APPENDIX A

Project engagement materials

January 2026

Manitoba Hydro

Altona to Winkler Gas Transmission Project

Information sheet

Manitoba Hydro is planning to construct a 30 km, 8-inch steel natural gas transmission line from a site north of Altona to a connection point on the east side of Winkler. will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation. This project is being developed to address capacity constraints in the regional gas transmission system and to support continued growth in the Altona and Winkler areas.

The project is being developed in response to increasing demand for natural gas in the region. The existing transmission system has reached its capacity limits, while continued urban growth and the expansion of crop production are driving further energy needs.

Environmental Assessment

An environmental assessment evaluates a project's potential impacts on the human and natural environment and identifies ways to minimize them. This project is a Class 2 development under The Environment Act. An environmental assessment report will be submitted to Manitoba Environment and Climate Change for review.

Opportunities to Engage

Manitoba Hydro plans to work directly with First Nations, the Manitoba Métis Federation, rural municipalities, landowners, interested parties, and the public throughout the project lifecycle to:

- Share information about the project
- Understand and consider concerns and interests.
- Offer opportunities to participate and inform the environmental assessment process and potential mitigations

Upcoming Events

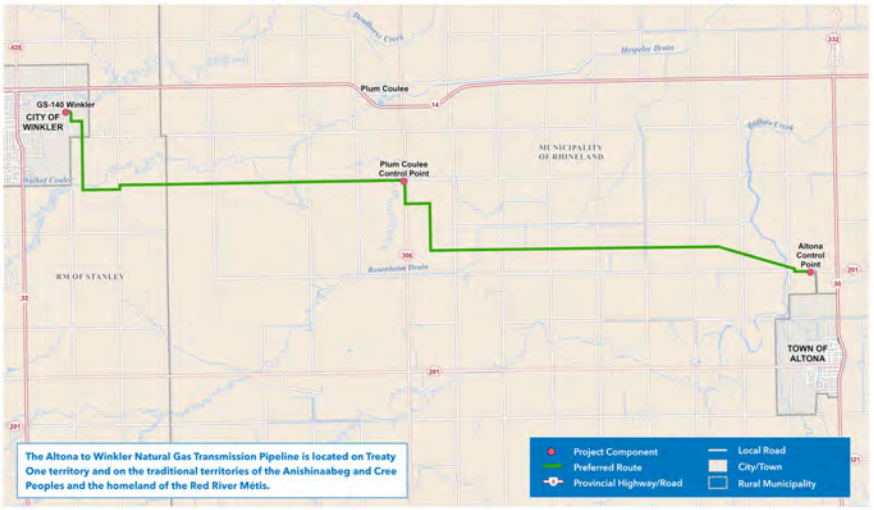
In Person Open House
Wednesday, July 23, @ 5 p.m. to 8 p.m.
Winkler Arts & Culture Centre,
547 Park St, Winkler, MB

Virtual Open Houses
Tuesday, July 22, @ 7-8pm
Thursday, July 24 @12-1pm

Register online at:
hydro.mb.ca/community/engagement/altona-winkler-gas-transmission

Project Timeline

July-August 2025	Opportunities to engage on mitigation measures and valued component selection. Project Open Houses and Meetings with identified interested parties.
September 2025	File environmental assessment for regulatory review.
Spring 2027	Licensing decision anticipated. Construction begins if license is approved.



Contact us for related inquiries

1-877-343-1631 projects@hydro.mb.ca

Manitoba Hydro energy for life

Pre-engagement letter sent to First Nations, the Manitoba Métis Federation, the Town of Altona, the City of Winkler, and the rural municipalities of Rhineland and Stanley

Dear [insert interested party here]

Subject: Manitoba Hydro – Altona to Winkler gas transmission project

I am reaching out to begin a conversation regarding a proposed gas transmission project and to better understand your preferred approach to engagement.

Manitoba Hydro is planning to construct a 30-kilometre, 8-inch steel natural gas transmission line. The proposed route extends from a site north of Altona to a connection point on the east side of Winkler, linking to our existing system to help address capacity constraints in the region.

This project was briefly introduced during engagement on the Dominion City to Altona Gas Transmission Pipeline Project, where we noted that planning was underway for a future gas transmission line between Altona and Winkler. At that time, we committed to sharing more information as the project progressed. This outreach reflects that commitment and marks the next step in our development process.

As part of the regulatory process, Manitoba Hydro will be preparing and submitting an environmental assessment report to Manitoba Environment and Climate Change to seek approval for the project as a Class 2 development.

As we move forward, we would appreciate the opportunity to connect and learn how [insert interested party here] would like to be engaged throughout this process. Your input will help guide our approach and support meaningful dialogue.

A map of the project area is attached for your reference. The green line indicates the preferred route. We're particularly interested in learning about any new proposed developments in or around this area.

In addition, we encourage you to attend one of the upcoming open houses to share your comments about this project. Staff will be available to provide project information and answer questions. Your feedback will help us to understand concerns about the project and inform the final preferred route.

- Tuesday, July 22 from 7 – 8 pm – VIRTUAL
- Wednesday, July 23 from 5 – 8 pm – IN-PERSON (547 Park St, Winkler, MB)
- Thursday, July 24 from 12 – 1 pm – VIRTUAL

To register for any of the virtual open houses, and for additional project updates and information, please visit the project webpage at:
www.hydro.mb.ca/community/engagement/altona-winkler-gas-transmission/

Please feel free to contact me by email at KOze@hydro.mb.ca or by phone at 204-574-8497 to share your preferences or to arrange a time to meet.

Kind regards,

Kale Oze,

Environmental Specialist
Manitoba Hydro
360 Portage Avenue (18)
Winnipeg, MB
R3C 0G8 Canada

Engagement letter sent to landowners along the preferred route

Manitoba Hydro

July 4th, 2025

[Insert name here]
[Insert Adress here]

MANITOBA HYDRO – ALTONA TO WINKLER GAS TRANSMISSION PROJECT

Dear [Insert name here],

I'm reaching out to share information about a proposed Manitoba Hydro natural gas transmission project that may involve your property and to begin a conversation about how you'd like to be engaged as the project moves forward.

Manitoba Hydro is planning to construct a 30-kilometre, 8-inch steel natural gas transmission line. The proposed route extends from a site north of Altona to a connection point on the east side of Winkler. This project is intended to address natural gas capacity constraints in the region by connecting to our existing system.

The proposed natural gas transmission line is primarily in-field and will require additional easement on private properties along the route. If your property is within or near the proposed corridor, we will be reaching out directly to discuss the project in more detail, including access, easement requirements, and next steps.

As part of the regulatory process, Manitoba Hydro will also be preparing and submitting an environmental assessment report to Manitoba Environment and Climate Change to seek approval for the project as a Class 2 development.

A map of the project area is attached for your reference. The green line indicates the preferred route. We're also interested in learning about any new or planned developments in the area that may be relevant to the project.

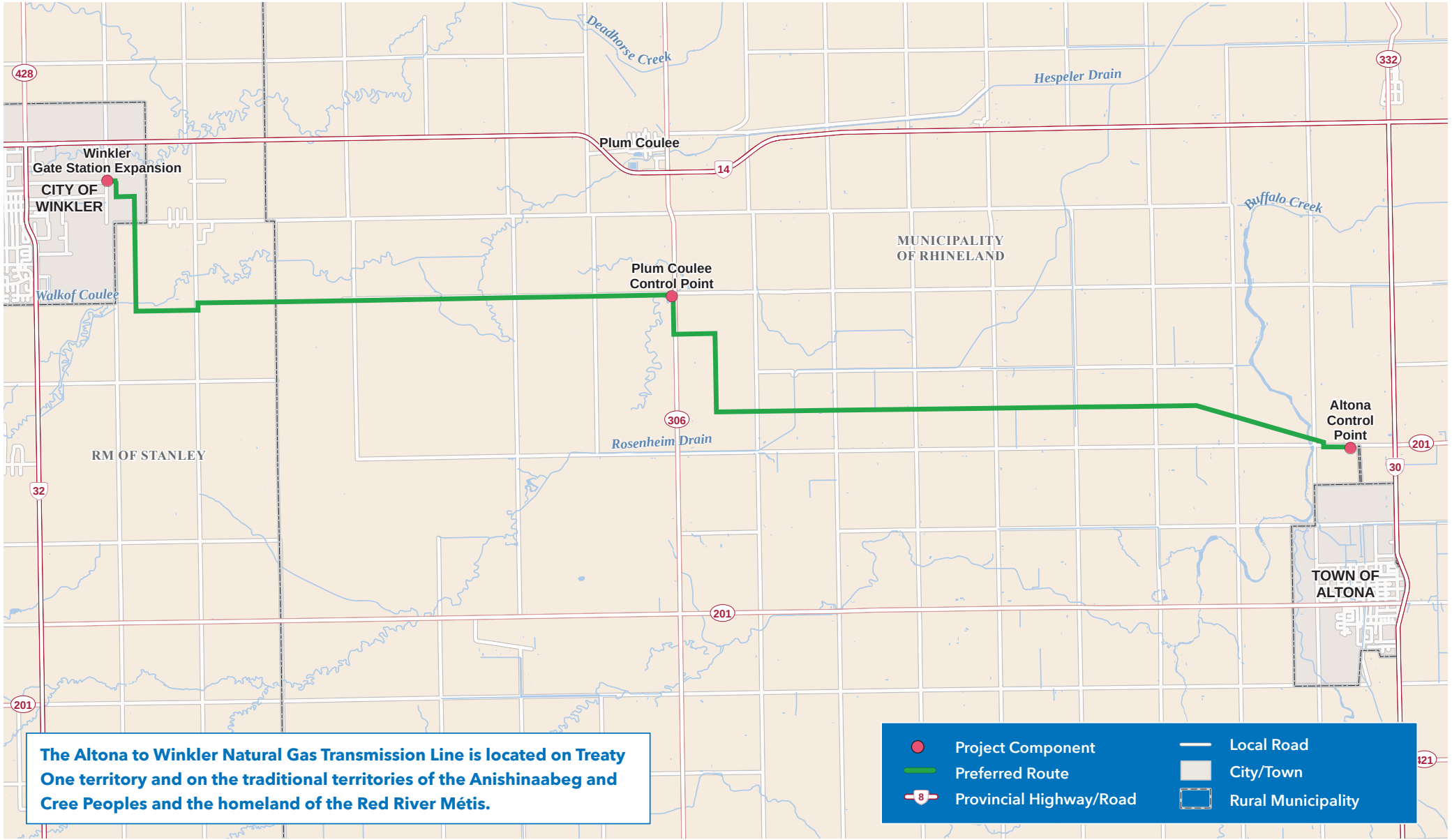
We encourage you to attend one of the upcoming open houses to share your comments about this project. Staff will be available to provide project information and answer questions. Your feedback will help us to understand concerns about the project and inform the final preferred route.

- Tuesday, July 22 from 7 – 8 pm – VIRTUAL
- Wednesday, July 23 from 5 – 8 pm – IN-PERSON (547 Park St, Winkler, MB)
- Thursday, July 24 from 12 – 1 pm - VIRTUAL

To register for any of the virtual open houses, and for additional project updates and information, please visit the project webpage at:
www.hydro.mb.ca/community/engagement/altona-winkler-gas-transmission/

If you have any questions or wish to schedule a meeting, please feel free to contact me by email or by phone.

The following map was included as an attachment in the letters to interested parties


Deadhorse Creek
Hespeler Drain
Buffalo Creek
Walkof Coulee
Rosenheim Drain
Plum Coulee
Winkler
Gate Station Expansion
CITY OF
WINKLER
Plum Coulee
Control Point
MUNICIPALITY
OF RHINELAND
RM OF STANLEY
Altona
Control
Point
TOWN OF
ALTONA
428
14
332
306
32
201
30
The Altona to Winkler Natural Gas 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.
Project Component
Preferred Route
8
Provincial Highway/Road
Local Road
City/Town
Rural Municipality

Follow up registered mail letter sent to landowners along the preferred route who had not previously been heard from during project engagement

Manitoba Hydro

November 21, 2025

[Insert name here]
[Insert Adress here]

MANITOBA HYDRO – ALTONA TO WINKLER GAS TRANSMISSION PROJECT

Dear [Insert name here],

I'm reaching out to follow up on information that was shared with you in July 2025 about a proposed Manitoba Hydro natural gas transmission project. I would like to follow up to discuss the project in more detail and notify you that **the proposed route for the project involves your property.**

Manitoba Hydro is planning to construct a 30-kilometre, 8-inch steel natural gas transmission line. The proposed route extends from a site north of Altona to a connection point on the east side of Winkler. This project is intended to address natural gas capacity constraints in the region by connecting to our existing system. The proposed natural gas transmission line is primarily in-field and will require easement on private property along the route. Please see the map provided to view the proposed project route in further detail.

As part of the regulatory process, Manitoba Hydro will also be preparing and submitting an environmental assessment report to Manitoba Environment and Climate Change in early 2026 to seek approval for the project as a Class 2 development.

We would like to meet with you in the coming weeks to discuss the project in more detail, including access and easement requirements. We would also like to understand any potential concerns you may have regarding the project and be informed of your preferred method of contact moving forward.

Please contact me by email at gcloutis@hydro.mb.ca or 204-583-2352 to set up a meeting, either in person or virtually.

Kind regards,

Geneva Cloutis

Environmental Specialist
Manitoba Hydro
360 Portage Avenue (18)
Winnipeg, MB
R3C 0G8 Canada

Altona to Winkler Gas Transmission Project

Manitoba Hydro

July 2025

Available in accessible formats upon request.

Land Acknowledgement

Manitoba Hydro operates throughout Manitoba, on the original territories of the Anishinaabe, Cree, Anishininew, Dakota, and Dene peoples and the National Homeland of the Red River Métis. We acknowledge these lands and pay our respects to the ancestors of these territories. We also acknowledge the ancestral lands of the Inuit in northern Manitoba.

