provide recommended maximum levels for microbiological, chemical, and radiological substances in drinking water in Canda (Health Canada 2024).

13.1.2.6 Manitoba drinking water quality standards

Manitoba's drinking water quality standards are regulated as part of the *Drinking Water Safety Act*. The Act sets bacteriological, microbial, chemical, and radiological, and physical standards for drinking water in Manitoba, as well as corrective actions required if drinking water sources are found to be non-compliant with the standards (Government of Manitoba 2024).

13.1.2.7 International Commission on Non-Ionizing Radiation Protection

While there are not provincially or federally maintained guidelines or standards for low frequency EMF exposure, Health Canada recognizes the international exposure guidelines established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a group recognized by the World Health Organization as the international independent advisory body for non-ionizing radiation protection (ICNIRP 2010).

Government and international medical agencies, including Health Canada, have thoroughly reviewed the available scientific information about EMF, but have not recommended regulatory standards. This guidance is relevant for the environmental assessment because it provides information on EMF exposure levels to reference in relation to the anticipated EMF that could result from the project.

13.1.2.8 International Committee for Electromagnetic Safety

The International Committee for Electromagnetic Safety (ICES) is responsible for developing standards for the safe use of electromagnetic energy in the 0 Hz to 300 GHz range relative to the potential hazards of exposure, standards for products that emit EMF and standards for environmental limits. The ICES represents 27 countries, including Canada, in working to develop consensus among representative nations for the safe use of electromagnetic energy and producing practical, science-based standards that are readily accepted and applied (Institute of Electrical and Electronics Engineers 2024).

13.1.2.9 Pest Control Products Act

Pest Control Products Act (Health Canada 2006). Herbicide registration, pre-market approval and regulations governing herbicide application follow the federal *Pest Control Products Act*, which is reviewed by Health Canada to confirm that human health is adequately protected (Health Canada 2006). Project-related use of herbicides relates to a potential change in harvested foods quality, an effect that relates to the assessment of human health risk. Health Canada has also published a guidance document for evaluating the human health impacts on harvested foods for environmental assessments (Health Canada 2018).

13.1.2.10 Pesticides and Fertilizers Controls Act

In Manitoba, the sale and use of herbicides, including applicator licensing, follows the *Pesticides and Fertilizers Control Act* (Government of Manitoba 2021).

13.1.3 Consideration of engagement feedback

Project engagement actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project.

The following concerns, and interests about the project regarding human health risk were raised during project engagement:

- The impacts of noise during construction, operation, and maintenance activities, including corona discharge
- Increased erosion and run-off from disturbed areas
- Concerns about the effects of EMF on people and human health
- Concern about impacts to picking medicines and food plants (e.g., sage, mushrooms, wild raspberries, cranberries, and juniper), and
- Concerns about the effect of the transmission line on the ability to hunt and forage on private property.

13.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on human health risk, along with effects pathways and measurable parameters are outlined in Table 13-1.

Table 13-1: Potential effects, effects pathways, and measurable parameters for human health risk.

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Decrease in air quality	Emission of dust and exhaust from vehicles and equipment particularly during construction, posing a potential increased human health risk via inhalation of criteria air contaminants.	NAAQS[1] levels for criteria air contaminants. Qualitative assessment of whether exposure to criteria air contaminants represents potential human health risk.
Increase in noise levels	Increased noise or changes in the types of noise during construction, operations, and decommissioning activities.	Assessment of noise risk based on Province of Manitoba guidelines.
Decrease in groundwater quality	Accidental intersection of artesian wells during tower foundation installation. Release of herbicides or hazardous materials during vegetation maintenance or spills.	Qualitative assessment of likelihood of groundwater disturbance from project activities.
Increase in exposure to EMF	Operation of the transmission line.	Comparison of predicted project-related EMF at the edge of the right-of-way for similar Manitoba Hydro projects to reference levels available from ICNIRP.

Decrease in harvested food quality.	The application of herbicides for vegetation maintenance activities poses a human health risk via uptake from harvested foods that are consumed.	Qualitative assessment of human health risk based on federal and provincial laws and Health Canada guidance.
[1]National ambient air quality standards		

13.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual environmental effects of the project on human health risk (Map 13-1).

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of a 1 km buffer around the PDA. It represents the area where EMF, noise, air quality and groundwater quality are most likely to be impacted during construction and operation activities.

Regional assessment area (RAA): includes the PDA and LAA and includes the administrative boundaries of the RMs of Armstrong and Gimli. This assessment area is sufficiently broad to encompass cumulative effects, including the incremental effects of the project. The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects.

13.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on human health risk are based on the timing and duration of project activities as follows:

- Construction – four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line's design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

13.1.7 Residual effects characterization

Table 13-2 provides the definitions used to characterize the residual effects on human health risk.

Table 13-2: Characterization of residual effects on human health risk

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect.	**Positive –** a residual effect that moves measurable parameters in a direction beneficial to human health risk relative to baseline. **Adverse –** a residual effect that moves measurable parameters in a direction detrimental to human health risk relative to baseline. **Neutral –** no net change in measurable parameters for human health risk relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions.	**No Measurable Change –** no discernable change to human health risk. **Low –** a discernable change in human health risk that is below regulatory benchmarks and not affecting daily activities. **Moderate –** a measurable change in human health risks that is at or around regulatory benchmarks and may moderately affect an individual's daily life and activities. **High –** a measurable change in human health risks above regulatory benchmarks that has a severe effect or could result in hospitalization or death.
Geographic Extent	The geographic area in which a residual effect occurs.	**PDA –** residual effects are restricted to the PDA. **LAA –** residual effects extend into the LAA. **RAA –** residual effects extend into the RAA.

Table 13-2: Characterization of residual effects on human health risk

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived.	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –** the residual effect extends through to completion of post-construction reclamation. **Long-term -** the residual effect extends for the life of the project.
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase.	**Single event** **Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases.	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation. **Irreversible –** the residual effect is unlikely to be reversed.

13.1.8 Significance definition

For this assessment, adverse residual effects on human health risk are considered significant if the proposed project exceeds specific thresholds:

- For changes in air quality, the significance threshold is reached if the project contributes to an increase in air quality parameter concentrations to levels that are above ambient air quality guidelines.
- For changes in noise levels, the significance threshold is reached when estimated audible noise exceeds the Manitoba provincial guidelines for residential and commercial areas for both daytime and nighttime conditions. Manitoba Environment and Climate does not enforce specific noise limits for regulation of ambient daytime and nighttime noise levels, but instead will review nuisance noise if residents have reported five complaints.

- For changes in groundwater quality, the significance threshold is reached when estimated impacts to groundwater quality exceed the Manitoba drinking water quality standards.
- For changes in EMF exposure, the significance threshold is reached when the estimated exposure of electric or magnetic field in human tissue exceeds the ICNIRP or ICES reference levels.
- For changes in harvested food quality, the significance threshold is reached when herbicides applied for vegetation management present a human health risk according to Health Canada.

The significance thresholds are based on Health Canada's guidance for conducting human health risk assessments for chemicals, Manitoba provincial guidance for noise and water quality, and ICNIRP or ICES reference levels for ELF EMF.

13.2 Existing conditions

Baseline information for this assessment was gathered through a review of available desktop information and data from previous recent Manitoba Hydro projects. The existing conditions described in this section focus on:

- Air quality
- Noise
- Groundwater quality
- EMF
- Harvested foods

Map 13-2 illustrates special features (including homes) in the LAA for human health risk and considered in this assessment.

13.2.1 Air quality

Manitoba generally has good air quality, with poorer air quality being attributable to aspects such as wildfire smoke and transboundary pollutants from the United States or other Canadian provinces.

In 2023, there were 18 fires reported in the Interlake region (Government of Manitoba 2023). Of these 18 fires, two were reported as natural, while humans caused the rest. These fires affected an estimated area of 2,115 hectares (Government of Manitoba 2023). Exposure to smoke from wildfires can cause lung problems and a persistent cough, can exacerbate existing heart and lung conditions, and is more likely to affect young children and the elderly (Manitoba Health n.d.). The Air Quality Health Index during wildfire events typically is classified as an exceedingly high heath risk, due to the elevated levels of fine particulate matter (PM2.5) from wildfire smoke (Environment and Climate Change Canada 2024).

In 2012, the Canadian Council of Ministers of the Environment committed to implementing a national Air Quality Management System (AQMS) to help protect the health of the public and the environment. Comparison of PM2.5 and ozone for the three-year period from 2013 to 2015, as part of the national AQMS, indicated that these parameters complied with the CAAQS at the five air monitoring stations located across the province of Manitoba (Manitoba Environment and Climate 2024). Two of these stations are in Winnipeg and are the closest monitoring stations to the RAA.

PM2.5 levels from the most recently publicly available air quality report for Manitoba (2017-2019 period) indicated that although PM2.5 levels were impacted by the severity of wildfires from year to year, the PM2.5 levels in Winnipeg consistently achieved the CAAQS standards (Manitoba Environment and Climate Change 2023). Ozone levels in Winnipeg also achieved the CAAQS ozone standard during the same reference period (Manitoba Environment and Climate Change 2023).

13.2.2 Noise

Existing noise levels in the area would be typical of typical of urban and rural settings. Noise in rural areas may be due to highway traffic, commercial agriculture and harvesting activities, airplanes, and recreational activities. Noise levels in urban areas near Gimli, especially those near industrial, commercial, and high-traffic areas (including the Diageo distillery facility), may be higher than noise levels in rural areas.

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 decibels (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.

13.2.3 Groundwater quality

The RAA for the project is part of the East Interlake Watershed District (EIWD). The main watershed within the RAA is the Willow Creek watershed (05SB). In 2009, the EIWD undertook groundwater well sampling at 363 private and rural wells in the watershed to understand the distribution and concentration of nutrient and bacteria levels in groundwater (namely nitrates, total coliform, and e. coli) (East Interlake Conservation District 2010). Of the 363 wells that were sampled, 41 wells failed the guidelines for bacteria and/or nitrates. The majority of wells failed for total coliform counts (29 wells), 5 failed for *E. coli* and total coliform, 4 failed for both nitrate and total coliform, and 3 failed due to nitrate concentrations (East Interlake Conservation District 2010). Although the report did not provide an explanation for these specific findings, previous studies indicated that areas with thin overburden and high agricultural activities can increase the likelihood of anthropogenic nitrate entering groundwater sources (East Interlake Conservation District 2010).

There are two groundwater wells located in the PDA: one domestic well and one livestock well (Map 13-3).

13.2.4 Electric and magnetic fields

Extremely low-frequency electric and magnetic fields (ELF EMF) are produced from the generation, transmission, and use of electric power (National Institute of Environmental Health Sciences 2002). ELF EMFs are considered to be within the frequency range of 1 Hertz (Hz) to 3 kilohertz (kHz). The EMF associated with electricity in Canada has a frequency of 60 Hz, placing it in the ELF category (Health Canada 2022). Electric fields are created via voltage when wires from electrical products are plugged into a power source, and magnetic fields are created through the flow of electrical current when these electrical products are turned on (Health Canada 2022).

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 2022). Household electrical wiring typically represents a substantial 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 (National Institute of Environmental Health Sciences 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).

13.2.5 Harvested foods

Through project engagement, we heard that residents and landowners in the area harvest and forage on their land. Harvested medicines and foods include sage, mushrooms, wild raspberries, cranberries, and juniper.

13.3 Project interactions with human health risk

Table 13-3 identifies, for each potential effect, the physical activities that might interact with human health risk and result in the identified effect.

Table 13-3: Project interactions with human health risk

Project activity	Decrease in air quality	Increase in noise levels	Decrease in groundwater quality	Increase in exposure to EMF	Decrease in harvested food quality
Transmission Line Construction					
Mobilization and staff presence	✓	✓	-	-	-
Vehicle and equipment use	✓	✓	-	-	-
Access development	✓	✓	-	-	-
Right-of-way clearing	✓	✓	-	-	-
Marshalling / fly yards	✓	-	-	-	-
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	✓	✓	✓	-	-
Implosive connectors	✓	✓	-	-	-
Helicopter use	✓	✓	-	-	-
Clean-up and demobilization	✓	✓	-	-	-
Transmission Line Operation					
Transmission line presence	✓	✓	-	✓	-
Vehicle and equipment use	✓	✓	-	-	-
Inspection patrols	✓	✓	-	-	-
Other maintenance activities	✓	✓	-	-	-
Vegetation management	✓	✓	✓	-	✓

Table 13-3: Project interactions with human health risk

Project activity	Decrease in air quality	Increase in noise levels	Decrease in groundwater quality	Increase in exposure to EMF	Decrease in harvested food quality
Transmission Line Construction					
Decommissioning					
Mobilization and staff presence	✓	✓	-	-	-
Vehicle and equipment use	✓	✓	-	-	-
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	✓	✓	✓	-	-
Rehabilitation	✓	✓	-	-	-
Clean-up and demobilization	✓	✓	-	-	-

✓= Potential interaction
– = No interaction

13.4 Assessment of project effects

While effects to human health risk could occur during construction, operation, and decommissioning, they are anticipated to be most pronounced during construction and operation and include the following:

- Decrease in air quality
- Increase in noise
- Decrease in groundwater quality
- Increase in EMF
- Decrease in harvested food quality

13.4.1 Effects pathways

13.4.1.1 Decrease in air quality

Analytical assessment techniques

The assessment of human health risk from the inhalation of criteria air contaminants is based on the change in exposure experienced by an individual that is predicted to occur between baseline (existing) and project conditions. Criteria air contaminants for the project are primarily associated with vehicle and equipment emissions, mainly during the construction phase.

Human health risks associated with air quality under both existing and future project-related conditions are typically estimated by comparing measured or calculated chemical concentrations in air to regulatory benchmarks for the protection of human health. The concentrations of criteria air contaminants were not measured or modeled for this project. Instead, a qualitative assessment of human health risk from exposure to criteria air contaminants from the project is based on comparisons with other Manitoba Hydro hydroelectric transmission projects like the Manitoba Minnesota Transmission Project.

Construction

The main effect pathway related to a decrease in air quality is the emission of exhaust and generation of dust from the operation of vehicles and equipment, particularly during clearing and other construction activities. Air quality is determined by the levels of gases and particulate matter in the air. Gases commonly emitted by passenger vehicles and other machinery include nitrogen dioxide (NO2), sulphur dioxide (SO2), and carbon monoxide (CO), all of which can have harmful health effects above certain concentrations. Particulate matter is classified according to particle size, with fine particulate matter defined as PM10 (less than 10 μm diameter) and PM2.5 (less than 2.5 μm diameter). Smaller particles pose a greater health risk, as they can travel deeper into the respiratory system when inhaled (Health Canada 2016; Environment and Climate Change Canada 2017).

Exhaust and dust emissions from the operation of vehicles and equipment during project construction, operation, and decommissioning activities may cause a change in local air quality. Project-related change to air quality poses a potential human health risk if levels of gases and particulates exceed health-based air quality objectives. Change in air quality is of particular importance to sensitive individuals, e.g., children, the elderly, and people with existing cardio-respiratory health problems such as asthma and chronic obstructive pulmonary disease (Health Canada 2021).

Exhaust and dust emissions are anticipated to be highest during the construction phase which will involve vegetation clearing, cutting, piling, and chipping/mulching activities along the right-of-way. During the construction phase, heavy equipment and vehicles will emit combustion by-products (e.g., NO2, SO2, CO and particulate matter). Construction activities may also emit fugitive dust (dust from disturbed soils becoming airborne) during the operation of heavy machinery.

Operation

Similar effects are anticipated for the operation and maintenance phase of the project but to a lesser extent given the smaller workforce size and work activities being shorter-term and more isolated.

Decommissioning

Effects like those described for construction are anticipated during the decommissioning phase of the project, but the effects would be to a lesser extent than those during construction.

13.4.1.2 Increase in noise

Analytical assessment techniques

Manitoba's provincial guidelines for maximum desirable 1-hour equivalent noise levels for residential and commercial areas are 45 dBA for nighttime and 55 dBA for daytime. These guidelines represent acceptable levels to prevent public annoyance and to protect public health and welfare with an adequate margin of safety and were used to assess predicted noise levels associated with project activities. There are two general sources of noise associated with the project:

- noise generated by construction and maintenance activities (e.g., vehicles, machinery), and
- noise generated by transmission lines (i.e., corona noise)

The qualitative assessment of human health risks from noise is based on comparisons of noise burdens associated with other Manitoba Hydro hydroelectric transmission projects. Health Canada does not have noise guidelines or enforceable noise thresholds or standards and recommends the use of standards or regulations specified for project-specific districts. Health Canada provides recommendations for the evaluation of projects where construction noise at a given receptor location lasts for more than one year, for operational noise, and where noise levels are in the range of 45-75 dB (Health Canada 2010; Health Canada 2017). As the project is not anticipated to produce noise levels above baseline conditions over the long-term, and provincial noise regulations are available, Health Canada guidance was not used in this assessment. Manitoba's Provincial Guidelines for outdoor ambient daytime and nighttime noise levels were used to assess potential human health risk from audible noise associated with construction activities and vehicle and machinery use during operation.

Construction

During project construction, activities that have the potential to increase noise levels, include the mobilization of staff and equipment, developing and using access route, creating, and using marshalling/fly yards, right-of-way clearing, installation of tower foundations, transmission tower construction, helicopter use, and the use of implosive connectors for conductor splicing.

Noise levels during the night will remain unchanged from the existing conditions because the above-noted construction activities are only anticipated to occur during the day.

Research on maximum noise levels generated during the construction phase of a project from combined construction equipment sources is suggested to be 89 dBA at a 15-metre distance from noise sources (Stantec Consulting Ltd. 2015). At 480 metres from noise sources, construction activities on a past transmission line project were expected to generate 59 dBA of noise, which is comparable to the noise level of indoor conversation (Stantec Consulting Ltd. 2015). Noise levels would generally be localized at tower locations and would typically last 7 to 10 days and would not occur at night-time.

Based on Health Canada's guidelines for construction noise levels (2017), the suggested mitigation noise level for quiet suburban or rural areas is 47dBA.Construction activities will be occurring in the winter months so outdoor activities will be limited and windows in homes are typically closed, which adds +5dBA to the recommended baseline sound level. The construction at any given tower location will be less than two months, which adds +10dBA to baseline sound levels. This results in the recommended mitigation noise level for the project construction to be 62dBA, which is higher than the anticipated noise level of 59dBA at a construction site from 480m away.

An exception to the predicted construction noise levels occurs when implosive connectors are used for conductor splicing. Implosive sleeve instantaneous discharges can generate 110 dBA of noise at 15 metres away (Stantec Consulting Ltd. 2015). If tower placement involves the use of helicopters, this activity would also result in isolated periods of elevated noise.

There are 12 homes within 500 m of the PDA. These homes and residences are the most likely to experience elevated noise levels during construction activities.

Operation

The noise generated from the operation phase of the project is expected to be far less than during the construction phase. The main sources of noise during the operation phase of the project will be corona discharge from the transmission line, and from maintenance activities.

Corona discharge is often described as a hissing or crackling noise, which results from the ionization of air surrounding electrical conductors. The noise can audibly be heard close to or under high-voltage transmission lines under certain weather conditions. Audible noise from corona discharges along the edge of the right-of-way is expected to be approximately 23 dBA during medium to fair-weather conditions (Exponent 2015b). This is lower than the estimated baseline sound level for quite rural (45dBA) and quiet suburban residential areas (Health Canada 2017). The Bipole III Electric and Magnetic Field Effects Monitoring Report (Manitoba Hydro 2021a) examined measurements of audible noise, resulting from corona discharge, recorded at a monitoring site positioned under Bipole III southeast of Winnipeg during operations. At the edge of the right-of-way, all measurements were below the predicted levels and well below the provincial recommendation that levels be a maximum of 55 dBA during the day and 45 dBA at night in residential and commercial areas (Manitoba Hydro 2021a). Overall, the noise generated by corona discharge is considered negligible since it falls below federal and provincial recommended guidelines.

The other pathway for noise during operations involves the use of vehicles and equipment during routine maintenance. This will include inspections, vegetation management, and the eventual removal of transmission infrastructure and rehabilitation activities. The noise resulting from these activities will be temporary and localized, contained mostly within the PDA.

Decommissioning

The noise generated from the decommissioning phase of the project is expected to be associated with the disassembly and removal of the equipment but is anticipated to be less than during the construction phase.

13.4.1.3 Decrease in groundwater quality

Analytical assessment techniques

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 (Government of Manitoba 2024) or the Guidelines for Canadian Drinking Water Quality (Health Canada 2024).

Construction

The 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 are 2 groundwater wells (one livestock, on e domestic) within the PDA.

Operation

Under typical vegetation maintenance activities, the release of herbicides or other hazardous materials resulting in a decrease in shallow groundwater quality would not be anticipated.

Should an accidental release of herbicides or other hazardous material occur during vegetation maintenance activities this would constitute an accident/malfunction (Chapter 17.0).

13.4.1.4 Increase in exposure to EMF

EMF-related concerns pertain to the presence of the transmission line (i.e., operational phase) and are not applicable for the construction and decommissioning phases of the project.

Analytical assessment techniques

Human exposure to EMF is determined by distance from the source (EMF decrease with distance from the source) and by the orientation of the EMF (e.g., height of the source from the ground).

Health effects can be categorized as long-term or short-term effects. For this discussion, long-term effects, if any, would occur over an extended period following exposure (e.g., cancers, neurological diseases, reproductive effects), and short-term effects would occur over a fleeting period following exposure.

Acute short-term exposure to extremely low-frequency electric fields can cause biological responses ranging from perception to annoyance through surface electric-charge effects. The only well-established effects on people exposed to short-term ELF magnetic fields are the stimulation of central and peripheral nervous tissues and a perception of faint flickering light in the periphery of the visual field (International Agency for Research on Cancer 2002) at remarkably high exposure levels. The World Health Organization has concluded that there is no evidence to confirm any health effects from long-term exposure to ELF EMF (World Health Organization 2016).

As there are no confirmed long-term health effects from exposure to ELF EMF, no standards, or guidelines for protection of long-term health have been established (World Health Organization 2016). However, the ICNIRP has published guidelines for short-term exposure to high levels of ELF EMF, which are based on the avoidance of immediate short-term health effects, such as perception, annoyance, and the stimulation of nerves and muscles (ICNIRP 2010).

It is important to note that the levels at which these short-term effects occur are not encountered in typical environments accessible to the public, including areas near electric transmission and distribution facilities (Exponent 2015a).

The qualitative assessment of potential ELF EMF effects on human health risk for this project is based on comparisons of predicted project-related EMF levels at the edge of the right-of-way for similar Manitoba Hydro projects (e.g., Manitoba-Minnesota Transmission Project) to the reference levels available from the ICNIRP and ICES for protection of the public (ICNIRP 2010; ICES 2002).

Operation

EMF from operation of the S65R Tap transmission line was an issue raised by landowners during project engagement. The operation of the transmission line will generate ELF EMF as the standard AC of power lines is 60 Hz.

The ELF EMF fields are strongest directly at their source and diminish rapidly with distance from the transmission line. Electric fields are easily blocked by solid materials, including buildings and trees. Therefore, the levels of ELF electric fields to which the public may be exposed are exceptionally low, and generally are not a concern. For example, inside a home, the electric fields from high-voltage power lines are often weaker than the fields from household electrical appliances (Health Canada 2022).

ELF magnetic fields are not as easily shielded. However, magnetic fields fall off rapidly with distance from the source. Health Canada has not independently established guidelines for ELF EMF, but rather follows the ICNIRP guidelines (2010). The ICNIRP has issued guidelines for limiting exposure to ELF EMF which help ensure that exposures to ELF EMF do not create electric currents that are stronger than the ones made naturally in the body.

For the Manitoba–Minnesota Transmission Project (MMTP), a 500 kV AC transmission line in southeastern Manitoba, the highest calculated electric field at the edge of the right-of-way was 0.8 kV/m. This level was well below recommended ICNIRP reference levels for public exposure (4.2 kV/m or 5.0kV/m) (ICNIRP 2010; ICES 2002).

The highest calculated electric field level on the MMTP right-of-way (more directly beneath the line) was 10 kV/m. This is an area where the public can be expected to spend a limited amount of time. ICES (2002) provide separate guidelines for electric-field levels on a right-of-way, recommending that they do not exceed 10 kV/m. Canadian Standards Association (CSA 2015) also refers to this 10 kV/m recommendation and further notes that it is based on comfort, stating that electric-field levels may exceed 10 kV/m for voltage classes 200 kV and greater. ICNIRP does not discuss separate guidelines for within a right-of-way but notes that in cases where reference levels are exceeded, further analyses and computations are needed to demonstrate compliance with the Basic Restriction, which limit the maximum recommended electric fields induced in body tissues (Exponent 2015b). The peak electric field on the MMTP right-of-way was roughly three times lower than the Basic Restriction.

The highest calculated magnetic field levels for the MMTP right-of-way were 32 milligauss (mG) on the edge of the right-of-way and 225 mG on the right-of-way (Exponent 2015b). These values were well below the reference levels for public exposure of 2,000 mG (ICNIRP 2010) and 9,040 mG (ICES 2002). For the MMTP human health risk assessment, it was concluded that residual human health risk effects associated with EMF are neutral as current scientific evidence indicates that ELF EMF from transmission lines is not harmful to human health, negligible in magnitude, and limited to the LAA. There were no residual human health risks associated with EMF at the levels associated with the MMTP project.

Manitoba Hydro also undertook EMF monitoring for Bipole III, another 500kV transmission line. The Bipole III Electric and Magnetic Field Effects Monitoring Report (Manitoba Hydro 2021a) found that the measured results of operational EMF quantities in 2019 and 2020 at a Bipole III monitoring site southeast of Winnipeg were at or below the predicted levels.

Given that the voltage of the S65R Tap transmission line is substantially less than the MMTP and Bipole III transmission lines (i.e., 230 kV vs. 500kV), EMF generated during operation is also expected to be below the recommended reference levels for public exposure. Therefore, human health risks associated with project-related EMF are also expected to be negligible.

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 NIEHS (2002) reported that the mean magnetic field decreased to below 2 mG in locations 61 m from the transmission line and to approximately 0.8 mG at 91 m (300 feet) from the transmission line (Figure 13-1). 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 (2010) guidelines. At 91 m, mean values for magnetic field are like typical background levels found in most homes. There are two occupied homes less than 91 m from the centerline of the transmission line. The two occupied houses are located approximately 65.5 m and 81.4 m from the centerline of the transmission line. background levels.

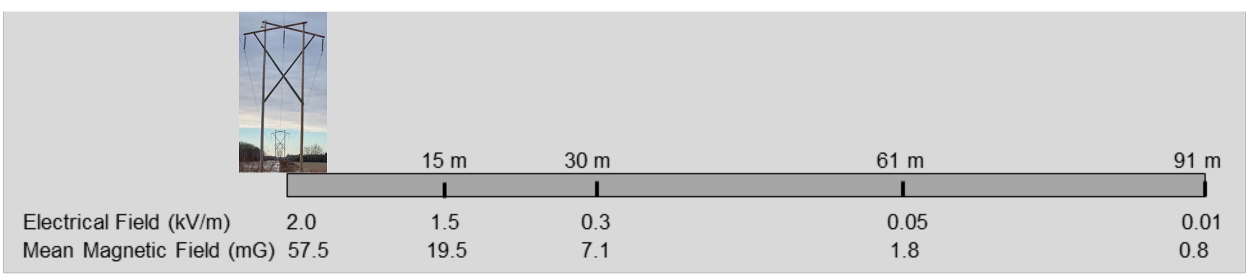


Figure 13-1: Typical mean EMF levels with increasing distance from a 230kV power transmission line (figure adapted from NIEHS 2002)

13.4.1.5 Decrease in harvested foods quality

Harvested foods, also referred to as wild foods, traditional foods, or country foods, are foods that are sourced outside of commercial food systems and can include food that is trapped, fished, hunted, harvested, or grown for subsistence or medicinal purposes (Health Canada 2018).

The application of herbicides for vegetation management and weed control during operation and maintenance may leave chemical residues on plants and soil, which have the potential to enter the food chain when consumed by animals or people.

Herbicides will not be used during construction and decommissioning activities and as a result, impacts to harvested food quality are not anticipated during these project phases.

Analytical assessment techniques

Human health risks associated with harvested food quality are typically estimated by comparing measured or calculated chemical concentrations in harvested foods to regulatory guidelines or standards for the protection of human health, if available (i.e., calculating an exposure ratio). The product information supplied to Health Canada to aid them in making their decisions is proprietary; therefore, these data are not publicly available. Without these data, project-specific exposure estimates, and exposure ratios cannot be calculated to assess human health risk. However, all pesticides approved for used by Health Canada, including the herbicides proposed for use in the project, have undergone human health risk assessments by Health Canada and are considered safe for use, provided that all guidelines for herbicide application are followed.

Operation

Herbicides applied to vegetation along the transmission line as part of an integrated vegetation management plan may be taken up by other organisms from the soil or foliage and passed on through the food chain. If chemicals contained in herbicides are taken up by species of vegetation or wildlife harvested as wild foods, there is the potential for human exposure to these chemicals via ingestion of the vegetation or wildlife.

Health Canada's Pest Management Regulatory Agency is responsible for the regulation of pest control products in Canada (i.e., pesticides, including herbicides). If the Pest Management Regulatory Agency deems there is reasonable certainty that no harm to human health, future generations, or the environment will result from exposure to, or use of, a pesticide, then an herbicide may be registered for use in Canada (Health Canada 2023). The Pest Management Regulatory Agency determines when pesticides and herbicides can be used safely when label directions are followed and will be effective for their intended use (Health Canada 2023).

13.4.2 Mitigation measures

13.4.2.1 Mitigation for air quality

Mitigation measures to reduce project-related combustion and dust emissions during the construction and operation phases include:

- Dust, and vehicle emissions will be managed in a manner that allows for safe and continuous public activities near construction sites.

13.4.2.2 Mitigation for noise

Transmission line routing considered proximity to residences and residential development, including areas designated for future urban and rural landscape development, to the extent practicable. Potential nuisance effects on sensitive receptors were a consideration in route planning and selection.

Mitigation measures for noise emissions during the construction and operation phases include:

- Conducting construction activities as per applicable noise bylaws.
- Use of passive or active techniques to minimize noise such as construction of barriers or noise cancellation in areas of prolonged noise generation to the extent feasible, grouping implodes to minimize the total number of noise events.

13.4.2.3 Mitigation for groundwater quality

Mitigation measures to reduce project-related impacts to groundwater quality during the construction and operation phases of the project include:

- A qualified drilling contractor with appropriate experience will be present 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 water leakage.
- 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.

13.4.2.4 Mitigation for increase in exposure to EMF

Transmission line routing considered proximity to residences and residential development, including areas designated for future urban and rural landscape development, to the extent practicable.

Beyond routing the transmission line to avoid as many homes as possible, additional mitigation measures are not required for the project as EMF levels within and outside the right-of-way are anticipated to be below exposure limits recommended by national and international agencies and standards.

13.4.2.5 Mitigation for harvested foods quality

Mitigation measures to reduce project-related impacts to harvested foods quality during the operation phase of the project include:

- Manitoba Hydro will develop an integrated vegetation management plan for the control of woody and non-woody vegetation along the right-of-way and at other project sites.
- Manitoba Hydro will adhere to all laws and regulations regarding herbicide use.
- Label restrictions will be adhered to during application.
- Manitoba Hydro will consider non-chemical vegetation management in clearly identified sensitive sites that contain plants of importance to First Nation and Red River Métis harvesters.

With the implementation of these mitigation measures, residual effects on harvested food quality are not anticipated during project construction, operation, and maintenance.

13.4.3 Characterization of residual effects

This section characterizes the residual project effects on human health risk predicted to remain after the application of mitigation measures.

13.4.3.1 Decrease in air quality

Project-related air emissions during the construction phase are expected to be minor, resulting in temporary, short-term reductions in localized air quality at and immediately around construction sites, but are not anticipated to result in exceedances of Manitoba's Ambient Air Quality Guidelines. Residual human health risk effects associated with changes in air quality during the construction phase are adverse.

Vehicles and heavy machinery will generate fugitive dust, particulate matter, and combustion products, but the magnitude of change in health risk from air quality is expected to be negligible.

Residual human health risk effects associated with changes in air quality during the operation and maintenance phase are adverse. However, particulate matter and dust generated during routine activities will be minor because of limited vehicle and equipment use during operations, and transient change in air quality will be limited to the PDA and immediately adjacent areas.

Project air emissions during the decommissioning phase are expected to be like the construction phase.

After the application of mitigation measures, the residual effects of the project on air quality are predicted to be:

- Direction: Adverse
- Magnitude: Negligible
- Geographic extent: PDA
- Duration: Short-term
- Frequency: Irregular event
- Reversibility: Reversible

13.4.3.2 Increase in noise

Residual effects on health and safety related to noise are anticipated to be more pronounced during the construction phase of the project as there will be the most noise-generating activities taking place during construction. However, the frequency of these activities will be multiple irregular events along the right-of-way because construction is conducted at different locations along the transmission line. Noise from construction activities will be temporary and intermittent (5-10 days at any one tower location). During the construction phase, residual effects for human health risk associated with noise levels are adverse. However, except for isolated activities such as splicing conductors, the magnitude of change in noise level will be low and like ambient noise levels.

Residual effects for human health risk associated with noise levels during operation and maintenance are adverse. However, noise generated by vehicles and equipment during routine maintenance activities may be noticeable but of short duration.

After the application of mitigation measures, the residual effects of the project on noise levels are predicted to be:

- Direction: Adverse
- Magnitude: Negligible
- Geographic extent: LAA during construction; PDA during operation
- Duration: Medium-term
- Frequency: Irregular event
- Reversibility: Reversible

13.4.3.3 Decrease in groundwater quality

After the application of mitigation measures, there are no anticipated residual impacts of the project on groundwater quality.

13.4.3.4 Increase in exposure to EMF

Residual effects during the operation phase of the project are neutral, since there is no current scientific evidence to suggest that ELF EMF from transmission lines is harmful to human health. EMF generated during operation of the transmission line will be below the levels set by international organizations.

The residual effects of the project on EMF are predicted to be:

- Direction: Neutral
- Magnitude: Negligible
- Geographic extent: LAA
- Duration: Long-term
- Frequency: Continuous
- Reversibility: Reversible

13.4.3.5 Decrease in harvested foods quality

After the application of mitigation measures, the residual effects associated with change to wild food quality during operation and maintenance are neutral, assuming herbicides are applied according to Health Canada regulations.

Table 13-4 characterizes the residual effect on human health risk.

Table 13-4: Project residual effects on human health risk

Residual Effects Characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Decrease in air quality						
Construction	A	NC	PDA	ST	IR	R
Operation	A	NC	PDA	ST	IR	R
Decommissioning	A	NC	PDA	ST	IR	R
Increase in noise						
Construction	A	L	LAA	LT	IR	R
Operation	A	NC	LAA	LT	IR/C	R
Decommissioning	A	L	LAA	LT	IR	R
Decrease in groundwater quality						
Construction	N/A	N/A	N/A	N/A	N/A	N/A
Operation	N/A	N/A	N/A	N/A	N/A	N/A
Decommissioning	N/A	N/A	N/A	N/A	N/A	N/A
Increase in exposure to EMF						
Construction	N/A	N/A	N/A	N/A	N/A	N/A
Operation	N	NC	LAA	LT	C	R
Decommissioning	N/A	N/A	N/A	N/A	N/A	N/A
Decrease in harvested foods quality						
Construction	N/A	N/A	N/A	N/A	N/A	N/A
Operation	N/A	N/A	N/A	N/A	N/A	N/A
Decommissioning	N/A	N/A	N/A	N/A	N/A	N/A

13.4.4 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably near future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

For human health risk, these conditions are met in relation to three effects: exposure to EMF, decrease in air quality, and increase in noise. Since there are no anticipated residual project effects on groundwater quality or harvested food quality, they are not assessed further for potential cumulative effects.

13.4.4.1 Project residual effects likely to interact cumulatively.

Table 13-5 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact infrastructure and services. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is conducted.

Table 13-5: Potential cumulative effects on human health risk

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Increase in exposure to EMF	Decrease in air quality	Increase in noise
Existing/ongoing projects and activities			
Domestic Resource Use (hunting, trapping, fishing)	-	-	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	-	-
Commercial resource use (includes fishery and forestry)	-	✓	✓
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	-	✓	✓

Table 13-5: Potential cumulative effects on human health risk

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects		
	Increase in exposure to EMF	Decrease in air quality	Increase in noise
Hydroelectricity transmission lines	✓	-	✓
Potential future projects and activities			
Crystal Spring Colony domestic wastewater lagoon	-	-	-
Diageo Hydroelectricity Station	✓	✓	✓
King's Park Phase 2	-	-	-

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

– = Interactions between the residual effects of other projects and those of the project residual effects are not expected.

13.4.4.2 Increase in exposure to EMF

Pathways for cumulative effect

Other existing transmission lines in the RAA will also be generating EMF during their operation. However, increased EMF levels will be concentrated underneath the rights-of-way and are not anticipated to contribute to a cumulative increase in EMF at any location.

The future Diageo hydroelectricity station has the potential to increase EMF levels in the project's LAA. Although the location of the station is not yet known, increased EMF levels are anticipated to be constrained to the project footprint of the station.

Mitigation measures

Additional mitigation measures are not required as EMF levels from existing projects and potential future projects and activities are anticipated to be below exposure limits recommended by national and international agencies and standards. The

Diageo hydroelectricity will be fenced off and there will not be access to the station where EMF levels are anticipated to be the highest, outside of operational and maintenance activities.

Residual cumulative effect

Given that EMF decreases rapidly with increasing distance away from the source, there are no anticipated residual cumulative effects.

13.4.4.3 Decrease in air quality

Pathways for cumulative effect

The current projects and activities that may interact cumulatively to affect air quality are commercial resource use and infrastructure. These activities have the potential to generate fugitive dust, particulate matter and other air pollutants that lead to a potential change in ambient air quality. However, based on existing baseline data for southern Manitoba measured out of Winnipeg and Brandon, ambient air quality in the region follows the CAAQS for PM2.5 and ozone (Manitoba Environment and Climate Change 2023).

The Diageo hydroelectricity station will be built within the existing Diageo property and will be connected to the point of delivery for the S65R Tap transmission line. The construction timelines for these two projects are likely to occur simultaneously and therefore may interact cumulatively to affect air quality. Construction of the new hydroelectricity station will reasonably have similar effects to air quality as other recent hydroelectricity station projects (e.g., Wash'ake Mayzoon Station). The effects assessment for Wash'ake Mayzoon Station concluded that the project was not expected to produce air emissions that exceed Manitoba's Ambient Air Quality Guidelines (Manitoba Hydro 2021b).

Given that air emissions associated with the project will occur primarily during the construction phase, reasonably foreseeable projects and physical activities are only anticipated to act cumulatively with the project to impact air quality if construction activities occur concurrently. These effects will be experienced primarily close to construction areas, and they will be short-term and continuous until the end of construction. Landowners and residents living near to both the S65R Tap transmission project and the other projects and activities identified in Table 13-5 may experience cumulative health risk from project-related changes in air quality.

It is not anticipated that the project will interact cumulatively to affect air quality with the future King's Park Phase 2 subdivision development or Crystal Spring Colony domestic wastewater lagoon projects because residual project effects on air quality are characterized as negligible and confined to the PDA, and these future projects are located approximately 1 km and 9 km from the PDA, respectively.

Mitigation measures

Implementation of the mitigation measures described in Section 13.4.2.1 will reduce the effects of the project on air quality. Other proponents may adopt measures to mitigate their own project effects. Manitoba Hydro will collaborate with other proponents and government agencies, where appropriate, to address cumulative effects.

Residual cumulative effect

The projects and activities listed in Table 13-5 may contribute to a change in air quality and related human health risk. Landowners and residents living near the proposed S65R Tap transmission project and near other existing and future projects are most likely to experience cumulative health risk from project-related change to air quality. However, these effects are expected to be negligible in magnitude, short-term in duration and reversible once construction activities subside.

13.4.4.4 Increase in noise

Pathways for cumulative effect

Noise generated by future projects and activities in the LAA and RAA have the potential to interact cumulatively with the project and could increase the overall exposure to noise experienced by people living and working in the RAA. Any activities involving the use of vehicles and equipment will contribute to noise levels. However, effects will only be cumulative if noise-generating activities occur concurrently and close to one another.

While many existing projects and activities occur within the LAA, the Diageo hydroelectricity station is the only other future project that will be located within the LAA, which the extent to which residual project increases to noise are expected. The construction timelines for these two projects are likely to occur simultaneously and therefore may interact cumulatively to increase noise in the LAA. Ambient noise levels will return to baseline after construction activities are complete.

It is not anticipated that the project will interact cumulatively to increase noise with the future King's Park Phase 2 residential subdivision or Crystal Spring Colony domestic wastewater lagoon projects because they are located outside the LAA.

Mitigation measures

Implementation of mitigation measures described in Section 13.4.2.2 will reduce project effects on noise levels. Other proponents may adopt mitigation measures to mitigate their own projects' effects, or they may be required as permitting conditions.

Residual cumulative effect

Cumulative effects on noise will be experienced primarily close to construction areas and are anticipated to be short-term and continuous until the completion of construction. The residual potential cumulative effects due to noise will be negligible to low in magnitude, short-term in duration, and reversible once construction activities are complete.

13.4.5 Determination of significance

With mitigation and environmental protection measures, the residual cumulative effects on human health risk are predicted to be not significant.

13.4.6 Prediction confidence

Prediction confidence in the assessment of effects on human health risk is based on desktop-based data compilation, engagement feedback from this project and other recent Manitoba Hydro projects in southern Manitoba, and an understanding of project activities, location, and schedule.

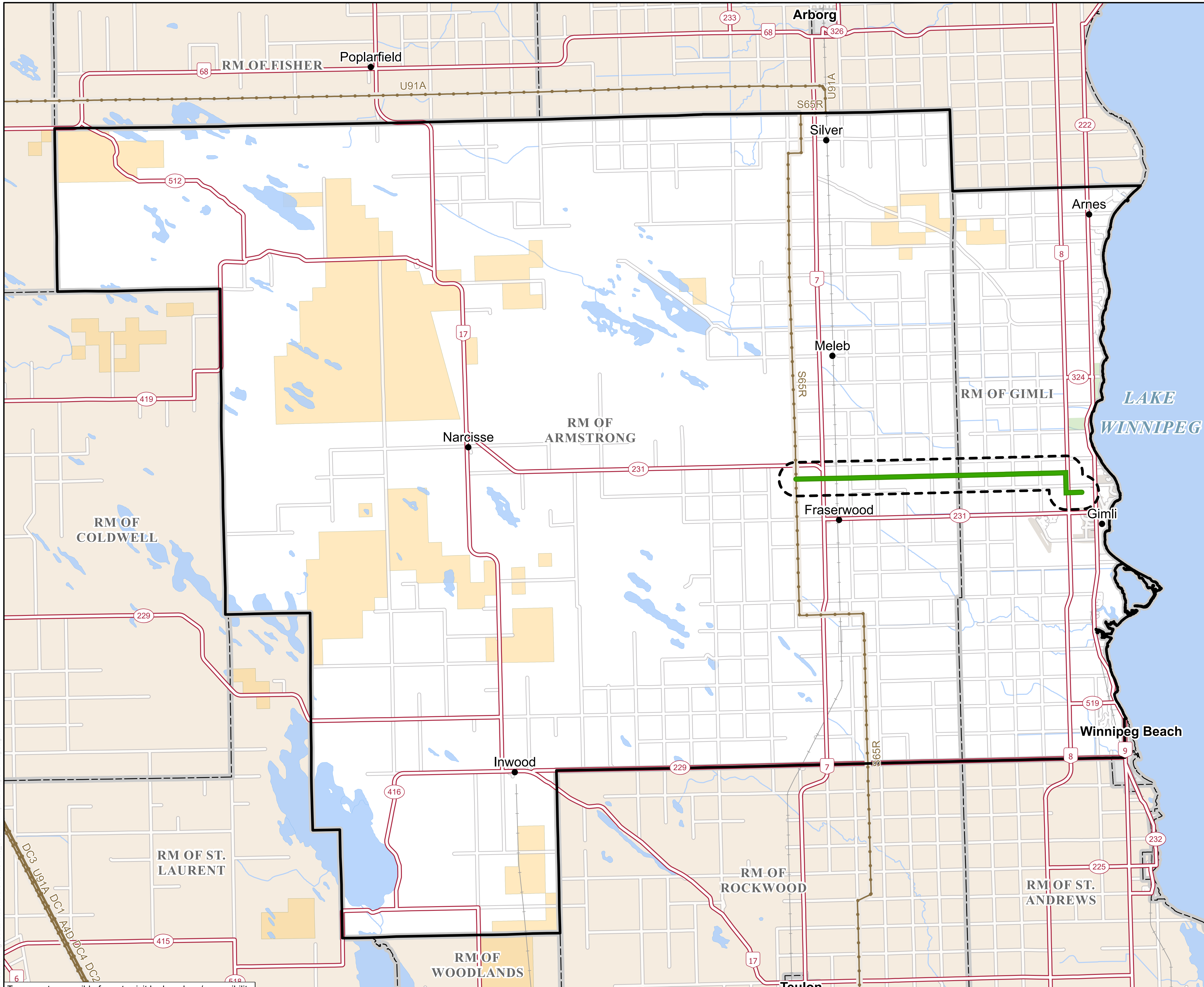
The prediction confidence is high for the assessment of project effects on human health risk, since the environmental effects mechanisms are well understood, and Manitoba Hydro has experience and has demonstrated due diligence on transmission projects in southern Manitoba in agricultural and urban areas.

13.4.7 Follow-up and monitoring

Due to confidence in predictions and monitoring results from Manitoba Hydro's other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, if environmental inspections identify unexpected effects, monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the EPP (Section 18.7.5.6). In terms of health concerns related to EMF, Manitoba Hydro will continue to follow studies and make information available to the public.

13.4.8 Sensitivity to future climate change scenarios

Effects of climate change on human health risk are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding).



To request accessible formats visit hydro.mb.ca/accessibility

Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Human Health LAA (PDA Buffer 1km)
- Human Health Regional Assessment Area

Existing Infrastructure
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

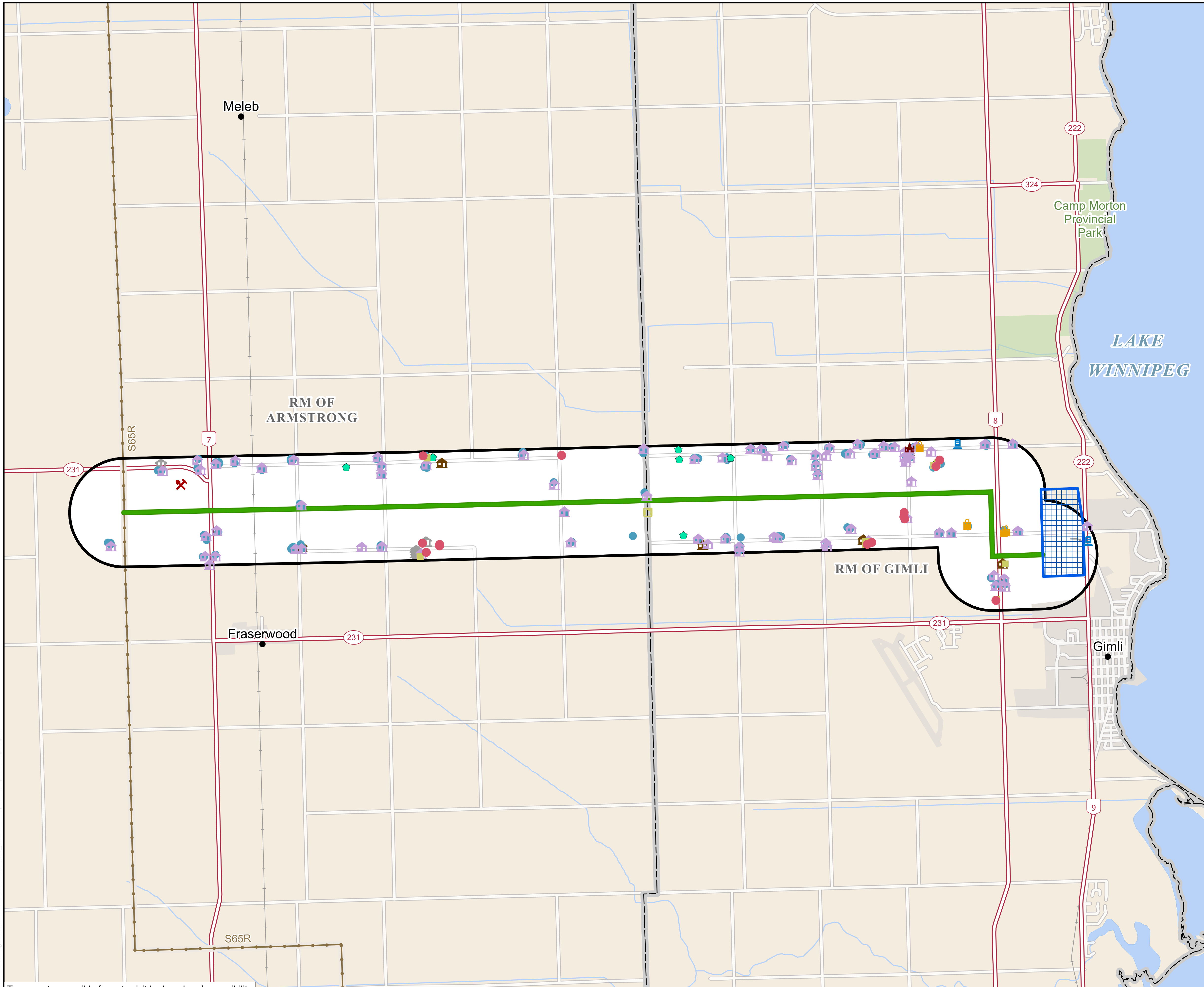
N

0 5 10 Kilometres
0 3 6 Miles
1:225,000

Spatial Boundaries for Human Health Risk Assessment Areas

Draft/Confidential: For Discussion Purposes Only

Map 13-1



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Human Health LAA (PDA Buffer 1km)

Special Features
- Agriculture Building
- Cemetery
- Church/Worship Site
- Commercial Building
- Grain Bin
- Livestock Operation
- Mine/Quarry/Pit
- Occupied House
- Outbuilding
- Special Structures
- Unoccupied House
- Unutilized Building

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

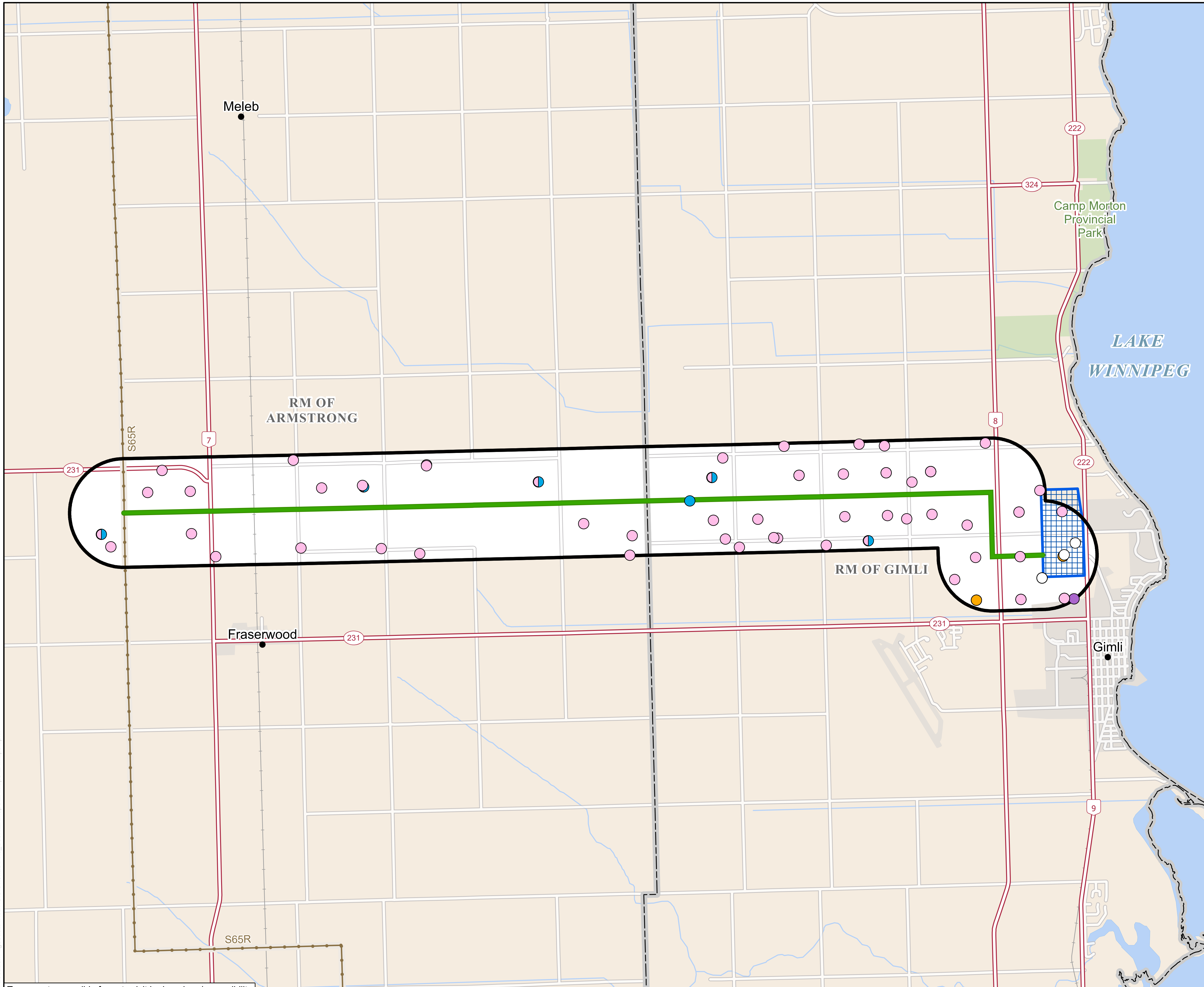
0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Special Features Within the Human Health Local Assessment Area

Draft/Confidential: For Discussion Purposes Only

Map 13-2



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Human Health LAA (PDA Buffer 1km)

Groundwater Wells within LAA
- Unknown
- Commercial/Industry
- Domestic and Livestock
- Livestock
- Public
- Domestic

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Groundwater Wells

Draft/Confidential: For Discussion Purposes Only

Map 13-3

14.0Community well-being

There is no single definition of well-being that is universally accepted, and perceptions of well-being vary across geographies, languages, and cultures (Indigenous Services Canada 2024). Indigenous Services Canada notes that well-being generally includes social, economic, health and political conditions that are essential to fulfilling enjoyable lives. The Canadian Index of Well-being (CIW) defines well-being as "the presence of the highest possible quality of life in its full breadth of expression focused on but not necessarily exclusive to good living standards, robust health, a sustainable environment, vital communities, an educated populace, balanced time use, high levels of democratic participation, and access to and participation in leisure and culture." (Canadian Index of Well-Being n.d.). Well-being can include mental and physical health, social, cultural, spiritual, economic, and environmental dimensions (Betley et al. 2023). For the purposes of this EA, community well-being refers to social and economic influences on human health that may be affected because of the S65R Tap transmission project.

Community well-being was selected as a VC because it was raised as a concern through the project engagement process. While human health risk covers many quantifiable elements of health related to environmental change, community well-being discusses subjective experiences of health, perceived health as well as other qualitative measures of well-being that may not be in-scope of other VCs.

14.1 Scope of the assessment

This chapter assesses the effects of project activities during construction, operation, and decommissioning on community well-being from project activities. An assessment of cumulative effects on community well-being is also presented.

This assessment has been influenced by engagement feedback and Manitoba Hydro's experience with other recent transmission line projects in southern Manitoba (e.g., the Pointe du Bois to Whiteshell Transmission Project, Dorsey to Wash'ake Mayzoon Transmission Project, and Manitoba-Minnesota Transmission Project). The assessment considers the following:

- Stress from perceived effects from the presence and operation of the transmission line.
- Changes to tranquility from construction and operation activities.

Tranquility includes both aural and visual factors and refers to how much individuals think a particular setting is quiet, peaceful, and attractive. Both noise and the visual intrusion of human-made structures into perceived natural environments can affect tranquility (Watts and Pheasant 2015). Tranquility considers annoyance from noise during construction and operation of the project, as well as changes to the viewscape because of the project.

14.1.1 The project

The scope of the project consists of the construction, operation, and decommissioning of a new and approximately 18.5-km long, 230-kV transmission line that would initiate at a new tap structure on the existing Silver to Rosser transmission line and terminate at a new switch structure at the property line of the Diageo facility in the RM of Gimli.

The footprint of the tap structure will be within the transmission line right-of-way. Within the Diageo facility property, a new station and associated transmission infrastructure will be built and owned by Diageo and are excluded from the proposed project and this environmental assessment.

14.1.2 Regulatory and policy setting

There are no provincial laws, and associated regulations, policies, and guidelines that were deemed relevant for the assessment of project effects to community well-being.

14.1.3 Consideration of engagement feedback

Project engagement (Chapter 5.0) actively sought to provide opportunities for concerned and interested parties to provide VC related feedback about the project.

The following questions, concerns, and interests about the project regarding community well-being were raised during project engagement:

- Potential effects to human health (e.g., perceived impacts of electric and magnetic fields (EMF), annoyance).
- Private property impacts (e.g., property devaluation, impacts on future development potential, trespassing on private property through the transmission line right-of-way).
- Aesthetic conditions (e.g., loss of trees, changes to viewscape, changes to perceived tranquility of property).
- Potential effects to services, including cell coverage and wireless internet, from operation of the transmission line.

Community well-being is a VC intended to cover perceived impacts of transmission line developments or impacts that cannot be quantitatively assessed.

14.1.4 Potential effects, pathways, and measurable parameters

The potential project effects on community well-being, along with effects pathways and measurable parameters are outlined in Table 14-1.

Table 14-1: Potential effects, effects pathways, and measurable parameters for community well-being

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Increase in stress from perceived effects of construction and operation of the transmission line.	Perceived EMF effects on human health. Perceived impact to cell service and wireless internet signal. Stress related to property devaluation from presence of transmission line.	Qualitative assessment of feedback related to perceived health effects shared through project engagement (e.g., breadth and perceived severity of impact). Qualitative assessment of stress related to impacts to cell service and wireless internet signals. Qualitative assessment of stress related to property value.
Decrease in tranquility from construction and operation of the transmission line.	Noise annoyance during construction and maintenance activities, including noise from corona discharge. Physical changes to viewscape from vegetation clearing during construction and presence of the transmission line.	Qualitative assessment of feedback related to tranquility shared through project engagement (e.g., breadth and perceived severity of impact). Qualitative assessment of aesthetic conditions.

14.1.5 Spatial boundaries

Three spatial boundaries are used to assess residual and cumulative environmental effects of the project on community well-being (Map 14-1).

Project development area (PDA): the project footprint and anticipated area of physical disturbance during construction, operation, and decommissioning of the project.

Local assessment area (LAA): includes all components of the PDA and consists of a 1.5 km buffer. This area represents properties that will be traversed and immediately adjacent to the transmission line and are most likely to experience annoyance from project activities, perceived health impacts from proximity to the transmission line, and changes to viewscape. This area is also broad enough to encompass the LAA for human health risk.

Regional assessment area (RAA): includes the PDA and LAA and includes the administrative boundaries of the RM of Armstrong and the RM of Gimli. This assessment area is sufficiently broad to encompass cumulative effects, including the incremental effects of the project. The RAA area is crucial for understanding the broader environmental and socio-economic context of the project and is the area used for assessing cumulative environmental and socio-economic effects.

14.1.6 Temporal boundaries

The primary temporal boundaries for the assessment of project effects on community well-being are based on the timing and duration of project activities as follows:

- Construction – Four months spanning winter 2025 to spring 2026.
- Operation – the operational phase of the project including maintenance and estimated to be 75 years based on the transmission line’s design.
- Decommissioning – estimated to be two years once the project has reached the end of its serviceable life.

14.1.7 Residual effects characterization

Table 14-2 provides the definitions used to characterize the residual effects on community well-being.

Table 14-2: Characterization of residual effects on community well-being

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect.	**Positive –** a residual effect that moves measurable parameters or qualitative categories in a direction beneficial to community well-being relative to baseline. **Adverse –** a residual effect that moves measurable parameters or qualitative categories in a direction detrimental to community well-being relative to baseline. **Neutral –** no net change in measurable parameters or qualitative categories for community well-being relative to baseline.
Magnitude	The amount of change in measurable parameters or the VC relative to existing conditions.	**No Measurable Change –** non-discernible change to community well-being. **Low –** a discernable change in community well-being resulting from the project that exceeds baseline conditions but does not affect daily activities. **Moderate –** a measurable change in community well-being resulting from the project that exceeds baseline conditions and moderately affects individuals' daily lives and activities. **High –** a measurable change in community well-being resulting from the project that exceeds baseline conditions and has a severe effect on individuals' daily

Table 14-2: Characterization of residual effects on community well-being		
Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
		lives or activities or could result on hospitalization or death.
Geographic Extent	The geographic area in which a residual effect occurs.	**PDA –** residual effects are restricted to the PDA. **LAA –** residual effects extend into the LAA. **RAA –** residual effects extend into the RAA.
Duration	The time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived.	**Short-term –** the residual effect is restricted to the construction phase. **Medium-term –** the residual effect extends past the construction phase and into operation. **Long-term -** the residual effect extends for the life of the project, including decommissioning
Frequency	Identifies how often the residual effect occurs and how often during the project or in a specific phase.	**Single event** **Multiple irregular event –** occurs at no set schedule. **Multiple regular event –** occurs at regular intervals. **Continuous –** occurs continuously
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases.	**Reversible –** the residual effect is likely to be reversed after activity completion and reclamation. **Irreversible –** the residual effect is unlikely to be reversed

14.1.8 Significance definition

For this assessment, adverse residual effects on community well-being are considered significant if the proposed project has the potential to adversely change community well-being in a manner that has a severe negative effect on individuals' daily lives or activities and cannot be mitigated or reduced with current or anticipated programs, policies, or mitigation measures (*i.e.,* community well-being is adversely affected to a high magnitude).

14.2 Existing conditions

Baseline information for this assessment was gathered through a detailed review of available desktop data. The existing conditions described in this section focus on:

- Regional population health
- Self-rated health & well-being
- Cell phone and internet services
- Perceived effects of EMF

Map 14-2 illustrates special features (including homes) in the LAA for community well-being and considered in this assessment.

14.2.1 Regional population health

The project is in the Interlake-Eastern Regional Health Authority (RHA), within the West Zone of the RHA. The RHA region extends east to the Ontario border, north to the 53rd parallel, west to the eastern shores of Lake Manitoba and south to Winnipeg's north perimeter, dipping down just past Winnipeg to slightly below the Trans-Canada Highway eastwards to Ontario (Interlake-Eastern Regional Health Authority 2024). The RHA serves over 133,800 Manitobans and includes 17 First Nations communities. The percentage of the population aged 65+ is 18.8%, compared to the Manitoba average of 15.9%, and 27.3% of the RHA population identifies as Indigenous (compared to 18.0% for Manitoba) (Interlake-Eastern RHA 2023).

The Interlake-Eastern RHA has rates of many chronic diseases that are higher compared to the provincial average, including: rates for cancer, hypertension (high blood pressure), diabetes, and childhood asthma (Interlake-Eastern RHA 2020). Chronic conditions, such as diabetes, cancer, and circulatory diseases, are the leading causes of death and disability within the Interlake-Eastern RHA. Cancer rates within the West Zone were 541.6 per 100,000 residents, compared to the regional rate of 511.8 and provincial rate of 478.4 per 100,000 (Interlake-Eastern RHA 2020).

Rates of respiratory disease (including asthma, bronchitis, emphysema, and chronic air obstruction) in the Interlake-Eastern RHA vary with some areas having rates below the provincial average and other areas being substantially higher than the provincial average. The rate for the West Zone, which includes the project RAA, was 7.9%, which is lower compared to the regional (9.4%) and provincial (10.3%) rates. The rates of asthma in children have increased in all areas of the Interlake-Eastern RHA and were higher than the provincial average (Interlake-Eastern RHA 2020).

14.2.2 Self-rated health and well-being

Although Manitoba Hydro undertakes an environmental assessment to quantify the impacts of the project on the environment and communities, we recognize that individuals and communities may perceive the impacts of our projects differently. Perceived environmental conditions can be a strong predictor of mental health, and in some cases may be more useful for predicting mental health than objective environmental conditions (Gomm & Bernauer 2023).

In some cases, even environmental conditions that do not cause adverse biophysical human health effects may contribute to negative mental health outcomes, since the perception of the severity of impacts is often subjective (Gomm and Bernauer 2023). Moreover, subjective exposure and concern about environmental hazards may be at least as important a predictor of poor health outcomes as objective exposure to hazards (Peek et al. 2009).

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 and Marmot 2006).
- Stress can lead to the adoption of health-threatening coping behaviours such as tobacco use and alcohol consumption (Mikkonen and 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 and Wilkerson 2011).

For these reasons, understanding the current perceived health status of individuals and communities in the RAA is helpful when considering potential project impacts on perceived health. Self-rated health, also known as perceived health, is a metric collected by Statistics Canada as an indicator of overall health status. Self-rated health includes components of mental, physical, and social well-being.

Statistics Canada uses multiple surveys to measure self-rated health in Canada, one of which being the Canadian Community Health Survey. The Canadian Community Health Survey is an annual survey to track and monitor the health status and health determinants for the Canadian population at the national, provincial, and health region levels.

Table 14-3 displays the health characteristics for self-rated health from the Interlake-Eastern RHA alongside provincial and national rates for both males and females from the most recently available two-year data set from 2019-2020.

As summarized in the table, the self-rated health and self-rated mental health for people in the Interlake-Eastern RHA was like the provincial and national rates. For males in the Interlake-Eastern RHA, the perceived life stress was considered significantly lower than the provincial and national averages.

Table 14-3: Indicators for community well-being for the Interlake-Eastern Regional Health Authority and provincial and national rates, 2019-2020

Geography	Canada		Manitoba				Interlake-Eastern RHA, Manitoba					
Sex	Males	Females	Males		Females		Males			Females		
Characteristics	Percent	Percent	Percent	Statistically different from the Canada rate	Percent	Statistically different from the Canada rate	Percent	Statistically different from the Canada rate	Statistically different from the provincial rate	Percent	Statistically different from the Canada rate	Statistically different from the provincial rate
Perceived health, very good or excellent	62.6	61	62.4	0	58	-1	59.9	0	0	57	0	0
Perceived health, fair or poor	10.4	11.2	11.2	0	12.1	0	13.3E	0E	0E	12.0E	0E	0E
Perceived mental health, very good or excellent	69.4	62.8	67.9	0	59.1	-1	69.5	0	0	59	0	0
Perceived mental health, fair or poor	8	9.7	7.1	0	10.2	0	F	F	F	8.8E	0E	0E
Perceived life stress, most days quite a bit or extremely stressful	19.4	22.2	17.6	0	22.4	0	11.0E	-1E	-1E	21.5	0	0
Sense of belonging to local community, somewhat strong or very strong	68.7	71.2	72.1	1	74.2	1	73.9	0	0	71	0	0

All data is total population 12 years and older, for the 2019-2020 reference period (most recent available data) from the Canadian Community Health Survey

E: use with caution, F: too unreliable to be published

Source: Statistics Canada 2024.

14.2.3 Cell phone & internet service

Much of rural Manitoba has internet service provided by companies such as Xplorenet, Bell MTS and Shaw. The area around Gimli has cell phone coverage from the three major cell phone providers: Bell, Rogers, and Telus, as well as smaller providers who connect to the major networks (Kearney 2023).

There are approximately 17 communication towers in the RAA, located mostly near Gimli and Arnes, as well as Chatfield, Fraserwood, Meleb, Inwood and Sandy Hook (SCADACore 2024). These towers include services for Xplorenet, Bell, Rogers, Telus and I-NetLink Incorporated (SCADACore 2024).

14.2.4 Perceived effects of electric and magnetic fields

While the human health risk chapter (Chapter 13.0) describes the anticipated human health risk from the operation of the transmission line as being negligible, some participants expressed concerns about potential health impacts from EMF during project engagement.

Transmission lines produce EMF at a level that is categorized as extremely low frequency (ELF), in the range of 1 Hertz (Hz) to 3 kilohertz (kHz) on the electromagnetic spectrum. This ELF EMF can induce electric fields in the human body, but the levels are extremely small (World Health Organization 2016). While both electric and magnetic fields induce voltages and currents in the body, even directly beneath a high voltage transmission line the induced currents are exceedingly small compared to thresholds for producing shock and other electrical effects (World Health Organization 2016).

There is a perceived risk that living near powerlines increases cancer risk due to the production of electric and magnetic fields (City of Hope 2023) which was first raised in 1979 due to a study which associated increased risk of childhood leukemia with residential proximity to power lines (Zeman n.d.). There has been no consistent evidence linking cancer to EMF exposure from powerlines including childhood leukemia and brain tumours (National Cancer Institute 2022). The only well-established effects on people exposed to short-term ELF magnetic fields are the stimulation of central and peripheral nervous tissues and the perception of faint flickering light in the periphery of the visual field (Institute for Electrical and Electronics Engineers 2019) at extremely high exposure levels. The levels at which these short-term effects occur are not encountered in typical environments accessible to the public, including areas near electric transmission and distribution facilities (Exponent 2015b).

The International Commission on Non-Ionizing Radiation Protection has issued guidelines for limiting exposure to ELF EMF which help ensure that exposures to ELF EMF do not create electric currents that are stronger than the ones made naturally in the body.

Concerns about potential effects from EMF have been raised in engagement processes on several recent Manitoba Hydro projects in southern Manitoba, including PW75, D83W, and MMTP. Participants on D83W also raised that the perceived effects from EMF cause stress to participants and that providing scientific information and data from previous studies may not alleviate concerns about potential impacts.

14.3 Project interactions with community well-being

Table 14-4 identifies, for each potential effect, the physical activities that might interact with community well-being and result in the identified effect.

Table 14-4: Project interactions with community well-being

Project activity	Increase in stress from perceived effects	Decrease in tranquility
Transmission line construction		
Mobilization and staff presence	–	✓
Vehicle and equipment use	–	✓
Access development	–	✓
Right-of-way clearing	–	✓
Marshalling / fly yards	–	✓
Transmission tower construction (i.e., foundations, tower and conductor installation, and conductor splicing)	–	✓
Implosive connectors	–	✓
Helicopter use	–	✓
Clean-up and demobilization	–	✓
Transmission line operation		
Transmission line presence	✓	✓
Vehicle and equipment use	–	✓

Table 14-4: Project interactions with community well-being		
Project activity	Increase in stress from perceived effects	Decrease in tranquility
Inspection patrols	–	✓
Other maintenance activities	–	✓
Vegetation management	–	✓
Decommissioning		
Mobilization and staff presence	–	✓
Vehicle and equipment use	–	✓
Removal of transformers, disassembled towers, foundations, conductors, and associated equipment	–	✓
Rehabilitation	–	✓
Clean-up and demobilization	–	✓
✓= Potential interaction – = No interaction		

14.4 Assessment of project effects

While effects to community well-being could occur during construction, operation, and decommissioning, they are anticipated to be most pronounced during operation and include the following:

Increase in stress from perceived effects of operation of the transmission line.
Diminished tranquility from construction and operation of the transmission line

14.4.1 Effects pathways

14.4.1.1 Increase in stress from perceived effects.

Analytical assessment techniques

The assessment of project impacts on increased stress levels from perceived effects are based on secondary research, with baseline information developed from similar environmental assessments and applications; information gathered through project engagement; an understanding of project interactions and mitigation; and professional judgement.

Construction

While perceived effects of the project are anticipated to be highest during operation, construction activities may cause an increase in stress, particularly for individuals who have concerns about the effects of the project. Prior to construction, the project could also cause stress and annoyance to individuals living in the area who are concerned about how the project may affect them and their households. Anticipation of future project impacts during the operation phase may also contribute to an increase in stress during construction.

Related to property, individuals living in the LAA during construction who want to sell their property may worry that their property values will decrease because of active construction activities, or that the future presence of the transmission line will affect the resale value of their property.

Operation

High voltage transmission lines (≥230kV) have a moderately high level of perceived risk, which is often more important to opposition about a project or development than actual risks (Cain and Nelson 2013). The perceived impact of living near a transmission line may cause increased stress, which can have adverse mental health outcomes, such as increased anxiety, depression, substance abuse problems, sleep problems, pain and complaints, increased headaches, gastrointestinal problems, weakened immune system, raised blood pressure, contribute to difficulty conceiving, cardiovascular disease, and stroke (Centre for Addiction and Mental Health n.d). Based on feedback from project engagement, we have identified three main pathways for an increase in stress during the operation phase of the project:

- Perceived EMF effects
- Perceived effects to cell service and internet signal
- Perceived impacts to property devaluation

Perceived EMF effects

Following project construction, perceived health risks of exposure to EMF created by the operation of the transmission line will be a specific pathway through which the project may cause an increase in stress based on perceived health effects. EMF can be considered an undetectable risk since it cannot be seen visually or felt by the body, and individuals may feel they are taking on this risk involuntarily and that it may not be within their control to reduce their risk or exposure (Cain and Nelson 2013).

Although the evidence of EMF on human health in Canada states there "is no conclusive evidence of any harm caused by exposures at levels found in Canadian homes and schools, including those located just outside the boundaries of power line corridors" (Health Canada 2012), there is still a perceived risk that living in proximity to power lines increases cancer rates (City of Hope 2023). There has been no consistent evidence linking cancer to EMF exposure from powerlines including childhood leukemia and brain tumours (National Cancer Institute 2022).

Although levels on past transmission projects generally fall below exposure guidelines and there is no literature to support that ELF EMF may impact human health, Manitoba Hydro recognizes that the perceived concerns of project-related EMF on human health may adversely impact well-being. Hess et al. (2021) discovered that health and safety such as perceived health risk from EMF, noise and construction effects were frequently mentioned concerns to proposed powerlines in North America. This observation has been supported through comments recorded through engagement efforts conducted by Manitoba Hydro.

Cell service and internet signal

As a 230kV transmission line, operation of the project 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-Minnesota Transmission Project (MMTP) environmental impact statement report (Exponent 2013) 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 MMTP (Exponent 2013), it was determined that radio noise from an AC transmission line does not overlap with the wireless internet signals used and as a result, does not affect wireless internet function at locations near AC transmission lines (Exponent 2013).

Manitoba Hydro generally does not anticipate there being any potential for adverse effects on internet service from the S65R Tap 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.

Property devaluation

Manitoba Hydro's corporate policy on rights-of-way provides compensation to private landowners. In addition, Manitoba Hydro does not have any evidence to suggest that property values are negatively impacted long-term by transmission line development. However, this was a concern shared by landowners during project engagement and landowners may still believe that their property values will be negatively impacted by the presence of the transmission line despite a lack of conclusive evidence.

Hess et al (2021) identified that effects on property value had the greatest frequency of concern for proposed electricity power lines in North America, which has been identified as a concern by many landowners through project engagement. With respect to stress and anxiety related to devalued property, a literature review was conducted for the MMTP on the effects of transmission line development on private property value. The results of this review were inconclusive, with some studies showing that there were negative private property value impacts due to transmission line proximity and other studies finding that transmission lines have little to no effect on property values (Stantec Consulting Ltd. 2015). The literature also provided mixed conclusions about whether the effect on property value diminishes over time (Stantec Consulting Ltd. 2015).

14.4.1.2 Decrease in tranquility

Analytical assessment techniques

The assessment of project impacts on tranquility are based on secondary research, with baseline information developed from similar environmental assessments and applications; information gathered through project engagement; an understanding of project interactions and mitigation; and professional judgement.

Although Health Canada uses “percent highly annoyed” (% HA) to calculate the relationship between noise and annoyance, this is only calculated for receptors of noise that are exposed to long-term noise, classified as longer than one year (Health Canada 2017). Construction is only anticipated to take one winter season, and 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.

Based on a review of the literature for visual quality and transmission line visiibility ((Palmer 2016); (Sullivan et al. 2014), 500m is considered the area where transmission lines would be in the foreground view and, therefore, most intrusive. The 1.5km buffer for the LAA is intended to represent the areawhere the transmission line would be in the midground view, at which point the structures have muted colours, and details become subordinate to the whole structure. There are 95 homes located within the LAA for the project, 12 of which are within 500 m. Of these 95 homes, 91 have shelterbelts or are in treed areas. The visual impacts are anticipated to be less at these locations due to trees obstructing the view of the transmission line from homes.

Construction

There are two main pathways of effect during construction of the project: annoyance from construction activities, and physical changes to the viewscape from vegetation clearing for the right-of-way.

Throughout construction, there will be an increase in noise or change in the types of noise in the project area resulting from activities 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, transmission tower construction, helicopters, and the use of implosive connectors for conductor splicing. Although construction activities will adhere to local noise by-laws and the mitigation measures outlined in Section 13.4.2.2, individuals living in the LAA may experience annoyance from construction noise.

The other impact to tranquility during the construction phase of the project is physical changes to the viewscape from vegetation clearing. Through project engagement, residents, and landowners in the area shared concerns about the vegetation that would need to be cleared for the right-of-way. There were several reasons why participants expressed a concern for clearing vegetation for the transmission line, including a loss of vegetation and wildlife habitat, loss of biodiversity, loss of carbon captured from trees, and impacts to the view from their homes.

Operation

Project-related activities and the presence of a transmission line may result in direct and indirect changes related to tranquility of the area. Direct effects may include changes in accessibility (e.g., loss of land, fragmentation, change in wildlife and plant abundance) and indirect effects may include changes in perception of the land (e.g., observed changes to wildlife, air, land, and water) which may result in avoiding the area, or negatively impacting the tranquility and aesthetics of the area. Project operation and maintenance has the potential to affect residents and property owners through visual aesthetic changes and noise generation. Residual effects are expected to be associated with changes in visual quality on rural residences due to the visibility of the transmission line once it is operational.

The presence of the transmission line once it is operational may influence the viewscape, particularly for homes within the LAA and near the PDA. Participants during engagement shared concerns about being able to see the transmission line, particularly the towers, from their homes. This impact would be greater for homes that do not have a visual buffer (e.g., treeline) between their home and the transmission line.

The other effects pathway for a decrease in tranquility is noise from operation. Once the line is in operation, the auditory experience of individuals using areas remarkably close to the transmission line may change due to the potential presence of corona discharge, which is a hissing or crackling noise that sometimes occurs with high voltage transmission lines. Although the audible noise from corona discharge is not anticipated to have significant changes to the ambient noise levels for a quiet rural area (see Section 13.4.3.2), people may choose not to spend time in certain areas near the transmission line if they find the noise unpleasant, or if they are concerned that the sound created is unsafe. There will also be intermittent maintenance and inspection work, which may annoy individuals living close to the project.

14.4.2 Mitigation measures

14.4.2.1 Mitigation for increased stress from perceived effects

Manitoba Hydro will implement the following measures to reduce effects on stress from perceived project effects:

- Manitoba Hydro will enter into easement agreements and provide information to private landowners whose land is crossed by the transmission line.
- Manitoba Hydro's routing process considers populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks, and communities.
- Manitoba Hydro will continue to address concerns related to EMF and providing factual, science-based information to concerned individuals and organizations.

14.4.2.2 Mitigation for decreased tranquility

Transmission line routing included the consideration of homes within the right-of-way, proximity to homes, and the number of proposed residential developments.

Manitoba Hydro will use the following mitigation to address noise:

- Construction activities will follow local noise by-laws.
- A communication protocol will be developed to notify relevant parties of conductor splicing (i.e., implodes). Relevant parties may include Manitoba Environment and Climate Change, RCMP, municipalities, landowners, and resource users.
- Use of passive or active techniques to minimize noise to the extent feasible.

Manitoba Hydro has or will use the following mitigation measures to enhance visual screening and reduce visual contrast of the project:

- The transmission line has been routed to consider populated areas, paralleling opportunities with existing transmission lines, proximity of residences, parks, and communities.
- Where practical, towers will be sited to limit their visibility from viewpoints of concern identified through project engagement.
- Efforts will be made during the design process to spot transmission towers to reduce visual interference in areas identified during project engagement.

14.4.3 Characterization of residual effects

14.4.3.1 Stress from perceived effects

Perceived health effects from EMF due to the presence of a transmission line and stress-related effects such as devalued property may contribute to adverse mental outcomes such as stress and anxiety. Manitoba Hydro will continue to address concerns related to EMF by providing evidence-based information to concerned individuals and organizations which has the potential to decrease associated risk perceptions. However, perceived risks are subjective and there is the potential that the perceived risks over EMF may linger throughout the operation phase of the project.

The magnitude of project effects on stress from perceived effects has been assessed as ranging from negligible to moderate because perceived health risks are subjective, and stressors and the experience of stress may vary broadly between individuals. Individuals living closer to the transmission line or frequently visiting the area may experience a greater magnitude of perceived risk and impacts, and increased stress (Mueller 2019).

Risk perceptions may change over time for some individuals and the effects of may linger beyond the lifespan of the project for others depending on individuals' ability to cope with stress.

After the application of mitigation measures, the residual effects of the project on stress from perceived effects are predicted to be:

- Direction: Adverse
- Magnitude: Negligible to moderate depending on the individual
- Geographic extent: LAA
- Duration: Medium-term
- Frequency: Continuous

- Reversibility: Reversible

14.4.3.2 Tranquility

As assessed in Section 13.4.3.2, except for isolated activities, the magnitude of noise during construction has been assessed as low and noise generated by vehicles and equipment during operation and maintenance phases are negligible. While there may still be annoyance from noise and subsequent impacts on tranquility, this will be irregular and mostly restricted to the construction phase. Visual impacts from the project will be more noticeable and will remain throughout the operation phase of the project. The magnitude of the effects on tranquility will range from negligible to moderate as individuals may perceive the impact of transmission line's presence on tranquility differently.

After the application of mitigation measures, the residual effects of the project on tranquility are predicted to be:

- Direction: Adverse
- Magnitude: Negligible to Moderate depending on the individual
- Geographic extent: LAA
- Duration: Long-term
- Frequency: Continuous
- Reversibility: Reversible

Table 14-5 characterizes the residual effect on community well-being.

Table 14-5: Project residual effects on community well-being

Residual Effects Characterization						
Project Phase	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility
Increase in stress from perceived effects						
Construction	A	NC	LAA	MT	C	R
Operation		NC - M				
Decommissioning		NC				
Decrease in tranquility						
Construction	A	NC - M	LAA	LT	C	R
Operation		NC - M				
Decommissioning		NC				

14.4.4 Cumulative effects

The assessment of cumulative effects is initiated with a determination of whether two conditions exist:

- the project has residual effects on the VC and
- a residual effect could interact with residual effects of other past, present, or reasonably near future physical activities.

If either condition is not met, further assessment of cumulative effects is not warranted because the project does not interact cumulatively with other projects or activities.

For community well-being, both conditions are present. The project is anticipated to have adverse effects on stress from perceived effects and tranquility. Each of the residual effects could interact with other past, present, or reasonably near future physical activities.

14.4.4.1 Project residual effects likely to interact cumulatively.

Table 14-6 shows the project and physical activities inclusion list which identifies other projects and physical activities that might act cumulatively with the project to impact community well-being. Where residual effects from the project act cumulatively with residual effects from other projects and physical activities, a cumulative effects assessment is conducted.

Table 14-6: Potential cumulative effects on community well-being

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects	
	Increase in stress from perceived effects	Decrease in tranquility
Existing/ongoing projects and activities		
Domestic Resource Use (hunting, trapping, fishing)	-	-
Recreational Activities (Canoeing, Snowmobiling, Hiking)	-	-
Commercial resource use (includes fishery and forestry)	-	✓

Table 14-6: Potential cumulative effects on community well-being

Other Projects and physical activities with potential for cumulative environmental effects	Potential cumulative environmental effects	
	Increase in stress from perceived effects	Decrease in tranquility
Infrastructure (includes rail lines, provincial trunk highways, provincial roads, pipelines, water treatment facilities, wastewater treatment facilities)	-	✓
Hydroelectricity transmission lines	✓	✓
Potential future projects and activities		
Crystal Spring Colony domestic wastewater lagoon	✓	✓
Diageo Hydroelectric Station	✓	✓
King's Park Phase 2	✓	✓

✓ = Other projects and physical activities whose residual effects are likely to interact cumulatively with project residual environmental effects.