The proposed Altona to Winkler gas transmission pipeline is on Treaty 1 lands, the original territories of the Anishinaabeg, Dakota, Anishininewak and Ininewak, and the National Homeland of the Red River Métis. We acknowledge these nations who have occupied and cared for these lands for thousands of years and their longstanding cultural and spiritual connections with the land. Through this we recognize the importance of learning and considering the unique perspectives these nations share throughout the project.

Purpose of the meeting

- Share project information
- Answer questions
- Listen to feedback

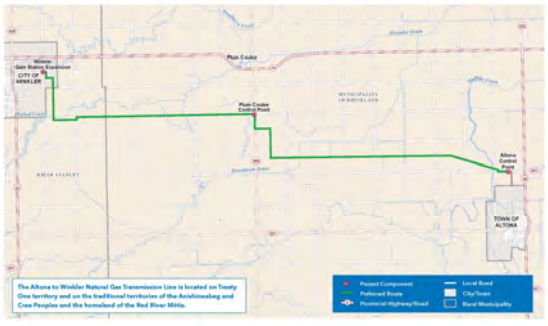
About the project

- **Overview**: 30 km, 8-inch steel natural gas transmission line running from north of Altona to a connection point on the east side of Winkler
- **Purpose**: to increase capacity and address constraints in the area
- **Construction methods**: trenching and horizontal directional drilling
- **Regulatory classification**: Class 2 Development according to *The Environment Act* (Manitoba)
  - An Environmental Assessment Report will be submitted to Manitoba Environment and Climate Change for approval

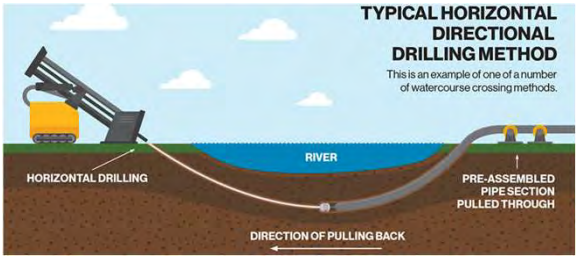
Purpose

- The purpose of this project is to increase the supply of natural gas to the Altona and Winkler regions in response to growing customer demand
- Key drivers of this demand include urban growth, the expansion of cereal crop production, and a shift by some users from alternative energy sources to natural gas

Proposed Project Route



Horizontal directional drilling (HDD)



Manitoba Hydro

Horizontal directional drilling (HDD)

Manitoba Hydro

Trenching

Manitoba Hydro

Who are we engaging with?

- First Nations and the Manitoba Métis Federation
- The Municipality of Rhineland and the RM of Stanley
- The Town of Altona and City of Winkler
- Landowners
- Associations, special interest groups, government organizations

Potential project impacts:

- Speed limits on roads during construction
- Removal of trees
- Noise disturbance
- Potential to find heritage resources during construction
- Potential temporary property access restrictions during construction
- Temporary parking of vehicles and equipment along right-of-way

Manitoba Hydro

Anticipated Schedule

01	02	03	04	05	06
July 2025	**September 2025**	**2025-2027**	**Spring 2027**	**Spring 2027**	**Fall 2028**
Start of engagement process	File environmental assessment report	Regulatory Review	Licence decision anticipated	If licence approved, construction starts	Estimated in-service date

Manitoba Hydro

Next steps

- Continue engagement for the project
- Prepare environmental assessment report
- Conduct heritage work

Questions, Concerns, Feedback?

Key contact at Manitoba Hydro:

Geneva Cloutis
Environmental Specialist
Phone: (204) 583-2352
Email: gcloutis@hydro.mb.ca

Detailed Map

Community Open House

Altona to Winkler gas transmission project

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

Manitoba Hydro energy for life

What is the project?

A new 8-inch steel natural gas transmission line running approximately 30 km from a site northwest of Altona to a connection point on the east side of Winkler.

Why are we doing this?

The purpose of this project is to increase the supply of natural gas to the Altona and Winkler regions in response to growing customer demand. This demand is being driven by urban growth, more cereal crop production, and a shift by some users from alternative energy sources to natural gas.

When is it happening?

- **September 2025**
  File environmental assessment for regulatory review
- **Summer 2027**
  Licensing decision (Anticipated)
- **Summer 2027**
  Construction (If licence is approved)

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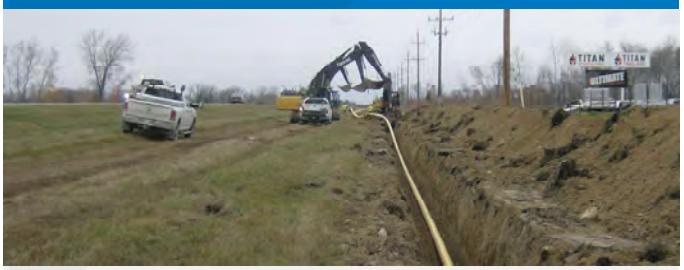
Construction Methods



Trenching involves digging a long narrow hole in the ground and placing the pipeline within it.

- **Typically the trench is 1.3 meters deep with the top of the pipe lying 1 meter below the surface.**

Horizontal Directional Drilling is a method used to install underground utilities, like pipelines. A tunnel that follows an arc shape is drilled under the designated area, and the pipeline is pulled through this tunnel, coming out on the opposite side.

- **Horizontal directional drilling is used to install the pipeline where it crosses drains, railways and roadways.**

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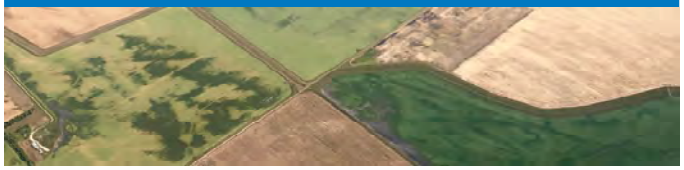
Environmental Assessment

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.



This project is classified as a Class 2 development under *The Environment Act*. An Environment Act Proposal will be developed and submitted to the Environmental Approvals Branch of Manitoba Environment and Climate Change for review.

The steps in the environmental assessment process include:

- Defining the project scope
- Describing the existing conditions
- Assessing project effects
- Assessing cumulative effects
- Monitoring and follow-up commitments

Manitoba Hydro energy for life

Environmental Assessment

Some of the valued components that will likely be considered in the environmental assessment include:

- Important sites
- Vegetation
- Wildlife and wildlife habitat
- Commercial agriculture
- Health and well-being
- Economic opportunities
- Infrastructure and community services

The environmental assessment will evaluate the potential impacts of the project on valued components and identify ways to reduce or prevent potential negative impacts.

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Compensation

For this project, Manitoba Hydro is looking to secure easements along the preferred route. Easements allow for landowners to maintain ownership and continue farming practices. Compensation for easements is based on current market value of the land.

Affected property owners are compensated for:

- Easement for below-ground gas infrastructure
- Easement for above-ground gas infrastructure, if applicable
- Crop damages during construction
- Ancillary damage during construction, if applicable

Our goal is to make every reasonable effort to develop a mutually acceptable agreement for compensation on privately owned land.

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energy for life

Project Details

The anticipated length of the gas transmission line is approximately 30 km.

Where the proposed gas transmission line runs parallel to existing gas transmission lines, a 40-metre right-of-way will be required.

The right-of-way width for the project will be 30 metres where the gas transmission line does not parallel other lines.

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Keep in touch

- If you have any further questions, send them to **projects@hydro.mb.ca** or call **1-877-343-1631**
- You can stay up to date with project information at **www.hydro.mb.ca/community/engagement/altona-winkler-gas-transmission/**

Scan this QR code to visit the project webpage.

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

Manitoba Hydro
energy for life

Altona to Winkler Gas Transmission Line – Meeting Notes

Altona to Winkler Gas Transmission Line Virtual Information Session		
Location: Microsoft Teams	Date: July 22, 2025, 7-8pm	
# of participants	3	
Action Items		
Action Item	Item	Status
Action Item 1	Manitoba Hydro will provide a document to participants that provides information on what activities may be permissible above a gas transmission line and the requested easement area.	Complete. Attached to meeting notes.
Action Item 2	Manitoba Hydro will provide notes from virtual and in person information sessions to participants.	Completed August 2025.

Discussions – category specific	
Category	Discussion
Agriculture	A participant inquired about how many agricultural producers may be impacted by the project and what commodities they focus on. - A Manitoba Hydro representative responded that approximately 44 private property owners are anticipated to be impacted by the project. Manitoba Hydro did not have specific information on agricultural practices in the area yet, and are hoping to gather more information at the in person open house, as well as through one-on-one discussions with property owners to better determine how to mitigate potential impacts.
	A participant mentioned that weed management is always a concern for producers, especially with the transportation of equipment, backfilling soil, and more. They asked if Manitoba Hydro has a strategy for vegetation management. - A Manitoba Hydro representative shared that a biosecurity management plan is part of the project and gets taken into consideration in the construction phase of the project, through the environmental protection program.
Construction	A participant asked who would be undertaking the construction work for the project. - A Manitoba Hydro representative responded that the work will be taken by a combination of Manitoba Hydro employees and contractors. A general pipeline contractor will be hired, and they may subcontract work out to local and regional contractors. Manitoba Hydro staff will be present on site for all of the work, and may include pipeline inspectors, contract inspectors, and other Manitoba Hydro staff.

	A participant asked for further clarification around the schedule, and a definition of what "summer" means regarding construction. - A Manitoba Hydro representative stated that the construction schedule for natural gas transmission lines typically runs from May 15th through September 15th, weather dependent. The participant shared that considerations should also be given in the construction schedule for disruptions to calvers and cattle producers. They also asked that Manitoba Hydro be mindful of the potential for the presence of anthrax in the area, as it can be immediately fatal to cattle. - Manitoba Hydro thanked the participant for sharing these concerns, and noted that these factors will be taken into consideration when planning the construction schedule and project mitigations.
Compensation	A participant inquired whether crop damages are compensated for, so farmers are not wasting their seed. - A Manitoba Hydro representative shared that the property department coordinates with farmers to reduce wasting seeds. There is also a formula utilized to determine the compensation that may be provided to a landowner for their property, taking into consideration the area, the crop, and market value estimates.
Routing	A nearby property owner asked how the route was decided and if there is any possibility of it going further south - A Manitoba Hydro representative shared that a portion of the existing route was selected to parallel existing transmission infrastructure, and is connected to a loop system. The proposed route also considers existing infrastructure development including barns and homes, as well as urban growth of the City of Winkler. Manitoba Hydro is willing to listen to suggestions from landowners and further understand concerns and requests for the line to avoid planned future development on private property. Manitoba Hydro also committed to sharing information with participants on what activities may be permissible above a gas transmission line and the requested easement area.
	A participant asked if the route primarily travels along private property. - A Manitoba Hydro representative shared that the proposed route is primarily located on private property, rather than along highways and ditches in an effort to avoid any issues with ditch clearing, highway expansions, and more. The proposed route traverses a small amount of Crown land where it crosses several watercourse crossings.

Altona to Winkler Gas Transmission Line – Meeting Notes

Altona to Winkler Gas Transmission Line Virtual Information Session		
Location: Microsoft Teams	Date: July 24, 2025, 12-1 pm	
# of participants	8	
Action Items		
Action Item	Item	Status
Action Item 1	Manitoba Hydro committed to providing a KMZ file of the proposed route and associated easement to a participant.	Completed July 24, 2025.
Action Item 2	Manitoba Hydro will publish a KMZ file of the proposed route on the project webpage.	The KMZ file will be made public on the project webpage after August 26, 2025.
Action Item 3	Manitoba Hydro will share the PowerPoint presentation slides with a participant.	Completed July 24, 2025.

Discussions – category specific	
Category	Discussion
Compensation	A participant asked how compensation for easements is negotiated with landowners - A Manitoba Hydro representative shared that an appraiser values the easement area and offers 100% of fair market value for the easement. Any damages, including crop damage, are assessed after construction and compensation is provided for those losses.
Agriculture	A participant inquired about how the project approaches in-ground watering pipelines such as livestock watering systems to supply water troughs. - A Manitoba Hydro representative shared that natural gas transmission lines are considered a shallow utility, and water lines are normally deeper infrastructure. All utilities along the project route including, water lines and fiber optics, are located prior to construction to plan accordingly. A participant asked about considerations made for landowners who may have trenched in their own lines. They also shared that tile drainage should be considered when planning for construction as well. - A Manitoba Hydro representative shared that one-on-one discussions with landowners will take place to account for these considerations in construction. Manitoba Hydro welcomed feedback as to what may be the best practice for working around present or future planned tile drainage, as each landowner may have a different perspective on this.
	A participant asked whether plans for future tile drainage may impact the depth of the pipeline installation on their property. - A Manitoba Hydro representative shared that they would work with each landowner to determine any future development plans including

	drainage. Information is required prior to construction to determine the appropriate depth of the line at each location. When property representatives speak to landowners they will request information regarding planned developments.
Easements	A participant inquired about the setback distances for easements and asked whether landowners have been contacted yet about this project. - A Manitoba Hydro representative shared that an easement of 15 metres on each side of the line will be needed for this project, for a total of a 30-metre-wide easement. Permanent structures such as homes and farms cannot be built on the easement. All property owners along the proposed route received letters with project information and will continue to be contacted for further discussions about the project. A participant inquired whether roads and ditches could be built over the easement area. - A Manitoba Hydro representative shared that roadways cannot be built along the easement, but may be able to cross it, depending on weight restrictions and the purpose of the roadway. Considerations would be made at the time of construction of a roadway over the easement, including additional safe work practices.
	A participant asked if additional easement would be needed in the areas where the proposed route runs parallel to existing lines. - A Manitoba Hydro representative shared that additional easement would be needed, and that compensation would be provided for this additional easement.
	A participant asked if they could be provided a GIS file of the proposed easement to better plan future developments - A Manitoba Hydro representative committed to provide a KMZ file of the proposed line and easement to the participant. This information will also be published on the project webpage.
	A participant asked how deep the line will be in the ground. They shared a concern regarding crossing water bodies, water lines, and ditches. - A Manitoba Hydro representative shared that the line will be placed a minimum of 1 meter below the ground surface. Water bodies may impact the depth, which is considered on a case-by-case basis, utilizing standards set by Manitoba Transportation and Infrastructure (MTI). A participant asked whether the pipe will be 1.3 metres below their ditch, and whether the project will impact drainage programs and ditch cleanouts in Municipal ditches. - A Manitoba Hydro representative responded that the proposed route limits ditches as much as possible, and that they will adhere to the expectations of the landowners and RMs. Sharing concerns and information about specific areas as soon as possible would be helpful for planning purposes and if there are any site-specific mitigation measures that can be identified along the proposed route.
Construction	A participant asked if property owners or Manitoba Hydro would be responsible to cover the cost of burying the line deeper in the future to accommodate future development