14.4.4.2 Increase in stress from perceived effects

Pathways for cumulative effect

Based on engagement feedback, stress from the perceived effects from existing transmission lines are anticipated to act cumulatively with the project. Existing transmission lines have the potential to contribute to stress from the perceived effects on cell phone and internet service, property devaluation, and human health impacts from EMF.

The construction and presence of the Diageo hydroelectric station will be an additional source of EMF, particularly for those living close to the Diageo Gimli distillery.

Individuals living near the King's Park Phase 2 development, or the Crystal Spring Colony domestic wastewater lagoon may also experience stress from potential perceived effects from these projects, particularly if they are also experiencing stress from perceived effects of the S65R tap project.

Mitigation measures

Implementation of the mitigation measures described in Section 14.4.2.1 will likely reduce the project's effects on stress from perceived effects. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effect

Considering the existing transmission infrastructure in the area, and proposed Diageo hydroelectricity station, more industrial development may contribute to an increase in stress from perceived effects.

The cumulative magnitude of stress from perceived effects will range from a non-measurable change to potentially low because perception is related to proximity to the projects/existing transmission lines, and individuals may have different perceptions depending on where they reside in relation to the project. Perceived health effects are subjective and may differ among individuals.

Stress from perceived effects will likely diminish over time after projects are operational. The project's contribution to stress from perceived effects is not anticipated to result in significant cumulative impacts.

14.4.4.3 Decreased tranquility

Pathways for cumulative effect

Future industrial or commercial development in the area, including the Diageo hydroelectric station, the King's Park Phase 2 development, and the Crystal Spring Colony domestic wastewater lagoon site, may contribute cumulatively to a decrease in tranquility of the RAA. Through engagement, some participants shared that their enjoyment of the area was tied to the relatively undeveloped nature compared to more urban centres. With additional development on the landscape, individuals may feel that the character of the RAA has changed and may perceive the area to be less tranquil. Individuals in the RAA may feel like the tranquility has already been altered by existing development, notably infrastructure and existing commercial resource use.

Mitigation measures

Implementation of the mitigation measures described in Section 14.4.2.2 will likely reduce the project's impact on tranquility. Other proponents may adopt similar mitigation measures to mitigate their own project effects.

Residual cumulative effect

With the new proposed developments in the RAA, in addition to the existing projects and activities, there may be a cumulative impact on tranquility. The cumulative magnitude of decreased tranquility will also range from a non-measurable change to potentially low because individuals may perceive changes to the tranquility of the environment differently. The decreased tranquility may diminish over time if individuals become desensitized to industrial features on the landscape, and it is anticipated that tranquility would return closer to baseline conditions if these activities or projects were removed from the RAA.

14.4.5 Determination of significance

With mitigation and environmental protection measures, the residual effects on community well-being are predicted to be not significant. The project's impacts on stress and tranquility are not anticipated to affect individuals' daily lives and activities.

We recognize that although the project's residual effects and cumulative effects are predicted to be not significant, individuals may experience these effects uniquely and may deem such effects substantive.

14.4.6 Prediction confidence

Prediction confidence in the assessment of effects on community well-being is moderate, given that individuals living in the RAA may experience these effects differently. These effects were assessed qualitatively, considering indicators of the potential effect, literature reviews, engagement feedback, information from previous Manitoba Hydro projects, and professional judgment.

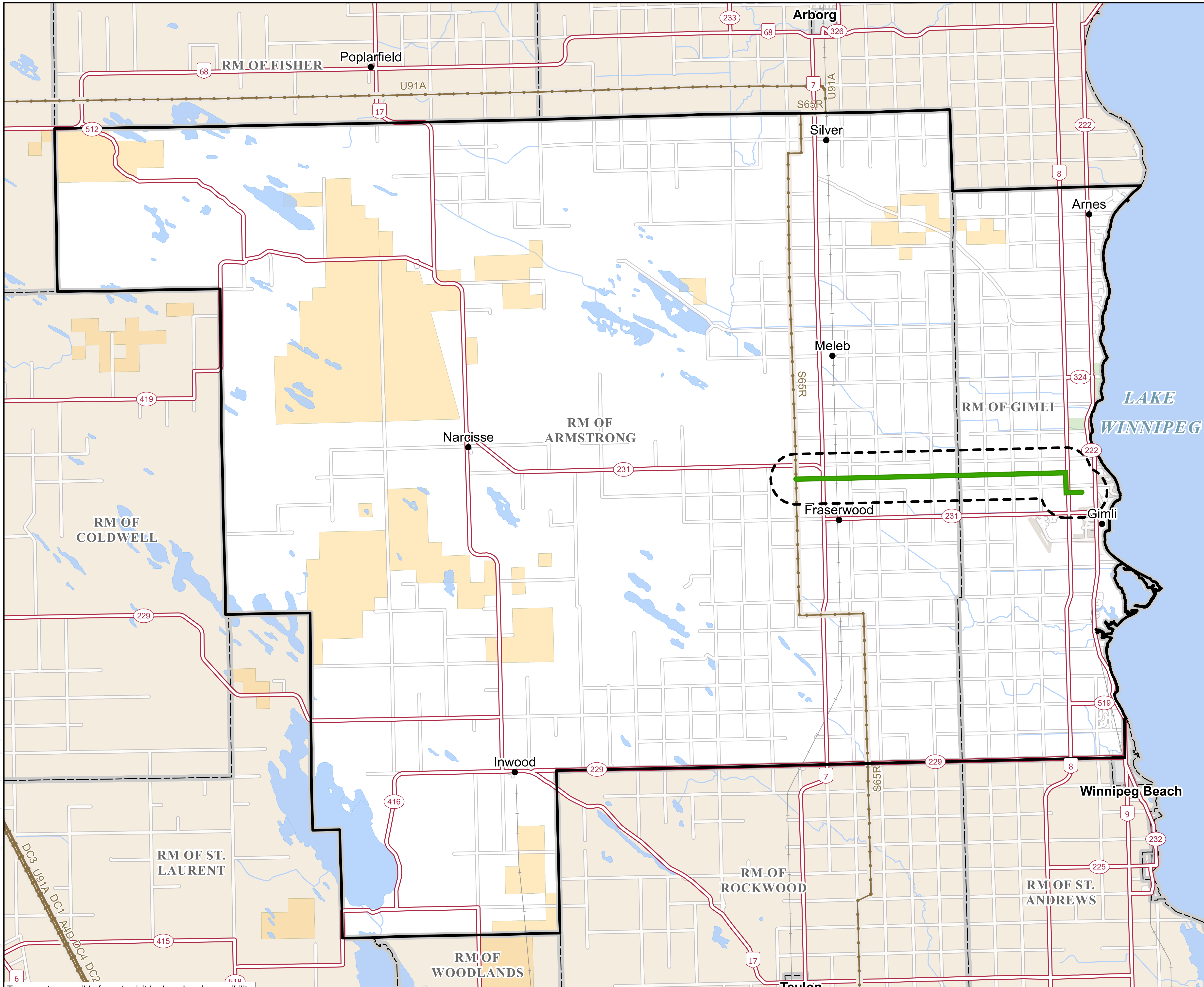
14.4.7 Follow-up and monitoring

Due to confidence in predictions and monitoring results from Manitoba Hydro's other similar projects in Manitoba, a comprehensive environmental monitoring plan has not been proposed for this project. However, if environmental inspections identify unexpected effects, monitoring and follow-up would be undertaken in pursuit of appropriate rehabilitation per the EPP in Chapter 18.0.

14.4.8 Sensitivity to future climate change scenarios

Effects of climate change on community well-being are expected to relate to the anticipated increase in temperature, changes in precipitation patterns, and associated extreme weather events (e.g., flooding).

There is a growing body of literature surrounding the impacts of climate change on mental health and increased anxiety, often referred to as climate anxiety (Clayton 2020). Emotional responses to climate change can be both the result of physical changes to the landscape (such as an increase in severe weather patterns) and the perception of climate change, including the dread associated with negative environmental information or feelings that environmental challenges are intractable (Clayton 2020). Climate anxiety will negatively impact community well-being, particularly related to perceived health effects.



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- Final Preferred Route

Assessment Area

- Community Well-Being LAA (PDA Buffer 1.5km)
- Community Well-Being Regional Assessment Area

Existing Infrastructure

- Existing ≥69kV Transmission Line

Landbase

- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

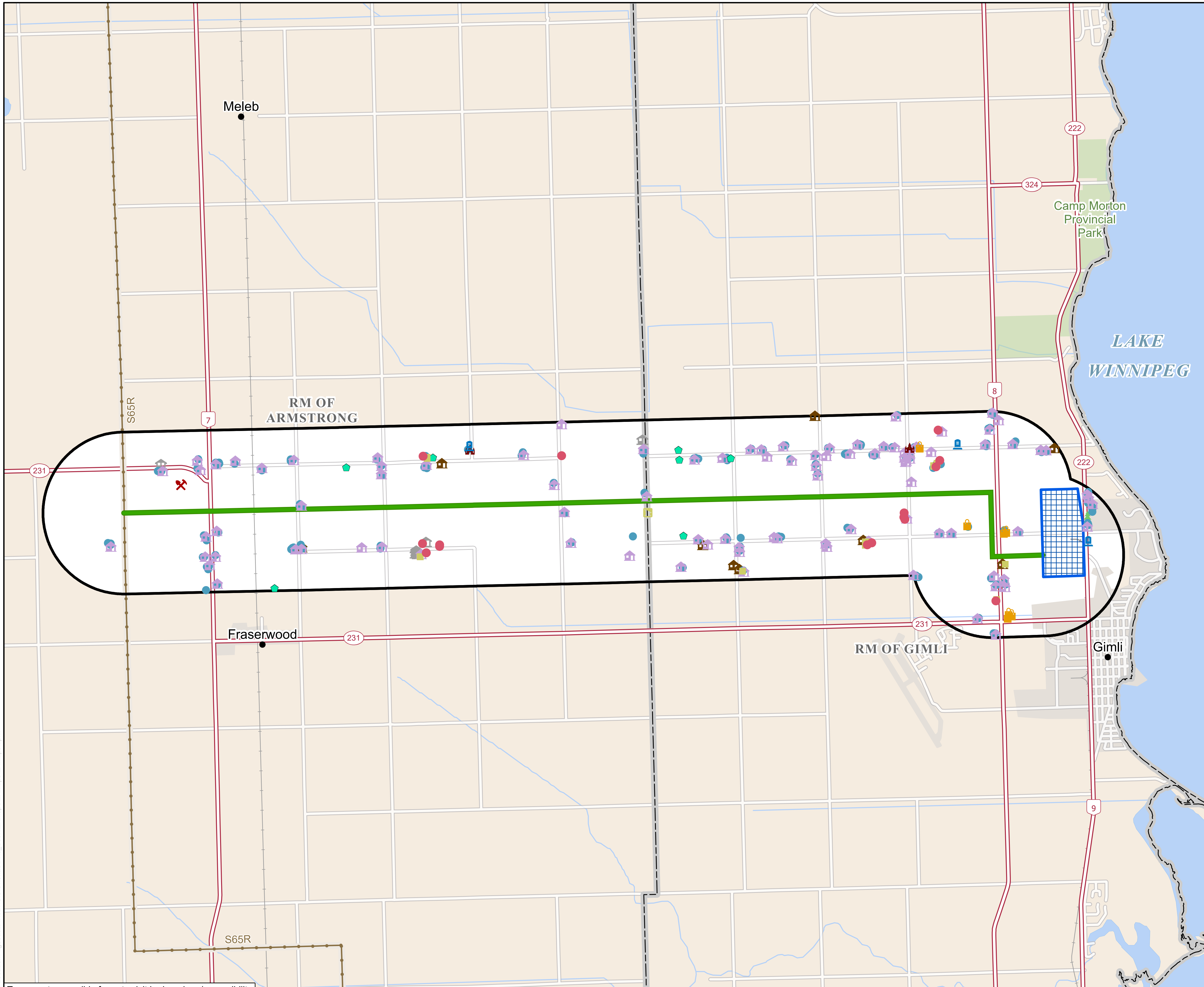
Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

0 5 10 Kilometres
0 3 6 Miles
1:225,000

Spatial Boundaries for Community Well-Being Assessment Areas

Draft/Confidential: For Discussion Purposes Only

Map 14-1



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure
- Final Preferred Route

Assessment Area
- Community Well-Being LAA (PDA Buffer 1.5km)

Special Features
- Agriculture Building
- Cemetery
- Church/Worship Site
- Commercial Building
- Grain Bin
- Livestock Operation
- Mine/Quarry/Pit
- Occupied House
- Outbuilding
- Recreational Bldg/Site
- Special Structures
- Unoccupied House
- Unutilized Building

Existing Infrastructure
- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase
- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Special Features Within the Community Well-Being Local Assessment Area

Draft/Confidential: For Discussion Purposes Only

Map 14-2

15.0Greenhouse 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 calculated according to guidelines developed by Environment Canada (2021) and the United Nations (IPCC 2019).

Climate plays an important role in multiple aspects of the project. For example, design loads are influenced by ice accumulation and wind, conductor clearances are influenced by ambient temperature and wind conditions, and construction planning may utilize seasonal temperature patterns to favor frozen ground conditions. Furthermore, the impact of extreme climate events such as wet snow and wildfires can result in damage to existing transmission lines, resulting in outages and financial consequences. Section 6.1.1 includes a description of historic climate conditions.

The following sections outline projections of how climate in the area may change in the future, followed by a summary of the greenhouse gas assessment. Further details on greenhouse gases can be found in Appendix .

Each VC assessment chapter also includes a discussion about sensitivity to climate change scenarios.

15.1 Future climate

Global climate models driven by future greenhouse gas emission scenarios are used to project how Earth's climate may evolve in the future. Forty-two simulations from fourteen global climate models and three greenhouse gas emission scenarios (Shared Socioeconomic Pathways; SSP2-4.5, SSP3-7.0, SSP5-8.5; Riahi et al., 2017) provide the basis for this assessment.

Descriptions of the models, pathways, methods, and mapped projections will be published in Manitoba Hydro's upcoming climate change report. The descriptions will be like those presented in Manitoba Hydro's most recent climate change report (2020) but utilize the latest global climate model datasets (i.e., from the Coupled Model Intercomparison Project phase 6; CMIP6; Eyring et al., 2016). For temperature and precipitation projections, we rely on an ensemble of simulations known as ESPO-G6-R2 (Lavoie et al., 2024) which have been bias-adjusted by the Ouranos Consortium. For other variables (evaporation, runoff and windspeed), we rely on projected changes derived from the raw CMIP6 global climate model data.

The tables and text below characterize projections specific to a grid point near Gimli, Manitoba for the 2050s (2040-2069) and 2080s (2070-2099) future horizons relative to the reference 1981-2010 period.

Agreement among global climate change projections is assessed in accordance with the Sixth Assessment Report published by the Intergovernmental Panel on Climate Change (IPCC; Gutiérrez et al., 2021). Cells coloured in dark green in Table 15-1 and Table 15-2 indicate high model agreement, where at least 80% of the ensemble agrees on the sign of projected change (*i.e.,* that an increase or decrease will occur). This simple measure of agreement can provide some additional context to characterize the climate change signals.

Table 15-1: Median projected change of forty-two global climate model simulations for the 2050s future horizon (2040-2069) relative to 1981-2010 at the grid point nearest Gimli, MB

Season	T min (°C)	T mean (°C)	T max (°C)	Precipitation (%)	Evaporation (mm/month)	Runoff (mm/month)	Wind Speed (%)
Annual	3.17	3.00	2.82	5.94	4.11	-0.92	-1.56
Winter	3.93	3.43	2.99	13.20	1.38	1.53	-0.54
Spring	2.63	2.56	2.52	13.54	5.21	-3.53	-1.27
Summer	2.86	2.91	2.91	-1.98	5.17	-0.91	-3.27
Fall	2.89	2.87	2.86	7.32	2.91	-0.40	-1.58

Table 15-2: Median projected change of forty-two global climate model simulations for the 2080s future horizon (2070-2099) relative to 1981-2010 at the grid point nearest Gimli, MB

Season	T min (°C)	T mean (°C)	T max (°C)	Precipitation (%)	Evaporation (mm/month)	Runoff (mm/month)	Wind Speed (%)
Annual	5.13	4.85	4.93	7.78	5.93	-1.78	-1.66
Winter	6.77	5.83	4.95	21.17	2.75	2.44	0.06
Spring	4.45	4.38	4.26	18.97	7.80	-4.87	-1.58

Summer	5.15	5.16	5.26	-6.15	6.44	-1.44	-5.00
Fall	4.66	4.66	4.83	8.00	4.78	-0.52	-2.30

Based on the ESPO-G6-R2 ensemble median, annual average temperatures are projected to increase by 3°C in the 2050s and 4.85°C in the 2080s. Both future time horizons show high agreement that temperature will increase into the future in all seasons, with the winter season for the 2050s and summer season for the 2080s projected to experience the greatest temperature increase.

There is high agreement that winter and spring precipitation will increase for both future time horizons. There is also high agreement that annual and fall precipitation will increase for the 2080s period. For both time periods, the ensemble median points towards potential decreases in summer precipitation, but with low agreement.

As expected, increasing temperature results in increasing evaporation, which depending on changes in precipitation may result in overall wetter or drier conditions. Local runoff projections show mostly low agreement, however, there is high agreement that spring runoff will decrease in the 2050s and high agreement that winter runoff will increase in the 2080s. This result is expected as increased winter temperatures contribute to earlier snowmelt, which may leave less snow to melt in the spring. Global climate models suggest relatively small changes in future mean wind speed, with high agreement of decreasing wind speeds in the summer.

Due to the data and methods used to compute projected changes in Table 15-1 and Table 15-2, results may require special interpretation. For example, the projected changes are based on multiple global climate models with varying spatial resolutions, biases, and incomplete water balance data (e.g., soil moisture). Furthermore, the ensemble median projections presented are derived independently for each variable and each season.

Due to the proximity of Gimli to Lake Winnipeg, some global climate models may characterize the corresponding grid as water (instead of land) which can have an influence on the change signal. In general, there tends to be greater confidence in global climate models abilities to simulate temperature and precipitation in comparison to other variables such as evaporation, runoff, and wind speed. Projected changes should be interpreted accordingly.

15.2 Greenhouse gases

A greenhouse gas emission (GHG) life cycle assessment was undertaken for the project. This assessment can be found in Appendix D and builds on the GHG assessments Manitoba Hydro has undertaken for previous transmission projects.

The S65R GHG life cycle assessment concluded that construction of the project will result in 7 kilotonnes of carbon dioxide equivalents (“kt CO2e”) being emitted over its lifetime.

For this project, it was considered appropriate to undertake a GHG life cycle assessment instead of a more comprehensive GHG mitigation assessment, which would have compared a “project scenario” with a “baseline scenario” and brought additional GHG effects into scope. Rationale for this scope decision can be found in Appendix D.

The S65R GHG life cycle assessment did not consider potential baseline scenario alternatives to the S65R tap that could occur in the absence of the project, as the S65R Tap is assumed to be required: Manitoba Hydro has a duty to provide natural gas and/or electric service to all customer services within the province, and a new 230kV line was determined to be the feasible option to replace natural gas use for the Diageo facility. Nevertheless, GHG estimates presented herein are absolute S65R tap GHGs (i.e., the baseline scenario for the S65R GHG Assessment is, by default, a ”do-nothing” scenario).

The GHG life cycle assessment quantified construction related GHGs as presented in Table 15-3. Construction related GHGs were calculated using the transmission line’s preferred route, transmission line design elements, and fuel use assumptions for line construction and worker transportation.

Table 15-3: Summary of S65R tap life cycle GHGs

Activity	kt CO_2e	% of total
Construction: Material Supply Chain	1.53	21.0%
Construction: On-Site Energy	0.26	3.6%
Construction: Labour Transport	0.28	3.8%
S65R Tap Maintenance	0.40	5.5%
ROW Land Use Change	4.81	66.0%
Total	7.29	

The two most important categories of construction related GHGs are the supply-chain GHGs embedded in the materials of the S65R Tap components (21% of life cycle

GHGs) and permanent land-use change due to the formation of the right-of-way (66% of life cycle GHGs). As with other Manitoba Hydro transmission projects, emissions related to on-site energy consumption during construction and worker transportation are estimated to be relatively small (cumulatively accounting for only 7.3% of life cycle GHGs).

16.0Effects of the environment on the project

Effects of the environment on the project refer to the forces of nature that could affect the project physically or hamper the ability to conduct 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 project are focused on the following effects:

- Delays in construction and/or operation and maintenance activities
- Damage to infrastructure
- Reduced visibility impacting public health and safety

16.1 Effects analysis

The assessment of the effects of the environment on the project considers potential changes to the project that may be caused by the environment.

There are no environmental factors expected to interact substantially with the construction of the 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 project 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 adversely 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 regional assessment area for the project.

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. Chapter 15.0 includes further discussion about future climate.

Potential effects of climate change on the operation and maintenance of the 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 project by increasing the frequency of unexpected maintenance requirements due to storm damage. Changes in temperature could affect the freeze/thaw cycle and result in decreased foundation stability and potentially increased maintenance.

Mitigation measures include applying engineering practices (e.g., following CSA design standards) and scheduling of activities to account for possible weather disruptions. Based on the above, the residual effects of the environment on the project during all phases of the project were deemed minor with a moderate level of confidence because of uncertainty in the potential changes to local, regional, and global climate that could occur over the life of the project.

16.2 Assessment conclusions

The most likely effect of the environment on the project is a short-term disruption in service and the economic costs of repair.

The 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 occur during construction, operation, and maintenance, and or result from forces of nature and affect the project physically or hamper the ability for project activities to proceed normally as planned.

The project will be designed to meet applicable CSA standards and the structural design loads will be based on a 150-year return period.

Despite these measures, it is possible that extreme weather events could still result in outages and the requirement for repair of transmission 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.

In the very unlikely and improbable event that damage to the S65R Tap transmission line was 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. 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.

Overall, given the nature of the project and 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.

17.0Accidents and malfunctions

In the context of environmental assessment, an accident is an unexpected and unintended interaction of a project component or activity with environmental, health-related, social, or economic conditions, and a malfunction is a failure of a piece of equipment, a device, or a system to operate as intended (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 chapter, potential accidents and malfunctions associated with the 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 an exceptionally low probability of occurrence and thus their environmental effects are of low likelihood. They have an even lower likelihood of occurring together – thus their combination is not considered credible, nor of a measurable likelihood of occurrence.

Accident and malfunction event scenarios have been conservatively selected to represent higher consequence events that would also address the consequences of less likely or lower consequence scenarios.

The following accidents, malfunctions, and unplanned events are assessed in this section and were selected based on experience and professional judgment:

- Worker accident
- Fire
- Power outage
- Tower or structure collapse (e.g., due to adverse weather, sabotage, or force majeure)
- Spill of hazardous materials
- Vehicle accident

- Encounter of a heritage site or object
- Electrocution
- Failure of erosion/sediment control
- Release of insulating gas
- Explosives accident

Table 17-1 presents the potential interactions between the assessed 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.

Table 17-1: Potential interactions between accidents and malfunctions and areas of assessment

Potential accidents and malfunctions	Vegetation and wetlands	Wildlife and wildlife habitat	Harvesting and important sites	Commercial agriculture	Infrastructure and community services	Economic opportunities	Human health and safety	Community well-being
Worker accident	-	-	-	-	✓	-	✓	✓
Fire	✓	✓	✓	✓	✓	-	✓	✓
Power outage	-	-	-	-	✓	✓	✓	✓
Tower or structure collapse	✓	✓	✓	✓	✓	-	✓	✓
Hazardous materials spill	✓	✓	✓	✓	-	-	✓	✓
Vehicle accident	-	✓	-	-	✓	-	✓	✓
Encounter of a heritage site or object	-	-	-	-	-	-	✓	✓
Electrocution	-	✓	-	-	-	-	✓	✓
Failure of erosion/sediment control	-	-	-	-	-	-	-	✓
Release of insulating gas	-	-	-	-	-	-	✓	✓
Explosives accident	✓	✓	✓	✓	✓	-	✓	✓

✓ = Potential interactions that might cause an effect.
- = Interactions not expected.

17.1 Effects assessment for accidents and malfunctions

17.1.1 Worker accident

A worker accident has the potential to interact with health and safety and infrastructure and community services as it could result in harm, injury, or death to workers and could prompt the need for emergency response and medical services.

Adherence to public safety codes and regulations will help the project to be conducted in a safe manner to protect workers and the public. Safety risks to workers will be reduced by complying with the requirements of various governing standards including the federal Canada Labor Code, the *Transportation of Dangerous Goods Act (Canada)*, the *Workplace Health and Safety Act* (Manitoba) and all associated regulations.

All workers will be professionally 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.

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 potential environmental effects, the potential effects of a worker accident on community well-being and infrastructure and services during all project phases are considered not significant.

17.1.2 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 and safety)
- Need for emergency response and medical services (infrastructure and community services)
- Loss or damage to property or resources (health and safety, harvesting and important sites)
- Direct vegetation and habitat loss (vegetation, wildlife, and wildlife habitat, harvesting, and commercial agriculture)
- Soil and shallow groundwater contamination with sediment-laden water used in extinguishing the fire (groundwater [human health and safety], wildlife and wildlife habitat)

- Damage to infrastructure or heritage sites or objects (infrastructure and services, important sites)

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 anticipated because of planned mitigation and prevention measures. The potential residual environmental effects of a fire are therefore considered not significant.

17.1.3 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, economic activities, and human health and safety.

Effects on infrastructure and services consist of disruption to community road traffic and transportation due to failure of traffic lights and interference with communication and radio signals with the loss of power to signal sources.

Effects on economic opportunities occur if a power outage results in a loss of productivity for businesses.

Effects to human health risk relate to changes to the capacity of health care services resulting from a lack of power affect the operation of health care facilities. Additionally, a power outage during periods of extreme temperature (*i.e., heat or cold*) may introduce additional human health risks if residential heat or cooling systems are without power for a prolonged duration.

With the application of, and compliance with, 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.

17.1.4 Tower or structure collapse

Tower collapse has the potential to:

- Cause injury or death (human health risk)
- Prompt the need for emergency response and medical services (infrastructure and community services)
- Cause fires (effects and mitigation discussed above)
- Damage other infrastructure, heritage, or cultural sites, either directly due to tower collapse or indirectly because of emergency repair activities (human health risk, harvesting and important sites)
- Impede access or movement (harvesting and important sites, and wildlife and wildlife habitat)

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.

While considered unlikely given the applied design standards, it is possible for a transmission tower or structure to collapse during construction and operation due to extreme weather, mechanical failure, or intentional or unintentional human interaction.

Potential consequences of a collapse 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 and disruption to infrastructure would be short term and minimal. 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 a tower collapse on the affected valued components could be moderate to high, given the low likelihood of occurrence and array of mitigation measures identified the effect is assessed as being not significant.

17.1.5 Hazardous material spills

Hazardous materials could be released into the air, soils, surface water or groundwater because of an accidental spill during construction, operation, or decommissioning activities.

In general, hazardous materials spills have the potential to:

- Contaminate surface and groundwater (human health risk, community well-being, harvesting and important sites, wildlife and wildlife habitat)
- Contaminate soil (vegetation and wetlands, wildlife and wildlife habitat, harvesting and important sites, human health risk, and community well-being)
- Increase harmful emissions (GHG effects, climate change)

Spills are usually localized and cleaned up by on-site crews using standard equipment.

Implementation of a detailed spill response plan and a well-designed construction environmental protection plan (Chapter 18.0) 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 in designated areas. Vehicles will be equipped with spill containment and cleanup materials.

Personnel handling fuels and hazardous wastes will have WHMIS training and be qualified to manage 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, the potential residual environmental effects of a hazardous material spill on groundwater resources, the aquatic environment, and the terrestrial environment during construction and operation and maintenance of the project are considered not significant.

17.1.6 Vehicle accident

A vehicle accident arising from project-related activities could cause injury or death to workers or the public (human health risk) and wildlife (wildlife and wildlife habitat) and could prompt the need for emergency response and medical services (infrastructure and community services). The potential for a fire or hazardous material spill, which could be associated with a vehicle accident have been assessed above.

The potential for a vehicle accident would exist during construction, operation and maintenance, as well decommissioning phases of the project. Worker traffic and truck traffic to and from the site, and the operation of heavy equipment have the potential to result in a vehicle accident.

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 project will comply with applicable traffic rules and regulations, and given that the project will result in a nominal increase in traffic volumes, the potential residual environmental effects of a vehicle accident are considered not significant.

17.1.7 Encounter of a heritage site or object

Cultural or heritage sites or objects may be encountered during activities involving ground disturbance such as construction-related excavation. It is less likely that heritage sites or objects will be encountered during operation.

The encounter of a heritage site or object has the potential to affect harvesting and important sites. Heritage potential is analyzed 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 Culture and Heritage Resource Protection Plan (CHRPP) (Section 18.7.4.4).

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.

Given the planned mitigation and precautions related to heritage resources, the potential residual effects are considered not significant.

17.1.8 Electrocution

Human or animal contact with a live wire or electrical equipment could lead to electrocution. While unlikely, electrocution could also occur if an aircraft were to collide with live wires or if collision of equipment with towers resulted in contact with live wires.

Human or wildlife contact with high-voltage electricity can result in human or wildlife injury or death. Electrocution of humans and most wildlife (i.e., other than birds) from regular operation of the transmission line is not likely due to the height and grounding of the towers and transmission lines.

Birds could be at risk of electrocution during normal operational conditions if they perch and connect two electrified line phases (i.e., two lines). Bird electrocutions are not anticipated due to the large spans between two electrified transmission line phases (even a very large bird could not stretch wide enough to touch two electrified parts simultaneously).

From a public safety perspective, the threat of electrocution would be of greatest concern during the operation and maintenance phase if flooding or storm conditions damaged infrastructure and resulted in live wires contacting the ground.

Manitoba Hydro has public information campaigns (Manitoba Hydro website and media commercials) regarding avoiding contact with power lines and what to do if downed wires are encountered. Manitoba Hydro maintains an emergency contact number that is available 24 hours per day, seven days per week and can be used to report downed lines. Where conditions create the potential for electrocution, the likelihood of electrocution will be reduced through public notification and communication. Once the site of any downed lines has been secured and the power turned off, the risk of electrocution is eliminated.

Other preventative measures include maintenance and repair activities being conducted by qualified personnel following corporate safe work procedures and having stations and other ground level equipment fenced and secured from public access.

Electrocution during construction is unlikely because the conductors will be grounded as per grounding safe work procedures and will not be energized until the commissioning phase of construction. Testing of electrical equipment during commissioning will be conducted by qualified personnel under controlled conditions following Manitoba Hydro safe work procedures.

Since the consequences of electrocution could result in substantial injury or even death to wildlife and human health, considerable effort is placed into reducing the likelihood of this occurring, through grounding, fencing and security, regular testing, and real-time monitoring and protection systems. As a result, while the magnitude of the effect is high, the likelihood is low, and the effect is assessed as being not significant.

17.1.9 Explosives accident

Explosives will be used for conductor splicing during conductor installation. Explosives will be stored at a Manitoba Hydro transmission line material yard, which already has a permit for this activity, prior to being used on the project.

Explosive handling and storage are highly regulated in Canada and compliance is mandatory. The Transportation of Dangerous Goods Directorate of Transport Canada control the transportation of explosives. All companies that transport explosive materials for the project will be required to comply with all related regulations. Explosives magazines will be stored in accordance with guidelines.

Environmental concerns associated with potential accidents during explosives storage and usage include:

- Disturbance of nearby receptors, including wildlife, due to associated sound
- Damage to project infrastructure or facilities

A blasting plan will be developed describing all proposed blasting operations at the project and will address:

- Personnel responsibilities
- Type of equipment and materials to be utilized
- Safety requirements, including pre- and post-blast notification and notices for site personnel, and pre- and post-blast pit inspections
- Periphery signs
- Dust suppression
- Spillage control and clean-up

All personnel who manage explosives will have appropriate training; all other individuals will be restricted from access to blasting areas.

Destruction of explosives (such as those unfit for use), and misfires will be managed according to applicable regulatory instruments. Deteriorated explosives are potentially more hazardous than explosives in good condition and will be managed under strict, carefully controlled conditions. Experienced personnel will complete all destruction.

By contracting an experienced transmission line construction company, having well-trained employees, following regulatory requirements, and using good housekeeping practices, explosives will be appropriately managed at the project, with minimal potential of inadvertent detonation or other accidents.

The worst possible scenario would involve improper handling of explosives causing bodily harm.

Damage to facilities and infrastructure may be possible but would generally only occur in association with the explosives' storage and potentially at a blasting location.

The potential for an uncontrolled explosion would be limited to a malfunction or accident in relation to a planned blasting activity (i.e., an early detonation or unplanned detonation). As all explosives will be managed by a licensed blasting contractor who will be highly trained in the safe handling, storage, and use of explosives, this accident scenario is unlikely and the effects therefor not significant.

17.2 Assessment conclusion for accidents and malfunctions

The 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 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 notable effects at a localized scale. However, the potential for these events to occur, given the measures that will be undertaken to prevent their occurrence, is low. If an accident or malfunction 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, the credible accidents and malfunctions considered, and proposed mitigation, the potential residual environmental effects of project-related accidents and malfunctions on the valued components considered in this report, are assessed as not significant.

18.0Environmental Protection Program

18.1 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 corporate environmental management 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
- Fostering an environment of continual improvement

18.2 Environmental management

Manitoba Hydro employs an environmental management system that aligns with ISO 14001.

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 environmental management system ensures quality, performance, and continual improvement in the delivery of Manitoba Hydro's EPP.

18.3 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 EPP for the 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.

18.4 Experience from previous projects

Manitoba Hydro has 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).

18.5 First Nation and Red River Métis engagement

Feedback shared by First Nations and the Manitoba Métis Federation during project engagement helped inform the environmental assessment report and EPP.

The knowledge that was shared through the First Nation and Métis engagement 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

Manitoba Hydro remains open to learning from engaged First Nations and the Manitoba Métis Federation throughout the project lifecycle about additional sensitive sites that should be identified in the EPP.

Manitoba Hydro recognizes the unique relationship that First Nation and Red River 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 project.

18.6 Environmental Protection Program framework

Manitoba Hydro's 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 PEP and FNMEP. 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 what, where, and how aspects of protecting the environment during the pre-construction, construction, operation and decommissioning phases of the project. Figure 18-1 illustrates the components of the EPP. The following sections describe each component in further detail.

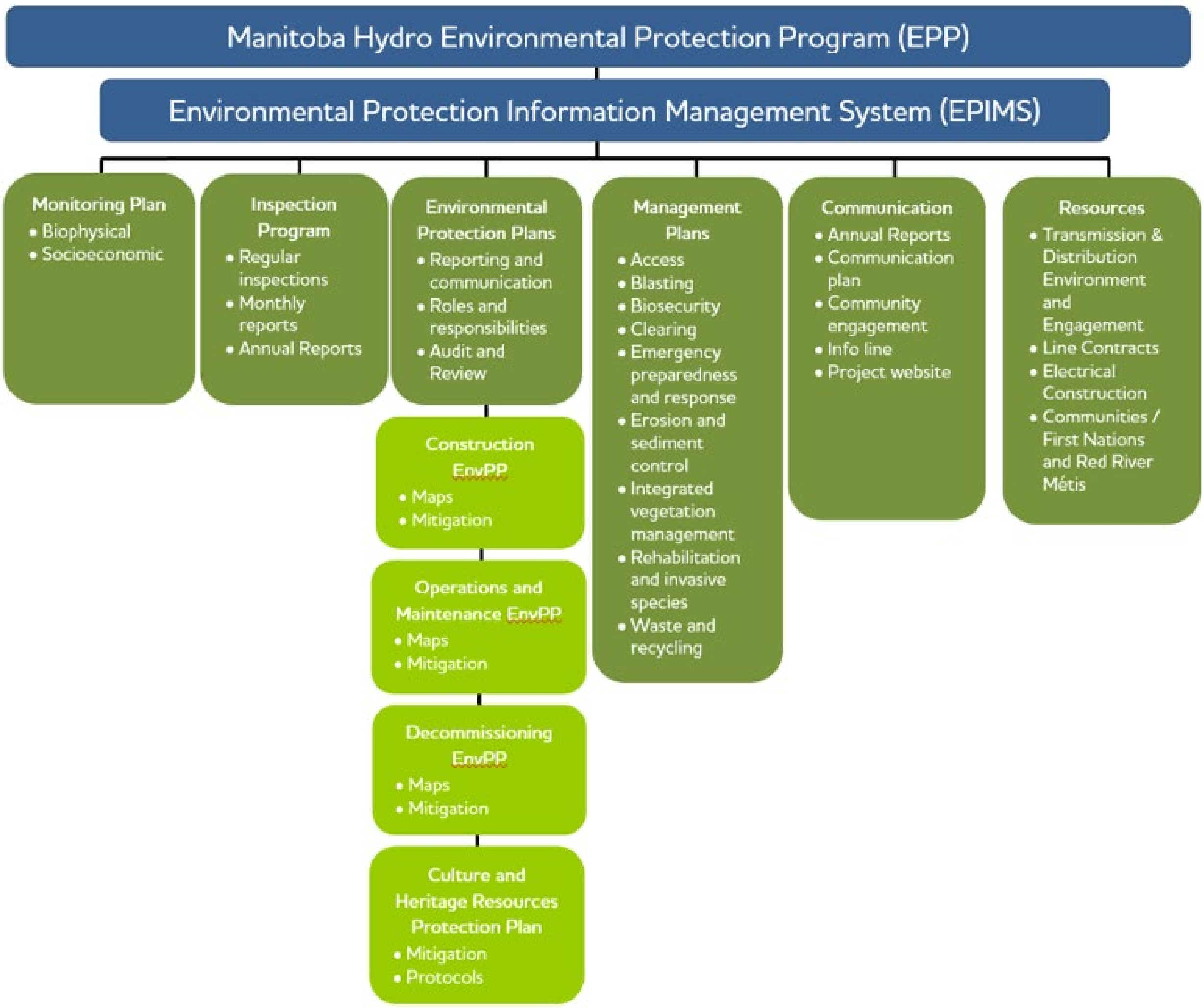


Figure 18-1: Environmental protection program components

18.7 Organization

The organizational structure of the EPP (Figure 18-2) 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. 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 Red River 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.

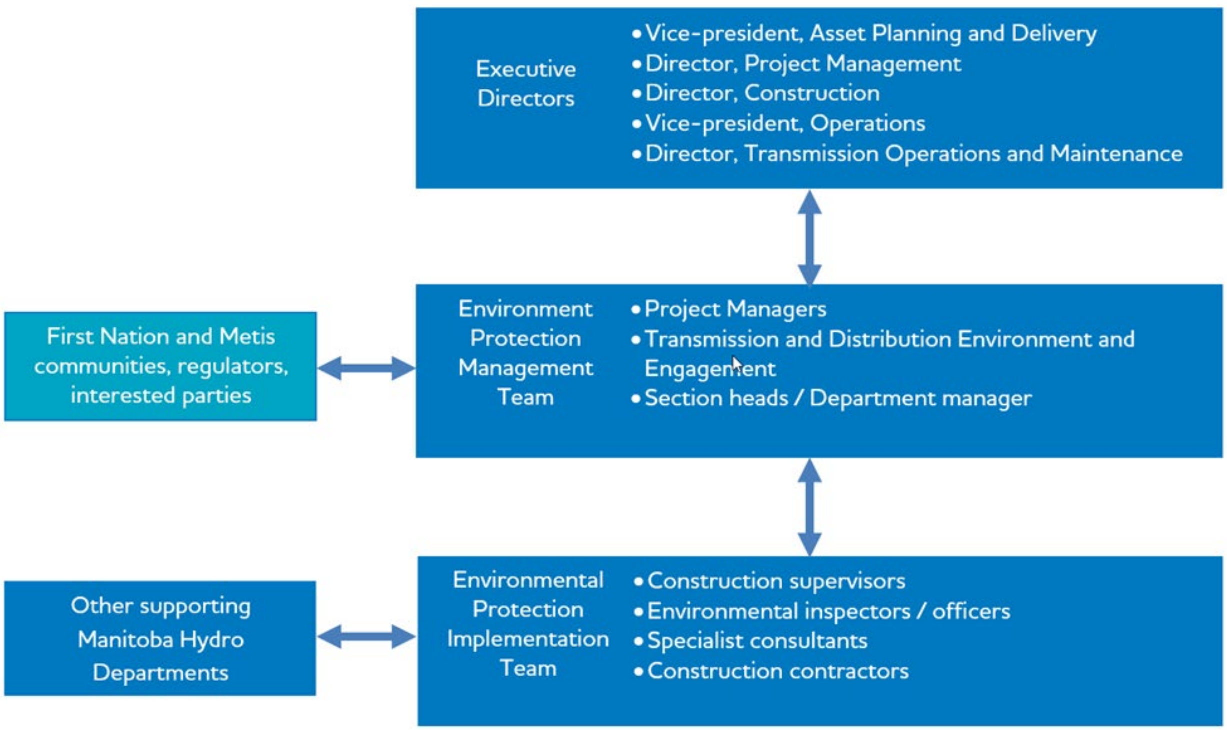


Figure 18-2: Environmental protection program organizational structure

18.7.1 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.

18.7.2 Roles and responsibilities

Figure 18-3 illustrates the typical organizational lines of reporting and communications. The roles and responsibilities for delivery of the 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 Red River 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.

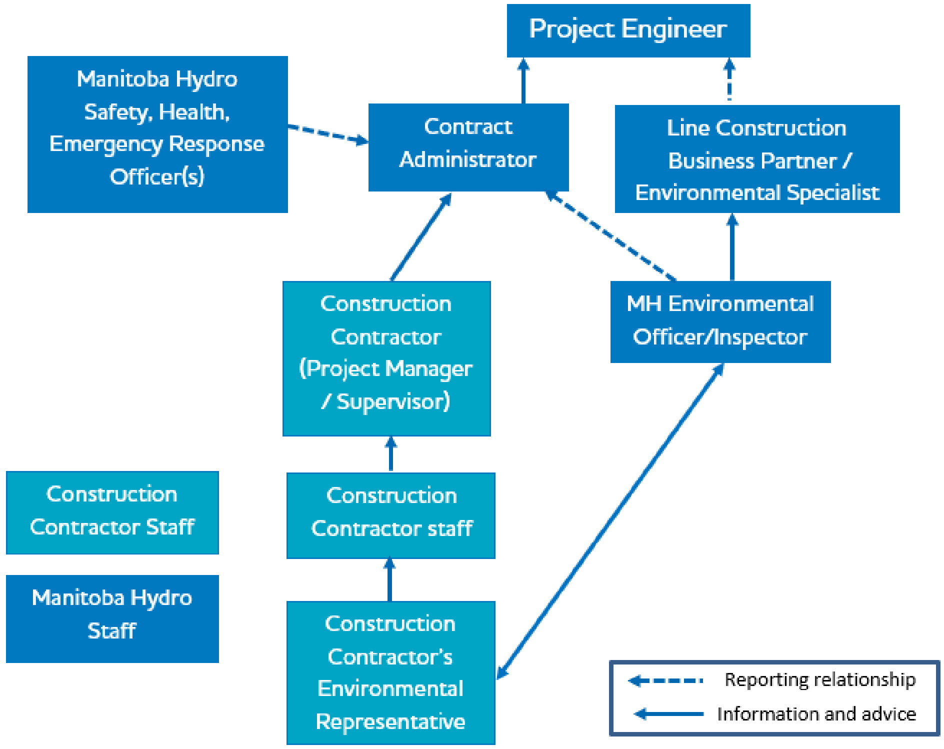


Figure 18-3: Typical organizational lines or reporting and communications.

18.7.3 Communication and reporting

Manitoba Hydro personnel will maintain ongoing communications with Manitoba Environment and Climate Change, other provincial and federal departments, First Nation communities and Red River Métis citizens 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 communities and Red River Métis citizens and organizations, landowners, interested parties and the public with ongoing opportunities to review and comment on the project. Manitoba Hydro developed a dedicated project webpage to facilitate communication with First Nation communities and Métis citizens 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.

18.7.4 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.

18.7.4.1 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. A key 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 received during the PEP and FNMEP.

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 Red River Métis engagement and assessment activities. ESSs 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.

18.7.4.2 Operation and maintenance

Standard mitigation measures will apply during operations. A specific operation and maintenance environmental protection plan is not planned currently.

18.7.4.3 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.

18.7.4.4 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 E**)** 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 the FNMEP and feedback from 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 Red River 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.

18.7.5 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.

18.7.5.1 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 Red River Métis rights and resource users
- Protection of natural, cultural and heritage sites / objects

18.7.5.2 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 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.

18.7.5.3 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.

18.7.5.4 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

18.7.5.5 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

18.7.5.6 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

18.7.5.7 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

18.8 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 inspection and monitoring programs, which are discussed further in the sections below.

18.8.1 First Nation and Red River Métis engagement

Manitoba Hydro will offer audiences engaged through the FNMEP 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 FNMEP participants in project monitoring opportunities.

18.8.2 Inspection program

Inspection is the organized examination or evaluation involving observations, measurements and sometimes evaluates 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.

18.8.3 Monitoring program

Due to understood effects to natural habitat traversed by the final preferred route and monitoring information recently learned from similar projects in southern Manitoba, a comprehensive environmental monitoring plan has not been prepared for this project. Should environmental inspection discover unexpected effects or damage to habitat, the EPP will outline monitoring steps to ensure appropriate rehabilitation and follow-up.

18.8.4 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.

18.9 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 CEnvPP. 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 / negotiated contract development process to make sure environmental requirements are included as contract specifications when required. 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.

18.10 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.

18.11 Review and updating

18.11.1 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.

18.11.2 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.

18.11.3 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.

19.0 Conclusion

The environmental assessment outlined in this report evaluated the potential biophysical and socio-economic effects of the proposed Silver to Rosser Tap transmission line.

Feedback and perspectives shared by engaged audiences influenced the selection of valued components and informed the assessment of project effects on the bio-physical and socio-economic elements discussed throughout this report.

Manitoba Hydro understands that effects on all aspects of the environment have the potential to be experienced by the public, First Nations people, and Red River Métis citizens, and that the severity of the residual effects are experienced uniquely by different individuals, nations, and communities.

The primary mechanism to mitigate potential adverse effects was to follow a routing process that aimed to balance multiple perspectives and consider known environmental values and areas of concern related to the proposed project. Beyond routing, other mitigation measures informed by Manitoba Hydro's experience with similar projects as well as feedback from this and other transmission projects, will be implemented to further reduce adverse effects of the project.

Residual effects to the biophysical environment consist mainly of changes to vegetation cover resulting from clearing the project right-of-way, and the associated effects to wildlife, through changes to habitat.

Residual effects to the socio-economic environment include, but are not limited to:

- Disruptions to rights-based activities and the cultural experience of First Nations people and Red River Métis citizens
- A potential decrease in the number of heritage resources or other important cultural sites mainly due to project-related ground disturbances
- Increases in traffic and strain on health and emergency response services
- A localized decrease in air quality and increase in noise
- Increased stress for certain individuals resulting from concerns about project-related impacts to property value/aesthetics and human health risk (e.g., EMF)

Based on the route selection process, and the measures developed to mitigate and manage any potential adverse effects, the residual effects of the project are predicted to be not significant.

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Appendix A: Transmission line routing

Appendix B: Engagement materials and feedback summary

Appendix C: Vegetation technical report

Appendix D: Greenhouse gas emissions life cycle assessment report

Appendix E: Cultural and heritage resources protection plan

Appendix A

Transmission line routing

Table of Contents

List of tables

List of Figures

1.0 Overview

This appendix is intended to be read as supporting material to Chapter 3 of the environmental assessment report for the S65R tap transmission project. It describes the models used in the transmission line routing process and describes in detail how the models are used.

This appendix will cover:

- Determining the areas of least preference
- Developing routing corridors
- Selecting a preferred route

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:

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[1] EPRI-GTC. 2006. EPRI-GTC Overhead Electric Transmission Line Siting Methodology. Tucker, GA: Georgia Transmission Corporation.

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.

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 Determining the areas of least preference

Areas of least preference (Table 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 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, recreation centers (e.g., golf, skiing), religious / worship sites, schools / day cares
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)
Ecological reserves, wildlife management areas, park reserves, traditional use planning areas, national and provincial parks, provincial forests, and land trusts
Towers and antennae / oil well heads / wind turbines
Waste disposal sites
Wastewater treatment areas
World Heritage Sites

3.0 Developing routing corridors

Corridors map the suitability of an area for locating a transmission line. They 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
- Cost distance analysis

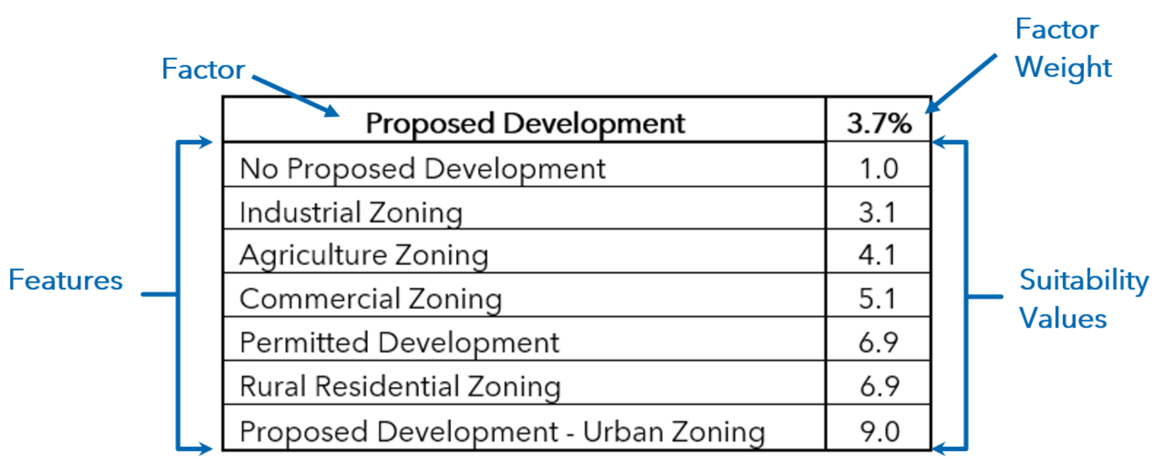
The creation of routing corridors is discussed below.

3.1 Developing the 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: Example corridor model factor layer

Table 2: Corridor Model

Engineering	
Linear Infrastructure	**40%**
Unutilized ROW (Manitoba Hydro Owned)	1
Parallel Roads ROW	2.6
Municipal Road Allowances	3.1
Parallel Provincial Highways ROW	3.4
Parallel Existing Transmission Lines	3.8
No Linear Infrastructure	4.4
Rebuild Existing Transmission Line	5
Parallel Oil / Gas Transmission Pipeline	5.6
Parallel Railway ROW	5.6
Future MIT Plans	7.8
>= 300kV TLine & Within Separation Buffer	8.5
Within Road, Railroad, or Utility ROW	9
Spannable Waterbodies	**12%**
No Waterbody	1
Non-Nav. Spannable (Standard Structures)	2.8
Nav. Spannable (Standard Structures)	4.3
Non-Nav. Spannable (Specialty Structures)	6
Nav. Spannable (Specialty Structures)	9
Geotechnical Considerations	**34%**
Rock	1
No Special Geotechnical Considerations	1.3
100 Year Floodplain	6.6
Wetland / Peatlands	9
Mining Operations / Quarries	**15%**
No Mining Operation	1
Abandoned/Inactive Mines	6.5
Mine-Owned Land	9

Natural	
Aquatics	**10%**
No Aquatic Feature	1.0
Ephemeral Streams (Non-Fish Bearing)	4.9
Spannable Waterbodies (Lakes & Ponds)	6.1
Ephemeral Streams (Fish Bearing)	6.3
Swamps	6.8
Ephemeral Streams (CRA Fish Bearing)	6.9
Riparian Floodplain	7.1
Permanent Stream	7.5
Bogs	7.7
Fens	8.2
Marsh	8.2
Permanent Stream (CRA Fish Bearing)	9.0
Special Features	**43%**
No Special Land	1.0
Managed Woodlots	5.4
Crown Land With Special Code	7.0
Community Pastures	7.3
Flyways	7.5
Areas of Special Interest (ASI)	7.8
Rec. Prov Park (Non-Protected Portions)	8.0
Conservation Easements	8.0
WMA (Non-Protected Portions)	8.2
Proposed Protected Areas	8.6
Heritage Rivers	8.7
Important Bird Areas	8.7
Heritage Marshes	8.9
Conservation Lands	8.9
Natural Prov. Park (Non-Protected Portions)	9.0
Land Cover	**10%**
Exposed / Urbanized / Open Land	1.0
Agricultural (Forage)	2.5
Agricultural (Crops)	2.8
Burnt Areas	4.9
Grassland	5.0
Decidious Forest	5.5
Coniferous Forest	5.7
Mixed Forest	6.0
Non-Developed Sand Hills	8.1
Native Grassland	9.0
Wildlife Habitat	**37%**
Other	1.0
Ungulate Habitat (High)	6.1
Waterfowl Habitat (High)	6.3
Waterfowl Paired Density (High)	6.9
Waterfowl Hotspots (High)	7.0
Grouse Lek Area	7.7
Rare Species Habitat	8.0
Critical Habitat	9.0
Endangered Species Habitat	9.0

Built	
Proximity to Buildings	**15%**
> 800 m	1
400 - 800 m	2.8
100 - 400 m	6.5
ROW - 100 m	9
Proposed Development	**4%**
No proposed development	1.0
Industrial zoning	3.1
Agricultural Zoning	4.1
Commercial / Mixed Use Zoning	5.1
Rural Residential / Settlement Centre	6.9
Residential / Institutional	9.0
Soil Capability & Agricultural Use	**16.0%**
Other	1.0
Class 6 & 7 Agricultural Land	3.3
Organic Soils/Peat Bogs/Sod Production	3.9
Artisanal Farms / Wild Rice	4.3
Class 4&5 Agricultural Land	5.9
Class 1- 3 Agricultural Land	9.0
Land Use	**22%**
Forest	1.0
Open Land (Sand & Gravel)	1.5
Industrial	1.6
Burnt Areas	1.8
Active Forestry Operation	2.3
Hunting / Trapping Locations	3.9
Listed Trails (Existing & Planned)	4.6
Agricultural (Forage)	4.9
Organic Farming	5.5
WMAs (Unprotected)	5.8
Out-of-Park Recreational Development	6.4
Intense Development & Use	6.5
Agricultural (Crops)	6.6
500m Buffer of Irrigated Land	6.6
Intensive Livestock	6.9
In-Park Recreational Development	7.9
Institutional	7.4
Agricultural (Aerial Application)	8.9
Irrigated Land	9.0
Proximity to Heritage Sites	**16%**
> 300 m	1.0
200 - 300 m	9.0
Landscape Character (Viewsheds)	**11%**
Other	1.0
Recreational Trails	4.1
Cottage Subdivisions	6.1
Identified Scenic Prov Trails & Roads	6.8
Escarpments (Timeless Topography)	7.5
Resort Lodges & Campgrounds	8.6
Residential	8.9
Designated Historic Sites	9.0
Edge of Field	**16.0%**
Road Allowances	1.0
Drains	1.8
Quarter/Half-Mile Section Lines	2.0
Vacant Rail ROW	2.1
Parallel/Adjacent To Road Allowances	2.8
Other (None of the Above)	9.0

3.1.1 Factors

Factors (e.g., proposed development) are groups of similar features on the landscape considered in transmission line routing. Each factor will be represented by a geospatial data layer (Section 3.3).

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 close 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.

3.2 Gathering 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.

3.3 Creating 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.

3.4 Creating 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).

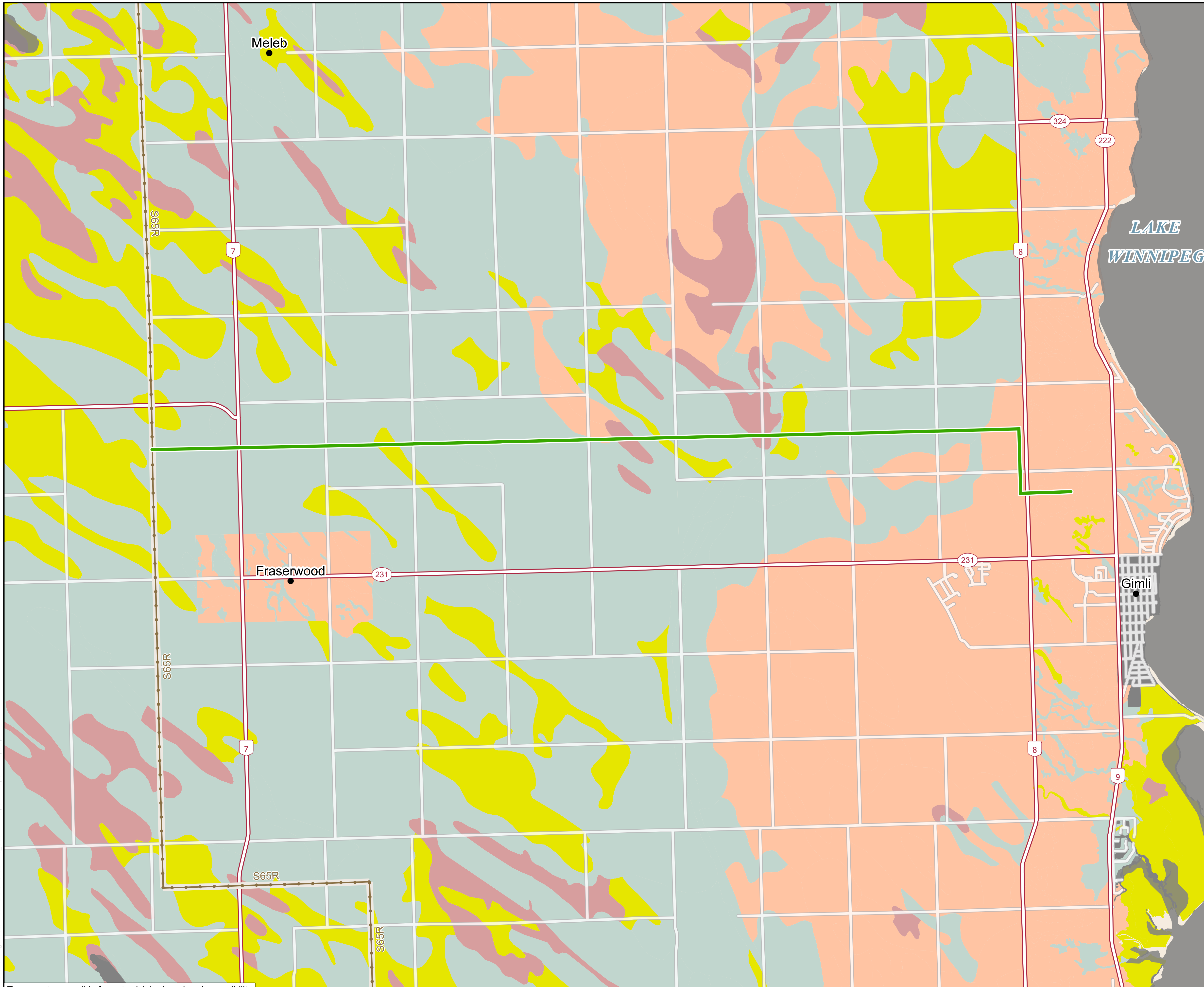
Suitability surfaces are created for each of the three perspectives: engineering, natural, and built, as well as one for the simple average. Each suitability surface represents a weighted combination of the three perspectives. Four scenarios were created by distributing the weight of each environment 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).



Manitoba Hydro

Silver to Rosser
Tap Transmission Project

Proposed Infrastructure

Final Preferred Route

Existing Infrastructure

Existing ≥69kV Transmission Line

Soil Capability Routing Criteria

Other - Suitability Value 1.0
Class 6 & 7 - Suitability Value 3.3
Organic Soils/Peat Bogs - Suitability Value 3.9
Class 4 & 5 - Suitability Value 5.9
Class 1-3 - Suitability Value 9.0

Landbase

Local Road
Provincial Highway/Road

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

N

0 1.5 3 Kilometres
0 0.9 1.8 Miles

1:70,000

Figure 2: Soil Capability Routing Criteria

Draft/Confidential: For Discussion Purposes Only

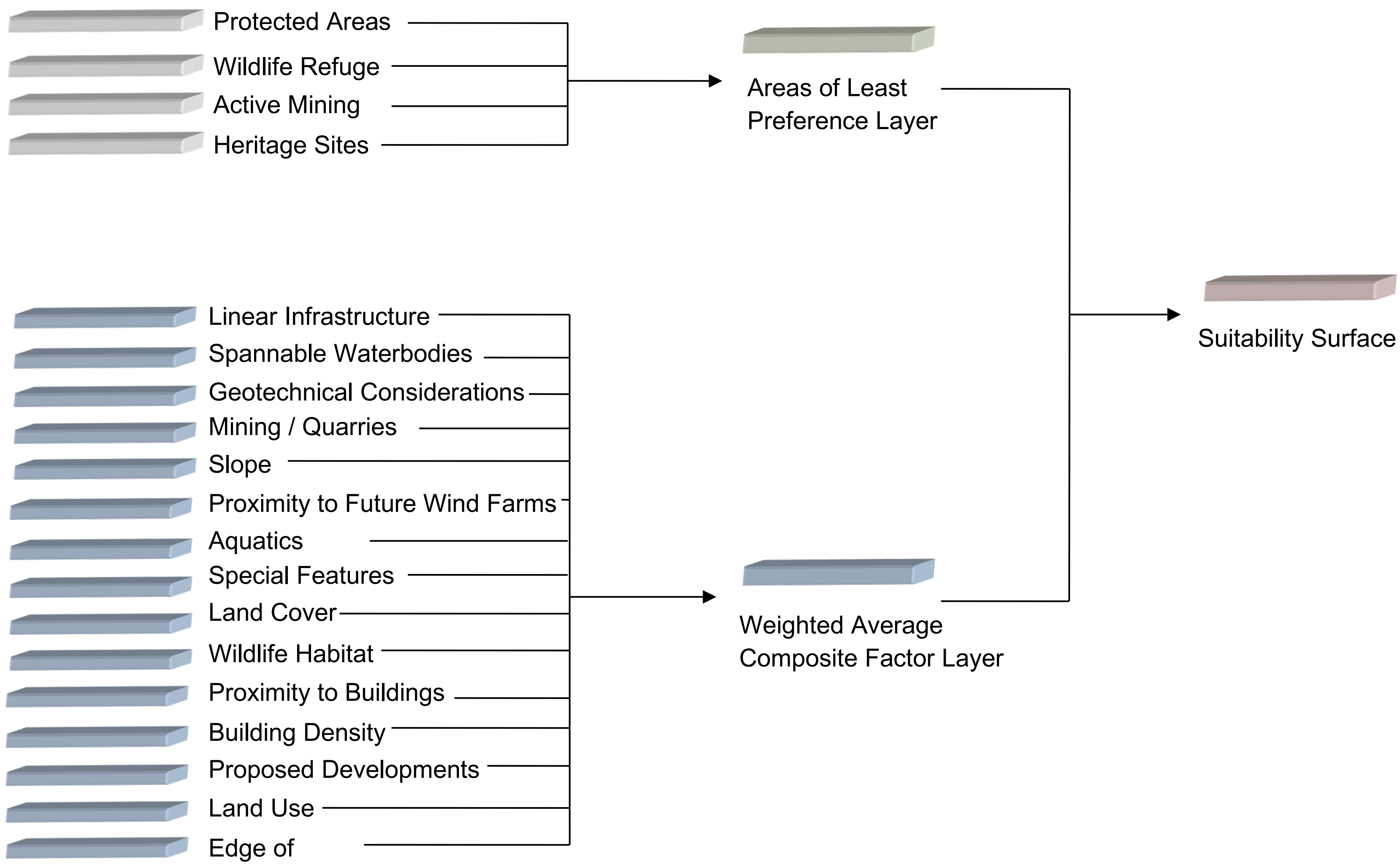


Figure 3: Combining the factor layers and areas of least preference layer into the suitability surface

3.5 Developing routing corridors

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 (S65R) and end point (Diageo property line) were used. Cost distance analysis was run from the start to the end point.

An algorithm is used to find the accumulated cost of getting from each cell back to the start point. The "cost" in this case is the sum of values of each grid cells, and not monetary in nature.

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).

3.6 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 Selecting the preferred route

Selection of a preferred route involves developing the route evaluation model and using it to create route statistics, which allows comparison of routes to help the routing team select a few of the top routes.

4.1 Developing the 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	
Occupied homes	44
Proposed subdivisions	17
Special features	17
Agricultural cropland	11
Livestock operations	11
Natural	
Natural Forest	85
Wetlands	15
Engineering	
Cost	80
Accessibility	20

4.2 Creating 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) 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: Route evaluation model definitions

Criteria	Criteria Description
Built	
Occupied homes	Any occupied residence categorized in the buildings layer and windshield surveys – within 75 m of centerline
Proposed Developments	Quarter section of land within which there is an approved development
Special Features	Schools, churches, park parcels, recreational trails, campgrounds, resorts and lodges, woodlots, homes, cemeteries - edge of ROW to 250 m
Agricultural cropland	Apply weighting based on production values to annual crop (2.7x) and hayland (1x) land cover classes
Livestock operations	Quarter section within which there is a livestock operation
Natural	
Natural Forest	All forested (i.e., productive, and non-productive) cover classes from the best available landcover data
Wetlands	All wetland classes from the best available landcover dataset
Engineering	
Cost	Typical cost* / km + clearing costs per acre + angle towers + property costs
Accessibility	A value determined by the ROW's proximity to the nearest public roadway (improving accessibility), and any wetland locations within the ROW (reducing accessibility)
*Typical costs are a high-level estimate including general construction and material costs based on previous projects, used as a general comparison between routes, not meant to signify project costs.	

Table 5: Route statistics for the top routes

Features	ROUTE ID		
	Route A	Route B	Route C
Built			
Occupied homes (count)	2	2	2
Proposed developments (count)	1	1	1
Special features (count)	4	4	4
Agricultural cropland (acres)	41	28	22
Livestock operations (count)	1	1	1
Natural			
Natural forest (acres)	70	80	83
Wetlands (acres)	0	0	0
Engineering			
Length (km)	18	18	18
Accessibility (value)	2,933,757	3,110,695	3,234,920

4.3 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 from project engagement.

Team members responsible for engineering, technical design, construction, and maintenance represented the engineering perspective.

Team members responsible for the project engagement processes represented feedback received from project engagement 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 generally carried forward for further evaluation at the preference determination workshop.

Using the route statistics and GIS software, the top routes from each perspective were reviewed. Based on the review, one route was preferred by all perspectives, the preferred route presented in round 1.

However, after further discussions with the customer, it was determined that the point of delivery would be the south termination point (Diageo B on Map 3-4 in the main report). Three routes were selected for preference determination.

4.4 Preference determination

4.4.1 Preference determination model

Prior to the development and evaluation of route segments, the routing 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 6).

Table 6: Preference determination model

Criteria	Percent	Description
Cost	45%	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	10%	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.

4.4.2 Preference determination scoring

In the preference determination step, the preference determination model (Table 6) 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 project engagement 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.

Scoring is guided by the experts responsible for each criterion. In some cases, meetings are held to discuss the routes and determine scores.

The cost criteria scoring was determined by the engineering team. The community criterion scores were developed by the engagement team. 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.

Appendix B: Engagement materials and feedback summary

Plans underway for new transmission line in Gimli area - Silver to Rosser tap transmission line

Opportunity for feedback on alternative route segments

We are planning to build a new 230kV transmission line connecting an existing line along Highway 7 to the Diageo Canada Inc. distillery facility in Gimli.

This project will allow Diageo Canada Inc.'s distillery facility added electrical capacity to reduce natural gas usage and use more hydroelectricity to power its facility. We are seeking input from landowners, First Nations, the Manitoba Métis Federation, interested parties, and the public to help inform our routing and plans.

Join us on March 14 between 5:30 - 8:30 at the Fraserwood Community Hall (10140 PR 231, Fraserwood, MB)

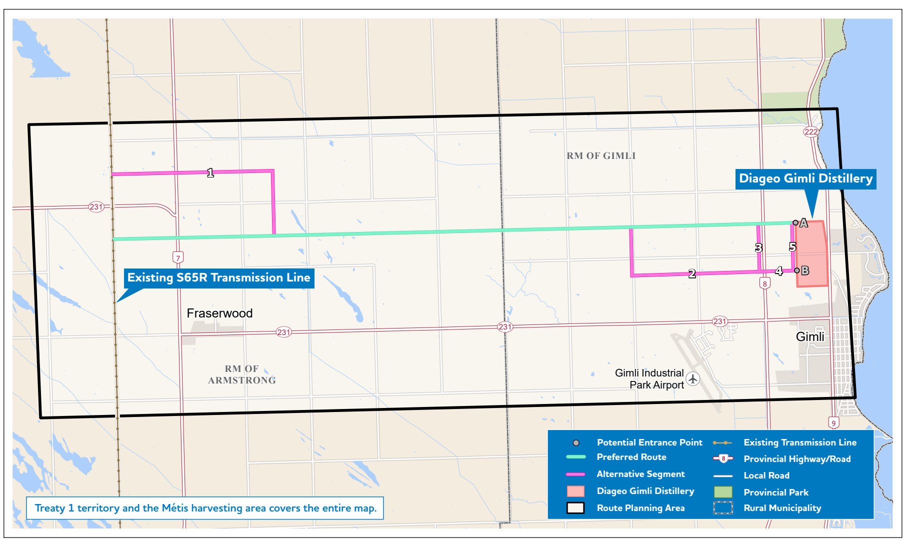
Online survey & feedback portal

Fill out our online survey or comment on the preferred route and alternative route segments in our interactive feedback portal at: www.hydro.mb.ca/silver-rosser-tap

Join us virtually for an information session:

- March 12 at 7pm (virtual)
- March 20 at noon (virtual)

To register for a virtual session, go to www.hydro.mb.ca/silver-rosser-tap, email **projects@hydro.mb.ca** or call **1-877-343-1631**



Map of preferred route (teal) and alternative route segments (pink) for the Silver to Rosser tap transmission line. View enlarged map and more project information at www.hydro.mb.ca/silver-rosser-tap

Stay Connected

Learn more and sign-up for updates at www.hydro.mb.ca/silver-rosser-tap

February 2024
Available in accessible formats upon request.

Manitoba Hydro
energy for life

Meeting notes

Meeting: Silver to Rosser tap transmission project - Round 1 virtual information session	
Date: March 12, 2024	Time: 7:00-8:00 pm
Meeting type (virtual or in-person)	Virtual
Facilitators	Chantal Brodbeck Geneva Cloutis
Note-taker	Elise Dagdick
Number of participants	9
Round 1 virtual information session to learn about the project and to ask questions, voice concerns, and share feedback on the alternative route segments to help inform Manitoba Hydro's (MH) routing and plans.	

Owner	Action item:	Status
MH	Provide contact information for questions relating to Diageo's operations.	Complete – shared contact information with participant via email.
MH	Follow up on whether MH offered any other electricity supply options to Diageo.	Complete – see below.
MH	Confirm distance between towers.	Complete – the average distance between towers is 250m.
MH	Follow up with contact information for the MH Property Department for details related to property rights.	Complete – shared contact information with participant via email.
MH	Follow up on why a route along Lakeside Road (Road 114) and the Meleb Drain was not considered at this time.	Complete – see below.

Category	Community comment/concern	Summary of MH response
GHG reduction	What is Diageo's greenhouse gas reduction (GHG) target for this project?	Diageo has provided contact information for questions relating specifically to their operations. MH shared this directly with the participant.
Project information	What will be the distance between the towers?	MH shared they believe distance between towers is approximately 400 m but will confirm.

Category	Community comment/concern	Summary of MH response
		Follow-up: The approximate distance between the towers is 250m. This will vary based on the final route, corners, crossings, terrain and other obstacles.
Environmental assessment	Who is preparing the environmental assessment document?	MH is preparing the environmental assessment using in-house expertise with support from consultants for heritage work and field surveys.
Environment Act licensing	Does a Class 2 Development under The Environment Act get a public hearing?	It is the minister's decision whether a public hearing will be held.
Project alternatives	Did MH offer any other electricity supply options to Diageo?	MH will follow up with a response. *Follow-up:* Based on Diageo's request, Manitoba Hydro is currently considering a 230kV transmission line to the facility.
Route alternatives	Why was an alternate route along Lakeside Road (Road 114) and the Meleb Drain not considered for routing?	Longer line lengths are avoided due to consideration of increased costs and impacts of the line. MH will follow up to confirm if this route was not considered for additional reasons. *Follow-up:* In addition to a longer line, there are homes that are within 40m of the road on either side of Road 114, which would be located within the right-of-way and would not be compatible with transmission line routing. This option will be considered through the same routing process as route options prepared by MH.
Route alternatives	Why are there no alternatives proposed for the central portion of the study area? Are the only feasible alternatives those shown on the map?	Yes, the routes shown on the map are the only feasible alternatives that Manitoba Hydro is currently considering. Landowners can also propose alternative segments using the online mapping feedback portal or by drawing alternatives on a map. These route options will be considered through the same routing process as route options prepared by MH.
Future engagement	Will Round 2 include a town hall meeting?	Round 2 will follow the same format as Round 1, including an open house in-person meeting.

Category	Community comment/concern	Summary of MH response
Future engagement	Will the information presented at the open house be the same as the virtual session?	Yes, however questions asked at the meeting could result in new information being provided.
Future engagement	Will there be representatives from Diageo and the municipality at future meetings?	Municipal representatives may attend the open house meeting and Diageo has provided contact information for inquiries.
Vegetation maintenance	Will the transmission line right-of-way be maintained by mowing?	Vegetation along the right-of-way may be maintained by mowing. Trees are not compatible with transmission lines but other vegetation (such as shrubs) could be allowed.
Vegetation maintenance	What type of vegetation control is utilized? Is it chemical applications?	Vegetation maintenance along the right-of-way could include the application of herbicides, however Manitoba Hydro can discuss alternatives with landowners if landowners prefer to avoid chemical spraying.
Land use on the right-of-way	Will haying and grazing be allowed on the right-of-way?	Yes, the right-of-way can continue to be used for agricultural and livestock purposes.
Agricultural Crown land leases	Are there any agricultural Crown land leases along the routes?	There is one available agricultural Crown land lease on segment 1, but the preferred route does not traverse any Crown land parcels.
Landowner compensation	Will there be compensation to landowners for opportunities lost (such as building a house)?	Compensation for future potential losses to landowners is built-in to the land easement, which is 150% of fair market value. MH hires a third-party appraiser, and discusses the compensation amount one-on-one with landowners.
Landowner rights	Does the legislation related to easements for transmission lines (Manitoba Hydro Act) apply to customer driven projects?	MH has a mandate to provide a cost estimate to customers requesting electrical supply. MH would own and operate the transmission line and it would be held to the same standards as other lines. MH followed up with contact information for the MH Property Department for further details on property rights with the participant.

Meeting notes

Meeting: Silver to Rosser Tap – Round 1	
Date: March 20, 2024	Time: 12:00 – 1:00pm
Meeting type (virtual or in-person)	Virtual
Facilitator	Geneva Cloutis, Engagement Specialist, Manitoba Hydro
Note taker	Lindsay Mierau
Number of participants	7
Meeting description	Round 1 virtual information session to learn about the project and to ask questions, voice concerns, and share feedback on the alternative route segments to help inform Manitoba Hydro's routing and plans.

Owner	Action item:	Status
Manitoba Hydro	Follow up with participant with response to question about Diageo's operations and their future plans for the distillery.	Ongoing – Manitoba Hydro following up with response from Diageo
Manitoba Hydro	Explore whether there is an opportunity to share public feedback on energy policy as it relates to Manitoba Hydro's energy resource planning and capacity considerations. Participant asked to have concerns shared with Manitoba government.	Complete - Followed up with Government Relations and their response included below.
Manitoba Hydro	Confirm how property assessments are undertaken.	Complete – see response below.
Manitoba Hydro	Respond to RM of Gimli regarding the potential eagle nesting grounds concern.	Complete – followed up with the RM directly on March 21, 2024.
Manitoba Hydro	Meeting Minutes to be shared back to all participants by email on or before April 3, 2024.	In progress.

Category	Community comment/concern	Summary of Manitoba Hydro response
Other (Energy Policy and Energy Capacity)	A participant shared that the Manitoba government should clarify its policy on energy resource planning to ensure the grid is meeting the needs of all Manitobans, including the grid's ability to meet future energy needs. Beyond the goals to reduce usage of natural gas, a participant asked if there are other	Manitoba Hydro cannot speak to Diageo's future plans for its operations at this time. Manitoba Hydro will follow up with a response from Diageo. Under the Manitoba Hydro Act, Manitoba Hydro is required to serve customers on a first come, first serve basis. This project is

Category	Community comment/concern	Summary of Manitoba Hydro response
	reasons that Diageo wants this new transmission line.	responding to that customer request to electrify its operations. At this time, Manitoba Hydro is not aware of any opportunities for the public to engage on the Manitoba government's direction related to energy policy. Manitoba Hydro has noted these concerns about energy capacity constraints and the impacts that projects (such as Diageo) may have on the overall grid.
Routing	A participant asked if the study area can be broadened to use existing corridors in the area. For example, why is the transmission line running alongside Highway 8 not within scope to be used to supply power to the facility.	Manitoba Transportation and Infrastructure has a control zone around Highway 8, which limits future development in proximity to the highway. As well, the existing line is a 66kV sub-transmission line, which does not have adequate capacity for Diageo's operations. Moreover, the current study area was selected based on the need to balance infrastructure costs with impacts to the environment and surrounding community.
Property	A participant shared concerns about increased access and asked how changes to access are accounted for in the compensation process.	Access is common concern from landowners. Once Manitoba Hydro has determined the preferred route for the transmission line, Manitoba Hydro will meet one-on-one with impacted landowners to discuss their concerns and potential mitigation options. In the past, mitigation options have included signage, fencing, and/or other mutually agreed upon solutions to manage access.
Property	A participant asked how property value assessments are undertaken for compensation.	To determine the market value of the right-of-way area required for the project, an appraisal report will be prepared by an accredited appraiser.
Environmental assessment process	A participant asked about where the environmental assessment report will be posted.	The environmental assessment report will be posted to Manitoba Hydro website on the [Silver to Rosser tap] project page.

Category	Community comment/concern	Summary of Manitoba Hydro response
		The environmental assessment will also be posted on the Government of Manitoba's project registry website. Once it is posted on the registry, there will be a public comment period for the project.
Environmental assessment process	A participant asked about the timelines for the environmental assessment process.	Manitoba Hydro expects to submit the environmental assessment to the Environmental Approvals Branch in summer 2024.
Wildlife & wildlife habitat	A participant asked whether Manitoba Hydro has received feedback from the RM of Gimli on the potential eagle nesting grounds located at the intersection of the preferred route.	Manitoba Hydro staff have received this information and will consider this in the environmental assessment. Manitoba Hydro responded directly to the RM by email regarding this feedback.
Wildlife & wildlife habitat	A participant asked what Manitoba Hydro's policy is on herbicide use in and around transmission corridors. The participant shared their concern that the use of herbicides has significant impacts on bees and the participant wanted to know if there are opportunities to mitigate or avoid this impact. The participant indicated they think that there is precedent for not mowing area(s) where bees exist per Thompson landowner deal with Manitoba Hydro. The participant shared they believe his may be a potential option here given the extent of bees reliant on this agriculture land.	When creating a new transmission line Manitoba Hydro would use mechanical methods to clear vegetation along the right-of-way.Vegetation management during operations may include mowing, cutting and/or the use of herbicides. 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.
Wildlife & wildlife habitat	A participant asked if Manitoba Hydro would consider planting beneficial flora and other vegetation that supports bee populations along transmission line rights-of-way.	Manitoba Hydro clarified that in Manitoba, rights-of-way for transmission lines are normally obtained by way of easement so that landowners continue to own the land underneath the line. As such, it is a landowner's decision what types of vegetation may be planted. Manitoba Hydro is open to supporting the planting beneficial bee species if that is of interest to the landowner.

Silver to Rosser tap transmission line open house

Summary report

Date: Thursday, March 14, 2024, from 5:30-8:30pm.

Location: Fraserwood Hall, Fraserwood, MB

Facilitators: Lindsay Thompson, Geneva Cloutis, Chantal Brodbeck, David Block, Karine Martel, Wara Chiyoka

Summary:

Manitoba Hydro invited members of the public to an open house in Fraserwood, MB, to introduce the Silver to Rosser tap transmission project. There were approximately 35 participants who attended the open house. We set up three different stations around the room for participants to walk through and visit. Additionally, there were four Manitoba Hydro representatives available for one-on-one conversations with participants.

The three stations included:

1) Storyboards
   a. Manitoba Hydro set up storyboards around the room with up-to-date transmission line information.
2) Mapping
   a. Manitoba Hydro set up maps in a section of the room for participants to leave specific feedback about the route options.
3) Environmental assessment
   a. Manitoba Hydro set up a station to gather feedback, concerns, and thoughts from the public relating to specific valued components being assessed in the environment assessment.

The objectives of the open house were to:

- Share project information with the public and answer questions.
- Gather feedback on route options and understand the publics values and concerns.
- Gather feedback on specific topics to be assessed in the environmental assessment report about how the project may affect each topic (i.e., valued components)

What we heard

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
Vegetation & wetlands	Loss of vegetation due to right-of-way clearing.	The transmission line routing process considered forests and wetlands. Standard industry and project-specific mitigation measures would be used to help manage

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
		potential effects to vegetation.
Vegetation & wetlands	Participants shared concerns about weeds and invasive species growing along the transmission line right-of-way due to vegetation clearing.	For rights-of-ways on private or municipal lands, as Manitoba Hydro has only an easement, the responsibility of invasive species management lies with the landowner. If invasive weeds are introduced to the right of way as a direct result of Manitoba Hydro activities, Manitoba Hydro will work with the landowner to implement control options.
Vegetation & wetlands, Harvesting	Participants shared concerns about potential impacts to medicine picking areas including a loss of biodiversity from vegetation clearing.	Environmentally sensitive sites, features, and areas including important plant and medicine locations will be identified and mapped before clearing and would be included in the Environmental Protection Program for specific mitigation measures.
Vegetation & Wetlands, Harvesting	Participants shared that there are mushrooms, wild raspberries, cranberries, and juniper picking areas near the preferred route.	Manitoba Hydro has noted this feedback, and it will be used to inform the environmental assessment.
Harvesting	Concerned about impacts to hunting activities due to displaced wildlife.	Manitoba Hydro noted this feedback, and it will be used to inform the environmental assessment.
Wildlife & wildlife habitat	Loss of wildlife habitat via right-of-way clearance.	Clearing activities would not be carried out during reduced risk timing windows for wildlife species without additional mitigation, such as bird nest sweeps.
Wildlife & wildlife habitat	Impacts to eagle nesting are just west of potential entrance A.	Important wildlife features (i.e., mineral licks, stick nests) would be identified in map sheets and flagged prior to clearing. Trees containing large nests of sticks and areas where active animal dens or burrows are encountered within the ROW would be

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
		left undisturbed until unoccupied. Artificial structures for nesting may be used if unoccupied nests must be removed. Clearing activities would not be carried out during reduced risk timing windows for wildlife species without additional mitigation, such as bird nest sweeps.
Culture and heritage	Impacts to picking of bones for Indigenous crafts.	If the project were approved, once the line was in operation, the right-of-way could still be used for harvesting. There may be temporary access restrictions during active construction.
Culture and heritage	Impacts to the rights of Indigenous Peoples’	Manitoba Hydro will consider the impacts to rights-based activities such as harvesting in the environmental assessment.
Community well-being	Impacts to aesthetics due to the presence of the t-line.	Impacts to aesthetics will be considered in the environmental assessment for the project.
Human health, Community well-being	Concerns about EMF effects on people	Extremely low frequency (ELF) EMF falls within the frequency range of 1 Hertz (Hz) to 3 kilohertz (kHz). The ELF EMF associated with electricity distribution to homes and buildings in Canada has a frequency of 60 Hz. Exposures to extremely low frequency EMF in Canadian homes, schools, and offices are well below the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines and, therefore, precautions are not required for these levels of exposures. For more information, refer to Health Canada (2022).
Animal health	Concerns about the impacts of EMF exposure on animals	The potential effects of EMF exposure for animals will be considered in the environmental assessment for the project.