	- A Manitoba Hydro representative shared that if a landowner proposed to deepen a line in a certain area prior to construction it could be discussed and accommodations to the request would be considered. If the line was requested to be deepened after initial construction, the requester would be responsible for the associated cost. Completed drawings of the proposed project will be sent to Municipalities for review and approval, and Manitoba Hydro remains open to meeting and discussing planned development and accommodation requests.
Routing	A participant asked if there is any irrigation piping along the proposed project route. - A Manitoba Hydro representative shared that they are not currently aware of any irrigation piping along the proposed route. A route that follows Road 10N was initially proposed, but was not selected as the preferred route due to a major water line running near the road.
Services	A participant asked if customers near the proposed route will have the opportunity access natural gas services off this new line. - A Manitoba Hydro representative confirmed that property owners would be able to request services from this line.
	A participant asked how many additional customers Manitoba Hydro will be able to service with natural gas after this project is completed - A Manitoba Hydro representative shared that it cannot provide a number of customers anticipated to connect to natural gas services and shared that many factors were considered when estimating the requests for supply into the future, including the cost of construction, as well as the current and future demand. Capacity requirements are considered based upon the needs of all customers utilizing the services at the same time, also known as peak demand. The peak demand was developed considering historical growth rates, recent connections, and an estimate of future growth.
	A participant asked if the project was initiated by a specific customer. - A Manitoba Hydro representative shared that the project was not requested by a customer, and is a public interest driven project. The project has been proposed to address the capacity limits of existing infrastructure in the area. The project anticipates to address anticipated capacity and demand 20 years into the future. Customers hoping to connect to natural gas would need to request services, and a distribution line would be developed to service customers. Customers are responsible for the cost of distribution lines, and requests are reviewed on a case-by-case, customer-by-customer basis.
General	A participant asked who participants should provide written submissions and further questions about the project. - Manitoba Hydro shared the following contact information: *Geneva Cloutis* *Environmental Specialist* *Phone: (204) 583-2352* *Email: gcloutis@hydro.mb.ca*

	A participant shared that the municipality they represent is looking forward to the project happening, and that Manitoba Hydro has their support for the project. - A Manitoba Hydro representative thanked municipality representatives for attending and sharing this feedback.

Altona to Winkler Gas Transmission Line – Meeting Notes

Altona to Winkler Gas Transmission Line Public Open House		
Location: 547 Park St, Winkler, MB	Date: July 23, 2025, 5-8pm	
# of participants	~15	
Action Items		
Action Item	Item	Status
Action Item 1	Manitoba Hydro to send letter to send project information letter to a landowner who did not receive project information. The participant had a family member attend the open house and shared that they are a landowner and did not receive a project notification letter.	In progress. Awaiting information from landowner.
Action Item 2	Manitoba Hydro will email a detailed map of the project to a participant	Completed July 24, 2025
Action Item 3	Based on a request from a participant, Manitoba Hydro will investigate moving the line further east and/or whether Horizontal Direct Drilling could be used in this location. Manitoba Hydro will follow up with the participant on the feasibility of these options.	In progress. See follow up in notes below.
Action Item 4	Manitoba Hydro will follow up on the gas line in front of Walmart and future plans for the line and follow up on findings with landowners.	Complete. See follow up in notes below.
Action Item 5	Manitoba Hydro will further review property development plans for a subdivision sent by developers	In progress.
Action Item 6	Rural Municipality of Rhineland to share development plans with Manitoba Hydro.	In progress. Awaiting information from RM.
Action Item 7	Manitoba Hydro will provide a document to participants that provides information on what activities may be permissible above a gas transmission line and the requested easement area.	Complete. Attached to meeting notes.
Action Item 8	Manitoba Hydro to follow up with landowner about what may happen regarding depth of cover and their easement if they decided to install tile drainage to their property after construction, in 2029.	In progress.

Discussions – category specific	
Category	Discussion
Routing	A participant asked if the preferred route is following Road 20W, and how many feet of setback would be needed in that area. - A Manitoba Hydro representative shared that the route does not parallel Road 20W, and is on the west side of the quarter section. A

	30-metre-wide easement would be needed on that section of the proposed route.
	A participant asked if a landowner could do whatever they desire on their property if an easement is in place. - A Manitoba Hydro representative shared that a landowner cannot build a building or permanent structure on the easement, but farming and crossing the easement will still be possible.
	A participant asked why the route does not follow the Hespeler drain - A Manitoba Hydro representative shared that the ground is unstable around the drain so the area was avoided.
	A participant suggested routing the natural gas transmission line along Highway 201, noting that many farmers south of the highway are interested in connecting to natural gas. Bringing the pipeline closer to this area could help reduce connection costs for those farmers. - A Manitoba Hydro representative thanked the participant for this feedback. They shared the route is not following highway 201 as major roadways have been avoided to not interfere with ditches, highway expansions, and other planned developments.
	One participant mentioned that there is a proposed drainage ditch between SE-36-2-4-W and SW-31-2-3-W and between SE-36-2-4-W and NE-25-2-4-W. - A Manitoba Hydro representative noted this information, and thanked the participant for sharing.
	Multiple participants questioned why the proposed line couldn't follow the ditch located on NE-26-2-4-W. They expressed concern that the current route might limit future development opportunities south of the ditch. - Manitoba Hydro responded that this is mostly due to geotechnical considerations. A participant responded that they would be more supportive of the project if it were routed along the ditch.
	A participant shared concerns with the proposed location of the line where it crosses their property, as it is located where they undertake construction activities. They shared that their activities shut down for 2 weeks in July and would prefer, if possible, for construction not occur during that window as to not lose access to their staging yard. They also shared that the site is prone to frost boils in the winter, so staff often auger the property in the winter. Staff will need to be made aware of pipe location to avoid potentially auguring over the line. - A Manitoba Hydro representative shared that Manitoba Hydro will investigate moving the line further east onto agricultural property, and/or whether Horizontal Direct Drilling could be used in this location. - *Follow up:* Manitoba Hydro noted that Horizontal Direct Drilling will need to occur nearby due to the railway, so the line should be deeper than 1 meter within the property. Manitoba Hydro will set up a meeting with the property owner to determine their expectations and scope of work at this location.

	Property developers are proposing a 90-unit subdivision and shared that backyards and a ditch is planned for the location of the proposed line. They shared the proposed development plans with Manitoba Hydro via email. They shared that they could investigate adjusting their proposed plans to accommodate the line. - A Manitoba Hydro representative thanked the participants for sharing this information and will further review the plans sent by developers.
	The Rural Municipality of Rhineland shared that they have expectations for depth of cover in ditches. They shared that they will provide information to Manitoba Hydro. - A Manitoba Hydro representative shared they would be happy to meet to discuss routing options and depth of cover concerns.
	A participant shared that they are supportive of the proposed project, however they were hoping it would not run along the existing infrastructure but rather further from it to lower the cost for those landowners interested in accessing natural gas further south of the current line. - A Manitoba Hydro representative thanked the customer for their support and shared that the line runs along or close to current infrastructure and based upon present and planned development and construction activities, the proposed route is Manitoba Hydro's preferred location for the line. The requests for additional infrastructure south of the existing line may be considered in the future.
	A participant shared concerns regarding depth of coverage and tillage for properties with different crops on them. They shared that some crops may require the line to be built lower than 1 metre below the surface to maintain required depth of coverage. - A Manitoba Hydro representative thanked the participant for sharing this concern and shared that one-on-one discussions with property owners will help to better determine the appropriate depth for pipe installation across various properties.
Compensation	A landowner shared that they rent out their property and inquired what the process for land disturbance is. - A Manitoba Hydro representative shared that the compensation cheque (including compensation for any damages) would be written to the landowner and they can determine how to allocate the funds.
	A participant expressed concern about potentially bearing the cost to deepen a Manitoba Hydro pipeline for future development-related needs, such as drainage. They noted having to pay for an adjustment for pipeline depth in the past for development-related drainage, despite it being Manitoba Hydro infrastructure. - A Manitoba Hydro representative noted this concern and explained that if there are any plans in the future for drainage or development on a property, the landowner should let Manitoba Hydro know when in discussions with their assigned property representative. Property owners will not be responsible for initial costs if Manitoba Hydro is

	aware of them before construction, but will be responsible for future costs associated with depth of cover.
	A landowner shared that they had issues with an exposed pipe west of Winkler and had to pay $80,000 to move the pipe so they could drain water from their property. - A Manitoba Hydro representative thanked the participant for sharing their experience and mentioned that if the participant is planning to have drainage work completed in the future, they should let Manitoba Hydro know so sufficient depth of cover can be planned accordingly.
	A participant asked how compensation for crop damages is calculated. - A Manitoba Hydro representative shared that the affected area as well as the crop planted on the land will be considered. Losses for crop damage are provided at 100% for the first year, 50% for the second year, and 25% for the third year. Compensation is also provided for loss of access.
Construction	A participant asked what pressure the line runs at. - A Manitoba Hydro representative shared that the system is a loop, and pressure remains the same throughout the line. The current pressure along the existing line is 600 PSI, which will remain operational. The proposed line would operate at 800 PSI.
	A participant asked if the pipe is welded, and what the pipe is made of. - A Manitoba Hydro representative shared that the pipe is made of steel, and it is welded. There are testing measures that occur at regular intervals during construction, as well as throughout the operation of the line.
	A participant asked why the project was not considered to be 20% larger than the proposed 8 inches. They had concerns about long-term demand and capacity. - A Manitoba Hydro representative thanked the participant for sharing their concern, and shared many factors were considered when estimating the requests for supply into the future, including the cost of construction, as well as the current and future demand. The capacity requirements are considered based upon the needs of all customers utilizing the services at the same time, also known as peak demand. The peak demand was developed considering historical growth rates, recent connections, and an estimate of future growth. Manitoba Hydro is working to study grain dryer usage and will review solutions to manage this load, which is a contributor to increasing peak demand in the region.
Agriculture	A landowner shared concerns about future development loss and future drainage conflict. Other landowners expressed that they would like to see the line buried further underground, to allow for future development potential - A Manitoba Hydro representative thanked landowners for sharing this concern, and shared that landowners should let Manitoba Hydro know about any plans for future development prior to

	construction. Tile drainage can be installed over or below the proposed line, as long as the line maintains a depth of cover of a minimum of 1 metre.
	Some participants shared concerns that the line will cross water lines on agricultural lands. - A Manitoba Hydro representative shared that natural gas is considered a shallow utility, whereas water lines are typically a deeper utility to eliminate freezing in our climate. This is not a major concern for Manitoba Hydro; however water lines and other utilities are considered when planning the proposed route. The Construction Contractor will also be mandated to identify all utilities in area prior to construction.
	Landowners asked if the line could be installed deeper. - A Manitoba Hydro representative shared that the line can be installed deeper, however it would have to be within reason for depth of cover and would be considered on a case-by-case basis. Construction costs significantly increase when placed deeper, as well as increases to soil disturbance, which we try and minimize wherever possible.
	A participant inquired about soil disturbance, and practices taken to reduce disturbance. - A Manitoba Hydro representative shared that the topsoil would be stripped and kept separately in its own pile. In addition, a soil survey will be undertaken to determine soil conditions pre-constructions. This will provide baseline information for post-construction soil remediation. Biosecurity will be a requirement for construction activities, and the contractor will be required to adhere to any mitigations and plans for biosecurity.
	A participant asked what may happen regarding depth of cover and their easement if they decided to install tile drainage to their property after construction, in 2029. - A Manitoba Hydro representative responded that they would look into it and follow up with this customer on this question.
Easements	Many participants had questions about easements and building restraints and requirements on an easement. - A Manitoba Hydro representative communicated that no permanent structures could be built on easements, however the land can still be farmed.
	A participant shared concerns about depth of coverage on a property they own with an existing easement. They shared that they had the line located utilizing the “Call before you dig” program and requested additional information on the present depth of coverage on their property, however Manitoba Hydro was not able to provide this. The inquiry was to support work they intend to conduct in the fall, and want to ensure they do not expose the pipe. - A Manitoba Hydro representative shared that depth of coverage surveys are conducted on each line every 3 to 5 years. Land

	coverage can change over time due to environmental and human caused factors, so Manitoba Hydro cannot always provide customers with an accurate measurement. The appropriate steps were taken to call and have the line located, and if additional concerns persist, it is recommended to apply for a safety watch to be conducted when working over the line. An application can be filled out on the Manitoba Hydro website.
	A participant shared that they have had no issues with compensation, and have always felt the compensation offered has been fair and reasonable. - A Manitoba Hydro representative thanked the participant for sharing this feedback.
Natural gas services	A participant shared that they have not been able to connect to the existing natural gas infrastructure, and asked if they would now be able to once this project is complete. - A Manitoba Hydro representative shared that the existing system is at capacity, and the purpose of this project is to address demand, so the customer should be able to connect in the future. Those interested in connecting to natural gas would have to fill out an application. Manitoba Hydro would then provide design options for the customer to review. Once confirmed, the customer would pay for the connection services to their desired location. Additional considerations may include the number of customer requests in an area, the load, and if the customers want to share associated costs.
	A participant asked how much it costs to install a farm tap. - A Manitoba Hydro representative shared that there are 4 sizes of farm taps, and that the cost can range anywhere from $30,000-100,000, based on factors including the size of the line, location, and more. Customers may also be able to share the costs.
	A participant shared that many of their neighbours are interested in connecting to the proposed natural gas line, and that they are anticipating that there will be many requests for customer hook-ups. The participant encouraged Manitoba Hydro to survey the area in future to better determine the number of requests that they can anticipate. - A Manitoba Hydro representative thanked the participant for sharing this information and noted the suggestion.
	A participant asked how long will the proposed expansion will address the demand requests in the area. - A Manitoba Hydro representative shared that planning and future forecasting anticipates are undertaken for all of our projects. It is anticipated that this project will service the present and future demands for services for up to 20 years in this area.
General	A landowner shared that they have concerns about the project, based upon their previous experiences with Manitoba Hydro. - A Manitoba Hydro representative thanked the participant for sharing their concerns

	A participant shared that there are existing development plans south of Rhineland that have not yet been approved and are still in the planning phase. - A Manitoba Hydro representative thanked the participant for sharing this information.
	A participant asked if all impacted landowners are contacted, and how their feedback is considered. - A Manitoba Hydro representative shared that all impacted landowners have been notified by mailed letters, and that a property representative will be in touch with them prior to construction of the project. Feedback is documented and considered in the selection of a final preferred route, as well as in developing mitigation measures and the environmental protection program for the project.
	Participants expressed a general sense of support for natural gas expansion in the area, with many expressing interest in connections for agricultural use—particularly grain dryers. Landowners considering subdivision of their properties were also more supportive, recognizing that future developments could benefit from access to natural gas.
	Some participants noted the project aligns well with their current development efforts and shared interest in how it could support or enhance future plans.
	Landowners inquired about the gas line that is located in front of Walmart in Winkler, noting that they were under the impression that the line may be decommissioned or stepped down to lower pressure. - A Manitoba Hydro representative committed to determine any future plans for the line, and to follow up on findings with open house participants. - *Follow up:* Manitoba Hydro determined that this line was previously used for transmission pressure, but is now at distribution pressure and fully integrated into the distribution system in Winkler. Manitoba Hydro has not been made aware of further plans for this line by the developer.

The virtual and public open house meeting notes were shared with participants on August 26, 2025. As of December 2025, the following updates to action Items related to the public open house that took place on July 23, 2025, labelled as "in progress," have since been made:

- Status of Action Item #1: Manitoba Hydro followed up with the landowner by phone on August 20, 2025 and left a voicemail. No follow-up has been received. Based on information shared at the open house, the parcel of land owned by this landowner is not along the final preferred route.
- Status of Action Item #3: Manitoba Hydro has addressed concerns through discussions with the landowner and has moved the location of the final preferred route on this property further east.
- Status of Action Item #5: Manitoba Hydro has reviewed the information shared for a subdivision sent by developers and taken this into consideration in the proposed route and design of the project. The final preferred route no longer traverses the proposed subdivision shared at the open house.
- Status of Action Item #6: the Municipality of Rhineland confirmed presently available development plans with Manitoba Hydro and will provide additional information in 2026 when it becomes available. More information can be seen in *Section 4.7.2.2*. of the environmental assessment report.
- Status of Action Item # 8: Manitoba Hydro has continued to engage in discussions with individual landowners regarding property-specific concerns and these conversations will continue as the project moves into the regulatory review and property acquisition phases. More information is available in *Table 4-5: Summary of engagement feedback and associated project outcomes.*

Note: Attached letter *RE: Land Development Near Proposed 8" Transmission Pressure Pipeline*

The attached letter *"RE: Land Development Near Proposed 8" Transmission Pressure Pipeline"* details the permitted and unpermitted activities that may take place above ground of a natural gas transmission pipeline. The letter was developed in response to recurring questions from property owners who may be directly impacted by the development of the proposed Altona to Winkler project.

Information that addresses key questions and concerns raised throughout our engagement on this project has been summarized below:

- Items such as construction materials, vehicles, campers, boats, barrels, chemicals, etc. are not permitted to be stored on the easement, even for short durations. Stored items may restrict access to the pipeline should Manitoba Hydro need to respond to an emergency in the area.
- Habitable structures, catch basins, stockpiled material (such as excavated soil, sand, gravel, building material or snow), septic fields or pits, individual garden plots, buildings, sheds, underground structures (foundations, posts, poured piles, footings), planting of trees or shrubs, all signage (including billboards and portable signs) are not permitted on any portion of the easement.
- The following may be permitted on a transmission easement, subject to conditions:
    - Agricultural activities
    - Fences
    - Parking lots
    - Public greenways or recreational corridors
    - Driveways and property access
    - Utility crossings including water, sewer, pipelines, and other services
- A Manitoba Hydro High Pressure Safety Watch is required for all construction activities within 3.0 m of any transmission pressure natural gas pipeline.
- Contact "Click before you dig" a minimum of 2 weeks prior to any work commencing within 3.0 m of the transmission pressure natural gas pipeline to arrange for the pipeline to be properly located and marked by Manitoba Hydro personnel at www.ClickBeforeYouDigMB.com or call 1-800-940-3447
- If it is determined that a final depth of cover of 1.0 m cannot be maintained for the transmission main, then please contact Andrew Greaves at agreaves@hydro.mb.ca to discuss options pertaining to lowerings or relocations.

For more detailed information, please review the attached letter.

Manitoba Hydro

360 Portage Ave (16) ♦ Winnipeg, Manitoba Canada • R3C 0G8
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E: agreaves@hydro.mb.ca

Aug 22nd, 2025

To Whom It May Concern:

RE: Land Development Near Proposed 8" Transmission Pressure Pipeline

Manitoba Hydro's proposed construction of an 8-inch steel transmission natural gas pipeline will provide significant capacity upgrades to the area (Altona to Winkler), supporting growth for residential, commercial, industrial and agricultural growth. This project, in some cases, may allow direct connection for serving rural properties and will enhance and support expansion of the existing distribution network in nearby towns and cities.

Special Concerns

- A Manitoba Hydro High Pressure Safety Watch is required for all construction activities within 3.0 m of any transmission pressure natural gas pipeline.
- During construction activities Manitoba Hydro may require that natural gas mains within 3.0 m of the work be exposed to determine the exact location and depth of cover in relation to both existing and proposed grades. Note that all locating and soft-digging requirements listed below are to be upheld.
- If natural gas mains are exposed during construction, they should not be exposed or undermined past the 3 o'clock and 9 o'clock position on the cross-section of the pipe.

Easements

- Please note that Manitoba Hydro has pending easements for the proposed transmission pressure pipeline. These easements provide Manitoba Hydro permit access rights that will allow continued safe operations of the pipeline.
- Note that there are some restrictions for development on transmission pressure easements.
- Items such as construction materials, vehicles, campers, boats, barrels, chemicals, etc. are not permitted to be stored on the easement, even for short durations. Stored items may restrict access to the pipeline should Manitoba Hydro need to respond to an emergency in the area.
- No handling of environmentally hazardous material is permitted on any portion of the easement.
- Any use that has a negative effect on the natural drainage of the property is not permitted on any portion of the easement.
- Habitable structures, catch basins, stockpiled material (such as excavated soil, sand, gravel, building material or snow), septic fields or pits, individual garden plots, buildings, sheds, underground structures (foundations, posts, poured piles, footings), planting of trees or shrubs, all signage (including billboards and portable signs) are not permitted on any portion of the easement.

Items which are permitted on transmission easements, subject to conditions:

- Fences may be permitted, provided that a minimum horizontal separation of 1.0 m is maintained between the natural gas main and any portion of the fence. Perpendicular fence crossings are preferred to parallel fences.
- Parking lots will be permitted, provided that a minimum cover of 1.0 m is maintained over the natural gas main. The gas main must be protected from sub-base materials.
- Agricultural use is permitted.
- Public greenways or recreational corridors in partnership with a municipality are permitted.
- Driveways and property access are permitted where property has become landlocked, and no other options are available.
- Utility crossings, including water, sewer, pipelines and other utility services are permitted. If utilities must be installed in Manitoba Hydro's easement, a Manitoba Hydro Crossing Agreement is required to be executed between the owner of the crossing utility and Manitoba Hydro's Property Department.
- While the above items are permitted, Manitoba Hydro may require their removal to facilitate access to their natural gas main or easement under special circumstances. Manitoba Hydro will make reasonable efforts to avoid removal when possible.
- Any item which is not identified in the above list shall not be placed on our easement without prior review and approval by Manitoba Hydro. Please contact Andrew Greaves at agreaves@hydro.mb.ca if you have any questions or require clarification.
- If it is determined that a final depth of cover of 1.0 m cannot be maintained for the transmission main, then please contact Andrew Greaves at agreaves@hydro.mb.ca to discuss options pertaining to lowerings or relocations.

1. **Transmission Pressure Natural Gas Main**
   - Contact "Click before you dig" a minimum of 2 weeks prior to any work commencing within 3.0 m of the transmission pressure natural gas pipeline to arrange for the pipeline to be properly located and marked by Manitoba Hydro personnel at **ClickBeforeYouDigMB.com or Call 1-800-940-3447.** Upon receiving clearances, the excavator will be provided with the phone number of the appropriate District in order to coordinate a Manitoba Hydro High Pressure Safety Watch.
   - Prior to construction at this location, please expose the pipeline by hand or hydro-excavation in order to confirm elevation of the pipe. The elevations & corresponding locations shall be forwarded back to Andrew Greaves at agreaves@hydro.mb.ca.
   - Once the pipeline depth and location has been confirmed by hand or hydro-excavation, the safety watcher *may* authorize the limited use of mechanical excavation. A smooth edged bucket must be used for excavations within 3.0 m of the main.
   - A minimum 1000 mm of cover shall be maintained in all areas where highway rated equipment will be crossing, traveling or compacting over the 219.1 mm gas mains. Vibratory compaction cannot be used over or within 3.0 m of a high pressure main.
   - If highway rated equipment must cross, travel, or compact over the gas main with less than the minimum depth of cover, or if equipment heavier than highway rated load cross the main then submit construction/crossing plans to the engineer

agreaves@hydro.mb.ca. Earth bridging or steel plates must be placed over the main and extend a minimum of 1.0 m on either side at each crossing location when crossing with less than minimum cover.

- When working with less than minimum cover, a minimum 300 mm of granular material shall be bladed into place with tracked equipment offset from the pipeline. Then static compaction equipment would be allowed and built up in layers until minimum cover is achieved.
- Subbase material shall be bladed into place as opposed to being end dumped over the 219.1 mm gas main in areas with less than the minimum cover.
- Crossings shall be punched, bored, or horizontally directionally drilled (HDD). Open cut or trenched crossings may be authorized under special circumstance but require further review and engineering approval from Manitoba Hydro Gas Design. Pipe jacking across any gas main is not permitted unless approved by Gas Design.
- Directional drills, punches, and bored crossing shall maintain the greater of a minimum of 1.0 meters or 1.5 times the bore diameter separation between external surfaces of the pipelines or cables and bores and must be drilled beneath the existing Manitoba Hydro pipeline. Crossings above Manitoba Hydro's pipeline are not acceptable.
- For directional drills, punches, and bored crossings, the clearance space around the third party's pipeline or cable must be kept to a minimum and post installation soil settling of the clearance space must not reduce the support or soil compaction of Manitoba Hydro's pipeline above.
- The third party's new pipeline or cable shall maintain the same elevation and alignment for the width of the crossing, with no bends or changes in elevation.
- The crossing shall be made such that the pipeline or cable crosses Manitoba Hydro's pipeline as close to perpendicular as possible.
- No joints shall be made directly over or under of the Manitoba Hydro pipeline.
- Cathodically protected foreign facilities shall be designed and tested to ensure no adverse interference with the existing pipeline cathodic protection.
- The third party shall soft-dig by hand or hydro-vac a "viewing hole" as per the Manitoba Hydro Safe Excavation and Safety Watch Guidelines to confirm alignment and elevation of drill head during crossing.
- Depth of cover must be restored to the greater of the pre-existing coverage or 1.5 m above Manitoba Hydro's pipeline. Backfill must be bladed into place, not end-dumped.
- Caution must be used to ensure the integrity of the pipeline coating. Any damages to the coating must be reported to and repaired at no cost by Manitoba Hydro prior to backfilling.
- The contractor and all site supervisory personnel and equipment operators shall be informed of the risks associated with working adjacent to, and over this pipeline by the Resident Inspector. New site personnel during construction shall be orientated as to the significance and constraints associated with working over and around a high pressure natural gas main.

2. Insufficient Cover

- Absolutely no work including concrete cutting or pavement breaking may occur over the pipeline (regardless of size) until depth of cover is determined and a safety watch is on site.

3. **Tree Installation**
   - A minimum 1.9 m of separation shall be maintained in all areas between the center line of new trees and the 219.1 mm gas mains. Under no circumstances are trees approved to be planted closer.
   - The minimum separation may be reduced to 1.0 m if an approved root barrier system is used. For further details on approved products contact Andrew Greaves at agreaves@hydro.mb.ca.

4. **Tree Removal**
   - Proposed excavations of trees and roots within 3.0 m of a natural gas main require the roots to be exposed by hand to ensure it does not affect the integrity of the main or the coating on the pipe.

5. **Deep Utilities Removal and Installation**
   - Proposed excavations for the removal and installation of deep utilities appear to be within 1.0 m of a gas main in which case will require exposure to be completed by hand or Hydro-excavation. Caution must be used when working in the vicinity of the natural gas mains at these locations.
   - Deep utilities shall maintain a minimum horizontal clearance from natural gas mains of 1.25 m when running in parallel.
   - A minimum horizontal separation of 300 mm from gas mains and 100 mm from service lines must be maintained for any new underground structure installations excluding directionally drilled, punched, and bored crossings. If an underground structure must be installed with less than the minimum horizontal separation, an underground rigid foam barrier shall be placed over the main for protection. Submit plans for barrier installation to the engineer agreaves@hydro.mb.ca
   - Underground structure installations above natural gas infrastructure should be avoided. Contact the engineer agreaves@hydro.mb.ca if installations above facilities are required.

6. **Building Foundation Installations**
   - In areas where there are no easements prohibiting buildings, a minimum horizontal clearance from building foundations of 3.0 m must be maintained.

7. **Sidewalk Renewals**
   - Excavations shall be limited to removal of the existing concrete sidewalk. All further excavations within 1.0 m of any natural gas main or service must be completed by hand or soft dig methods.