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
Human health, Community well-being	Concerns about noise effects during construction and corona during operation.	Noise impacts, during both construction and operation, will be considered in the environmental assessment for the project.
Human health, community well-being	A participant asked how transmission lines affect people who live in proximity to the line?	Manitoba Hydro will assess impacts to health and safety, including real and perceived impacts, in the environmental assessment for the project.
Engagement	A participant asked if Manitoba Hydro will have a town hall with the rural municipalities and Diageo.	There are no plans for Manitoba Hydro to have a town hall with the municipalities and Diageo. Manitoba Hydro will continue to offer virtual and in-person engagement events as the environmental assessment and routing processes proceed.
Property	Restrictions on future development e.g., future additional residence and businesses.	No structures are permitted to be located within the 40 m right-of-way required for the transmission line.
Property	A participant asked what would happen if participants didn't want the transmission line to go across their land and didn't want to sign the easement agreement.	Most transmission lines concerns can be addressed through routing, such as minor adjustments to the placement of the tower on the land. Conversations on how to accommodate concerns and work together with landowners are ongoing.
Property	Participants shared concerns about the impacts to property values due to presence of the transmission line. Participants asked what the impacts are on property values for residential homes versus clear/undeveloped land, and the impacts of a transmission line on agricultural land values.	Manitoba Hydro does not have any evidence to suggest that property values are negatively impacted long term by transmission line development.
Construction	Landowner expressed interest in clearing the trees on their property.	Manitoba Hydro noted this interest and will discuss the interest further with the landowner after Manitoba Hydro determines the transmission line route.
Commercial Agriculture	Concerns about safety for cattle on pasture due to extreme weather impacts	Manitoba Hydro noted this concern. While environmental forces (e.g., severe weather, climate change) have the potential to

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
	on towers.	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. Manitoba Hydro does not anticipate any impacts to cattle based on extreme weather impacts on towers.
Commercial agriculture	Participants shared that they aerial spray on their property along the preferred route and that this would no longer be possible with the presence of a transmission line.	Manitoba Hydro noted this concern and will consider in the route selection process and the environmental assessment report.
Infrastructure and services	A participant asked if the line would bring internet.	There are currently no plans to include internet services as part of the transmission line infrastructure.
Infrastructure and services	A participant asked what the voltage of the transmission line that runs along Highway 8 is.	The line running along Highway 8 is a 66kV sub-transmission line.
Infrastructure and services.	Participants asked whether transmission lines will interfere with cell service or Wi-Fi signals.	Studies on previous Manitoba Hydro transmission lines have indicated that radio noise from alternating current transmission lines does not overlap with wireless internet signals, and therefore does not affect wireless internet function.
Infrastructure and services	Participants asked why Manitoba Hydro could not use the existing 66kV line and upgrade it.	Manitoba Transportation and Infrastructure has a control zone around Highway 8, which limits future development in proximity to the highway. Additionally, transmission lines have different material and design requirements than the sub-transmission 66kV line along

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
		Highway 8.
Economic opportunities	Concerns about the transmission line having no benefits for the community.	Manitoba Hydro noted this feedback.
Design	A participant asked what the tower height is.	The tower height will range from 55 to 100 ft.
Cost	A participant asked what portion of the cost Diageo Canada Inc. is covering.	Manitoba Hydro's customers are responsible for the material and labor costs of all new or upgraded servicing, in excess of any qualifying revenue allowance.
Cost	A participant asked what the cost of the project is.	Manitoba Hydro does not currently have a publicly available estimate for the overall cost of the project.
Routing	Participant suggested we follow the drains all the way from the tap, as it is a pre-disturbed area, and they provide easy access.	Manitoba Hydro is investigating the feasibility of this route suggestion.
Routing	Concerns about alternative route segments 2 and 4 due to the future development plans of Gimli.	Manitoba Hydro noted this feedback and will consider in the route selection process.
Routing	Participant suggested for Diageo to place their converter station further West to decrease the voltage of the line the closer you get to Gimli.	Diageo is responsible for building the converter station as the point of delivery of the transmission line.
Routing	A participant asked by alternative route segment 3 is so far from Highway 8?	Manitoba Transportation and Infrastructure has a control zone around Highway 8, which limits future development in proximity to the highway.
Routing	A participant asked how close a transmission line can be built from a house.	For safe operation of the transmission line, there are no structures or developments allowed within the 40m right-of-way for the transmission line.

Category	Participant Comment / Concern	Manitoba Hydro Response / Mitigation
Routing	Participants asked whether Manitoba Hydro would investigate a route option running along the Fish Lake Drain.	Manitoba Hydro is investigating the feasibility of this route suggestion.

Silver to Rosser tap transmission project

Round 1 presentation

March 12, 2024

Manitoba Hydro

Meeting outline

Welcome & introductions

Project presentation by Manitoba Hydro

- Project background
- Routing process
- Project and engagement timeline

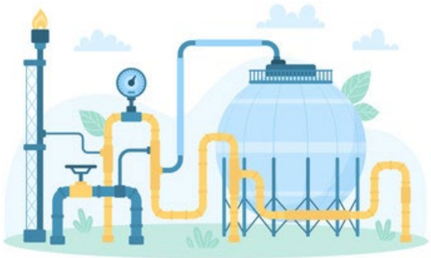
Questions & answers

About the project

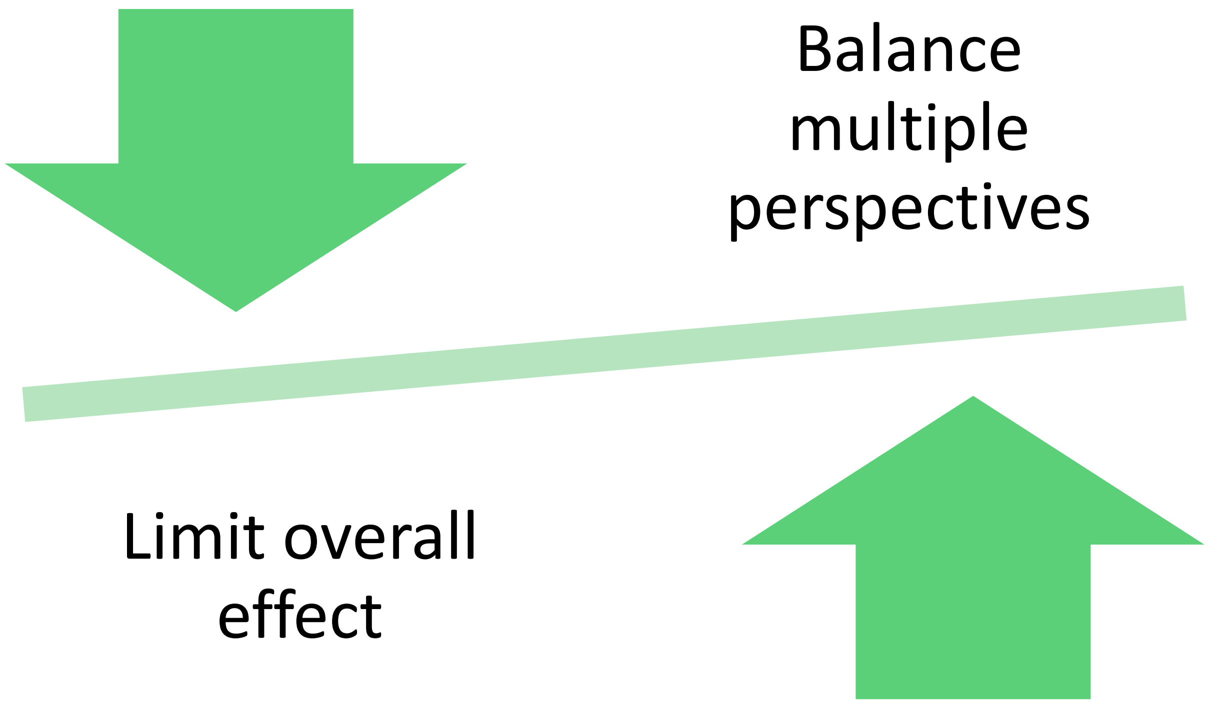
- Proposed 230-kV transmission line located north of Gimli to supply Diageo Canada Inc.'s distillery facility with hydroelectricity
- Line will tap into an existing 230kV line (S65R)
- Class 2 development under the *Environment Act* (Manitoba)

Why is this project needed?

This project is customer driven and will allow the Diageo Gimli distillery the ability to reduce natural gas usage and use more hydroelectricity to power its facility.



Goals of transmission line routing



Transmission line routing and engagement process

- Draw study area

Identify start and end points of line

Draw routes

- Round 1 engagement

- Compare and evaluate routes

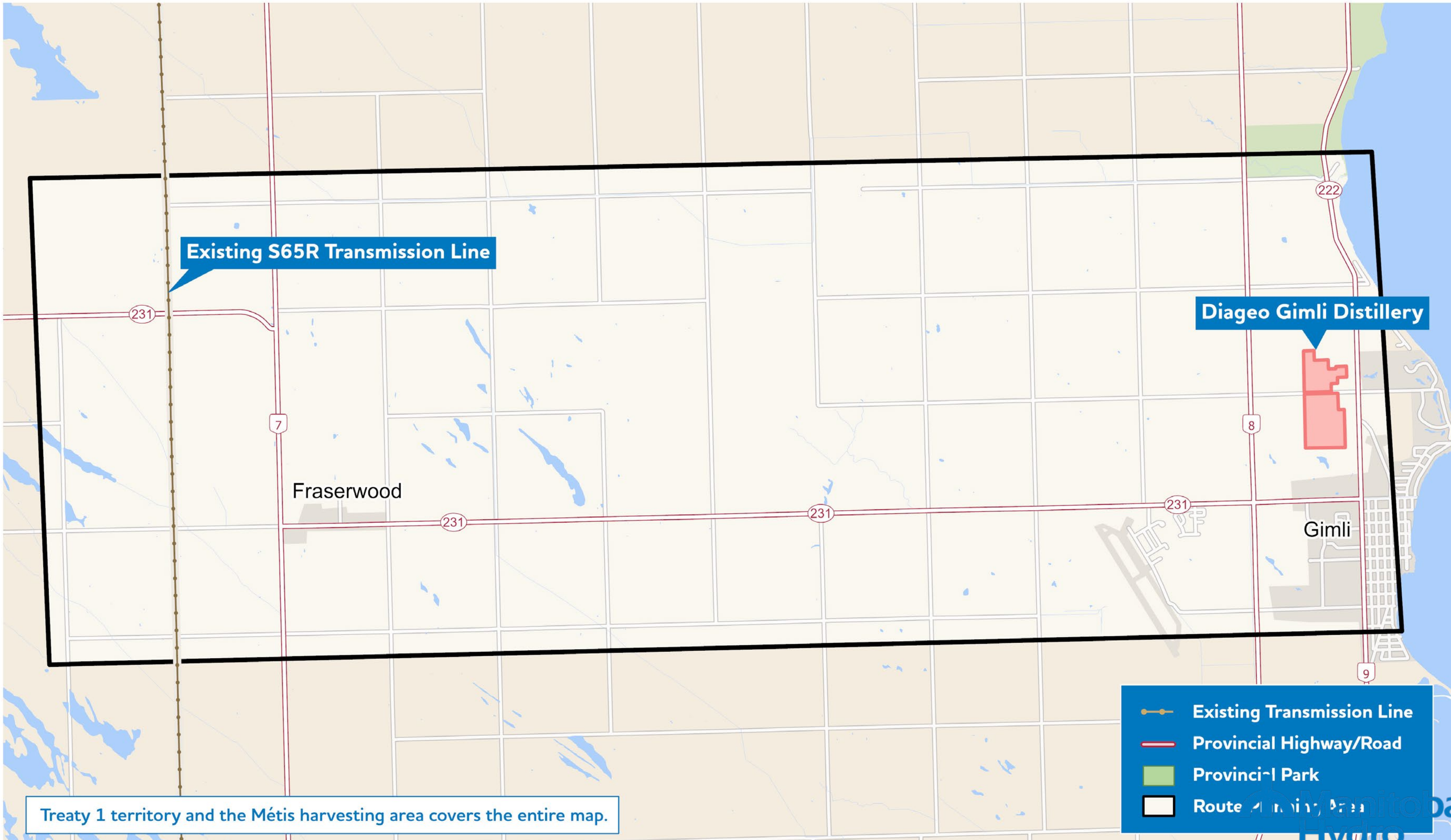
Narrow down options

Pick preferred route

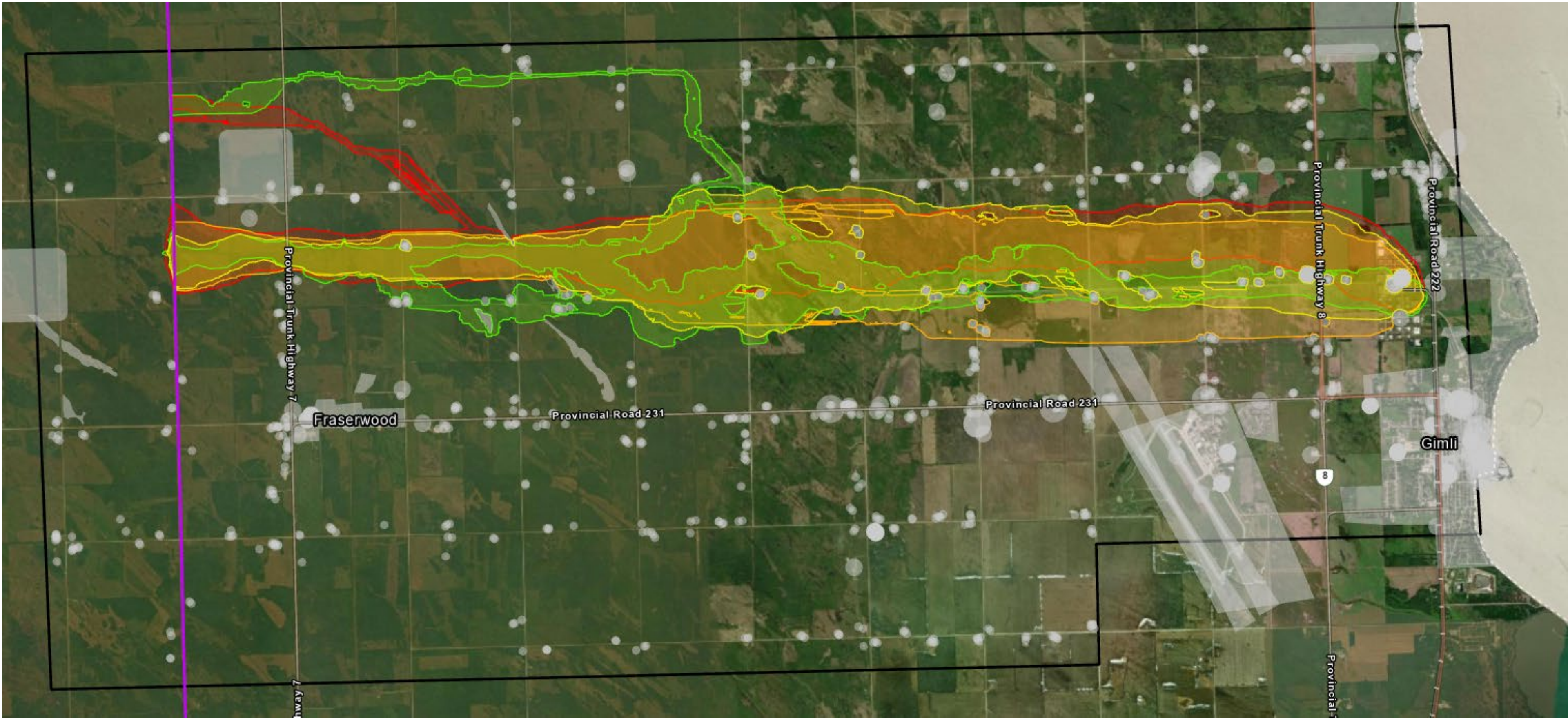
- Round 2 engagement

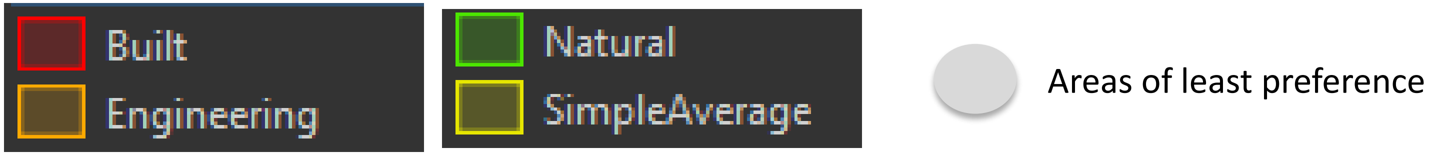
Manitoba Hydro

Route planning area

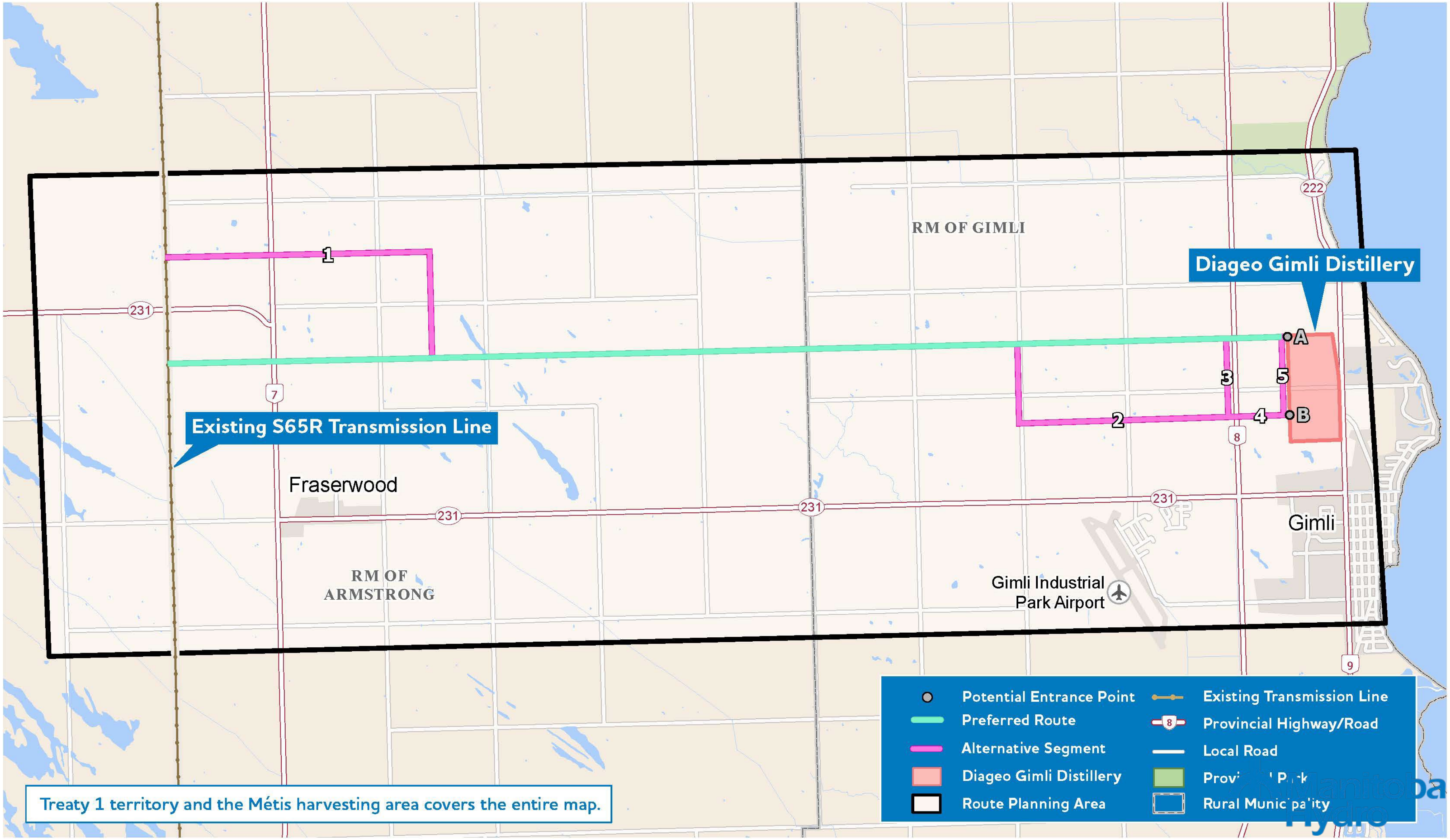


Alternative route corridors





Preferred and alternative routes



Schedule

Engagement process

January - May 2024

File environmental assessment report

Summer 2024

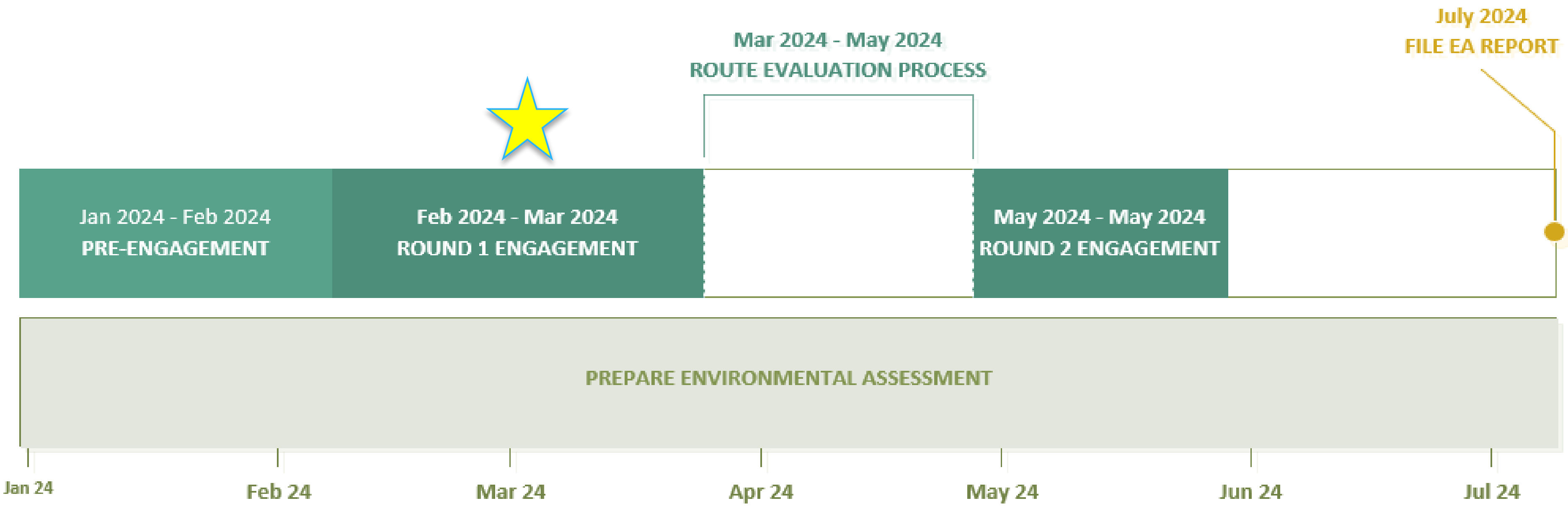
Regulatory review

2024 - 2025

Construction start, if regulatory approvals are received

Winter 2025/26

Engagement timelines*



* Subject to change

Manitoba Hydro

Rounds of engagement

Round 1 engagement

Feb – March 2024

- Introduce the project
- Present preferred route and alternative route segments
- Answer questions
- Identify and document concerns
- Use feedback to inform the route selection process

Round 2 engagement

May 2024

- Present findings from Round 1
- Present the route
- Answer questions
- Identify and document concerns
- Discuss potential effects and possible mitigation measures

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How we're engaging

- Mail-outs (postcards, letters)
- Radio advertisements
- Online survey
- Online map & feedback portal
- In-person open house
- Virtual information sessions

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Concerns we've heard so far

Disturbance to wetlands

Impacts to wildlife and habitat

Increase in access

Property values/ compensation

Impacts to aesthetics

Increase in erosion and herbicide use

Increase in noise

Thank you

For more project information visit:
www.hydro.mb.ca/silver-rosser-tap

Connect with us:

projects@hydro.mb.ca

1-877-343-1631

Manitoba Hydro

Thank you!

Questions?

Silver to Rosser tap transmission line

New transmission line

hydro.mb.ca/silver-rosser-tap

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Purpose of the open house

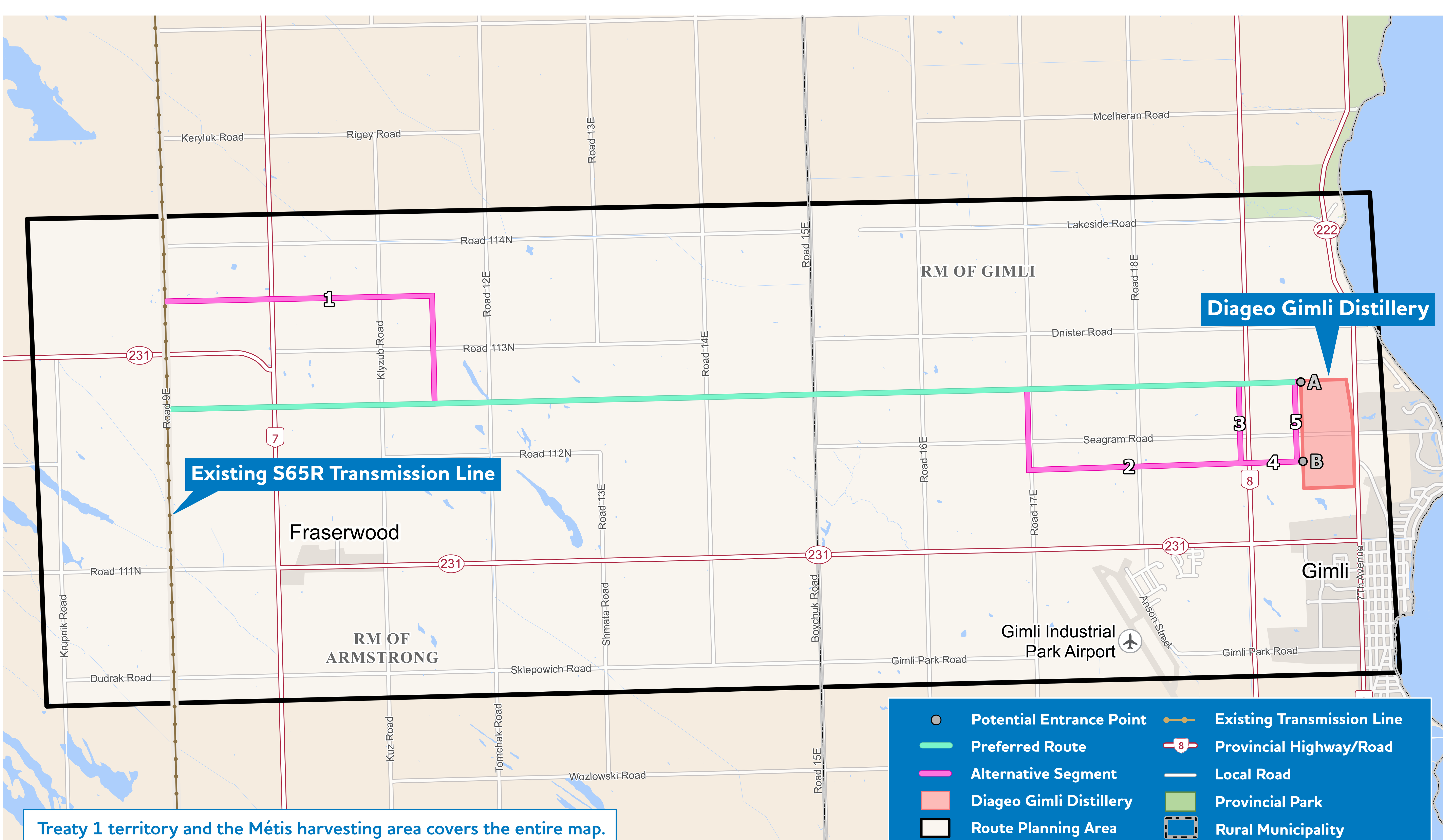
- Share information with you about the Silver to Rosser tap transmission line and environmental assessment process.
- Answer your questions about the line.
- Listen to your feedback.

What is the challenge we are trying to solve together?

- Manitoba Hydro needs to provide more hydroelectricity to the Diageo Gimli distillery to reduce natural gas usage to power its facility.
- To do so, we need a new 230kV transmission line to connect an existing transmission line (S65R) to Diageo Canada Inc.'s distillery facility in Gimli.
- We want to understand local concerns and interests to help us choose where to place the transmission line.

New transmission line

- The project will involve construction of a 230kV transmission line that will travel from the existing line (S65R) located west of Highway 7 near Fraserwood, Manitoba, to the Diageo Gimli distillery located north of Gimli.
- This project requires a Class 2 licence under *The Environment Act* (Manitoba).



Available in accessible formats upon request. To request accessible formats visit hydro.mb.ca/accessibility.

Transmission line routing and engagement process

1. Identify start and end points of line
2. Develop a Round 1 preferred route and alternative route segments
3. Round 1 engagement
    a. Present Round 1 preferred route and alternative route segments
    b. Answer questions
    c. Gather local knowledge and concerns to inform the preferred route selection process
4. Compare and analyze route options
5. Determine a Round 2 preferred route
6. Round 2 engagement
    a. Present the findings of Round 1
    b. Present the Round 2 preferred route
    c. Work to address outstanding concerns
    d. Discuss potential effects and possible mitigation measures
7. Determine final preferred route and submit environmental assessment report

What is an environmental assessment?

An environmental assessment is a multi-disciplinary evaluation of a project that examines what potential effects the project might have on the human and natural environment and how to minimize potential effects.

What is an Environment Act License?

- Under *The Environment Act* (Manitoba), Manitoba Hydro is required to submit an application for a Class 2 Licence to construct the project.
- To do this, Manitoba Hydro will prepare an Environment Act Proposal for Manitoba Environment and Climate Change, which will include an environmental assessment report.
- The Environmental Approvals Branch reviews the application and determines whether a licence will be approved.

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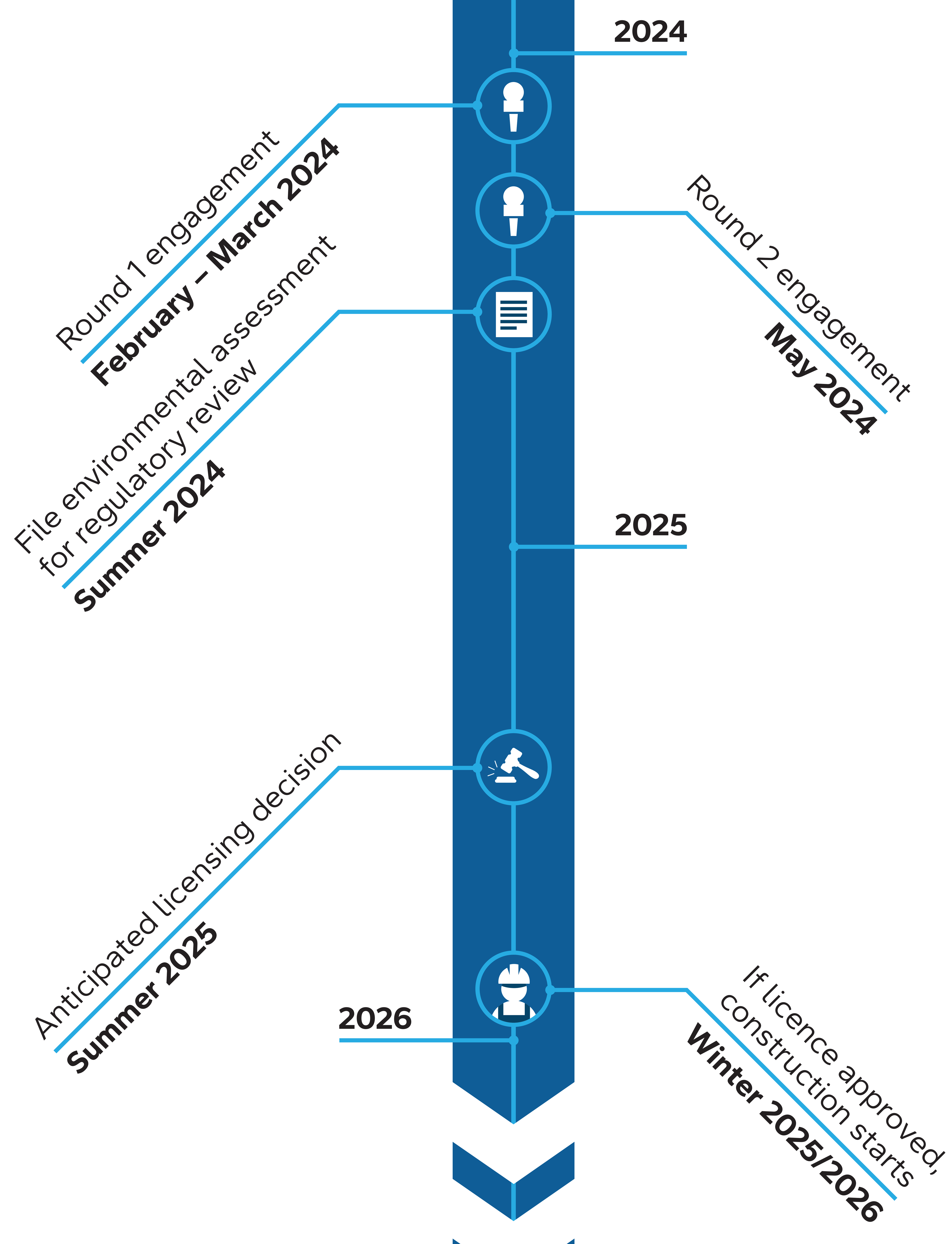
Schedule

Silver to Rosser Tap Transmission Line Project Timeline



Connect with us

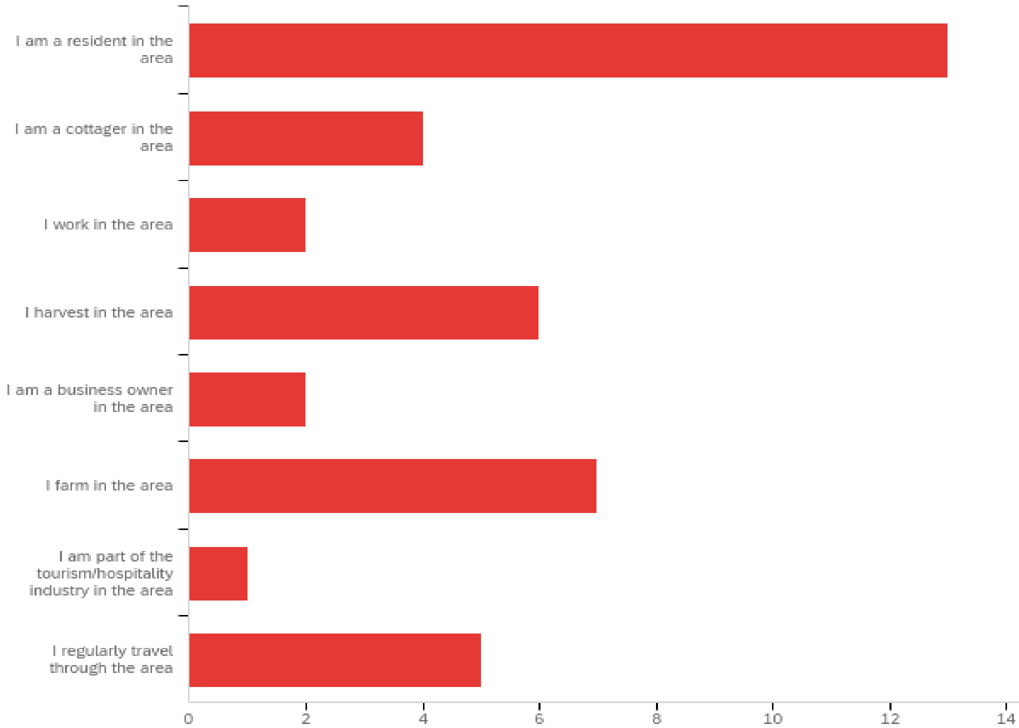
Our project team wants to hear from you.

Send your questions to **projects@hydro.mb.ca** or call **1-877-343-1631**

hydro.mb.ca/silver-rosser-tap

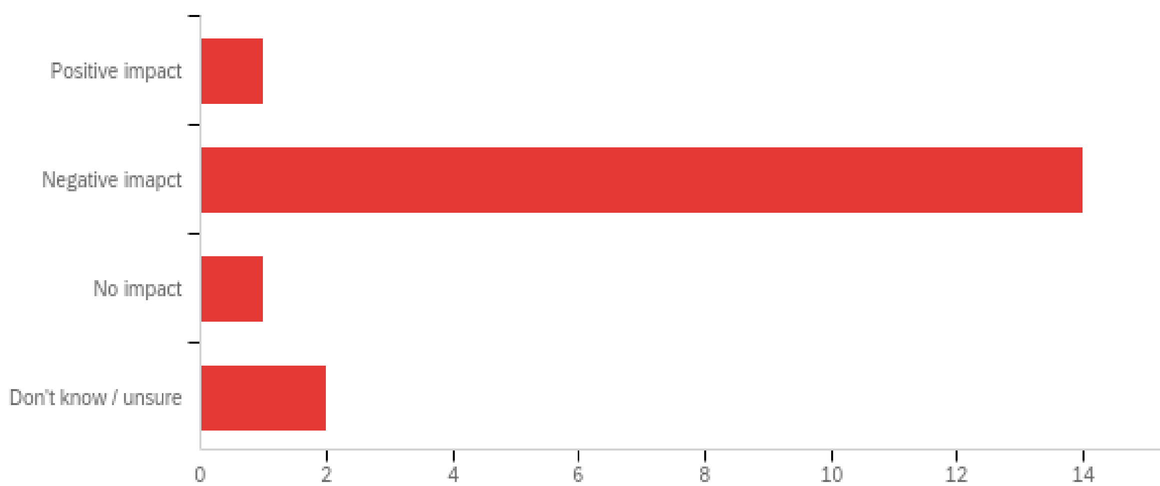
Silver to Rosser tap round 1 engagement survey results summary

Question 1: What is your connection to the project area*?



*Participants were able to select multiple options

Question 2: What type of impact do you think the project may have on you?



Positive impacts identified:

- Reductions to natural gas usage

Negative impacts identified:

- EMF effects on humans and the environment
- Loss of forest
- Disruptions to wildlife populations (e.g., deer, sandhill cranes)
    - Loss of habitat and increases in fragmentation
- Disruptions to farmland
- Noise during construction and maintenance
- Corona Effect (noise from a transmission line while in service).
- Loss of aesthetic value
- Disturbances to wetland habitat
- Concerns about using chemicals to control vegetation
- Impacts to drainage
- Increased likelihood of trespassing on private property
- Proliferation of invasive and nuisance species which creates a loss of biodiversity
- Limited use for recreational purposes on private property such as model rockets, kites, drones, model airplanes
- Impacts to property value

Suggestions to address the negative impacts:

- Explore other forms of electricity such as geothermal, renewable natural gas, H2 blending with natural gas, or solar panels.
- Consider using existing rights-of-way so less trees need to be cleared.
- Consider alternate routes to avoid disruptions to wildlife, homeowners, and farmers.
- Choose preferred route instead of alternative routes.
- Use alternative route 4 and 2
- Complete a public/private cost benefit analysis

Explanation of uncertainty:

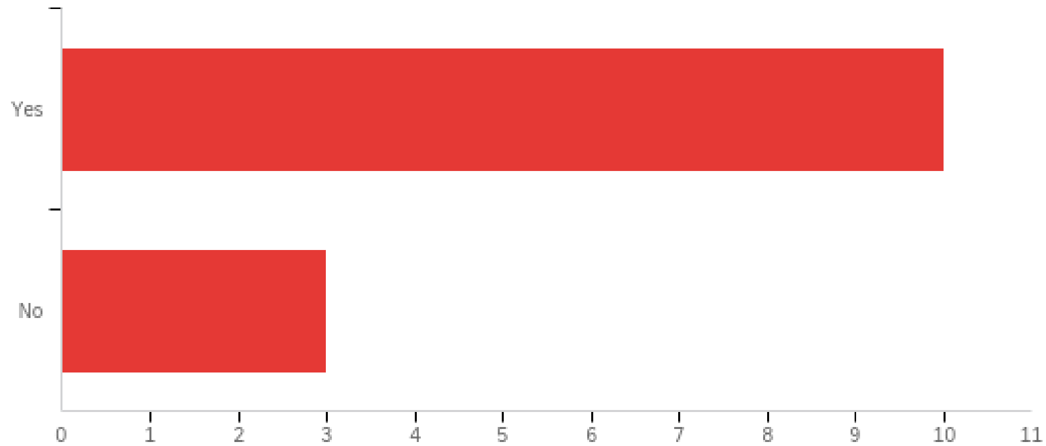
- Depends on where the line is placed.
- Questions around lowering property value, if machinery will be able to go under the line, how landowners will be compensated, construction activities, clean up after constructions activities, and revegetation.

Question 3: Which route (s) do you prefer and why?

- None
- The alternative route so the power lines are far away from the landowner's property.
- The alternative route because less destruction to existing homeowners and farming locations.
- The alternative route will have fewer negative effects on farmers in the area.
- The preferred route.
- Neither

- The preferred route.
- Alternate route 2 & 4.
- Neither. Manitoba Hydro should be considering alternative route options.

Question 4: Do you have concerns with the preferred route or alternative route segments?



Question 5: Which route (s) do you have concerns with and why?