8. **Asphalt Overlays and Road Reconstruction**

- When excavations for concrete works are required within 1.0 m of any natural gas main, the main must be exposed by hand or soft dig methods to verify the main elevation at intervals to be determined by the site inspector.
- Should a main be exposed to sub-base, the main requires rock wrap and may also require lowering.

9. **General:**
   - Please note that the requirements of Manitoba Hydro's Safe Excavation and Safety Watch guidelines shall apply. All natural gas pipelines and service lines must be properly located and marked by Manitoba Hydro personnel. This can be arranged by visiting **ClickBeforeYouDigMB.com or call 1-800-940-3447.** Construction operations are not to commence unless these conditions are adhered to.
   - A minimum separation of 100 mm from gas service lines must be maintained for any new underground structure installations excluding directionally drilled, punched, and bored crossings. If an underground structure must be installed with less than the minimum separation, an underground rigid foam barrier shall be placed over the main for protection. Submit plans for barrier installation to the engineer agreaves@hydro.mb.ca.
   - A minimum 450 mm of cover shall be maintained in all areas where highway rated equipment will be crossing, traveling or compacting over the gas service lines. Vibratory compaction cannot be used over or within 1.0 m of a service.
   - All construction operations within the vicinity of natural gas pipelines are to take place in a manner so as not to damage or cause detriment to the integrity of the natural gas pipeline. Any damages to the coating must be reported to and repaired at no cost by Manitoba Hydro prior to backfilling.

If you have any questions or comments, please contact the undersigned.

Regards,

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AG/BC
Cc: Nick Bruce
Megan Anger

APPENDIX B

Heritage technical report

January 2026

Manitoba Hydro

HERITAGE RESOURCES TECHNICAL REPORT ALTONA TO WINKLER GAS TRANSMISSION PROJECT

Prepared For:

MANITOBA HYDRO

Attn: Megan Anger

Transmission & Distribution

Environment and Engagement

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Prepared by:

NORTH ROOTS RESEARCH

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August 12, 2025

North Roots Research
Historical & Genealogical Services

EXECUTIVE SUMMARY

Manitoba Hydro is planning to construct a 30-km, 8-inch steel natural gas transmission pipeline from a site north of Altona to a connection point on the east side of Winkler, MB. The line will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation. This project is being developed to address capacity constraints in the regional gas transmission system and to support continued growth in the Altona and Winkler areas. This technical report supports the Environmental Assessment report to meet the requirements of the Manitoba Environment Act for a Class 2 Licence for this project.

All heritage resources and/or human remains are protected by Manitoba's *Heritage Resources Act* (Government of Manitoba 1986) and the *Policy Concerning the Reporting, Exhumation and Reburial of Found Human Remains* (Government of Manitoba 1987). Heritage resources are to be considered as part of the scope of the project to determine the potential for heritage resources within the project footprint and to ensure important or sacred sites will not be impacted through construction and development as required by Section 12(2) of *The Heritage Resources Act* (1986). This report details an initial assessment of heritage resource potential of the of the study area and specificially focused on a 1-km area around the proposed pipeline right-of-way, using a combination of archival research, LiDAR and terrain imagery, and review of existing archaeological and historic sites.

Through the desktop assessment, nine areas of heritage concern were identified, including areas in close proximity to known archaeological sites or historic Mennonite villages or cemeteries, relict channels, and waterways – specifically the Hespeler Drain and Buffalo Creek. These water crossings were deemed as having the highest potential for heritage materials. Based on these findings, it is recommened that an Heritage Resource Impact Assessment be completed for this proposed infrastructure development. This determination was based on information from data acquired from the Manitoba Sport, Culture, Heritage and Tourism, the Historic Sites of Manitoba dataset from the Manitoba Historical Society, a review of land-based features of interest, archival research and professional judgment. Additional information may be obtained through the project's engagement process and will be incorporated into the heritage assessment as information becomes available.

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1.0 INTRODUCTION

The objective of this technical report is to provide an assessment of the proposed Altona to Winkler gas transmission project relating specifically to heritage resources. Heritage Resources are protected under the Heritage Resources Act (Government of Manitoba 1986) and are defined as:

- a heritage site;
- a heritage object; and
- 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.

This technical report supports the Environmental Assessment (EA) Report to meet the licensing requirements of Manitoba's *The Environment Act* for a Class 2 Licence for this project. This report describes the existing cultural historical background, outlines initial heritage screening of the project, identifies heritage areas of concern and makes recommendations to address and mitigate these concerns.

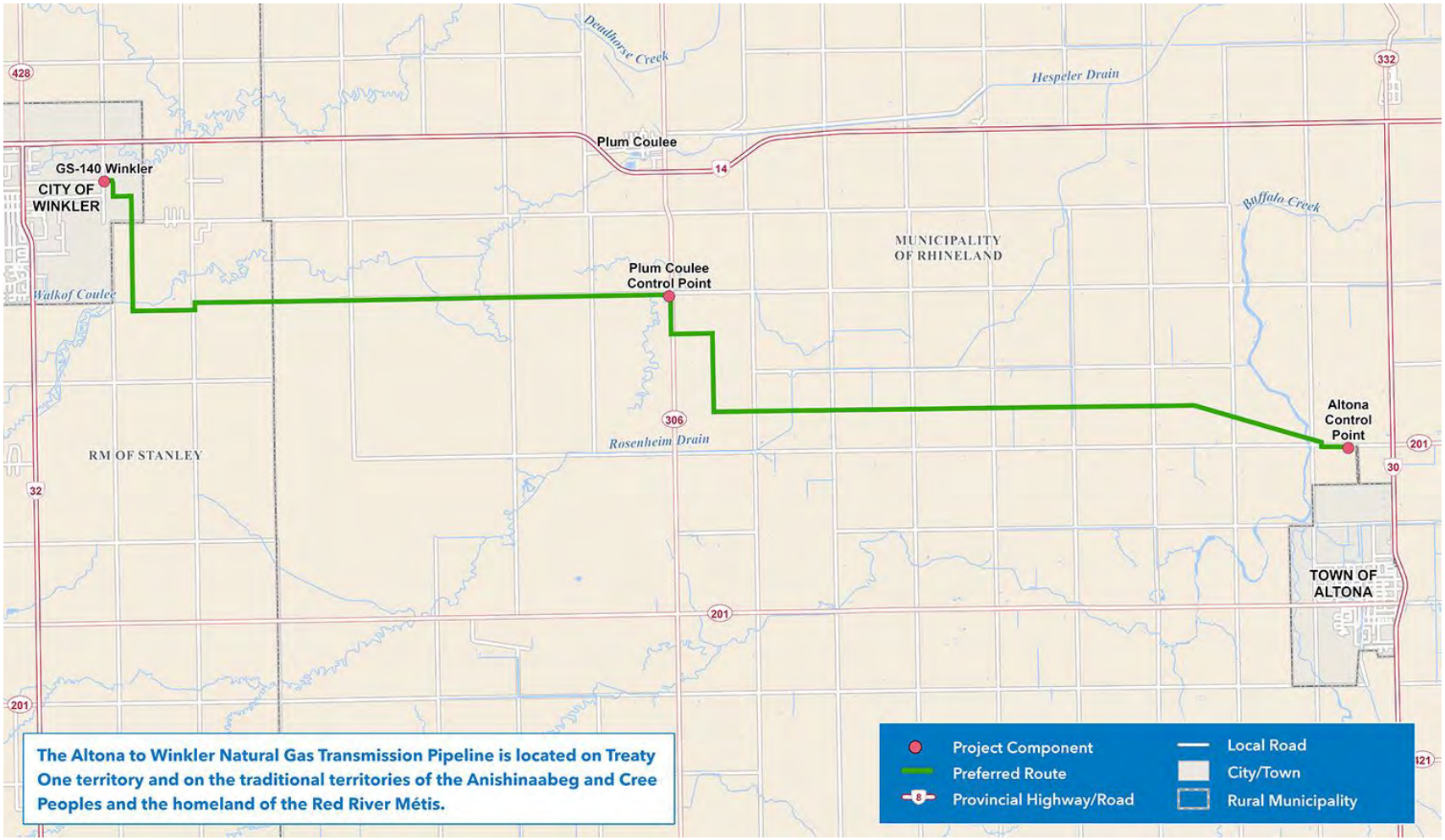
1.1 PROJECT OVERVIEW

Manitoba Hydro is planning to construct a 8" steel natural gas transmission line from a site north of Altona to a connection point on the east side of Winkler. The proposed line is 30 km in length and will fall within the Rural Municiaplity of Stanley and the Municipality of Rhineland and traverses the communities of Reinfeld, Altona, and Winkler. The project is located on Treaty 1 lands, the original territories of the Anishinaabeg, Anishininewak and Ininewak, and the National Homeland of the Red River Métis. The line will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation. This project is being developed to address capacity constraints in the regional gas transmission system and to support continued growth in the Altona and Winkler areas. This project is a Class 2 development under The Environment Act.

Construction methods for this project include trenching and horizontal direct drilling. Trenching involves excavating the ground and placing the transmission line within the excavated area. A typical trench depth is 1.3 meters, and the top of the pipe lays 1 meter below the surface. Horizontal direct drilling is used to install the transmission line where it crosses drains, railways and roadways. It is a technique used to install underground utilities, like pipelines. A tunnel that follows an arc shape is drilled under the designated area, and the transmission line is pulled through the drilled underground tunnel, resurfacing on the opposite side.

To be consistent with the EA document being prepared for this study, a regional assessment area (RAA) of five (5) km around the project right of way (RoW) and a local assessment area (LAA) of one (1) km around the project right-of-way are defined parameters of the study. Figure 1 shows the proposed pipeline route.

Figure 1. Proposed Project Location



2.0 STUDY AREA

An understanding of the heritage use and potential of a property begins with its environment. The environment shapes the type of human occupation and land use of an area. Major environmental factors, such as glaciers and glacial lakes, would affect the type of vegetation present which would then influence the presence of humans and animals that utilize these plant food sources. In addition, other types of natural resources such as rocks and minerals that could be utilized for tools and tool making may also influence occupation and suitable habitation areas.

2.1 ENVIRONMENT

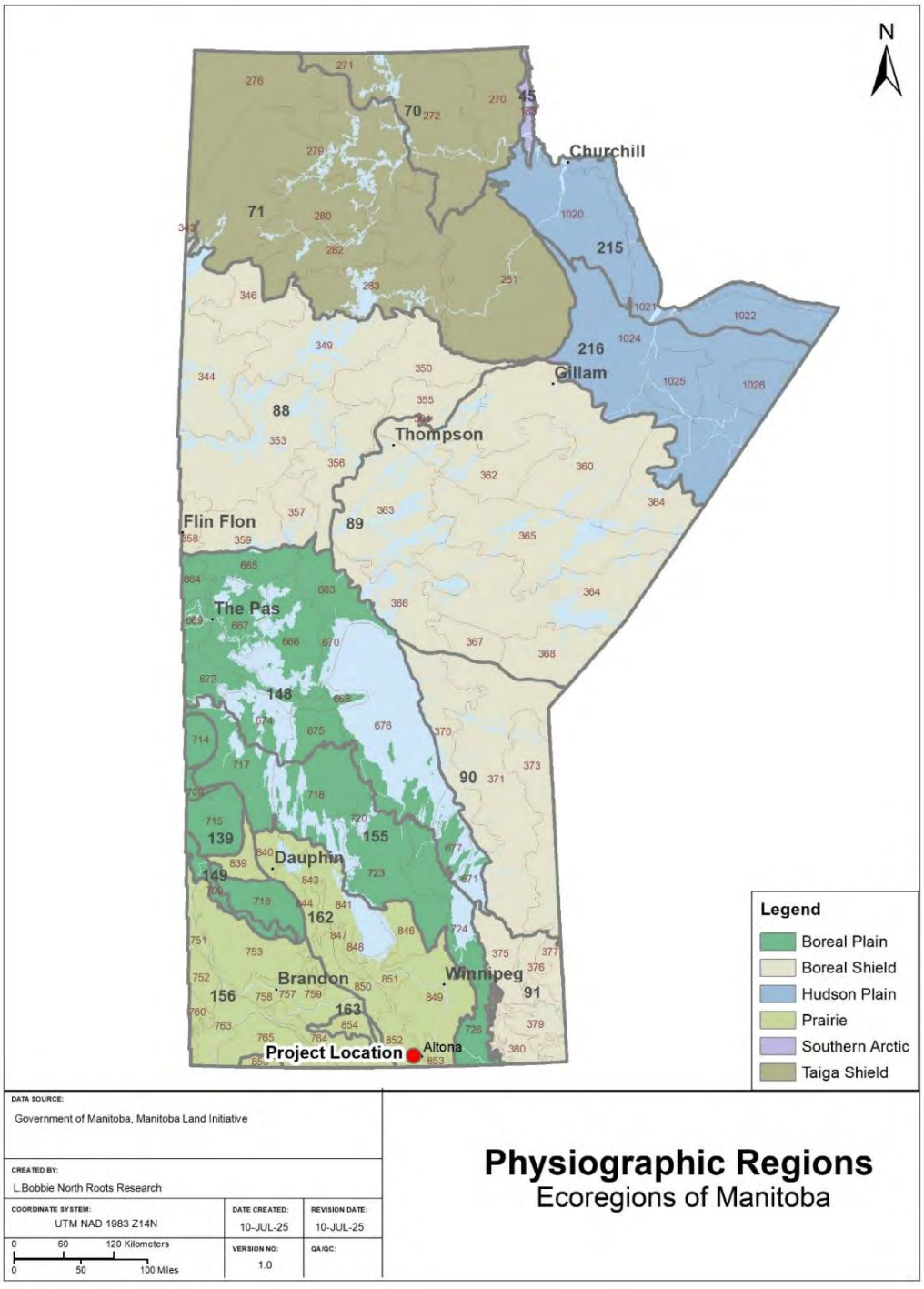
The RAA is situated in the Prairie Ecozone, the northern extension of the former open grasslands of the Great Plains of North America. Topographic relief is generally subdued (Smith et al: 205). Originally, a large part of this ecozone in Manitoba consisted of tall-grass prairie. Most of this region has been converted to cropland or has been strongly modified by drainage, grazing and haying (Smith et al: 206). The natural environment is part of the Winkler Ecodistrict (852) of the Lake Manitoba Plain ecoregion (162) which lies immediately east of the Manitoba Escarpment and north of the U.S. boundary.

The Lake Manitoba Plain ecoregion is siutated in the Manitoba Plain, the lowest and most level of the three prairie steps in Canada. It is underlain by low-relief, flat-lying Paleozoic limestone bedrock and is covered by glacial till and by silts and clays deposited by glacial Lake Agassiz. The topography of the RAA is generally level to very gently sloping. Throughout a large portion of the Muncipality of Rhineland, micro-relief is evident with only creeks and streams providing the only natural breaks in relief over much of the area (Podolsky 1991:1). However, these have been modified into ditches and channels to provide better drainage. The only natural body of water in the study area is the so-called Buffalo Lake, near Altona, which is a wider portion in the upper section of the Plum River channel (Podolsky 1991:4).

The soils in the Winkler Ecodistrict are predominantly moderately well drained to imperfectly drained Black Chernozems that have developed on shallow, strongly calcareous, loamy to clayey glaciolacustrine sediments. Local areas of dominantly clayey Gleysolic soils are also common. Its mean elevation is about 267 m asl. It is a level to very gently sloping glaciolacustrine plain, with relief of approximatley 1 to 3 m occuring along the numerous meandering creeks emanating from the escarpment and flowing generally northeastward toward the Red River or Morris River. The ecodistrict is marked by one of the warmest and most humid regions in the Canadian Prairies. The mean annual temperature is 3.1°C, the average growing season is 185 days.

The native vegetation of tall prairie grasses and herbs have largely disappeared as a result of cultivation. Native forest was found as strips along waterways and are comprised of green ash, white elm and Manitoba Maple with associated shrubs such as hazel and saskatoon. Bur oak could be found on riverbanks not prone to flooding. Wildlife includes white-tailed deer, coyote, rabbit and ground squirrel and waterfowl (Smith et al 1998:244-245; 266-267). The land use and economy of the Municipality of Rhineland is based on intensive and diversified agricultural production. The prime land is conducive to the growing of a variety of crops. In addition, there are several fairly large hog and poultry operations in the area along with limited livestock and dairy production (Podolsky 1991).

Figure 2. Project Location within the Winkler Ecodistrict (852), Aspen Parkland Ecoregion (156), and Prairie Ecozone



3.0 HERITAGE SCREENING METHODOLOGY

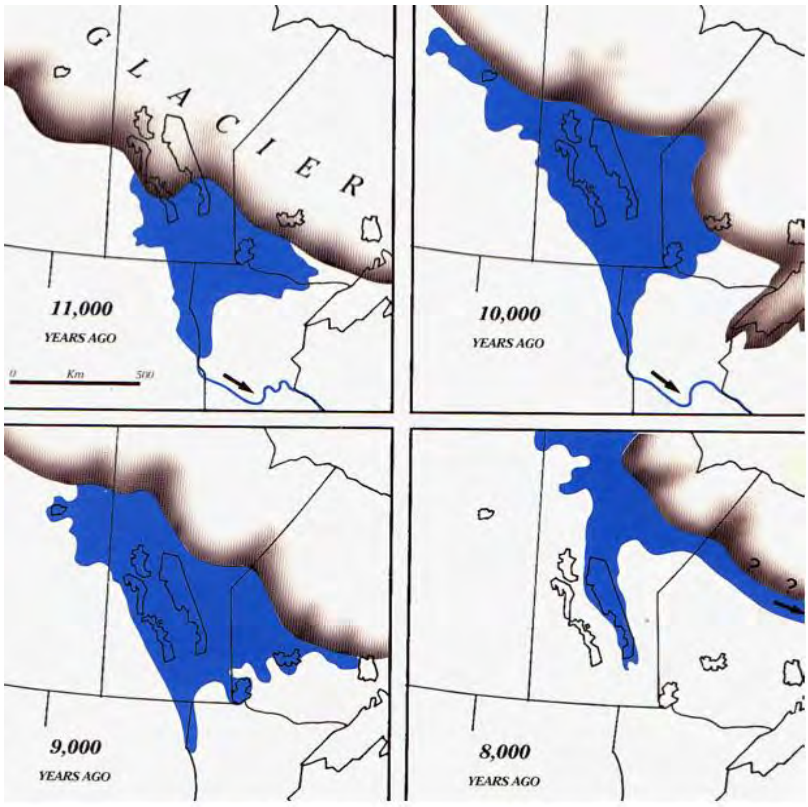
The heritage resource assessment was informed by three pieces of information: documented history, known archaeological and historical sites and detailed landscape analysis which included LiDAR imagery overlaid onto the study area to allow for visual examination of land-based features. Additional information may be obtained through the project's engagement process and will be incorporated into the heritage assessment as information becomes available.

3.1 CULTURAL AND HISTORICAL SETTING

The project lies within Treaty 1 lands, which historically included the Ojibway (Saulteaux), Cree, Assiniboine and the Sioux, and are the original territories of the Anishinaabeg, Anishininewak and Ininewak, and the National Homeland of the Red River Métis. We acknowledge these nations who have occupied and cared for these lands for thousands of years and their longstanding cultural and spiritual connections with the land.

The cultural history for Manitoba is complex and covers a period that would have begun after deglaciation and the final draining of Glacial Lake Agassiz around 7,700 years ago (yra)(Nielsen et al 1996). Lake Agassiz's 4,500-year lifespan saw the rise and fall of its water levels which created glacial beach ridges and escarpments. Glacial Lake Agassiz and its post-glacial beaches of sand and gravel played a central role in the shaping of Manitoba's topography and human history (Goldsborough 2018).

Figure 3. Deglaciation of the RAA



A brief cultural chronology is presented below and is divided into the Indigenous Period (8,000 – 300 yra[1]) and Indigenous-European Period (300-100 yra).

Indigenous Period

The first human inhabitants arrived in the southwestern corner of Manitoba during the Paleo Period (12,000-8,000 yra). As mentioned previously, the RAA was not habitable during this time period due to either being covered by glaciers or by glacial lake Agassiz. This is a time when 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 traditions based on projectile point typologies: Clovis, Folsom, and Plano. These large lanceolate projectile points were hafted at the ends of thrusting or throwing spears. These peoples were nomadic hunter-gatherers who tracked and hunted megafauna, such as the mammoth, using large lanceolate spear points. Cultural materials from this period are rare.

As the climate warmed during the Altithermal period, the once coniferous forest transitioned to grasslands and herds of bison migrated northwards. Several cultures depended upon the bison for their subsistence and expanded their spheres northward into southwestern Manitoba (Buchner 1990). This era, known as the Intensive Diversification Period (8,000 – 2,000 yra), represents a time of technological innovation with the use of atlatl darts and side-notched projectile points. These cultural groups, such as Oxbow, McKean, Pelican Lake, Ducan and Hanna, exploited a more diverse resource base but still focused on big game hunting represented by the large communal bison kill sites. Extensive trade networks developed with agricultural village cultures to the south along the Missouri River, and to both coasts as evidenced by native copper from the Great Lakes and west coast marine shell artifacts found in Plains archaeological sites (Green 1998:34). High-quality raw materials for tools and weapons included Knife River Flint from North Dakota which were imported and traded into Manitoba during ancient times.

The next cultural phase which followed is known as the Woodland Period (2000 -300 yra) and is marked by the introduction of ceramics, the bow and arrow, maize cultivation, bison pound structures and burial mound construction (Syms 1977). 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. These cultural groups had a broadly-based forest economy that included hunting a variety of large and small animals, fishing and gathering wild plant foods (Priess et al 1986). An important characteristic of Woodland culture in Southern Manitoba was the practice of burying the deceased beneath earthen mounds. The Mound Builder culture, noted for their large and complex earthworks in southern Manitoba, flourished between 900 and 1,400 A.D. and are assigned to the Late Woodland Period, specifically the Blackduck and the Devil's Lake-Sourisford complexes (Rempel 1994).

Indigenous European Period

During the historic period, the Ojibway, Cree and Assiniboine were among those who inhabited the area and were present when the first European explorers came through the region. Ancient Indigenous trade

[1] Yra – years ago

and travel routes became well-known cart trails in the historic period used by explorers, fur traders, bison hunters, and settlers. One of these historic trails, the St. Joseph (or St. 'Joe') trail led from St. Joseph, North Dakota (now Walhalla) northeast to Fort Garry (now Winnipeg, MB) and passed through the proposed pipeline project area, at approximately NW 23-02-02 W1.

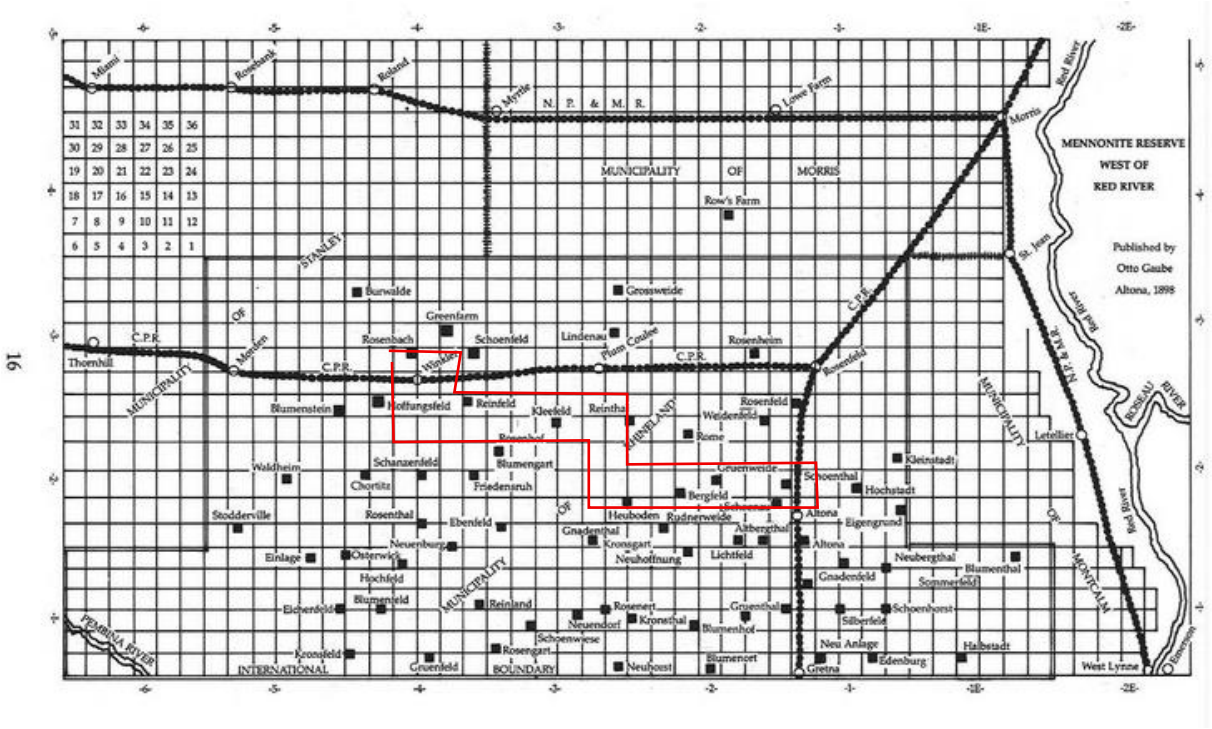
Explorer Pierre Gaultier de La Vérendrye, his sons and a company of fifty came south from Fort la Reine (near present day Portage la Prairie, MB) and are assumed to have been the first Europeans to come to southern Manitoba on their way to the Missouri River (Morden Re-Union Organization Souvenir Book Committee 1952). Following this, the explorer, Alexander Henry, is known to have established his major post at Park River in 1800, sending small detachments to winter at Riviere aux Marais (near St Joseph) and Hair Hills (near Morden). (Manitoba Culture, Heritage and Citizenship 1994: 3).

In the 1860s, the Red River Settlement Métis regularly crossed through what is now the Municipality of Rhineland enroute to their annual buffalo hunts to join the Dakota hunters at Pembina or near the present site of Gretna (Ens 1984:2).

Non-indigenous settlement in the area dates to the 1870s when Russian Mennonites arrived in Manitoba as a result of religious persecution. They established settlements on the east and west sides of the Red River. These were known as the East and West Reserves (Brown 1973:1). It is estimated that over 7,000 Mennonites had settled in Manitoba during this time. The good soil combined with warm climate allowed for a great diversity in crops and productive homesteads.

The Municipality of Rhineland and portions of the R.M. of Stanley are located in the West Mennonite Block which was granted in 1875 (Figure 4). In the colonization of the reserve, the Mennonites established a pattern of small, nucleated villages and form a cooperative, open field, strip farming (Podolsky 1991:1). Old Altona, settled in Feb 1880, was laid out in traditional Mennonite village style with a main road and farms on either side. In response to local requests to build a rail station, the Canadian Pacific Railway built a rail line from Gretna to Rosenfeld crossing through Sections 3, 4 and 5, in Township 2, Range 1. They also created a rail siding half a mile north of Old Altona (Penner & Friesen 1990: 15). Where a new town was surveyed in 1895. Within a year there were three elevators, six general stores, three wood and machinery dealers, one blacksmith, a flax warehouse, a liquor store, a boarding house, a hotel and a school. (Penner & Friesen 1990:16).

Figure 4. 1876 Map showing the Mennonite West Reserve (Epp-Tiessen 1982). Red polygon outlines general project area



The general region was affected by its very low gradient. From the town of Emerson to the Pembina Hills, which spans a distance of 47 km, there is only a 7.5 m elevation change. This created significant drainage problems. The streams running down the Manitoba escarpment spread out across the land in wide, shallow floods. Recurrent spring flooding and poorly receding rainwater, along with inconsistent groundwater quality led to the creation of modified drains (Altona the Story of a Prairie Town p3).