- All routes.
- I am concerned with the preferred route since the power line would be beside my property and EMF is not good for the trees and living things nearby.
- All routes are problematic and disruptive to migratory birds, deer populations, farming and land/homeowners. Consider the installation of the line along a major roadway.
- All routes.
- The preferred route section from distillery property NW corner to PTH 8. Cuts through property and mature bush.
- All routes because of the impacts to landowners and the environment.
- All routes because of the intrusive nature of transmission line clearance to remove natural habitat for wildlife and migratory birds, clear dense treed areas and impact animal grazing and crop farming for a single company is alarming. The destruction of unaltered environments and properties so that a reduction (not even an elimination) will be realized is truly concerning given the significant investment that will be required.

Question 6: Do you have any other questions or concerns about the project?

Question / Concern	Manitoba Hydro Response
Will landowners receive compensation if the selected route goes through their property?	Compensation for future potential losses to landowners is built-in to the land easement. Once a preferred route is identified Manitoba Hydro will discuss compensation one-on-one with landowners.
I am concerned the route planning area will be increased.	The route planning area shown on the map is the maximum spatial extent Manitoba Hydro is considering for routing the transmission line.
Is this project strictly for switching energy types or do they plan a further expansion of the operation?	Manitoba Hydro is not aware of any further expansion of Diageo's operations.
Why have no other sources or tie in points to existing infrastructure been identified in the figure provided?	The routes shown on the map are the current feasible alternatives that Manitoba Hydro is considering. Participants can also propose alternative segments using the online mapping feedback portal or by drawing alternatives on a map. These route options will be considered through the same routing process as route options prepared by Manitoba Hydro.
Why has an existing right of way not been selected as the preferred route?	There are no existing rights-of-way that would be compatible for routing the transmission line. Manitoba Transportation and Infrastructure has a control zone around Highway 8, which limits future development in proximity to the highway. Also, the existing line running along Highway 8 is a 66kV sub-transmission line, which does not have adequate capacity for Diageo's operations. Moreover, the current study area was selected based on the need to balance infrastructure costs with impacts to the environment and surrounding community.
What is the total cost of the project and what benefits and agreements are in place between Diageo and Manitoba Hydro?	Manitoba Hydro does not currently have a publicly available estimate for the overall cost of the project. This is a customer-driven project, so Diageo is responsible for the material and labour costs associated with the project. Manitoba Hydro is responsible for the licensing, construction and maintenance of the transmission line. Within certain terms and conditions, and legislation set out in the *Manitoba Hydro Act*, Manitoba Hydro has a duty to serve all applicants of power within the province of Manitoba.
If the project is for a private company, why are landowners to bear the impacts?	Compensation for future potential losses to landowners is built-in to the land easement. Once

Question / Concern	Manitoba Hydro Response
	a preferred route is identified Manitoba Hydro will discuss compensation one-on-one with landowners.
How much profit does Manitoba Hydro anticipate over the lifecycle of the project?	Manitoba Hydro does not have a publicly available estimate for any profits that may be generated from this project. Within certain terms and conditions, and legislation set out in the *Manitoba Hydro Act,* Manitoba Hydro has a duty to serve all applicants of power within the province of Manitoba.
What is the carbon footprint for the life cycle of this project and how does it relate to the carbon emissions of the status quo?	Diageo provided Manitoba Hydro with details regarding the carbon footprint and that the project will reduce carbon emissions by 83% by July 2026 at Gimli, with the full elimination of carbon emissions by 2028 as well as create local and regional air quality benefits. This is equivalent to taking 7,441 cars off the road per year.
Is the project planned to support future development at Diageo?	Manitoba Hydro does not know of any information about future development at the Diageo Gimli distillery.
What options do landowners have to refuse an easement on their property?	Manitoba Hydro will make every effort to work with landowners to mitigate any project impacts on their property and will work to reach a mutually beneficial agreement through easements.
Who is conducting the Environmental Assessment?	Manitoba Hydro is preparing the environmental assessment using in-house expertise with support from consultants for heritage work and field surveys.
Will the project have a clean Environment Commission Hearing?	The Minister of Environment and Climate Change decides whether a public hearing will be held.
When and how will the transmission line be decommissioned?	The transmission line design would be built to have a 75-year lifespan but can be maintained for longer. Information regarding decommissioning will be included and assessed in the environmental assessment for the project.
What mitigation or habitat compensation does Manitoba Hydro provide for loss of habitat? How are migratory birds and species at risk habitat identified and protected?	Manitoba Hydro protects species at risk and critical habitats in accordance with provincial and federal legislations and guidelines. We will work to mitigate project effects on habitat by developing a project-specific environmental protection plan. Mitigation measures may include but are not limited to: • Trees containing large nests of sticks and areas where active animal dens or burrows are encountered within the right-

Question / Concern	Manitoba Hydro Response
	of-way will be left undisturbed until unoccupied. • Artificial structures for nesting may be provided if unoccupied nests must be removed. • Clearing activities will not be carried out during reduced risk timing windows for wildlife species without additional mitigation, such as bird nest sweeps. • To reduce the potential for collisions with wires following wire installation, bird diverters will be placed at designated environmentally sensitive sites.
What type of towers will be used?	Most towers will be "Gulfport" style, which is the same towers design as the existing S65R line.
What is the distance between the towers?	The approximate distance between the towers would be 250m. This would vary based on the final route, corners, crossings, terrain and other obstacles.
What is the width of the right of way that is cleared and maintained?	The width of the right of way would be 40 meters.
How does Manitoba Hydro protect property owners from trespassing due to right of way access?	Manitoba Hydro would work with property owners to identify any access concerns along the right-of-way and will identify appropriate access management, including fencing, signage, or other mitigation measures acceptable to the landowners.
What mitigation is provided for landowners for the loss of use and enjoyment of their property, lost opportunities for future use and development, etc.	Compensation for future potential losses to landowners is built-in to the land easement. Once a preferred route is identified Manitoba Hydro will discuss compensation one-on-one with landowners.

Silver to Rosser tap transmission line

Round 1 engagement summary - what we heard

Summary

The Silver to Rosser tap is a new proposed transmission line to connect an existing transmission line (S65R) to Diageo Canada Inc.'s distillery facility in Gimli. Earlier this year, we reached out to First Nations, the Manitoba Métis Federation, Rural Municipalities, property owners and interested parties to share information and seek feedback about the project.

Key engagement themes

Vegetation
- Clearance of trees, plants, wetland, medicines
- Use of herbicides for vegetation management

Wildlife & wildlife habitat
- Increase in invasive species
- Impacts to birds
- Removal of habitat through vegetation clearing

Property
- Perceived negative impacts to property values
- Restricts future development potential of property

Land & resource use
- Reduces ability to use property for recreational purposes
- Disruptions to agriculture and livestock
- Impacts to harvesting

Health & well-being
- Exposure to EMF and impacts on people and the environment
- Lack of benefits to communities

Access
- Changes in access through new right-of-way
- Trespassing on private property

Tranquility
- Noise during construction and operation/maintenance
- Impacts to aesthetics from presence of the line

Heritage
- Interest in conducting independent heritage studies
- Potential sites with heritage concerns

Engagement activities to date

Round 1 engagement on the routing options for the line from February to March 2024 and included:

- 2 virtual information sessions
- 6 meetings with local governments, First Nations and the Manitoba Métis Federation.
- In-person open house in Fraserwood.
- Online survey & feedback portal.

Environmental assessment underway

We are developing an environmental assessment report for the transmission line. We will be submitting this report to Manitoba Environment and Climate Change for approval before construction work on the transmission line can begin.

Silver to Rosser tap transmission project

Preferred route engagement on transmission line

We're planning a new 230-kV transmission line that will connect an existing transmission line (S65R) located west of Highway 7 near Fraserwood, Manitoba, to Diageo Canada's Inc.'s distillery facility in Gimli. This project will allow the Diageo Gimli distillery to reduce natural gas usage and use more hydroelectricity to power its facility.

Preferred route for Silver to Rosser tap

Round 1 engagement on the transmission line started on February 22, 2024, where we presented different routing options for feedback. Data gathering, on the ground fieldwork, technical and environmental considerations, as well as input from landowners, First Nations, the Manitoba Métis Federation, interested parties, and the public, helped inform the evaluation of each alternative route segment and selection of a preferred route. The preferred route aims to balance different interests, local concerns and limit the overall effects of the transmission line. The map on the next page shows the preferred route.

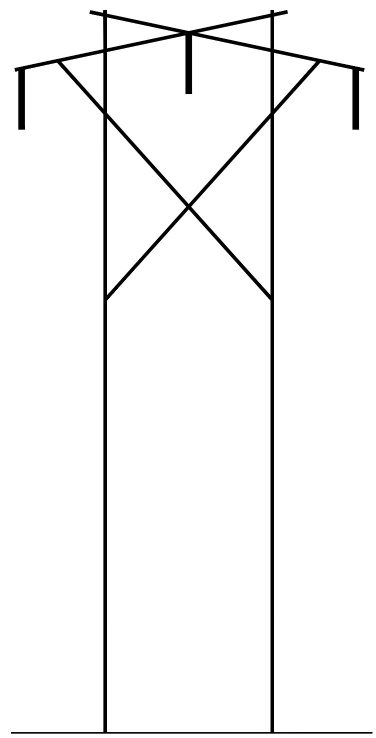
Read our **What we heard summary** at www.hydro.mb.ca/silver-rosser-tap to learn about the feedback collected in our engagement to-date and considered in the selection of the preferred route.

Tower design

Most of the transmission line will use Gulfport style towers.

Tower designs are not yet finalized. The preliminary design includes:

- A right-of-way width of 40 meters (130 feet).
- Tower spacing of approximately 250 meters (820 feet) apart on average.
- Towers typically ranging from 17 to 30 meters (55 to 100 feet) in height.



We want to hear from you on the preferred route

Our engagement on the preferred route 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.

Join us online on July 3, 2024, at 7:00 p.m. for an information session on Microsoft Teams.

To register, visit the project webpage at www.hydro.mb.ca/silver-rosser-tap. If you need assistance registering or would prefer sharing feedback through email or phone, please contact projects@hydro.mb.ca or 1-877-343-1631.

What's next?

Round 2 engagement on the preferred route will conclude on July 19, 2024, and any final refinements necessary will be made to the preferred route. The final preferred route for the Silver to Rosser tap transmission line will be presented in an environmental assessment report submitted to Manitoba Environment and Climate Change for regulatory review and approval before construction begins. We plan to submit the environmental assessment in summer 2024.

Part of the regulatory review process will include a public review period for local residents, First Nations, the Manitoba Métis Federation, interested parties, and the public to share their concerns and ask questions about the report. Manitoba Hydro will continue to share information as this process progresses.

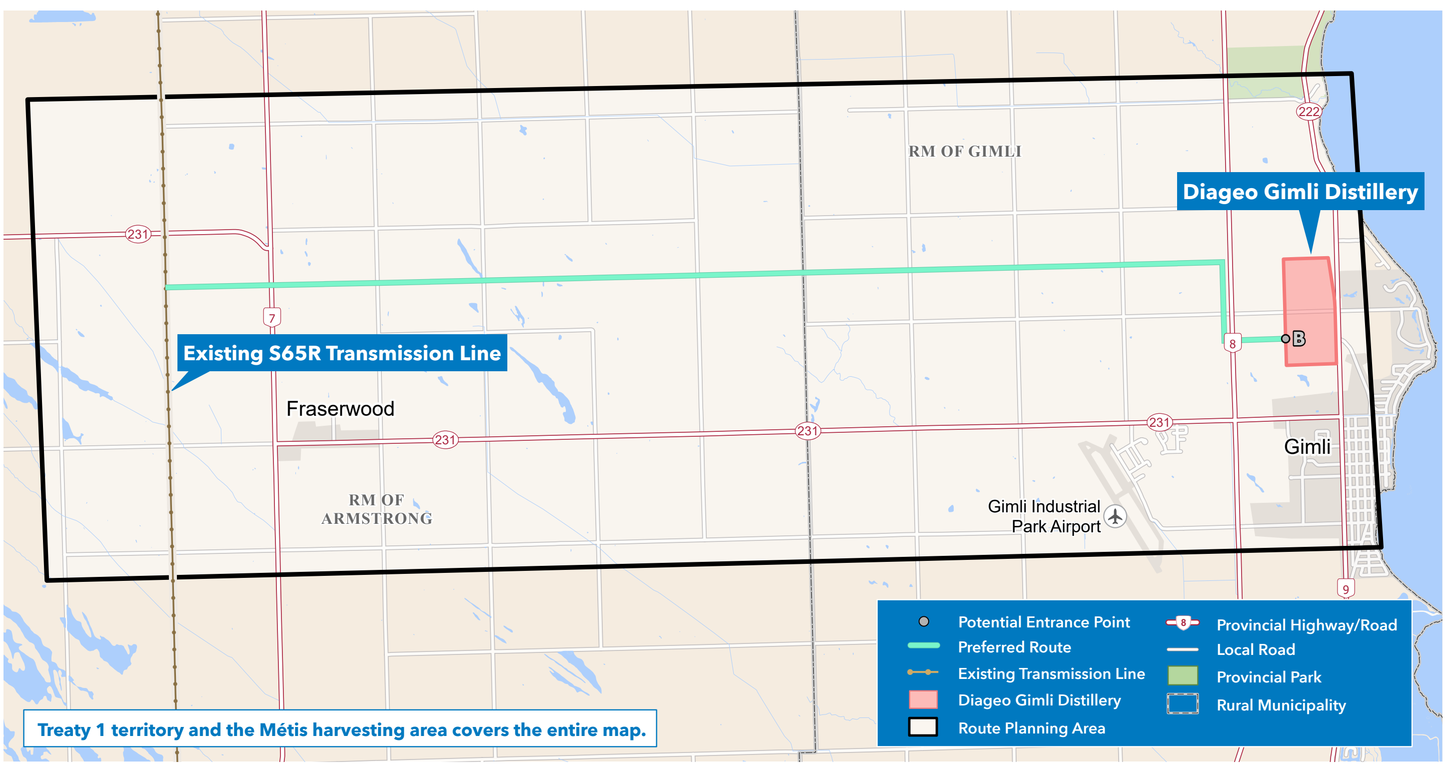
When will the work happen?

The tentative schedule (subject to change) is:

- **Round 1 engagement:** February – March 2024 (completed);
- **Round 2 engagement:** June – July 2024;
- **File environmental assessment report for regulatory review:** summer 2024;
- **Anticipated licensing decision:** fall 2025;
- **If license is approved, construction start:** winter 2025/26;
- **Target in-service date:** spring 2026.

Stay connected

Visit hydro.mb.ca/silver-rosser-tap to learn more and sign-up for updates. Send your questions to projects@hydro.mb.ca or call 1-877-343-1631.



June 2024

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Manitoba Hydro *energy for life*

Manitoba Hydro – Silver to Rosser tap transmission line

Round 2 engagement open house

Date: July 9, 2024

Location: Fraserwood Hall, Fraserwood MB

Time: 5:30-8:30pm

Manitoba Hydro staff: Geneva Cloutis, Megan Anger, Amy Stevenson, Karine Martel, Lindsay Thompson, David Block, Crystal Greenlay, Dan Schroeder

Category	Concern/comment/question	Manitoba Hydro response/mitigation
Access	Participants asked how Manitoba Hydro will control access along the right-of-way.	Access is common concern from landowners. Manitoba Hydro will meet one-on-one with impacted landowners to discuss their concerns and potential mitigation options. In the past, mitigation options have included signage, fencing, and/or other mutually agreed upon solutions to manage access.
Access	Participants asked if they would need a fence grounding study prior to building a fence, and if so, how long it would take.	More information would be needed on the specifics of the fence (such as height) in order to determine whether further studies would be needed.
Aesthetics	Participants shared concerns about the impact on their view, and that trees take a long time to grow.	Manitoba Hydro noted that planting trees on affected landowners properties can be discussed. Sometimes Manitoba Hydro will plant faster growing trees (poplars) with spruce.
Aesthetics	Participants shared concerns about visual impact from the presence of the line.	Manitoba Hydro shared that tower locations are not yet determined, but landowner feedback is considered and may influence where towers are placed. Manitoba Hydro can work with affected landowners to reduce visual impacts through tower spotting.
Aesthetics	A participant asked what the visual landscape of their property would be if the line were to be built.	Once a more detailed tower placement sketch can be prepared, Manitoba Hydro Property department will stake out the potential tower placement locations to give the landowner a better visual about how the project will fit on the landscape

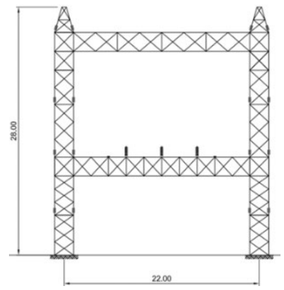
Category	Concern/comment/question	Manitoba Hydro response/mitigation
Aesthetics	Participants asked how far away you can still see the line.	The distance depends on the terrain and the tree cover.
Benefits	Participants asked what the benefits to landowners are if this is a customer driven project.	There are no direct benefits to landowners on this project.
Construction	Participants asked about the contracting timeline and strategies for the project.	The majority of construction activities will be completed by internal Manitoba Hydro crews. Some of the work will be contracted, but it will likely be done through existing service agreements and will likely not be put out for tender.
Compensation	Participants asked what affected landowners are entitled to for compensation.	Compensation will vary depend on the length of right-of-way located on each property. The compensation for the easement is based on 150% of fair market value of each individual property. For agricultural properties, compensation is also allocated based on the number of structures on the property.
Compensation	Participants asked why a house gets treated the same for compensation as an agricultural property.	Compensation is based on current land value, which considers land use and other features. Compensation includes the following components, where applicable: 1. Land compensation for the transmission line right-of-way based on 150% of market value; 2. Construction damage compensation for damages caused by construction, operation and maintenance of the transmission line; 3. Structure compensation for each tower structure located on land classified as agricultural; Ancillary damage compensation where Manitoba Hydro's use of the right-of-way directly or indirectly impacts the use of the property.
Compensation	Participants shared concerns that compensation is only provided one time, and felt that the payment would be as valuable as another trip to the grocery store	Manitoba Hydro acknowledged that there are project effects to landowners. The compensation process is intended to acknowledge and respond to those effects.

Category	Concern/comment/question	Manitoba Hydro response/mitigation
Compensation	Participants asked what the recourse is if landowners say no and do not sign easement agreements.	Manitoba Hydro shared that at this point in the project, we are looking to understand landowner concerns about the preferred route. The next steps include Manitoba Hydro's Property Department meeting with landowners to discuss and negotiate compensation intended to offset impacts to landowners. There are opportunities to provide concerns through the province's public comment period once the environmental assessment report is filed. If landowners are not in agreement or willing to negotiate, Manitoba Hydro may have to continue to look at options . There are many constraints and values that have been considered through the routing process with the goal of minimizing and balancing overall impacts of the project.
Compensation	Participants shared concerns about if there are property damages during the construction process.	Any property damage during construction will be repaired or compensated for.
Cost	A participant asked about the cost of an angle tower.	The estimate cost of an angle tower is approximately $250,000
Cost	Participants asked about the cost of the project.	The project cost is not publicly available.
Engagement	Participants shared they were concerned with the come and go format of the open house and were disappointed that Manitoba Hydro did not host a town hall. Participants noted they want to hear their neighbours concerns. Participants noted they also shared this feedback with the RM of Gimli.	Manitoba Hydro holds open houses because they allow participants to have one-on-one conversations with Manitoba Hydro staff to share their questions and concerns. A town hall typically leads to a few participants dominating the conversation while other participants leave with their questions and concerns unanswered and feeling uncomfortable or unheard. One of the benefits of an open house is that it provides the opportunity for participants to engage in two-way dialogue with a Manitoba Hydro representative. Additionally, an open house approach allows for participants to

Category	Concern/comment/question	Manitoba Hydro response/mitigation
		attend the session at a time that is most convenient for them rather than at a set time. Manitoba Hydro has attempted to create a safe space for individuals to participate in the engagement process through opting for the come-and-go open house format, which provides opportunity for one-on-one conversations as well as group discussions, and recognizes that different participants may have different preferences related to formats of engagement. Manitoba Hydro will also follow up with participants who provided their email addresses after the open house with a summary report of the feedback and concerns shared.
Engagement	Participants shared that their perspective is that the engagement format being undertaken is piecemeal and that participants don't know what their neighbors are saying or the status of the project.	Manitoba Hydro provided an update on the project's status. Following Round 1 engagement (i.e., the last landowner open house), Manitoba Hydro considered feedback shared in the routing process, including suggestions on alternative routes. The alternative route suggestions were not deemed feasible or practical, but certain engagement feedback was accommodated in the selection of the preferred route that Manitoba Hydro is engaging on in Round 2. Manitoba Hydro is currently preparing an environmental assessment report that will be submitted to the Province of Manitoba to seek an environmental licence for the project. The environmental assessment report takes a detailed look at all the different aspects of the environment that may be affected by the project. In response to a comment that participants probably won't be able to see the report, Manitoba Hydro shared that the environmental assessment report is made publicly available in full on the Province's

Category	Concern/comment/question	Manitoba Hydro response/mitigation
		Public Registry, where there will be a public comment period. Manitoba Hydro shared that affected landowners will be advised by letter when this report is filed and that the letter will contain a link to a copy of the report. In response to concerns that some landowners may not use the internet, Manitoba Hydro shared that requests for a hardcopy of the report can be accommodated.
Engagement	Participants shared concerns that some affected landowners are not aware of the project. Some participants shared that they only became aware of the project upon receipt of the Round 2 engagement letter.	Manitoba Hydro used a variety of communication methods to inform residents and landowners about the project, but it can be difficult to confirm receipt from every landowner. For letters, Manitoba Hydro relies on mailing information from land titles, which may not always reach all landowners. Other notification methods, including postcards and posters, were also used to notify residents in the area about the project.
Engagement	Perspective that nothing has changed as the result of participation in the Round 1 open house and that it seems that concerns are not being heard.	Manitoba Hydro shared some examples of ways the project has changed since Round 1 engagement. • During Round 1 engagement, Manitoba Hydro heard concerns about a stand of trees providing an eagle nesting area. The preferred route avoids having to clear in this area. A participant shared the perspective that it feels insulting that eagles were considered more than humans in routing decisions. Manitoba Hydro shared the eagle nesting area wasn't the only thing considered in this routing decision and that the preferred route minimizes the number of residences in close proximity. • Participants shared that the changes made did not accommodate their concerns because the route was still proposed on their property.

Category	Concern/comment/question	Manitoba Hydro response/mitigation
Engagement	Participants shared concerns with the project affecting many individuals for the benefit of an individual multi-million-dollar company, and that they do not believe there is any public benefit. Participants also shared concerns that it feels like the project is being forced upon affected landowners.	Manitoba Hydro noted this concern.
Harvesting	Participants shared that farmlands also provide hunting / harvesting grounds that are used to feed some families.	Manitoba Hydro noted this feedback. Impacts to harvesting are being considered and assessed in the environmental assessment report.
Human health risk	An adjacent landowner shared health and safety concerns about living near to a transmission line including concerns about EMF and noise.	Manitoba Hydro shared that the environmental assessment report includes a chapter assessing project effects on human health and committed to provide data and reports related to EMF by email.
Infrastructure and services	A participant asked if internet service could be affected by the project.	Evidence from previous projects suggests there are no impacts to internet service from transmission lines
Need	Participants asked why landowners are being inconvenienced for a single company.	Under the Manitoba Hydro Act, Manitoba Hydro is required to serve customers on a first come, first serve basis. This project is responding to that customer request to electrify its operations.
Project details	A participant asked how tall the towers are in comparison to most distribution towers.	The towers for the S65R tap will range from 17 to 30m tall.
Project details	A participant asked about if there were any comparable towers in the area for reference.	The existing Silver to Rosser line is located 1 mile west from Highway 7. The proposed S65R tap line will use a similar tower design.
Project details	A participant asked about the structure type being used at the location of the tap off of the S65R line and how much land it would take up.	The tap structure is a steel lattice square with a cross section that looks like this:

Category	Concern/comment/question	Manitoba Hydro response/mitigation
		 The approximate footprint of the structure will be 26m x 24m.
Property	Participants shared concerns about effects to property value resulting from the presence of the transmission line. Participants shared the perspectives that, with all other things equal, purchasers would choose to buy a property without a transmission line over one without.	Manitoba Hydro shared that there is no proof in southern Manitoba that property values are affected by transmission lines.
Property	Participants shared concerns that future plans to develop private properties traversed by the project will be derailed.	Manitoba Hydro typically does not restrict development on private property, with the exception of the 40m right-of-way.
Routing	A participant asked why the project could not be routed down the highway.	Manitoba Hydro shared that the reason the preferred route does not parallel the highway is that there are many homes located along nearby roads and they would be close enough that Manitoba Hydro would have to buy out those homes. The preferred route passes by the fewest number of homes between the start point and end point. Highway 8 was also investigated, but Manitoba Transportation and Infrastructure has a control zone around Highway 8, which limits future development in proximity to the highway.
Routing	Participants asked how involved Diageo has been in deciding where the route is located.	Manitoba Hydro shared that Diageo guided the selection of the termination point (i.e., where the transmission line will enter Diageo's property).
Routing	Participants asked why the Fish Lake drain was not used for routing the transmission line.	Manitoba Hydro shared that the option was analyzed following the Round 1 open house. Routing along the drain would still require a similar

Category	Concern/comment/question	Manitoba Hydro response/mitigation
		area of new right-of-way width given that the transmission line could not be routed right on the drain, would add length, and affect more landowners. It was, therefore, not considered a reasonable alternative as it would be shifting the affect to more landowners and have a larger overall impact.
Vegetation	Participants shared an interest in knowing what will happen with timber.	Generally, the timber resulting from clearing is mulched, however if there is salvageable timber it can be stacked for the landowner's use if this interest is communicated with Manitoba Hydro
Vegetation	Participants shared concerns with ongoing access to the land by Manitoba Hydro and that pesticides would be applied liberally to maintain the right-of-way.	Manitoba Hydro shared that maintenance of the right-of-way is still up to the landowner.
Vegetation	Participants asked what happens with the trees that are cleared for the right-of-way, and noted that when Silver to Rosser was built, the trees were piled but then left to rot.	The trees are typically mulched but it depends on the contractor. There may be an opportunity for merchantable timber to be left for landowners.
Other	A participant shared that they have permission to build a ditch on their property. The ditch will help get water from the field to the road ditch.	Manitoba Hydro noted this feedback.
Other	A participant asked if the slime from Diageo conducts electricity.	At this time, Manitoba Hydro is not aware of the black fungus (*Baudoinia compniacensis*) near the distillery facility having conductive properties.

Follow up	Status
A participant requested resources/evidence on human health risk and EMF.	Complete – shared via email with participant on July 29.
A participant wanted a copy of the summary report from the Round 1 open house	Complete – shared via email with participant on July 10
A participant wanted details about contracting strategy and timelines as they were interested in clearing.	Complete – shared via email with participant July 29.

Silver to Rosser tap transmission project

Nation

Round 2 presentation

Date

Manitoba Hydro

To request accessible formats visit hydro.mb.ca/accessibility.

Meeting outline

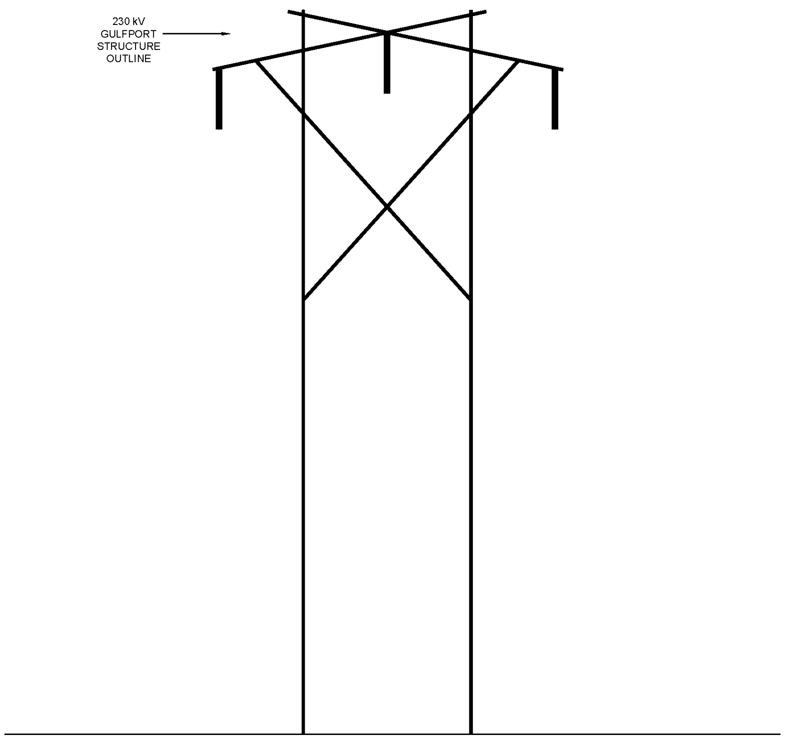
- Project overview
- Engagement to-date & what we have heard so far
- Discuss the preferred route
- Schedule and next steps
- Questions, discussion and feedback

About the project

- Proposed 230-kV transmission line located north of Gimli to supply Diageo Canada Inc.'s distillery facility with hydroelectricity
- Line will tap into an existing 230kV line (S65R)
- Class 2 development under the *Environment Act* (Manitoba)

Manitoba Hydro

Project details



- Right-of-way width: 40m
- Tower spacing: ~250 meters
- Tower height: 17 – 30 meters
- Mostly Gulfport style structures

Why is this project needed?

This project is customer driven and will allow the Diageo Gimli distillery the ability to reduce natural gas usage and use more hydroelectricity to power its facility. This project supports Diageo's goal to become carbon neutral by 2030.

Engagement activities to date

- 3 Virtual information sessions
- 2 open houses in Fraserwood
- Meetings with rural municipalities, landowners, and First Nations and the Manitoba Métis Federation
- Field tour with RMs and Indigenous Nations
- Routing workshop with RMs and Indigenous Nations
- Online survey
- Interactive map & feedback portal
- Email and phone communications