In 1892, the village of Winkler was officially founded by Valentine Winkler, who purchased property in the SE 04-03-04 WPM from one of the original landowners in the area, Mr. and Mrs. Isaac Wiens, who had received a Crown Grant in 1883 (WHC 1982: viii). In exchange, Isaac Wiens took ownership, one mile north, which became known as the Rosenbach District (Brown 1973:2). Valentine Winkler was an entrepreneur who owned a lumber yard and grain elevator and had convinced the Canadian Pacific Railway to build a spur route and railway siding on the northeastern edge of the settlement where development of the siding began in 1892. Winkler was also a long-time politician, representing the municipality of Stanley in the Manitoba Legislature from 1892 to 1920. By 1906, the village of Winkler was incorporated, and since the Mennonite immigrants were discouraged by their church from moving to town, the majority of early town residents were German, Jewish, Dutch and Anglo-Saxon immigrants who established some of the first businesses in the townsite (WHC 1982: 125).

3.2 REGISTERED HERITAGE SITES

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

Heritage sites or archaeological sites within the province of Manitoba are protected under *The Heritage Resource Act* of 1986 (Government of Manitoba). Archaeological sites are resources which consist of objects, structures, or groups of objects that were abandoned in the past and are found in buried, submerged or surficial contexts. All registered archaeological sites in Canada are designated with a Borden Number, which is an alphanumeric code 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.

Municipal Sites are sites designated by individual municipalities, under the Act. Provincial commerative plaques are registered through the Manitoba Heritage Council. The plaques are commemorative and may not be located at the actual site of an event.

The provincial registry does not specifically recognize cultural sites and therefore does not offer protection for cultural sites understood to be important to Indigenous peoples unless they can be captured and registered as an archaeological site. Examples of cultural sites that may be registered as an archaeological site include culturally modified trees or trees with prayer flags/tobacco ties. The provincial registry is protected under the Act and therefore is not available to the general public. As this is a public document, maps showing the locations of archaeological sites or heritage resources that are protected under *The Heritage Resources Act* are not included.

The archaeological assessment reviewed existing archaeological sites in the general region provided by the Manitoba Sport, Culture, Heritage and Tourism. The archaeological site inventory shows there are 19 existing registered archaeological sites within the RAA's 5 km of the proposed project. These sites include ancient Indigenous campsites, an ancient burial mound, isolated finds and uninterpreted occurrences. A summary of the site details can be found in Table 1.

Table 1: Listing of Known Archaeological Sites within 5 km Radius of the Study Area

Borden Number	Name	Site Type	Period	Description
DgLj-001	Braun Site	A Campsite	Woodland (2,000 – 300 yra	Plains triangular projectile point, scattered around a small low point in field
DgLj-002	Buffalo Creek Site	A. Campsite	Middle Precontact; Woodland (8,000 – 300 yra	Large site with large amounts of artifacts. Laurel, Blackduck ceramics, Oxbow, Pelican Lake, Besant, Prairie side-notched projectile points
DgLj-003	Braun Site -1	A Campsite	Middle Precontact; Woodland (8,000 – 300 yra	Similar artifacts as DgLj-004

DgLj-004	Braun Site -2	A Campsite	Middle Precontact; Woodland (8,000 – 300 yra	Projectile points, ceramics. Site is on the east bank of Buffalo Creek
DgLj-005	Dueck Site	A. Settlement	N/A	Site was not inspected
DgLj-006	Altona Mound Site	H. Uninterpreted	5,000 – 1,850 yra	Oxbow, Hanna, Pelican Lake projectile points
DgLj-009Y	N/A	H. Uninterpreted	Undetermined	Finds near Buffalo Creek in field
DgLj-010Y	N/A	H. Uninterpreted	Undetermined	Finds near Buffalo Creek in field
DgLj-011Y	N/A	H. Uninterpreted	Undetermined	Finds near Buffalo Creek in field
DgLj-012Y	N/A	H. Uninterpreted	Undetermined	Poorly recorded site near Buffalo Creek
DgLj-013Y	N/A	H. Uninterpreted	Undetermined	Poorly recorded site in cultivated field
DgLj-014Y	N/A	H. Uninterpreted	Undetermined	Poorly recorded site near Buffalo Creek
DgLj-015Y	N/A	H. Uninterpreted	Undetermined	Poorly recorded site near Buffalo Creek
DgLj-016Y	N/A	H. Uninterpreted	Undetermined	Exact location unknown
DgLl-006	Enn's Site	A. Campsite	Middle Precontact; Woodland (8,000 – 300 yra	Oxbow projectile point (more points in Enns collection)
DgLl-007	D Site	A. Campsite	Middle Precontact (8,000 – 2,000 yrs)	Oxbow, Hanna projectile points (more points in Enns collection)
DhLl-002	Dyck Site	A. Campsite	Middle Precontact; Woodland (8,000 – 300 yra	Pelican Lake, Oxbow, Hanna, Avonlea, obsidian scaper
DhLl-006	N/A	I. Isolated find	Undetermined	Sample of black metabasalt
DhLl-008	Sienzo 1	I. Isolated find	Undetermined	Single swan river chert flake in cultivated field

The majority of archaeological sites in the RAA are small, poorly understood, isolated finds within disturbed contexts. This limits the heritage understanding of the finds and their interpretive value. Larger sites have been recorded in the study are plotted along major drainages, specifically Buffalo Creek. This corresponds with general archaeological predictive modelling which considers waterways as land-based feature of interest. Few of the sites have evidence of cultural affiliation and it is not clear the extent of the investigation or testing that occurred at the sites. Five registered archaeological sites are within the LAA and are highlighted in red in the above-table. Sites, DgLj-005 and DgLl-006, were found through local collectors and appear to be surface finds. These sites have been registered with little documentation. The three other registered sites were registered by the HRB based on missing site form registries and undocumented archaeological assessment and are tentatively located on either side of Buffalo Creek. These sites include DgLj-012Y, DgLj-014Y, and DgLj-015Y.

The registers for Municipal and Provincially designated heritage sites was reviewed. There are only three Municipal sites in the project area, and of these, all are located within the town of Altona (Table 2). The list of commemorative plaques was also reviewed and there are 16 plaques within the RAA but none are in the LAA.

Table 2. Registered Municipal & Provincial Heritage Sites

Location	ID	Name	Age	Description
Altona	M0086	Bergthaler Church Waisenamt	1870s	The Bergthaler Waisenamt is a good illustration of the mutual aid institutions introduced by Mennonites
Altona	M0087	Klippenstein House	n/a	The picturesque Klippenstein House, built for Altona pioneers Bernhard and Agatha Klippenstein, is a fine example of a large four-square dwelling in an urban setting.
Altona	M0015	Schwartz House	n/a	The Schwartz House is a fine example of the kind of substantial dwellings prosperous families, such as that of businessman Johann Schwartz of Altona

Table 3. Commemorative Plaques

ID	Plaque Name	Location
PLAQ476	Greenfarm School	S13-3-4W
PLAQ632	Kleinstadt School	SW14-2-1W
PLAQ770	Mennonite Heritage Centre	NE21-2-4W
PLAQ772	Mennonite Settlement West Reserve	SW8-2-1W
PLAQ983	Reinfeld Cemetery	NE35-2-4W
PLAQ1011	Rosenbach Mennonite Burial Society Cemetery	NE9-3-4W
PLAQ1055	Schoendorf Cemetery	NW2-3-4W
PLAQ1316	Winkler Aquatic Centre	City of Winkler
PLAQ1317	Winkler Bergthaler Mennonite Church	City of Winkler
PLAQ1318	Winkler Mennonite Brethren Church	City of Winkler
PLAQ1319	Winkler Park	City of Winkler
PLAQ1634	Centennial Park, Plum Coulee	NW2-3-3W
PLAQ1658	Schantz, Jacob Y.	SE21-2-4W
PLAQ1798	Prairie Green - Hoffnungsfeld	City of Winkler
PLAQ1940	Hoffnungsfeld Mennonite Settlers	City of Winkler
PLAQ2160	Jewish Settlers of Winkler, Pioneer	S13-3-4W

In conjunction with the information held by the Historic Resources Branch (HRB), the Manitoba Historical Society (MHS) maintains an 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

Table 4. Centennial Farms within the RAA

Name	Legal Description	Original Date
Wiebe Family Farm	SW 12-2-2 W	1892-01-11
Friesen Family Farm	SE 32-2-1 W	1875-07-26
Wiebe Family Farm	NE 16-3-4 W	1892-03-17
Rempel Family Farm	SE 1-3-3 W	1881-06-07
Hildebrand Family Farm	SE 25-2-3 W	1881-04-09
Giesbrecht Family Farm	NE 16-2-2 W	1897
Penner Family Farm	NW 13-02-03 W	1903-02-03
Thiessen Family Farm	NW 22-2-4 W	1879-09-18

Only the Hildebrand Family Farm and Penner Family Farm are within the 1 km buffer of the LAA to the pipeline route and are still active farm operations which will not be impacted by the proposed project.

The above government and historical society database information was supplemented by conducting an historical and archival review of local history books, maps and plans, and the Manitoba Genealogical Society online database of cemeteries. The locations of a number of abandoned Mennonite villages, cemeteries and schools have been identified and will be a consideration during field investigations.

The village of Kleefeld was founded in 1880 and is within the LAA and in close proximity to the pipeline ROW. Based on the Atlas of Original Mennonite Villages, Homesteaders and Some Burial Plots of the Mennonite West Reserve (Rempel & Harms, 1990), the Gemeinde Buch page listing the property owners of Kleefeld circa 1881 includes the names of Abraham Classen, Abram Braun, Cornelius Dueck, Peter Friesen, Isaak Doerksen, Jacob Dueck, and Peter Neufeld. We have concluded that the village of Kleefeld did exist in 1881 at the intersection of sections 27, 28, 33 and 34, Township 2, Range 3 West with the village street running in the north-south direction. The village area probably consisted of the above named sections except for the south half of section twenty eight which formed part of Blumengart village area (Rempel and Harms, 1990:68). The Kleefeld cemetery is located 800 m south of the proposed pipeline in a open cultivated field in SW 27-02-03 W1. Aerial imagery shows the cemetery marked by a large tree in each corner and fenced with a gate.

The Kleefeld School District was established by Rhineland Municipal Bylaw #346 in December 1926. A one-room school house operated on the northwest corner of SW 34-02-03 W1 in what is now the Municipality of Rhineland (Figure 5). In 1967, the district was dissolved, and its area became part of the Plum Coulee Consolidated School District and later the Rhineland School Division. The school was moved to Gnadenthal to provide additional classroom space until 1982, and when no longer needed it was sold to a local farmer for use as a granary. The teacherage was sold and removed from the site and the barn was dismantled. The land was sold to a nearby landowner, but kept under separate title.

Within the LAA, the Doell Family Cemetery was identifed to be located in section SW 32-02-03 W1 is marked by a tree in the south-central part of quarter section. This cemetery contains four known burials dating between 1903-1941. The Neu-Reinthal Cemetery, also known as the Enns family cemetery, recorded in NW 30-02-03 W1. This small cemetery southeast of Winkler is believed to have been established in 1876 by

Franz Enns (1844-1933) on the land that he farmed. Over the years, family members were buried here. The land was sold out of the family in 1952 and the new landowner plowed up an access road into the cemetery. Consequently, it is now located in the centre of an agricultural field and access is only permitted before crops are sown in the spring or after they are harvested in the fall. Maintenance of the cemetery was done by a Enns descendant until his death in 1978. By the time of a 2018 site visit by two great-grandsons of Franz Enns, the cemetery was in a state of severe neglect. In 2020, assisted by the Winkler Heritage Society, they brought equipment to clear away accumulated debris, uncover some 20 grave markers including several that were partially buried in soil, and research the names of all those buried at the site (Wiebe et al. 2022). Findagrave.com website shows a photograph of the cemetery being surrounded by a chain fence. The abaondoned cemetery of Reinthal has been located in SE 25-02-03 W1 within a small treed area along a windrow 450 m east of the proposed right-of-way.

Figure 5. Kleefeld School, n.d. (G.G. Neufeld)

3.3 LAND-BASED ATTRIBUTES

Through examining various land-based features, it is possible to identify potential areas of interest or greater probability of archaeological artifact presence. A desktop study has been undertaken to provide an auxiliary understanding of the project area from an archaeological perspective.

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 groups. The St. Joseph Trail is noted to cross through the study area but previous research was at such a scale as to not be able to definitively identify specific sections. Further archival research undertaken through this study has found maps of the trail and has identified where it crosses through the project right-of-way in NW 23-02-02-W1.

The use of LiDAR imagery overlaid onto the study area allows for visual examination of relict channels, elevated ridges or waterways along the proposed gas transmission route. The analysis identified six (n=6) land-based features of interest along the proposed route. These consist of active waterways, such as Buffalo Creek and the Hespeler Drain (formerly known as Plum River), as well as a channel situated between two waterways, and two relict channels. These features may have the potential to have heritage resources on or along their margins. Overall, the land use of the project area primarily consists of agricultural fields and modified drainage channels.

4.0 ASSESSMENT OF EFFECTS

A way to understand the archaeological record, or to predict the potential locations of heritage resources or sites, is to study the social and physical environments which influenced how human populations survived and adapted. The resulting 'culture history' involves both spatial and temporal records that establish keystones of change and of continuity.

All the compiled data was analyzed using professional experience to determine specific areas of heritage potential that would require ground-truthing investigation. Although archaeologists are unable to exactly predict the location of a site, they can predict where sites would most likely be located. If a landform is likely to contain archaeological sites, the landform is labelled as having archaeological potential. For the purposes of this assessment, areas of heritage potential are entitled heritage Areas of Concern (AOC). Nine areas of heritage concern (AOC) have been identified along the proposed pipeline route and include relict channels, active waterways, the historic St. Joseph Trail and proximity to abandoned Mennonite villages and cemeteries (Table 5).

Within the LAA, the primary area of concern is the pipeline trench installation, some damage from the wheeled tracked vehicles, and directional drilling under roadways or waterways. However, it is anticipated that the potential adverse effects to heritage resources will be limited due to the narrow, linear footprint of the pipeline. Any information provided by the community engagement meetings and input from the Historic Resources Branch will also be incorporated as they arise.