Concerns we have heard so far

Vegetation

Impacts to wildlife and habitat

Property values/ compensation

Land and resource use

Health & well-being

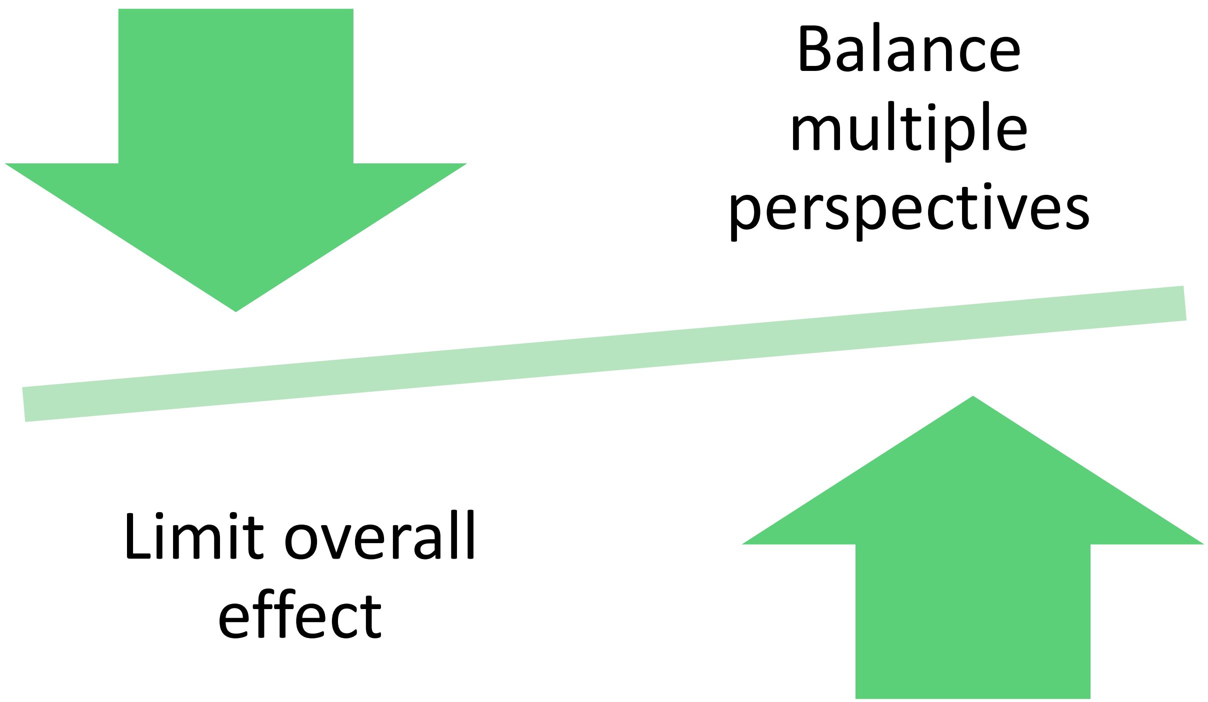
Increase in access

Tranquility & Increase in noise

Heritage Concerns

Manitoba Hydro

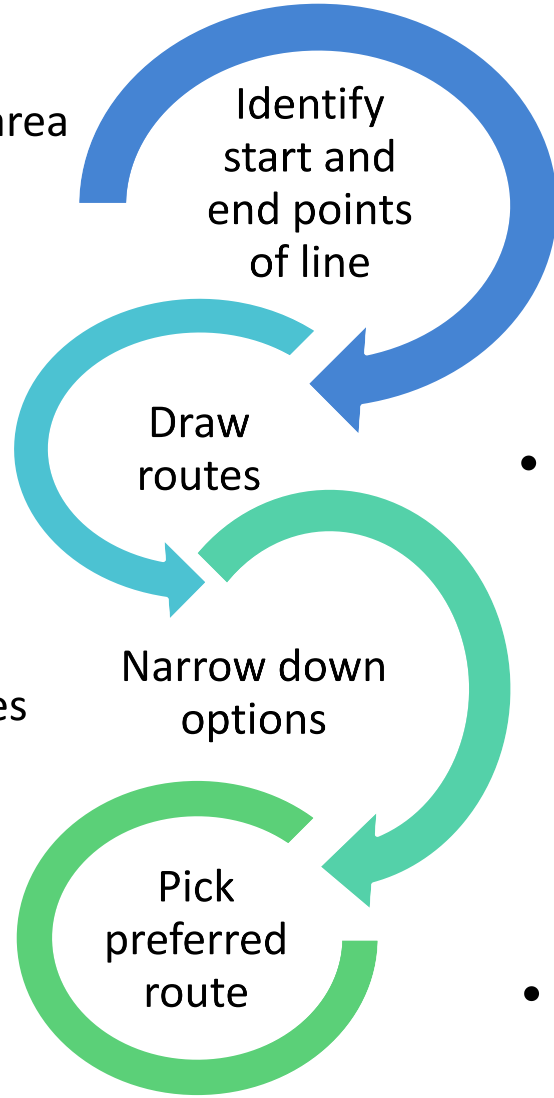
Goals of transmission line routing



Manitoba Hydro

Transmission line routing and engagement process

- Draw study area



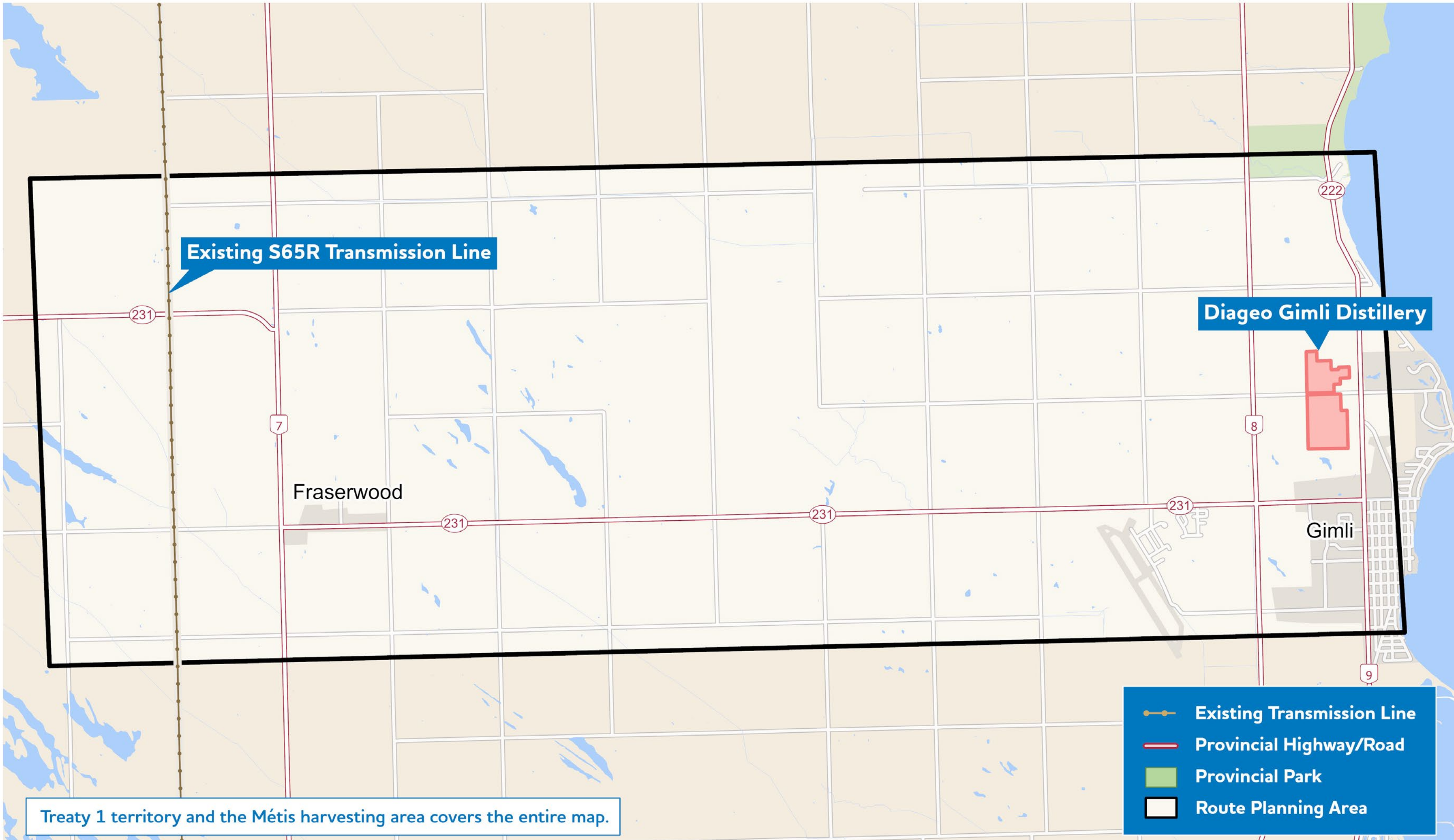
- Round 1 engagement

- Compare and evaluate routes

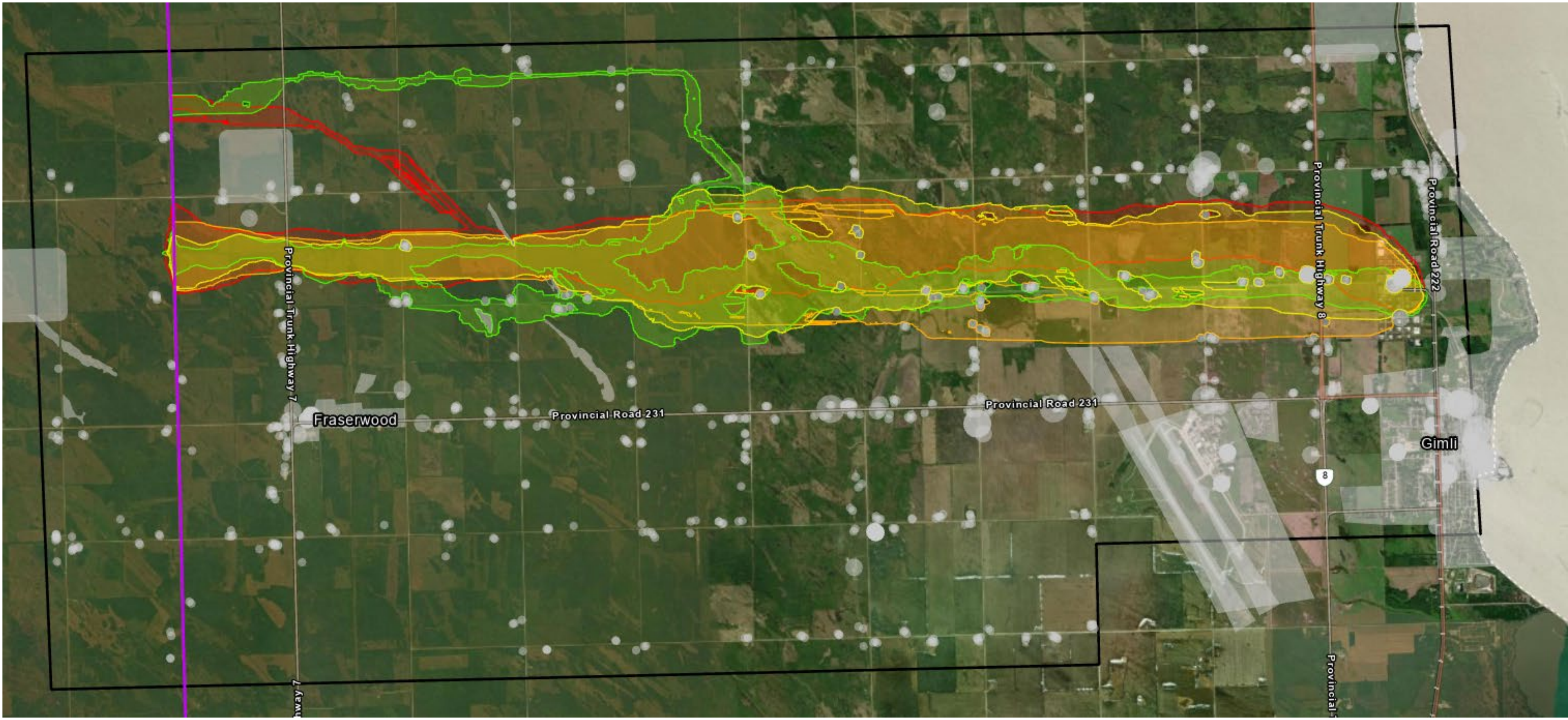
- Round 2 engagement

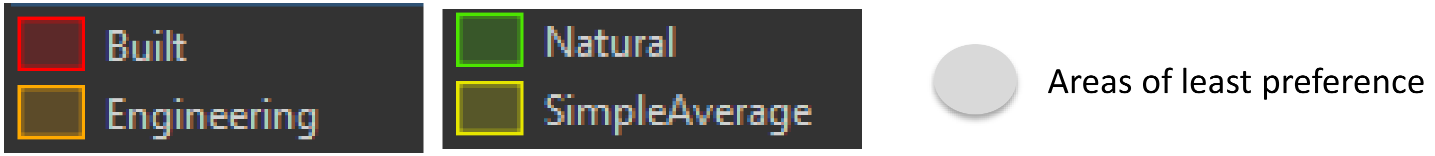
Manitoba Hydro

Route planning area

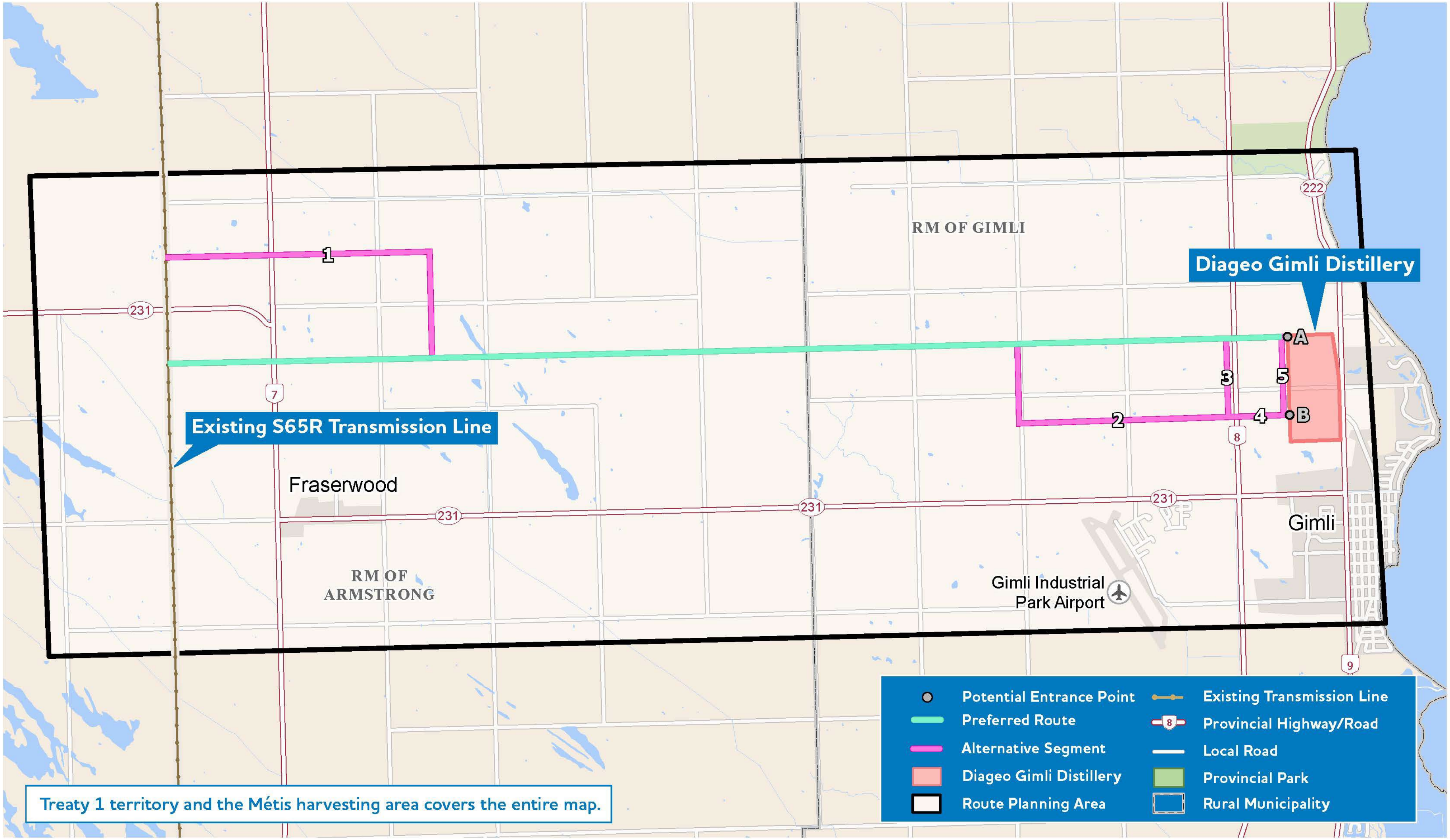


Alternative route corridors

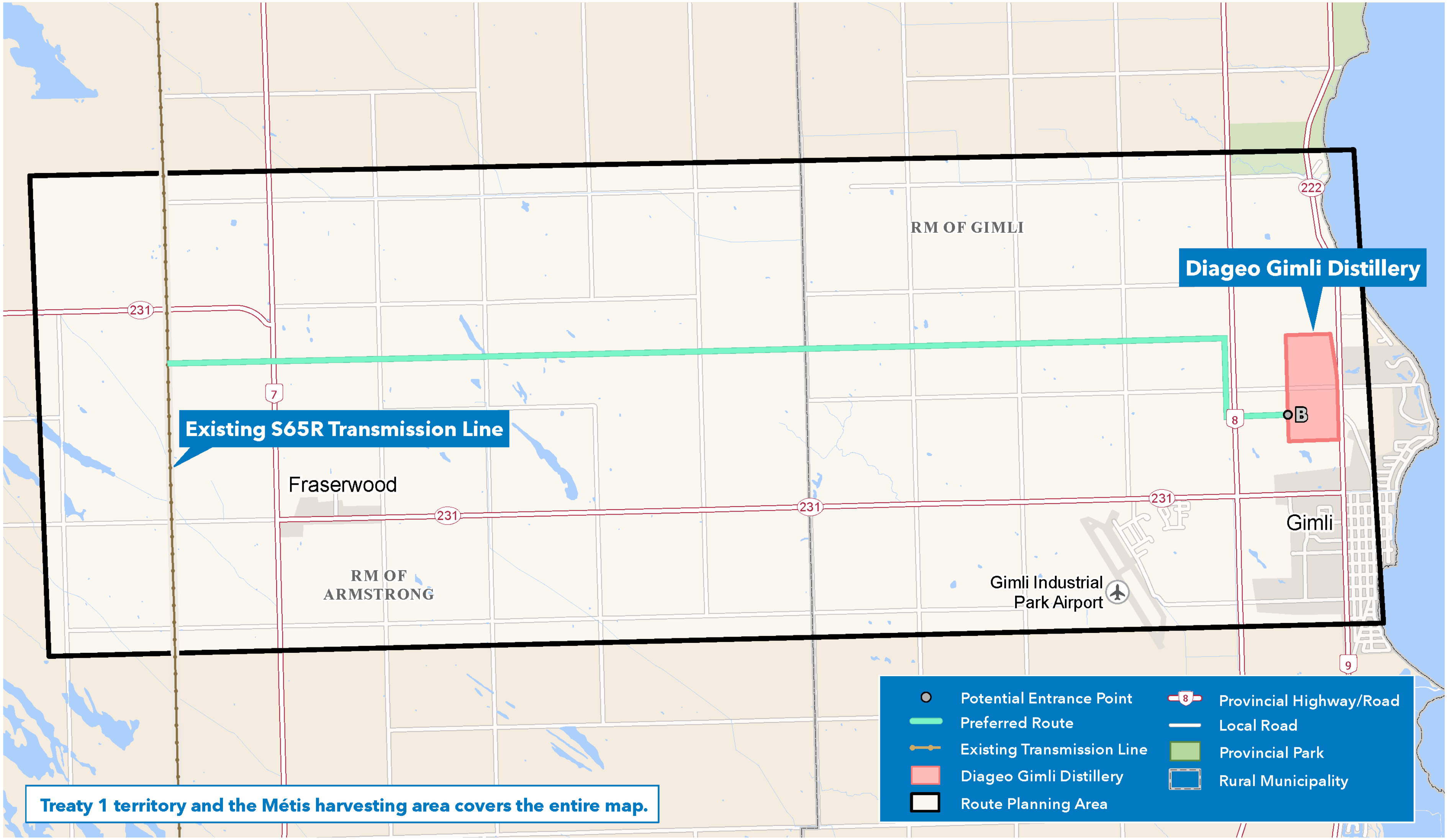




Preferred and alternative routes



The preferred route



How do we consider routing feedback?

We sometimes hear opposing preferences

Concerns shared through engagement are considered alongside other routing criteria

First Nations, the Manitoba Métis Federation, and the RM of Gimli participated in a routing workshop to help inform the preferred route selection

We consider the "mitigatability" of concerns and if/how we can address those concerns

The preferred route aims to limit overall effects

Manitoba Hydro

Schedule

Engagement process

Regulatory review

Summer 2024

Winter 2025/26

January –July 2024

2024 - 2025

File environmental assessment report

Construction start, if regulatory approvals are received

Rounds of engagement

Round 1 engagement

Feb – March 2024

- Introduce the project
- Present preferred route and alternative route segments
- Answer questions
- Identify and document concerns
- Use feedback to inform the route selection process

Round 2 engagement

June - July 2024

- Present findings from Round 1
- Present the route
- Answer questions
- Identify and document concerns
- Discuss potential effects and possible mitigation measures

Preferred route engagement

- Collecting feedback about the preferred route until July 19, 2024
- Preferred route engagement will:
  - Help refine the design and final preferred route of the transmission line
  - Work to address concerns
  - Inform mitigation measures and the environmental assessment
- Meetings with leadership and/or community members and supporting community-specific engagement activities to collect feedback

Manitoba Hydro

Looking ahead

Engagement on preferred route: until July 19

Preparing environmental assessment (EA)

Employment & training discussions – cont'

Thank you!

Questions?

Appendix C: Vegetation technical report

Memorandum

May 12, 2024

Subject: Silver to Rosser Tap Transmission Line

To: Jonathan Wiens
Manitoba Hydro

From: Kevin Szwaluk
Szwaluk Environmental Consulting Ltd.

Hello Jonathan,

As per your email on April 18, 2024 regarding updates to the schedule of the Silver to Rosser Tap Transmission Line, I have provided the "literature review" portion of the report as follows:

- Compile existing ecological and vegetation information, literature, and data (species of conservation concern) for the study area;
- Describe the vegetation communities along the preferred route and study area;
- Describe any rare plants or traditional use plants that may occur

A field reconnaissance was conducted for the project on May 1, 2024. The purpose of the reconnaissance was to drive the preferred route and alternative segments where it intersected roadways in the study area. Although, the vegetation types in the study area could not be described in detail due to timing of the field reconnaissance (early season), it provided an opportunity to view the existing vegetation types along the preferred route and alternative segments, and an opportunity to capture photographs in the study area. All field visits were conducted roadside, with no properties accessed.

The reconnaissance began at the existing line (S65R) located west of Highway 7 near Fraserwood, and mile roads were followed east to the Diageo Canada Inc. distillery facility located north of Gimli. Sixteen sites were visited.

The study area (local assessment area) consists of both agricultural and broadleaf forest that dominate the landscape. The agricultural land is a mixture of cultivated and pasture or rangeland. The pastures consist of mixed grasses and herbaceous vegetation, with sporadic shrub cover (Photograph 1). Some pastures exist with little to no shrub cover. Shelterbelts or windbreaks between agricultural fields are composed of mixed deciduous tree species (Photograph 2).

The forested areas consist dominantly of trembling aspen (*Populus tremuloides*) with varying amounts of tall shrub cover (Photograph 3). Willows (*Salix* spp.) and red-osier dogwood (*Cornus sericea*) are common shrubs occupying the forest edges. Mixed stands of trembling aspen with lesser amounts of white spruce (*Picea glauca*) are also present (Photograph 4 and 5). Bur oak (*Quercus macrocarpa*) is uncommon in the study area.

The study area overlaps Camp Morton Provincial Park. Mature forest cover here consists of white spruce, green ash (*Fraxinus pennsylvanica*), bur oak, Manitoba maple (*Acer negundo*), paper birch (*Betula papyrifera*), aspen and balsam poplar (*Populus balsamifera*) (Manitoba Government 2014). Plantations of Walker poplar (*Populus x Walker*) can also be found in the park.

Few wetlands were seen in the study area. These wetlands are classified as marshes and are dominated by tall grasses, cattails (*Typha* sp.) and other emergent reeds and bulrushes (Photograph 6). Marshes are surrounded by cultivated fields and or aspen stands, occasionally with little open water present.

A list of the field reconnaissance sites visited is provided in Table 1. No species of conservation concern or species at risk listed under the *Endangered Species and Ecosystems Act* of Manitoba (ESEA), the *Species at Risk Act* (SARA), or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) were observed during the roadside surveys. A pre-construction survey will occur later in the growing season to describe the vegetation in the study area.

Table 1. Field reconnaissance sites visited.

Sites Visited	**UTM Zone**	**Easting**	**Northing**
SRT-01	14U	623657	5613723
SRT-02	14U	625309	5613765
SRT-03	14U	626899	5613786
SRT-04	14U	628565	5613832
SRT-05	14U	631832	5613932
SRT-07	14U	635149	5613995
SRT-08	14U	636779	5614031
SRT-09	14U	638423	5614084
SRT-10	14U	640037	5614140
SRT-11	14U	640884	5613353
SRT-12	14U	639945	5613325
SRT-14	14U	636826	5612784
SRT-15	14U	627736	5614658
SRT-16	14U	626864	5615438
SRT-18	14U	623625	5615334
SRT-24	14U	630426	5614706

Photograph 1. Pasture land along the preferred route with a stand of trembling aspen to the left.

Photograph 2. Deciduous shelterbelt or windbreak occurring along the preferred route, between agricultural fields.

Photograph 3. Trembling aspen stand occurring along the preferred route.

Photograph 4. Mixed stand of trembling aspen with lesser amounts of white spruce in background, at preferred route tap location (S65R).

Photograph 5. Mixed stand of trembling aspen with white spruce and sparse bur oak.

Photograph 6. Marsh wetland in the local assessment area.

Literature Review

Ecological Land Classification

The proposed project lies within Manitoba Lowlands Section of the Boreal Forest Region (Rowe 1959). This low, level basin of south-central Manitoba is bound by the Cretaceous escarpment to the west, and on the north and east by rock outcrop of the Precambrian Shield. Southward, the Manitoba Lowlands borders the Aspen-Oak Section.

Within the Boreal Plains Ecozone, the project is located in the Interlake Plain Ecoregion (Smith et al. 1998), and more specifically, the Ashern and Gimli Ecodistricts. Table 2 shows the area of land that each ecodistrict occupies.

Table 2. Ecodistrict area (ha) and percent (%) coverage of the study area, within the Interlake Plain Ecoregion.

Ecodistrict	RAA (15 km buffer)		LAA (1 km buffer)		PDA (40 m buffer)	
	Ha	%	Ha	%	Ha	%
Ashern	79,305.4	65.0	3,365.9	90.0	129.5	94.1
Gimli	42,766.8	35.0	337.2	9.0	8.1	5.9
Total	122,072.2	100	3,743.0	100	137.7	100

Note: Regional assessment area (RAA), Local assessment area (LAA), and Project development area (PDA).

The regional landscape of the ecoregion is characterized as a level to ridged lake terrace complex, underlain by low relief, flat-lying Palaeozoic limestone rock. The water worked till has been smoothed over by thin, discontinuous veneers of sandy to clayey glaciolacustrine sediments as well as sandy to gravelly beach materials and boulder deposits. Soils are predominantly well to imperfectly drained Dark Gray Chernozems, with significant inclusions of well to imperfectly drained Black Chernozemic soils. Also present are Eutric Brunisols, shallow Gray Luvisols and Humic Gleysols, and Organic Mesisols occurring in peatlands.

The climate of the Interlake Plain Ecoregion consists of long, cold winters and short, warm summers. The mean annual precipitation ranges from slightly less than 500 to about 525 mm. The average growing season varies from 173 to 184 days.

The Interlake Plain is comprised of varying quality of closed-canopied trembling aspen (*Populus tremuloides*) with lesser amounts of balsam poplar (*Populus balsamifera*), tall shrubs and various herbs in the understory. The extreme calcareous soils often result in poor tree growth. White spruce (*Picea glauca*) and balsam fir (*Abies balsamea*) are climax species which exhibit moderate to good growth in the ecoregion. Also occurring is jack pine (*Pinus banksiana*), on dry sandy sites, while poorly drained sites support black spruce (*Picea mariana*) and tamarack (*Larix laricina*) tree growth.

One of the largest and most intact tracts of natural ecosystems within southern Manitoba occurs in the Interlake Natural Area (Becker and Hamel 2017). This area is located in a region comprised of woodlands, wetlands, lakeshores, karst features, and native prairie. The Interlake encompasses only one of two tall grass prairie remnants in Manitoba and the northernmost extent of tall grass prairie in North America (Becker and Hamel 2017). Grassland ecosystems once existed over large areas across North America (Sampson and Knopf 1994), however few undisturbed natural areas remain today, as losses to grasslands have exceeded those of other major biomes (Hoekstra et al. 2005).

Land Cover Classification

Within the regional assessment area, 12 land/land use cover classes are identified from the Manitoba Land Cover Classification. Table 3 shows the broad land/land use cover types determined for each of the assessment areas. These classes include native vegetation of coniferous and deciduous forest, mixed forest, marsh and fen wetland, and range and grassland. The water class includes lakes, rivers and streams. Agricultural cropland, cultural features, roads and rail lines and exposed land are also identified.

Range and grassland represent the dominant land cover, with 1,337 ha (35.7%) within the local assessment area. Deciduous forest occupies 1,061 ha (28.4%) with an additional 305.8 ha (8.2%) land cover from coniferous, mixedwood and open deciduous forest. Forest cover occupying and surrounding the study area lies within the Interlake Forest Section and Forest Management Unit 42 as defined by the Manitoba Forest Inventory classification system (EIPD 2023). Agricultural cropland makes up 514.4 ha (13.7%), while agricultural forage crops occupy 323 ha (8.6%) of the local assessment area.

Table 3. Land use/land cover class area (ha) and percent (%) coverage in the study area.

Land Use/ Land Cover Class	RAA (15 km buffer)		LAA (1 km buffer)		PDA (40 m buffer)	
	Ha	%	Ha	%	Ha	%
Agricultural Cropland	7,411.1	6.1	514.4	13.7	12.1	8.8
Bare Rock, Sand and Gravel	287.9	0.2	10.8	0.3	0	0
Coniferous Forest	395.3	0.3	17.4	0.5	1.4	1.0
Cultural Features	708.2	0.6	26.5	0.7	0	0
Deciduous Forest	25,152.5	20.6	1,061.4	28.4	49.9	36.2
Forage Crops	5,470.3	4.5	323.0	8.6	7.9	5.7
Marsh and Fens	7,261.0	5.9	8.3	0.2	0.6	0.4
Mixedwood Forest	6,500.5	5.4	132.8	3.5	1.3	0.9
Open Deciduous Forest	1,592.7	1.3	155.6	4.2	11.5	8.4
Range and Grassland	31,819.1	26.1	1,337.0	35.7	50.3	36.5
Roads, Trails and Rail Lines	2,649.8	2.2	156.0	4.2	2.6	1.9
Water	32,823.9	26.9	0	0	0	0
Total	122,072.2	100	3,743.0	100	137.7	100

Note: Regional assessment area (RAA), Local assessment area (LAA), and Project development area (PDA).

Species of Conservation Concern

According to provincial sources, there are 132 plant species of conservation concern that can be expected to range within the Interlake Plain Ecoregion (Manitoba Government 2024a). Currently, there are 11 species listed at risk in the ecoregion, with either the *Endangered Species and Ecosystems Act* of Manitoba (ESEA), the *Species at Risk Act* (SARA) or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), see Table 4. According to Becker and Hamel (2017), the Interlake Natural Area is known to support several species of conservation concern, species at risk, as well as karst features supporting globally important rare alvar habitats, valued for their unique ecological and topographic features. Endangered tall grass prairie is also known to occur in the Interlake Natural Area.

Table 4. 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
Cypripedium candidum	Small White Lady's-slipper	Endangered	Threatened	Threatened
Fraxinus nigra	Black Ash	-	-	Threatened
Pellaea gastonyi	Gastony's Cliffbrake	Endangered	-	-
Platanthera praeclara	Western Prairie Fringed Orchid	Endangered	Endangered	Endangered
Solidago riddellii	Riddell's Goldenrod	Threatened	Special Concern	Special Concern
Spiranthes magnicamporum	Great Plains Ladies'-tresses	Endangered	-	-
Symphyotrichum sericeum	Western Silvery Aster	Threatened	Threatened	Threatened
Teloschistes chrysophthalmus	Golden-eye Lichen	-	Special Concern	Special Concern
Veronicastrum virginicum	Culver's-root	Threatened	-	-

Based on provincial records (Manitoba Conservation Data Centre), one species of conservation concern was known to occur within the study area. Southern milkvetch (*Astragalus australis*) is ranked Critically Imperilled to Imperilled (S1S2). Four plant species of conservation concern are known to occur within a 5 km radius of the study area. These include hairy bugseed (*Corispermum villosum,* S1S2) and southern milkvetch, spikenard (*Aralia racemosa*) ranked Imperilled (S2), and ram's-head lady's-slipper (*Cypripedium arietinum*) ranked Imperilled to vulnerable (S2S3), see Table 5. Spikenard has been previously identified in Camp Morton Provincial Park (Manitoba Government 2014).

Table 5. Plant species of conservation concern occurring within the study area and within a 5 km radius around the study area.		
Scientific Name	**Common Name**	**MBCDC Rank**
Study Area		
Astragalus australis	Southern Milkvetch	S1S2
5 km radius around the Study Area		
Aralia racemosa	Spikenard	S2
Astragalus australis	Southern Milkvetch	S1S2
Corispermum villosum	Hairy Bugseed	S1S2
Cypripedium arietinum	Ram's-head lady's-slipper	S2S3

Invasive Species

Invasive species have been previously recorded in this region and have been a major concern. Red bartsia (*Odontites vernus*) is an agricultural and roadside invader that was accidentally introduced to the Gimli area in the 1950's (Rural Municipality of St. Clement's 2019). The Noxious Weeds Regulation list red bartsia as Tier 1 (Manitoba Government 2024b). While being a challenge to detect its presence due to its small size (15 to 30 cm), the reddish to purple flower clusters that form in late spring are the plants main identifier. The economic impact of red bartsia introduction in the Gimli area has been a concern for the Interlake Weed Control District. Although plant control measures were established in the late 1960's, a truly effective program was not initiated until 1999. By that time, red bartsia had already infested much of the Interlake region.

The Interlake Natural Area has identified non-native and invasive plant species as a threat to viability of the natural area conservation plan, and has identified strategies for species control such as monitoring and mitigation (Becker and Hamel 2017). The Manitoba Government (2014) has recognized the concern of encroachment of non-native and invasive species in small natural areas such as nearby Camp Morton Provincial Park. Public engagement for the proposed project identified concerns for the introduction of weeds and invasive species on the RoW from clearing activities (Manitoba Hydro 2024b).

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 traditional knowledge concerns plants and their use as food, medicines, for handicrafts, and technology. The study area for the project falls entirely within the Treaty 1 territory and the Metis harvesting area.

Through the public engagement process for the project, information was received on vegetation and important plant species in the study area (Manitoba Hydro 2024b). This information highlighted the value of important habitats such as wetlands, forests and trees, and foraging for plant species such as sage (*Artemisia* sp.), wild raspberry (*Rubus idaeus*), cranberry (*Viburnum* sp.), juniper (*Juniperus* sp.) and mushrooms. Concerns on the ability to gather and harvest local foods such as berries and medicines was identified through the engagement process. Concerns on biodiversity loss and disturbance to natural habitat was also received from public feedback.

According to regional vegetation descriptions (e.g., Manitoba Government 2014; Smith et al. 1998), a variety of trees, shrubs, herbs and other traditional use plant species would be expected to occur throughout the study area. A pre-construction vegetation survey will be completed for the project during the growing season in 2024.

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To:	*Jonathan Wiens* *Senior Environmental Assessment Officer* *Manitoba Hydro*	From:	*Kevin Szwaluk* *Szwaluk Environmental Consulting*
File:	*Silver to Rosser_Veg_EA_814*	Date:	*July 8, 2024*

Reference: Field Program Summary – ***Silver to Rosser Tap Transmission Line Environmental Assessment/ Summer 2024/ Vegetation Survey***

OBJECTIVE

The objective of this study was to visit various sites within the study area and along the preferred route to describe the vegetation communities and to survey and document rare and invasive plant species for the Silver to Rosser Tap Transmission line.

METHODS

STUDY DESIGN

Initially, available imagery of the study area and preferred route was viewed to identify potential sites to visit in the field, from the existing transmission line (S65R) to Diageo Canada Inc.'s distillery facility in Gimli. Spatial data (e.g., Manitoba Hydro digital interactive map and feedback portal; kmz file on Google Earth maps) provided by Manitoba Hydro was used. Suitable sites were selected based on a stratification of vegetation types (e.g., deciduous forest, pasture, wetland), importance of vegetation types (greater potential to support species of conservation concern), accessibility and disturbance.

The vegetation survey (qualitative) consisted of recording species composition and structure in the field. Rare plant searches occurred in/near selected habitats and followed methods outlined by the Alberta Native Plant Council (2012). Meander surveys were used and all vascular plant species observed were recorded. GPS coordinates and photographs were taken at each site visited. Fieldwork was conducted roadside or where access was available (e.g., Camp Morton Provincial Park). Fieldwork was conducted by Kevin Szwaluk.

DATA COLLECTION

Site visits in the study occurred on June 19 and 21, 2024. Where accessible by road, the preferred route was driven from the existing transmission line (S65R) to the Diageo Canada Inc.'s distillery facility in Gimli. Surveys occurred mainly along roadside ditches, no private land access was available.

Prior to field surveys, a database search of provincial rare plant records for the study area was completed. The Manitoba Conservation Data Centre (MBCDC) reported one Critically Imperilled species (southern milkvetch, *Astragalus australis*) known to occur within the study area. Four other species of conservation concern were previously known to occur within a 5 km radius around the study area. Habitat for species of conservation concern were reviewed before conducting fieldwork.

PRELIMINARY RESULTS

Twenty-four sites were visited in the study area, to describe the vegetation. The study area (local and project assessment areas) consisted of both agricultural and broadleaf forest that dominated the landscape. The agricultural land was a mixture of cultivated and rangeland. Vegetation on rangelands consisted of mixed grasses and herbaceous vegetation, with sporadic shrub cover (Photograph 1).

Forest stands consisted of multiple vegetation layers including tree canopy, tall shrub (>1m) stratum, low shrubs, and herbaceous ground cover. Forest stands were dominated by trembling aspen (*Populus tremuloides*) tree cover (Photograph 2). Also occurring but less common were white spruce (*Picea glauca*) and bur oak (*Quercus macrocarpa*).

Wetlands were uncommon in the study area. These shallow open water bodies supported emergent vegetation of cattails and various graminoids (sedges and grasses). Tall shrubs of willows (*Salix* spp.) occurred along wetland edges (Photograph 3).

From preliminary review, five species of conservation concern were recorded during the survey, including one Imperiled species and four Vulnerable species (Manitoba Government 2024a). Species included black ash (*Fraxinus nigra*), common milkweed (*Asclepia syriaca*), Harlequin blue flag (*Iris versicolor*), cottonwood (*Populus deltoides*) and rosy twisted-stalk (*Streptopus lanceolatus*), see Table 1. Photographs 4 and 5 show black ash and rosy twisted-stalk observed in the study area. Black ash is also listed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (Government of Canada 2018). Black ash was observed along the preferred route (one young tree <3m) and at Camp Morton Provincial Park.

Table 1. List of species of conservation concern recorded at sites visited, June 2024.

Imperilled species		**Rank**	**Site**
Fraxinus nigra	Black Ash	S2	9, 19
Vulnerable species			
Asclepia syriaca	Common Milkweed	S3S4	18
Iris versicolor	Harlequin Blue Flag	S3S4	1, 23, 24
Populus deltoides	Cottonwood	S3S5	19
Streptopus lanceolatus	Rosy Twisted-stalk	S3?	19

Several non-native and invasive plant species were recorded during the survey. These species were observed in the ditches along the preferred route and other sites within the study area. Frequent occurring species were alfalfa (*Medicago sativa*), caraway (*Carum carvi*), Canada thistle (*Cirsium arvense*), field sow-thistle (*Sonchus arvensis*), common dandelion (*Taraxacum officinale*), quack-grass (*Elymus repens*) and smooth brome (*Bromus inermis*). Oxeye daisy (*Leucanthemum vulgare*) was observed during the survey and is listed as a Tier 2 noxious plant species by the Noxious Weeds Regulation (Manitoba Government 2024b). Oxeye daisy is a threatening species that can spread quickly. Photograph 6 shows a patch of oxeye daisy occurring along the edge of a hayfield.

Traditional use plant species observed included hardwood trees, tall shrubs and a variety of low shrubs and herbs. Some berry shrubs recorded were Saskatoon (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*) and highbush-cranberry (*Viburnum opulus*). Other traditional plants observed were seneca snakeroot (*Polygala senega*) and sweetgrass (*Anthoxanthum hirtum*).

NOTABLE INFORMATION AND RECOMMENDATIONS

- The preferred route occurs primarily along agricultural and forest lands. No private land access was available at the time of the surveys. Five species of conservation concern were recorded in the study area. Of these, black ash is listed by COSEWIC as Threatened. Locations for species of conservation concern observed were as follows:

Black ash (S2)	UTM 14U 638429 E and 5614083 N
	UTM 14U 641097 E and 5616708 N
Common milkweed (S3S4)	UTM 14U 623625 E and 5615334 N
Harlequin blue flag (S3S4)	UTM 14U 623657 E and 5613723 N
	UTM 14U 631961 E and 5610593 N
	UTM 14U 630426 E and 5614706 N
Cottonwood (S3S5)	UTM 14U 641097 E and 5616708 N
Rosy twisted-stalk (S3?)	UTM 14U 641070 E and 5616700 N

- Attempt to minimize surface disturbance around the sites of species of conservation concern to the extent possible.

- Where trees are required to be cleared, it is recommended that clearing occur during frozen ground conditions to minimize ground disturbance. The forest communities have potential to support other species of conservation concern.

- Where possible, care should be taken in any clearing of shelterbelts and it is recommended to reduce clearing in these areas.

- Oxeye daisy (Tier 2 noxious plant) was observed at three locations in the study area. It is recommended that infestations be eradicated to control the spread of plants to adjacent properties. Threatening plant species will continue to persist and proliferate if left unmanaged. Sites where oxeye daisy plants were observed included:

Oxeye daisy	UTM 14U 625255 E and 5613761 N (~300 plants, one patch)
Oxeye daisy	UTM 14U 623657 E and 5613723 N (~200 plants, few roadside patches)
Oxeye daisy	UTM 14U 638416 E and 5613004 N (~200 plants, several patches on ditch crest)

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Manitoba Government. 2024b. The Noxious Weeds Act. http://web2.gov.mb.ca/laws/statutes/ccsm/n110e.php

Photograph 1. Rangeland or pasture in the study area.

Photograph 2. Trembling aspen forest in the study area.

Photograph 3. Marsh wetland in the study area.

Photograph 4. Black ash observed in the study area.

Photograph 5. Rosy twisted-stalk observed in the study area.

Photograph 6. Oxeye daisy observed in the study area.

To:	*Jonathan Wiens* *Senior Environmental Assessment Officer* *Manitoba Hydro*	From:	*Kevin Szwaluk* *Szwaluk Environmental Consulting*
File:	*Silver to Rosser_Veg_EA_815*	Date:	*July 17, 2024*

Reference: Field Program Summary – *Silver to Rosser Tap Transmission Line Environmental Assessment/ Summer 2024/ Vegetation Survey*

OBJECTIVE

The objective of this follow-up survey was to document any new rare and invasive plant species occurring along the preferred route for the Silver to Rosser Tap Transmission line.

METHODS

STUDY DESIGN AND DATA COLLECTION

Initially, available imagery of the study area and preferred route was viewed to identify potential sites to visit in the field, from the existing transmission line (S65R) to Diageo Canada Inc.'s distillery facility in Gimli. Spatial data (e.g., Manitoba Hydro digital interactive map and feedback portal; kmz file on Google Earth maps) provided by Manitoba Hydro was used. The follow-up survey consisted of recording new species along roadsides and property lines of the preferred route, private land access was not available. The follow-up survey occurred on July 16, 2024. Previous surveys to describe the vegetation in the study area were conducted on June 19 and 21, 2024.

PRELIMINARY RESULTS

Eleven sites were visited in the study area, mainly along the preferred route. Two new species of conservation concern were recorded during the follow-up survey. One additional species of conservation concern was determined from the June survey. These plant species are all ranked Vulnerable (S3S4) by the Manitoba Conservation Data Centre (Manitoba Government 2024a). Species included swamp milkweed (*Asclepias incarnata*), black twinberry (*Lonicera involucrata*) and narrow-leaved cat-tail (*Typha angustifolia*), see Table 1. Photograph 1 shows swamp milkweed along the preferred route.

Black ash (*Fraxinus nigra*) was previously recorded at two sites (9 and 19) earlier in the growing season. At site 9, identification of a young tree (<3 m) has changed to green ash (*Fraxinus pennsylvanica*) as a result of further leaf development. Black ash identification at Camp Morton Provincial Park (site 19) remains unchanged. Black ash is listed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (Government of Canada 2018).

Table 1. Species of conservation concern recorded at sites visited, July 2024.

Species	Common Name	Rank	Site
Vulnerable species (S3S4)			
Asclepias incarnata	Swamp Milkweed	S3S4	2
Lonicera involucrata	Black Twinberry	S3S4	16
Typha angustifolia	Narrow-leaved Cat-tail	S3S4	7

Additional non-native and invasive plant species were recorded during the follow-up survey. These species were observed in ditches and occasionally within private lands, observed from the property line. Species noted were meadow timothy (*Phleum pratense*), creeping bentgrass (*Agrostis stolonifera*), bird's-foot trefoil (*Lotus corniculatus*), foxtail barley (*Hordeum jubatum*), white sweet clover (*Melilotus albus*), red clover (*Trifolium pratense*), white clover (*Trifolium repens*) and common buttercup (*Ranunculus acris*).

Oxeye daisy (*Leucanthemum vulgare*) was frequently observed in the study area and along the preferred route; new sites of oxeye daisy recorded during the follow-up survey are provided below. Oxeye daisy is listed as a Tier 2 noxious plant species by the Noxious Weeds Regulation (Manitoba Government 2024b). Oxeye daisy is a threatening species that can spread quickly. Photograph 2 shows a patch of oxeye daisy occurring along the preferred route.

Red bartsia (*Odontites vernus*) is an agricultural and roadside invader that was accidentally introduced to the Gimli area in the 1950's. Red bartsia was not observed during the follow-up survey. The Noxious Weeds Regulation list red bartsia as Tier 1 (Manitoba Government 2024b).

NOTABLE INFORMATION AND RECOMMENDATIONS

- Three additional species of conservation concern were recorded in the study area. Locations for species of conservation concern observed were as follows:

Swamp Milkweed (S3S4)	UTM 14U 625309 E and 5613765 N
	UTM 14U 625273 E and 5613758 N
Black Twinberry (S3S4)	UTM 14U 626864 E and 5615438 N
Narrow-leaved Cat-tail (S3S4)	UTM 14U 635149 E and 5613995 N

- During construction, attempt to minimize surface disturbance around the sites of species of conservation concern to the extent possible.

- Oxeye daisy (Tier 2 noxious plant) was observed at several locations in the study area. New sites of oxeye daisy plants observed along the preferred route are identified below. It is recommended that infestations be eradicated to control the spread of plants to adjacent properties. Threatening plant species will continue to persist and proliferate if left unmanaged.

Oxeye daisy	UTM 14U 625322 E and 5613765 N (~30 plants, one patch)
Oxeye daisy	UTM 14U 626928 E and 5613792 N (~20 plants, one patch)

Oxeye daisy	UTM 14U 626909 E and 5613802 N (>100 plants, ditch and pasture)
Oxeye daisy	UTM 14U 640365 E and 5616600 N (>1000 plants, ¼ section infestation near Camp Morton Provincial Park)

REFERENCES

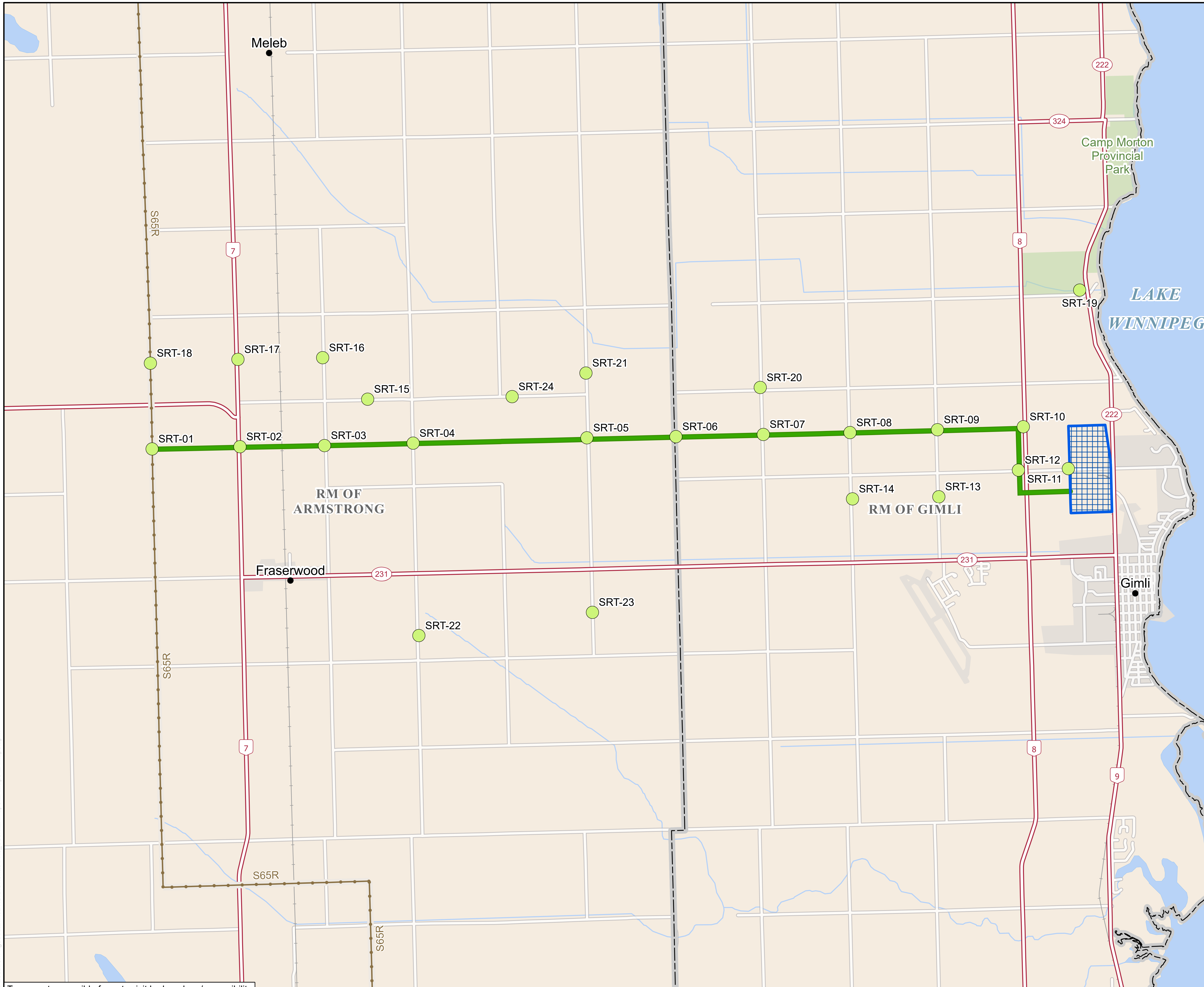
Government of Canada. 2018. Black Ash (*Fraxinus nigra*): COSEWIC assessment and status report. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/black-ash-2018.html

Manitoba Government. 2024a. Manitoba Conservation Data Centre. https://gov.mb.ca/nrnd/fish-wildlife/cdc/index.html

Manitoba Government. 2024b. The Noxious Weeds Act. http://web2.gov.mb.ca/laws/statutes/ccsm/n110e.php

Photograph 1. Swamp milkweed with monarch larvae along the preferred route.

Photograph 2. Oxeye daisy along the preferred route.



Manitoba Hydro

Silver to Rosser Tap Transmission Project

Proposed Infrastructure

- Final Preferred Route

Vegetation Survey Sites

- Vegetation Survey Site Location

Existing Infrastructure

- Diageo Gimli Distillery
- Existing ≥69kV Transmission Line

Landbase

- Railway
- Local Road
- Provincial Highway/Road
- First Nation
- Provincial Park
- Wildlife Management Area
- Rural Municipality

Manitoba Hydro acknowledges that the Silver to Rosser Tap transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: August 8, 2024

0 1.5 3 Kilometres
0 0.9 1.8 Miles

N

1:70,000

Distribution of Vegetation Survey Sites

Draft/Confidential: For Discussion Purposes Only

Map 1-1

Appendix D: Greenhouse gas emissions life cycle assessment report

SILVER TO ROSSER (S65R) TAP TRANSMISSION PROJECT –

GREENHOUSE GAS EMISSIONS LIFE CYCLE ASSESSMENT REPORT

ENERGY RESOURCE PLANNING DEPARTMENT

INTEGRATED RESOURCE PLANNING

PROVINCE OF MANITOBA
J. D.
CRUISE
2024-08-08
Member
42611
REGISTERED PROFESSIONAL ENGINEER

PREPARED BY:

J. D. CRUISE, P. ENG. Jordan Cruise

REVIEWED BY:

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The following people provided meaningful contributions to this report:

- **Jordan Cruise** (GHG Analysis Engineer, Energy Resource Planning Dept, AP&D) led the S65R Tap GHG Assessment and was the main author.
- **K. Michael Shaw** (Senior GHG Analysis Engineer, Energy Resource Planning Dept, AP&D) primary technical and report reviewer.
- **Ryan Waddell** (Transmission Line Engineer, Transmission Overhead & Civil Engineering Dept, AP&D) provided estimates of construction material weights.
- **Amy Stevenson** (Environmental Assessment Officer, T&D Environment and Engagement Dept, AP&D) was the primary point of contact for questions and information related to this emissions assessment. Provided review of relevant sections.
- **Evan Rodgers** (Technical Assistant with Geospatial Data Services, Engineering Standards & Support Services Dept, AP&D) contributed to assessing land land-use change emissions.
- **Kristina Koenig** (Energy Resource Planning Department Manager, Integrated Resource Planning Division, AP&D) provided managerial review.
- **Kevin Gawne** (Strategic Energy Planning and Operations Lead, Integrated Resource Planning Division, AP&D) approved the report for release on behalf of Lindsay Melvin, director of Integrated Resource Planning Division.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 PURPOSE

This report summarizes the estimate of life cycle greenhouse gas emissions (“emissions”) related to the construction of the Silver to Rosser (S65R) Tap Transmission Project (“S65R Tap”). The S65R Tap consists of the construction of a new 18.5 km 230 kilovolt (“kV”) transmission line tapped off of the existing S65R transmission line. The S65R Tap is required to supply the Diageo distillery facility in Gimli with additional electricity. The purpose of this report is to function as a point of reference for the environmental assessment (“EA”) of the S65R Tap, documenting the applied emissions estimation methodologies and assumptions.

The life cycle assessment of emissions from the S65R Tap (“S65R GHG Assessment”) includes estimates of construction-related emissions (including supply-chain emissions), permanent land-use change emissions along the right-of-way (“ROW”), and ongoing maintenance emissions. Due to Climate Lens direction[1], substantial uncertainty related to the future decommissioning of the S65R Tap, and the presumed relatively small GHG effects related to the decommissioning of the S65R Tap, decommissioning related GHG effects have been excluded from the S65R GHG Assessment. The S65R GHG Assessment draws on methodologies from previous life cycle assessments (“LCAs”), such as Jeyakumar, B., & Kilpatrick, R. (2015) and Manitoba Hydro (2024a) and the LCA principles therein. The S65R GHG Assessment relied on readily available construction information for the route and LCA emission factors (“EFs”). This approach was deemed reasonable because, although a more comprehensive analysis might provide greater accuracy, a greater level of accuracy was not considered necessary for

[1] [Infrastructure Canada, 2019]

a project where life cycle emissions are relatively small. Where detailed construction and system information was readily available it has been incorporated.

Only construction-related emissions were assessed; this was not a comprehensive GHG mitigation assessment (e.g., Manitoba Hydro (2021a)) which would incorporate estimates of all relevant GHG effects (both emissions and emission reductions), primary and secondary, of a project. The S65R Tap will facilitate an increase in the consumption of electricity at the Diageo distillery facility, resulting in a reduction in natural gas consumption. This will impact fossil fuel emissions at the facility as well as regional electricity generation emissions. As the goal of a reduction in natural gas consumption at the facility was a Diageo initiative (not a Manitoba Hydro initiative), Manitoba Hydro intentionally excluded the assessment of any GHG effects related to Diageo's decision from the scope of the S65R GHG Assessment.

A GHG mitigation assessment would compare a "project scenario" with a "baseline scenario." The scope of the S65R GHG Assessment did not consider potential baseline scenario alternatives to the S65R Tap that could occur in the absence of the project, as the S65R Tap is assumed to be required: Manitoba Hydro has a duty to provide natural gas and/or electric service to all customer services within the province, and a new 230kV line was determined to be the feasible option to replace natural gas use for the Diageo facility. Nevertheless, emissions estimates presented herein are absolute S65R Tap emissions (i.e., the baseline scenario for the S65R GHG Assessment is, by default, a "do-nothing" scenario), not incremental[2] S65R Tap emissions.

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[2] Note: For clarity, the methods related to land use change emissions (Section 4) are temporally incremental; but are not incremental relative to project alternatives.

2 SUMMARY OF LIFE CYCLE EMISSIONS

Table 1 provides a high-level estimate of in-scope life cycle emissions, indicating the order of magnitude of potential emissions. Aggregated life cycle emissions for the S65R Tap are 7.3 kilotonnes ("kt") of carbon dioxide equivalent ("CO_2e").

While aggregated emissions are presented to the nearest 100-tonne increment in Table 1, this is only done for comparison purposes; it is not intended to imply that this level of accuracy was achieved in this life cycle GHG assessment of the S65R Tap. Most construction-related emissions result from *Construction: Material Supply Chain* emissions embedded in the materials of S65R Tap components (e.g., towers and conductor wire) and the *ROW Land Use Change* emissions.

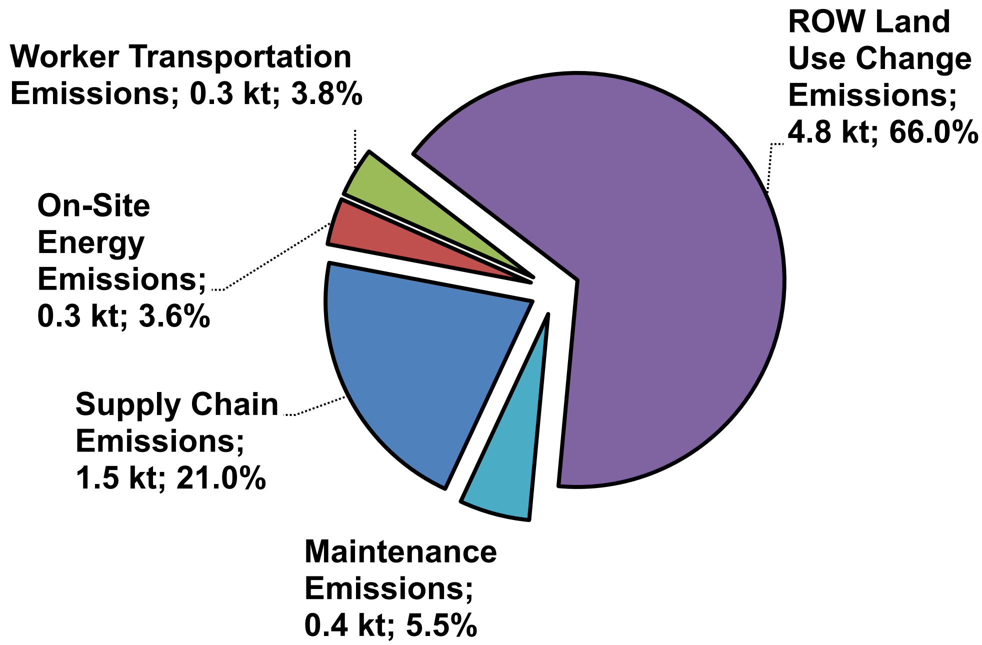
Table 1 Summary of S65R Tap Construction-Related Emissions

Activity	kt CO_2e	% of total
Construction: Material Supply Chain	1.5	21.0%
Construction: On-Site Energy	0.3	3.6%
Construction: Labour Transport	0.3	3.8%
S65R Tap Maintenance	0.4	5.5%
ROW Land Use Change	4.8	66.0%
Total	**7.3**	

The S65R Tap is assumed to require minimal clearing relative to larger transmission projects (i.e., 33 hectares) of forested land however, as there are minimal steel structures used on the S65R Tap, the *ROW Land Use Chang*e accounts for approximately 66.0% of the total construction-related emissions. Steel manufacturing is an emissions-intensive industry, and it is expected that if more steel structures are included in the final design, the increase in emissions in the *Construction: Material Supply* Chain category would be statistically significant.

Emissions from on-site energy use during construction are estimated to be 0.27 kt of CO_2e. For comparison, this is ~1% of the annual emissions from Manitoba Hydro's existing fleet (~24 kt of CO_2e in 2022) [3].

Figure 1 Visual Representation of S65R Tap Emissions by Category (in CO_2e)



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[3] [Manitoba Hydro, 2023a]

3 S65R TAP LIFE CYCLE EMISSIONS – METHODOLOGY

Due to the scale of the S65R Tap, it was considered reasonable to use readily available construction information and LCA emissions factors (“EFs”) and not undertake any comprehensive, fully project-specific analyses. However, where detailed construction information was readily available it has been incorporated.

Assumptions related to the construction of the S65R Tap are based on both project-specific details and assumptions incorporated into the recent construction emissions assessment of the R44H[4] assessment, which incorporated assumptions from the Pointe du Bois Transmission Project Environmental Assessment Report (“PdB Transmission Project EAR”[5]), the BP6/BP7[6] assessment, and other transmission projects. Construction assumptions incorporated into the S65R GHG Assessment are intended for emissions estimation purposes only and are not a precise indication of the workforce required for construction.

3.1 S65R TAP CONSTRUCTION ACTIVITIES

Construction activities for the S65R Tap have been broken down into three activities:

1. Manufacture of construction materials (supply-chain)
2. Transportation of construction materials (supply-chain)
3. Construction of the S65R Tap

[4] [Manitoba Hydro, 2024a]

[5] [Manitoba Hydro, 2014a; Manitoba Hydro, 2014b]

[6] [Manitoba Hydro, 2021b]

3.1.1 Manufacture of S65R Tap Components (Supply-Chain)

Material estimates for the S65R Tap components (Table 5) are both based on project-specific details and assumptions incorporated into the recent construction emissions assessment of R44H. Key assumed design elements are as follows:

1. The S65R Tap will be 18.5 km long.

2. The S65R Tap is designed for a three-phase 795.0 MCM 26/17ACSR “Drake” type conductor wire, 28.11 mm in overall diameter. The overall length of the conductor wire used on the S65R Tap is 58.5 km.

3. The overall length of ground wire assumed to be used for the S65R Tap was provided and specified to be 4,050 metres of #2 ACSR bare wire.

4. The average tower span will be 250 metres. It is assumed that 80 towers will be required, but this may not match the final design. 75 towers are assumed to be Gulfport Woodpole Structures with the remaining 5 structures assumed to be composed of galvanized steel. The 5 galvanized steel structures comprise 4 dead-end towers and 1 tap structure.

5. For the purposes of the S65R GHG Assessment, only the footings of the galvanized steel structures were considered. It is assumed that the Gulfport Woodpole Structures are placed into augured holes, backfilled with native soils and other aggregates. No new borrow areas are assumed for the S65R Tap.

6. All galvanized steel structure footings are assumed to comprise the following materials and configurations:
    a. **Helical self-supporting foundation:** Four pile configurations per tower leg with a total pile steel mass of approximately 3,425 kg per leg.
    b. **Steel cap:** Each four-pile configuration is capped with a steel cap weighing approximately 483 kg.

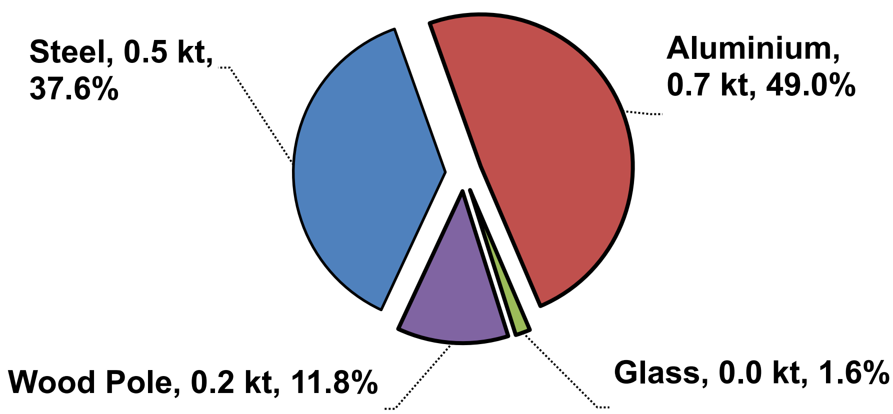
7. It was assumed each dead-end tower would require 571 kg of glass insulators and each Gulfport Woodpole Structure tower would require 172 kg of glass insulators.

8. For consistency and conservativeness, Türkiye will be the presumed source location for all metal and glass above-ground transmission components. The Gulfport Woodpole Structures are assumed to be manufactured along the west coast of North America.

9. Although multiple manufacturing processes will be required for fabricating conductors and towers, uniform material specific EFs will be applied separately to the weight of individual material types, regardless of the component the material comprises.

Figure 2 presents a high-level visualization, in kt of CO_2e, of emissions related to the manufacturing of construction materials based on information in the above bullet point list and EFs in Table 3. Emissions from the manufacturing of construction materials are estimated to be 1.46[7] kt of CO_2e.

Figure 2 Visual Representation of Emissions from the Manufacturing of S65R Tap Construction Materials (in CO_2e)



3.1.2 Transportation of the S65R Tap Components (Supply-Chain)

The S65R Tap components will likely be manufactured internationally (but some components could be manufactured in Canada). For the S65R GHG Assessment, Türkiye was selected as the presumed source location for most components as this results in higher emissions for a more conservative estimate; however, the actual

[7] Due to rounding, the summation of individual sub-categories may not equal the whole. Information in Table 1 should be used when presenting the emissions by each category.

source location of materials is unknown at this time. The Gulfport Woodpole Structures are assumed to be sourced on the west coast of North America based on supplier location.

Metal-based materials and equipment are assumed to be transported by ocean to Montreal, then by rail to Winnipeg, and then by road to the construction site. The Gulfport Woodpole Structures are assumed to be transported from the west coast to Winnipeg by rail and then by road to the construction site.

Alternative source locations (than Türkiye) for steel, aluminum, and other materials would likely result in lower transportation emissions. However,

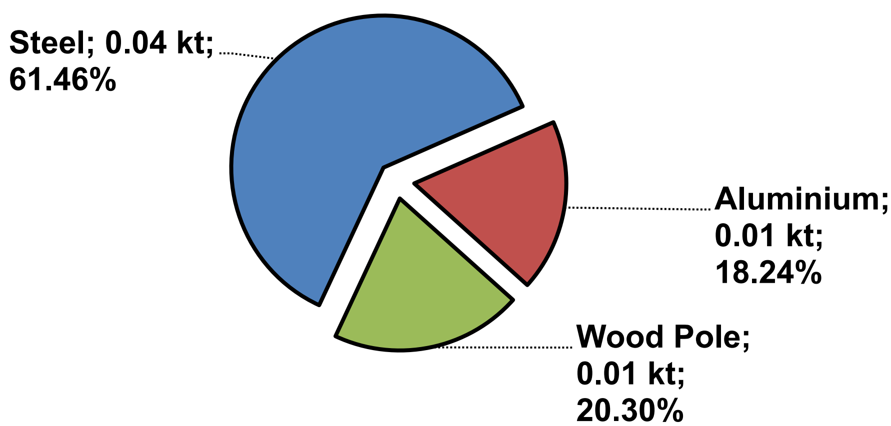


Table 2 disaggregates the emissions from material manufacturing and transportation which comprise the supply-chain emissions category. It is estimated that materials manufacturing emissions are much greater than material transportation emissions.

Table 2 shows that transportation emissions make up less than 5% of overall supply-chain emissions for these materials, even with this conservative assumption.

Figure 3 presents a high-level visualization in kt of the emissions related to the transportation of construction materials based on information presented in the above bullet point list and EFs presented in Table 3. Emissions from the transportation of construction materials are estimated to be 0.07[8] kt.

Figure 3 Visual Representation of S65R Tap Construction Materials Transportation Emissions (in CO_2e)

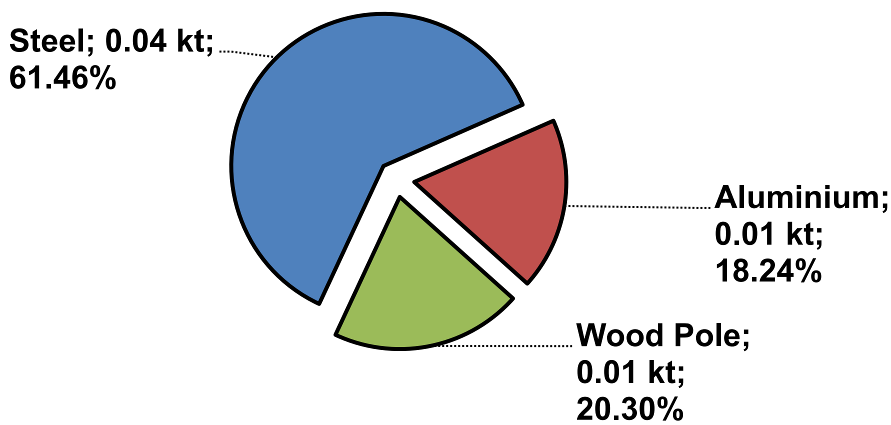


Table 2 disaggregates the emissions from material manufacturing and transportation which comprise the supply-chain emissions category. It is estimated that materials manufacturing emissions are much greater than material transportation emissions.

Table 2 S65R Tap supply chain emissions disaggregated by subcategories

Supply chain category	kt CO_2e	Percent of supply chain emissions
Materials Manufacturing	1.46	95.3%
Materials Transportation	0.07	4.7%
Total	**1.5**	

[8] Due to rounding, the summation of individual categories may not equal the whole. Information in Table 1 should be used when presenting the emissions by each category.

3.1.3 Construction of the S65R Tap

The estimated workforce for the S65R Tap, including the mobilization phase, clearing, construction, and demobilization are 335 person-months (842 person-months[9] * 18.5 km [10]/ 46.5 km).

For the S65R GHG Assessment, it is assumed that crews will commute from Winnipeg to the construction site daily, for a total of 200 km traveled per workday for commuting purposes. Although local accommodations in Gimli may be used during the week, assuming daily commutes from Winnipeg results in a higher estimate of emissions from worker transport to and from the site. This assumption is consistent with the principle of conservativeness followed in the S65R GHG Assessment.

Construction equipment will include feller-bunchers, skidders, bulldozers, drill rigs, backhoes, excavators, cranes, trucks, and other equipment. [Manitoba Hydro, 2014a][11] For the S65R GHG Assessment, it's been assumed that the typical construction vehicle would be an aerial device vehicle (e.g., a bucket truck) and that vehicles would be left on-site while workers commute to and from Winnipeg daily. It is assumed that there will be one major construction vehicle for every three workers and that workers will arrive at the construction site using one light-duty truck for every three workers. Construction vehicles are assumed to consume on average, twice the 3.4 litres/hour ("L/hr") to idle without load over 10 hours, or one construction day for a total of 6.8 L/hr.

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[9] [Manitoba Hydro, 2014a]

[10] PW75 is 46.5 km in length.

[11] PdB Transmission Project EAR – Chapter 2.2.3.1 (*Project Description – Project Components – Project Construction – PW75 115 kV Transmission Line*), p.16

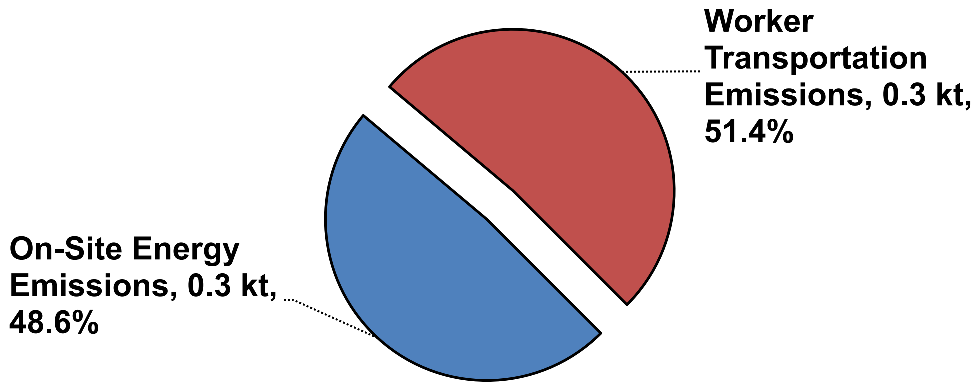
An exception to the above is that, in addition to the assumed 6.8 L/hr average consumption rate (per vehicle) throughout construction, additional fuel consumption is assumed for the two most energy intense construction activities:

1. **Tower Erection:**
    a. While crane erection of the towers is presumed, for conservativeness it has been assumed that all galvanized steel structures are erected via heavy-duty helicopter at a rate of 757 L of fuel per tower.[12]
    b. The Golfport Woodpole Structures are assumed to be crane erected at an assumed rate of 530 L of fuel per tower. This assumes that one crew of 25 workers is required per tower.
2. **ROW Clearing:**
    a. Based on assumptions from similar projects, 900 L of diesel fuel is consumed for every hectare ("ha") of forested area cleared on the ROW. 33 ha of ROW is assumed to require clearing as approximately half of the ROW is forest-covered land.

Figure 4 presents a high-level visualization of the emissions, in kt of CO_2e, related to the transportation of construction crews to and from the work site and the emissions from the tower erection based on information presented in the above list and EFs presented in Table 3.

[12] 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 the S65R GHG Assessment, the upstream emissions to produce and deliver all the fuel types considered is equal to that of diesel fuel, 979.29 kg CO_2e/L of fuel.

Figure 4 Visual Representation of Emissions from S65R Tap Construction from Fuel Use (in CO_2e)



Note that the *On-Site Energy Emissions* category in Figure 4 is composed of both the emissions from tower erection and ROW clearing. *Worker Transportation Emissions* only considers emissions from worker transport to and from the project site using the assumptions outlined in Table 4.

3.2 Key S65R GHG Assessment Assumptions and Inputs

Table 3 lists the EFs applied for the assessment of life cycle GHG emissions. Many of these EFs were selected for the LCA of the Manitoba–Minnesota Transmission Project ("MMTP")[13] and re-applied for the S65R GHG Assessment. New EFs, such as the timber production EF have been included in the S65R GHG Assessment, and some fuel combustion EFs have been updated with new data from Environment Climate Change Canada. It was conservatively assumed that no carbon sequestration benefits would result from the use of wood poles.

Table 3 Life Cycle Activity EFs

Activity	CO_2e	Unit	Source
Ocean Transport	15.84	g CO_2e/tonne-km	NREL
Rail Transport	18.97	g CO_2e/tonne-km	NREL
Road Transport	79.91	g CO_2e//tonne-km	NREL
Mine Iron Ore	43.04	g CO_2e/kg of ore	StatsCan
Produce Galvanized Steel Sheet	2,710.66	g CO_2e/kg steel	NREL
Forge Steel into Bars/Wire/Other	354.61	g CO_2e/kg steel	Chalmers University
Mine Bauxite Produce Aluminum Ingot	9,627.19	g CO_2e/kg aluminum	NREL
Produce Aluminum Conductor	860.00	g CO_2e/kg aluminum	Chalmers University
Produce Timber - general (Gulfport Woodpole Structure)	492.82	g/kg	ICE Database V3.0[14]
Produce Glass - general (Insulators)	1,436.97	g/kg	ICE Database V3.0[11]
Combust Diesel	2,761.38	g/L of fuel	ECCC[15]
Table 3 continued on next page			

[13] [Jeyakumar & Kilpatrick, 2015]

[14] [Circular Ecology, 2019]

[15] [ECCC, 2024]

Activity	CO_2e	Unit	Source
Combust Gasoline	2,315.10	g/L of fuel	ECCC[12]
Combust Aviation Fuel	2,202.83	g/L of fuel	US EPA[16]
Produce and Deliver Fuel	979.29	g/L of fuel	ECCC

Table 4 lists the key assumptions used in the estimate of construction emissions. The rationale and assumptions for these values are described in Section 3.1.

Table 4 Life Cycle Emissions – Key Input Assumptions

Assumption	Value	Unit	Source
Total # of Gulfport Woodpole Structure Mass	75	#	Manitoba Hydro
Total # of Galvanized Steel Towers	4	#	Manitoba Hydro
Total # of Tap Structures	1	#	Manitoba Hydro
Average Gulfport Woodpole Structure Mass	4.66	tonnes	Manitoba Hydro
Average Galvanized Steel Tower Mass	17.66	tonnes	Manitoba Hydro
Average Tap Structure Mass	29.53	tonnes	Manitoba Hydro
Conductor Mass - Steel	0.50	tonnes/km	[Midal Cable, 2010] & Manitoba Hydro
Conductor Mass - Aluminum	1.10	tonnes/km	[Midal Cable, 2010] & Manitoba Hydro
Ground Wire Mass (Steel)	0.64	tonnes/km	[Midal Cable, 2010][17] & Manitoba Hydro
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)	6.8	L/hr	Oak Ridge National Lab
ROW Clearing - Additional Energy	900	L/ha	Manitoba Hydro
Tower Erection - Additional Energy	757	L/tower	Manitoba Hydro
Türkiye to Vancouver by Ocean	17,500	km	sea-distances.org
Table 4 continued on next page			

[16] [US EPA, 2014]

[17] ASCR Sparate was assumed as it is the larger wire with a #2 specification.

Assumption	Value	Unit	Source
Montreal to Winnipeg by Rail	1,800	km	rome2rio.com
West Coast to Winnipeg by Rail	1,800	km	Manitoba Hydro
Winnipeg to S65R Tap by Road	18.5	km	Google Maps
Hours per Construction Day	10	hours	Manitoba Hydro
Construction Days Per Month	22	days	Manitoba Hydro
Vehicle Ratio (Labour & Construction)	3	persons/vehicle	Manitoba Hydro
Construction Labour for S65R Tap	7,769	person-days	[Manitoba Hydro, 2014a]

Table 5 summarizes the mass of major construction materials required for the construction of the S65R Tap. Most manufactured materials are required for towers and conductors.

Table 5 S65R Tap Construction Material – Mass Summary (tonnes)

Construction Material	S65R Tap
Aluminum	68
Steel	229
Timber	349
Glass	16

4 S65R TAP LAND USE CHANGE EMISSIONS – METHODOLOGY

For estimating land use change impacts, this assessment followed similar methods to those used for the LCA of the MMTP[18] and the GHG Mitigation Assessment of R44H[19]. From a carbon content perspective, only treed areas within the S65R Tap's ROW footprint, as well as land permanently converted for tower foundations, are permanently[20] disturbed. It is assumed treed areas will be converted to "Non-Treed" land (Table 6). 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 6) 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, the S65R Tap GHG Assessment assumes only above ground carbon content is permanently disturbed due to clearing: "*Carbon content of soils is assumed to be unchanged after clearing*" [Jeyakumar & Kilpatrick, 2015]. Both above and below ground biomass are assumed to be permanently removed from the land converted for tower foundations/footings consistent with the assessment completed for R44H.[18]

All the treed areas within the ROW are assumed to be completely cleared and converted to low-lying vegetation. While the actual transmission route is not final, 33 ha (Table7) of treed areas are assumed to be permanently disturbed. Some land will be

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[18] [Jeyakumar & Kilpatrick, 2015]

[19] [Manitoba Hydro, 2024a]

[20] Note: The assumption of permanence focuses on the life of the S65R Tap. However, ROW impacts can be expected to persist beyond their end of life as well.

permanently disturbed for tower foundations and piles with an end carbon content of 0 t/ha, and this is reflected in Table .

The S65R Tap ROW will require temporary land disturbances (e.g., temporary access roads, marshalling yards); however, net emissions from these temporary disturbances are assumed to be zero/immaterial within the full operational life of the S65R Tap; unless they are also within current treed areas within the ROW, they are assumed to return their original state, from a carbon content perspective.

This assessment follows IPCC (2003) direction on calculation methodology while using Manitoba-specific carbon contents, for different forestland types, from Shaw et al. (2005). Biomass assumptions in Table 6 are Manitoba-specific, not ROW footprint specific.

Table 6 Manitoba-specific Forest Above Ground Biomass [Shaw et al., 2005][21]

Dominant Stand Species	Stands in Sample	Total Above Ground Carbon Content	Total Below-Ground Carbon Content
Non-Treed	**3**	**15.33**	**79.33**
Coniferous (i.e., Needle)	**37**	**31.41**	**176.08**
Jack Pine	16	23.13	
Black Spruce	19	32.37	
White Spruce	2	88.50	
Deciduous (i.e., Broadleaf)	**16**	**55.06**	**214.25**
Balsam Popular	2	95.00	
White Birch	3	50.67	
Trembling Aspen	11	49.00	
Mixed	**8**	**69.00**	**158**

[21] 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 7 S65R Tap ROW – Current State Forestry Breakdown Summary

Manitoba Land Cover Classification	Dominant Stand Species	Forestland Withdrawal (ha)	Above Ground Biomass (tonne C/ha)	Below Ground Biomass (tonne C/ ha)
Agri - Forage Field	Non-Treed Dominant	1.40	15.33	79.33
Agricultural Field	Non-Treed Dominant	10.93	15.33	79.33
Cultural Features	Non-Treed Dominant	0.02	15.33	79.33
Deciduous Forest	Broadleaf Dominant	26.45	55.06	214.25
Mixed-wood Forest	Coniferous/Broadleaf Co-Dominant	0.56	69.00	158.00
Open Deciduous Forest	Broadleaf Dominant	5.73	69.00	214.25
Range and Grassland	Non-Treed Dominant	27.16	15.33	79.33
Roads Trails Rail Lines	Non-Treed Dominant	1.39	15.33	79.33
Wetland - Marsh	Non-Treed Dominant	0.25	15.33	79.33
All Stands		**73.89**	**33.05**	**138.70**
Treed Stands		**32.75**	**53.30**	**N/A**

Land use change emissions are estimated using Table 7 which assumes all carbon is released as carbon dioxide ("CO_2") as all biomass is combusted (either within the ROW or productively harvested for use elsewhere). CO_2 emissions are assumed to occur at, or soon after, the time of clearing; it is assumed that there is no significant decay[22].

[22] 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 methane, which has a higher 100-year global warming potential (28 compared to 1).

These assumptions are consistent with mitigation measures outlined in Manitoba Hydro (2014b).

Equation A CO_2e Emissions from ROW Land Use Change

$$\begin{aligned}\boldsymbol{CO_2\ emissions\ (tonnes)} \\ &= \boldsymbol{Area\ effected\ (hectacre)} \\ &* \left[\boldsymbol{Original\ Carbon\ Content}\left(\frac{\boldsymbol{tonnes\ Carbon}}{\boldsymbol{hectacre}}\right)\right. \\ &\left. - \boldsymbol{Modified\ Carbon\ Content}\left(\frac{\boldsymbol{tonnes\ Carbon}}{\boldsymbol{hectacre}}\right)\right] * \frac{\boldsymbol{44}}{\boldsymbol{12}}\end{aligned}$$ [23]

When using Equation A for this assessment, the total ROW was used and is also shown in Table 7. Using only the treed areas would have the same result as the net change to the Non-Treed Dominant category is zero.*ROW Land Use Change* emissions resulting from the clearing for the S65R Tap are estimated to be 4.80 kt of CO_2; Table summarizes the key inputs assumed for this estimate.

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[23] Note: 44/12 is the approximate ratio of the molecular weight of CO_2 (44) to that of carbon (12).

Table 8 S65R Tap ROW – Land Use Change Summary

Land Use Change Component	Value	Unit
Area Affected (ha)	73.89	ha
Carbon Content - Original State	33.05	tonne C/ha
Carbon Content - Modified State	15.33	tonne C/ha
Permanent Carbon Change	17.71	tonne C/ha
Total GHG Released	64.95	tonne CO_2/ha
Total GHG Released	**4.8**	**kt CO_2**

In addition to the above-ground carbon content changes due to ROW clearing, Table 9 details the permanently disturbed soil and land due to pile foundations and foundation caps.

Table 9 Permanently Disturbed Biomass due to Foundation Caps and Piles

Land use Change Component	Value	Unit
Permanently disturbed above-ground biomass (foundation caps)[24]	0.00	kt CO_2
Permanently disturbed below-ground biomass (foundation piles)	0.01	kt CO_2

The total GHG emissions due to land use change are estimated to be 4.8 kt CO_2e, as seen in Table 1 and Figure 2.

[24] Permanently disturbed above-ground biomass (foundation caps) was determined to be immaterial however it is shown in Table to demonstrate its consideration as ROW Land Use Change emissions are the largest category of emissions in the S65R GHG Assessment.

5 MAINTENANCE EMISSIONS – METHODOLOGY

The S65R Tap will require maintenance during the operations and maintenance (O&M) phase in a similar manner to other distribution and transmission lines on Manitoba Hydro's wires network:

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][25]
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 Manitoba Hydro'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][26]

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[25] PdB Transmission Project EAR – Chapter 2.2.4.1 (*Project Description – Project Components – Project Operations and Maintenance – PW75 115 kV Transmission Line*), p.20

[26] 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

Based on emissions from Manitoba Hydro's entire vehicle fleet (24 kt of CO_2e)[27] and the size of Manitoba Hydro's existing transmission (11,045 km) and distribution (75,320 km)[28] infrastructure[29], at a high-level, additional O&M emissions due to the S65R Tap are expected to be in the 0 to 5 tonnes of CO_2e per year range (including air patrols).

Additional O&M emissions are conservatively assumed to be 5 tonnes of CO_2e per year. Consistent with other transmission project GHG life cycle assessments, the S65R Tap is assumed to exist for 75 years before major modernization, upgrades, or decommissioning occurs. This results in total life-cycle emissions related to maintenance of the S65R Tap to be estimated at 0.40 kt CO_2e.

An assessment of supply-side emissions related to O&M materials was excluded from the S65R GHG Assessment and presumed to be relatively negligible. The quantity of material required to construct the S65R Tap will be higher than any material necessary for repairs during ongoing maintenance.

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[27] [Manitoba Hydro, 2023]

[28] [Manitoba Hydro, 2024b] – subject to change as network upgrades and expansion takes place, such as the S65R Tap

[29] [Manitoba Hydro, 2020b]

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Appendix E: Cultural and heritage resources protection plan






CULTURAL AND HERITAGE RESOURCES PROTECTION PLAN

Manitoba Hydro

Document Owner
Transmission & Distribution Environment and Engagement
Project Management Division
Manitoba Hydro

Version - Final

List of Revisions

Number	Nature of Revision	Section(s)	Revised By	Date

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 Transmission & Distribution Environment and Engagement (T&DEE) is prepared to offer the required support to On-Site Supervisors including archaeological services, to preserve and protect cultural and heritage resources. T&DEE can be contacted at 1-877-343-1631 or projects@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.

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 - Transmission & Distribution Environment and Engagement Department encourages anyone to provide feedback on this document and will review this plan on an annual basis. Feedback can be provided to projects@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.

Table of Contents

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 regarding 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 Transmission & Distribution Environment and Engagement Department is prepared to offer the required support to On-Site Supervisors including archaeological services, to preserve and protect cultural and heritage resources. T&DEE can be contacted at 1-877-343-1631 or projects@hydro.mb.ca.

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; T&DEE has access to archaeologists to support any investigation.

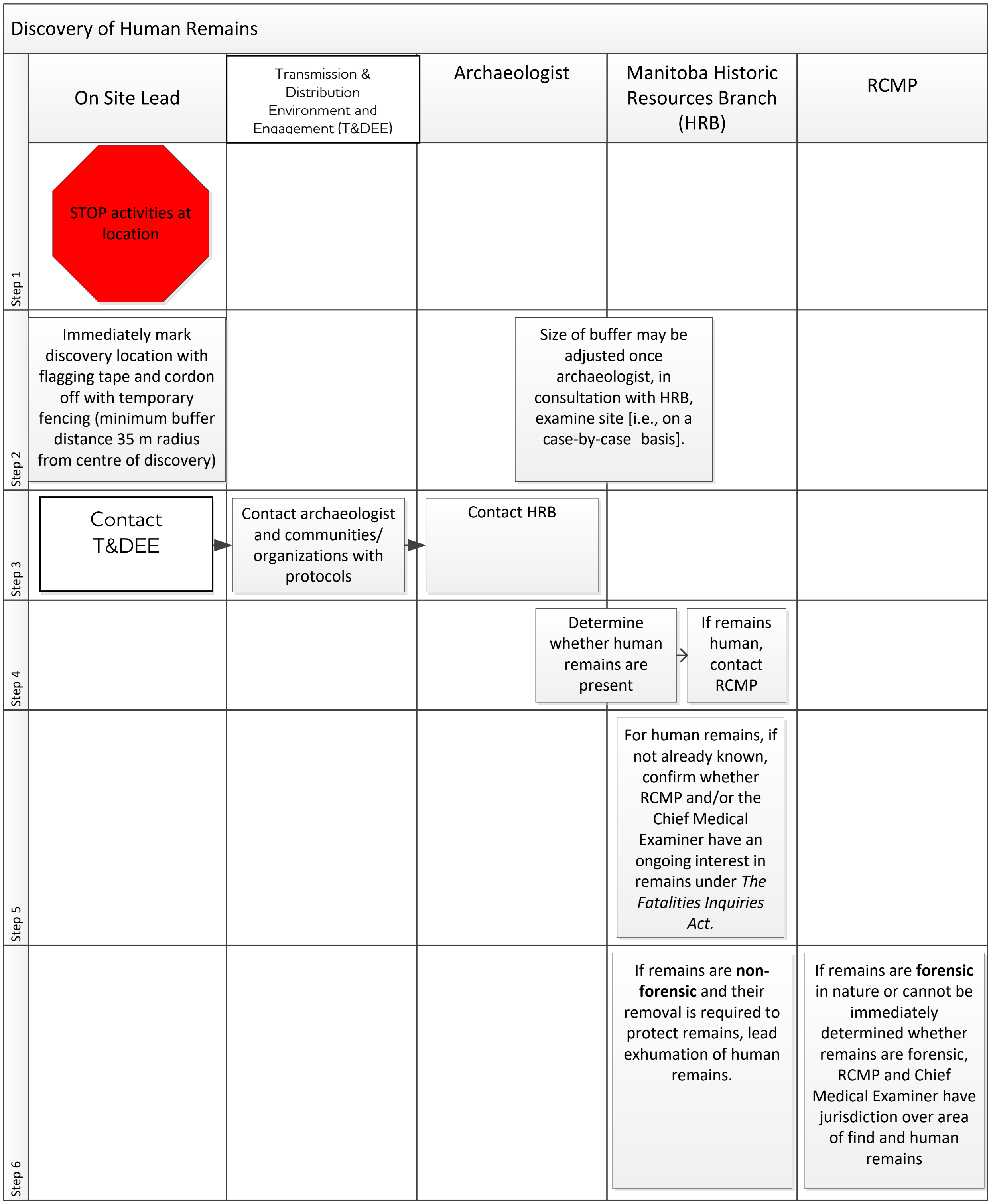
1.5 Human remains

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 would 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	Transmission & Distribution Environment and Engagement (T&DEE)	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	T&DEE 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

(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, workstations, 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.

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 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	Transmission & Distribution Environment and Engagement (T&DEE)	Archaeologist	Manitoba Historic Resources Branch (HRB)
Step 1	STOP activities at location			
Step 2	Contact T&DEE	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	Transmission & Distribution Environment and Engagement (T&DEE)	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 T&DEE 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 to fulfill regulatory and managerial responsibilities.

If requested, the archaeologist will meet with the applicable Community Representative(s), HRB and the Manitoba Hydro Transmission & Distribution Environment and Engagement 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

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. <u>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</u>**.**

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.

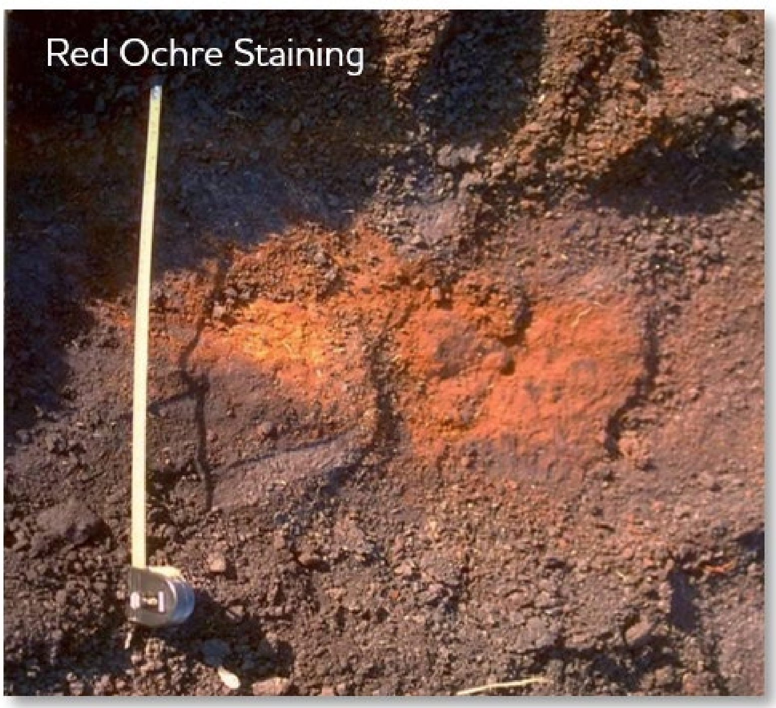
Pre-contact pottery sherd

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

Animal Bone

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

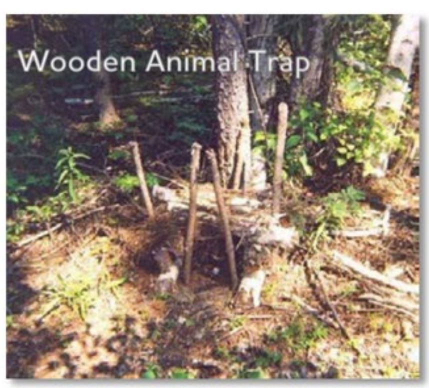
Bone was also an important material for tool manufacturing. Common bone tools include fleshers and beamers fashioned from large mammal long bones, barbed spear points and harpoons, awls, and needles. Bones at a site can indicate the kinds of animals that were being used as food. The ulna of swans, eagles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

Animal Long Bone with red staining

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 trap, as a material for building or for firewood and indicates that humans have been in the area.




Culturally Modified Tree

Stone features

There are many 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.


Petroform in the shape of a turtle


Rock Cairn

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 way structural features are constructed can be dated.

Appendix B: 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. Please sketch the cultural and heritage resource area of interest for the community/organization on an 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 ______________________________