Table 5. Areas of Heritage Concern (AOC) for the Altona to Winkler Gas Transmission Project

AOC ID	Rationale	Legal description
AOC1	Buffalo Creek and near registered sites DgLj-005, DgLj-012Y, DgLj-014Y, DgLj-015Y	SE 19-02-01 W1 NE 20-02-01 W1
AOC2	St. Joseph Trail	NW-23-02-02-W1
AOC3	Channel, near the confluence of two waterways	NE 26-02-03 W1
AOC4	Village of Kleefeld	NE 28-02-03 W1 NW 27-02-03 W1 NE 27-02-03 W1

AOC5	Relict channels	NW 28-02-03 W1 NE 28-02-03 W1
AOC6	DgLl-006, near Hespeler Drain, and Doell and Neu-Reinland/Enns family cemeteries	NE 30-02-03 W1
AOC7	Relict channel	NE 26-02-04 W1
AOC8	Hespeler Drain (Active waterway)	SW 35-02-04 W1 NW 26-02-04 W1
AOC9	Relict channel	SW 02-03-04 W1

Possible effects to potential heritage resources were determined by reviewing archival maps, photos, LiDAR, and mapping potential locations (e.g., types of landforms, nearness to documented heritage resources, proximity to water) and comparing potential sites to the project footprint. The likelihood of an area or property to contain heritage resources is known as its archaeological potential and is affected by the above examples. The more of those factors are present within an area, the greater the archaeological potential of an area and the greater the risk of disturbance.

A preconstruction Heritage Resource Impact Assessment (HRIA) of the heritage AOCs will take place in order to identify and protect heritage resources. If archaeological sites can be discovered prior to any potential effects from the development, it is possible to adjust activities related to the development (remove the effect) or capture the information contained within the archaeological site before it is damaged or destroyed (salvage mitigation). If heritage resources are discovered during the pre-construction assessment, appropriate mitigation measures will be addressed on a site-by-site basis in order to eliminate, reduce, control or offset the adverse effects to a heritage resource or site. These measures could include avoidance of a site or artifact recovery by salvage excavation.

The discovery of heritage resources may occur during the construction phase of any proposed development. In these cases, as per sections 46 and 51 of *The Heritage Resources Act* (1986), there is an obligation to report these discovered heritage resources immediately to the HRB to determine strategies for on-site assessment. In the event that human remains or suspected human remains are encountered, both the local Police or RCMP detachment and HRB (1-204-945-2118) must be contacted.

Additional 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 to discover any archaeological sites that may be affected by the project.
- Implementation of a cultural heritage resources protection plan (CHRPP) during pre-construction, construction, and operation activities of the project. It is standard practice for Manitoba Hydro to implement a CHRPP.as mitigation.
- All archaeological finds discovered during site preparation and construction will be left in their original position until the project archaeologist is contacted and provides instruction.

- The contractor(s) will report heritage resource materials immediately to the Construction Supervisor who would cease construction activities in the immediate vicinity until the project archaeologist is contacted and prescribes instruction.
- Manitoba Hydro will work to notify engaged First Nations and the Manitoba Métis Federation about any archaeological finds.
- Orientation information for project workers will include an overview of heritage resource materials and reporting procedures.
- Manitoba Hydro will remain open to engage 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.
- Manitoba Hydro will reach out to engaged Indigenous audiences prior to determine interest in arranging a ceremony or ceremonies at times that would work for those interested in participating.

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APPENDIX A:

APPENDIX C

Vegetation technical data report

January 2026

Manitoba Hydro

ALTONA to WINKLER GAS TRANSMISSION PROJECT

PRE-CONSTRUCTION VEGETATION TECHNICAL REPORT

Prepared for:

Manitoba Hydro

Prepared by:

Szwaluk Environmental Consulting Ltd.

August 2025

SUMMARY

The proposed Altona to Winkler Gas Transmission Project occurs within the Aspen Parkland and Lake Manitoba Plain Ecoregions, overlying the Emerson, Manitou, Winkler and Winnipeg Ecodistricts. Historically, the region existed largely as grassland, however agricultural development has now replaced much of the natural vegetation across the landscape.

Thirty-four sites were visited in the field, where plant species composition and structure were recorded along the preferred route and study area, with a total of 80 plant taxa recorded. The vegetation was grouped into three broad types including treed areas, creeks and drains, and roadside herbaceous. To further characterize the local vegetation, stands were classed into five community types based on the field data collected.

Three species of conservation concern were observed during surveys, ranked Vulnerable by the Manitoba Conservation Data Centre. Species recorded included common milkweed (*Asclepia syriaca*), narrow-leaved cat-tail (*Typha angustifolia*) and cottonwood (*Populus deltoides*). Historically, American pellitory (*Parietaria pensylvanica*), also ranked Vulnerable was known to occur within the study area.

Forty-three plant species recorded were considered non-native or invasive in the study area. Of these species, three were designated as Tier 2 noxious weeds (common tansy - *Tanacetum vulgare*; leafy spurge - *Euphorbia virgata*; nodding thistle - *Cardus nutans*) while 13 others were considered Tier 3 noxious weeds. Several non-native and invasive species were abundant and widespread in the study area.

At least 20 plant species with traditional value were recorded during surveys. Traditional species included trees, shrubs and herbs recorded throughout the study area. Frequently recorded traditional species were Manitoba maple (*Acer negundo*), prickly rose (*Rosa acicularis*), common dandelion (*Taraxacum officinale*), common lamb's-quarters (*Chenopodium album*), alsike clover (*Trifolium hybridum*) and common cat-tail (*Typha latifolia*).

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1.0 INTRODUCTION

1.1 Background

The purpose of this study was to assess the vegetation for the proposed Altona to Winkler Gas Transmission Project. Manitoba Hydro is planning to install a 30-kilometre, 8-inch steel natural gas transmission line to improve the capacity of the regional gas transmission system in southern Manitoba. This project will increase the supply of natural gas to the Altona and Winkler regions in response to growing customer demand. The existing infrastructure has reached its capacity limits, necessitating expansion to support ongoing regional development.

The Project is classified as a Class 2 Development under *The Environment Act.* An environmental assessment report will be prepared and submitted to the Environmental Approvals Branch of Manitoba Environment and Climate Change for review. If licencing is approved, project construction is anticipated to begin in spring 2027, with an estimated in-service date of fall 2028.

The objective of this study was to provide information on vegetation that will be used to help develop the existing environment portion of the environmental assessment report for the project. The specific tasks established for this study were as follows:

- Compile existing ecological, botanical and vegetation information for the study area;
- Visit various sites in the field to describe the vegetation communities along the preferred route and study area;
- Survey for potential rare plants;
- Document invasive and noxious plant species observed during site visits; and
- Develop a technical report that describes the existing vegetation environment.

1.2 Study Area

The Altona to Winkler Gas Transmission Project is situated in the Red River Valley of the Lake Manitoba Plain. Most of the natural vegetation was cleared in the region when the area was settled (Dillon Consulting 2012). Today, agricultural land use activities remain the leading economic sector (WSP and Dillon Consulting 2014). The proposed preferred route will extend from a site north of Altona west to a connection point on the east side of Winkler, where it will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation. The regional and local assessment areas and preferred route for the project are shown in Map 1-2 (Appendix II).

2.0 METHODS

2.1 Data Sources

Existing biophysical information was used to describe the environment, regionally for the gas transmission project (e.g., Rowe 1959; Smith et al. 1998). Rowe (1959) provided a geographic description of regions that included distinctive patterning of vegetation and information on plant major species. The existing ecological land classification was described from Smith et al. (1998). Here, all levels of classification (ecozone to ecodistrict) were delineated that are relatively homogeneous in overlapping patterns of climate, as expressed in vegetation, and geology, physiography and soil development.

Botanical and vegetation information was also described from other reports and available information sources in the vicinity of the project (e.g., Dillon Consulting 2012; WSP and Dillon Consulting 2014; Rhineland Municipality 2021). The Manitoba Conservation Data Centre (Manitoba Government 2025a) provided information on species of conservation concern known to occur in the region.

2.2 Field Site Selection

Initially, available imagery of the study area (Google Earth maps) and route options (KML files provided by Manitoba Hydro) were viewed to identify potential sites to visit in the field. Imagery of the landscape, infrastructure, residences and broad vegetation cover were visible on Google Earth maps. Suitable sites were selected based on a stratification of vegetation types (available habitat), importance of vegetation types (greater potential to support species of conservation concern), accessibility and disturbance.

Twenty-four sites along the route options were originally considered for surveys. Ten additional sites were considered once the preferred route was identified (mid-June 2025). All fieldwork was conducted within road allowances, near routing options. Permissions to access private lands were not secured at the time of the survey. Fieldwork was conducted on June 6 and July 8, 2025.

The preferred route for the proposed gas transmission project was determined through consideration of potential effects (e.g., environmental, technical and socio-economic) of route options, and input received through the engagement and environmental assessment process.

2.3 Vegetation Survey

The vegetation survey consisted of qualitatively recording species composition and structure in the field, noting each species encountered. GPS coordinates and photographs were taken at each site visited.

To characterize the local vegetation, community types were described from road allowances. Naming of vegetation community types were based on plant structure and species dominance by stratum. Species separated by a slash (/) indicated a change in stratum, while co-dominant species were separated by a dash (-) indicating similar abundance within the stratum. Canopy cover was defined as closed (>60%), open (>25-60%) and sparse (10-25%) (Strong et al. 1990).

2.4 Rare Plant Survey

Species of conservation concern are imperilled and vulnerable plants tracked by the Manitoba Conservation Data Centre (Manitoba Government 2025a), including those plants listed under the *Endangered Species and Ecosystems Act* of Manitoba (Manitoba Government 2025b), the federal *Species at Risk Act* (Government of Canada 2025a), or listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2025). A database search was conducted for plant species of conservation concern known to occur in the study area in the spring and summer of 2025 (Manitoba Government 2025a).

The standardized ranking of species used by Conservation Data Centres and Natural Heritage Programs throughout North America includes a series of ranks on a five-point scale from critically imperilled to secure. Listed below are definitions for interpreting conservation status ranks at the subnational or provincial (S) level. Ranks may also be intermediary between levels.

CRITICALLY IMPERILLED (S1): At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

IMPERILLED (S2): At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

VULNERABLE (S3): At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

APPARENTLY SECURE (S4): At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

SECURE (S5): At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

Under the *Endangered Species and Ecosystems Act*, the *Species at Risk Act* and the Committee on the Status of Endangered Wildlife in Canada, species are designated into the following categories: Endangered, Threatened, Extirpated, and Special Concern (see Appendix I).

Searches for species of conservation concern began with the review of provincially tracked species previously known to occur in the study area (Manitoba Conservation Data Centre database). Biological information on species flowering times and preferred habitat were also reviewed for listed species.

Survey methods outlined by the Alberta Native Plant Council (2012) for rare plant searches were followed. Where species of conservation concern were observed in the field, plant locations were recorded using GPS, individuals were counted, phenology was recorded and population extent was estimated. Photographs were captured in the field.

2.5 Collection Guidelines and Plant Identification

All vascular plants were recorded and only those unidentifiable in the field were collected as voucher specimens, where the population size permitted. Identification of vascular plants followed published volumes of Flora of North America (1993+). Plant nomenclature followed the Manitoba Conservation Data Centre provincial species list (Manitoba Government 2025a).

3.0 RESULTS

3.1 Ecological Land Classification

Ecological classification in Canada is a hierarchical designation describing ecologically distinct areas based on interrelationships of geology, landform, soil, water, vegetation, and human factors, with the ecozone at the coarsest level. The proposed project occurs in the Prairies Ecozone and comprises the northern extension of the former grasslands of the Great Plains of North America (Smith et al. 1998). Within this ecozone, the Lake Manitoba Plain and Aspen Parkland Ecoregions encompass the study area, and include the further delineated Emerson, Manitou, Winkler and Winnipeg Ecodistricts (Map 3-1, Appendix II). Among the assessment areas, the Lake Manitoba Plain Ecoregion occupies the greatest area

regionally, and the entire study area locally. Table 3-1 shows the area and percent coverage of land that each ecoregion and ecodistrict occupies in the study area.

Table 3-1. Ecodistrict area (ha) and percent (%) coverage in the study area, within the Aspen Parkland and Lake Manitoba Plain Ecoregions.

Ecodistrict	Regional Assessment Area		Local Assessment Area		Project Development Area	
	Ha	%	Ha	%	Ha	%
Aspen Parkland Ecoregion						
Manitou	3,757.61	2.43	0.00	0.00	0.00	0.00
Lake Manitoba Plain Ecoregion						
Emerson	13,026.73	8.42	0.00	0.00	0.00	0.00
Winkler	125,288.32	80.98	6,409.87	100	92.66	100
Winnipeg	12,488.99	8.07	0.00	0.00	0.00	0.00
No Data	156.22	0.10	0.00	0.00	0.00	0.00
Winkler Gate Station Expansion in PDA (Winkler Ecodistrict)					0.04	-
Plum Coulee Control Point (Winkler Ecodistrict)					0.04	-
Total	154,717.88	100	6,409.87	100	92.66	100

In absence of specific vegetation studies for the project area, ecoregions and ecodistricts (Smith et al. 1998) are used here as a detailed level of ecological reference, to describe the existing environment.

Aspen Parkland Ecoregion

The Aspen Parkland Ecoregion forms part of the extensive transition zone between the boreal forest to the northeast and the grasslands to the west. The eastern boundary is marked by the Manitoba Escarpment. The terrain ranges from kettled to gently undulating landscapes of till, glaciofluvial and glaciolacustrine surficial deposits. Eolian dunes also occur in the region. Black Chernozemic soils, well-drained and developed over calcareous deposits are dominant in the region. Sandy Regosols and poorly drained Gleysols also occur. The climate is characterized by short, warm summers and long, cold winters. The mean annual precipitation ranges from about 440 to 530 mm. The average growing season varies from 173 to 183 days.

On moist sites, vegetation in the Aspen Parkland consists of trembling aspen (*Populus tremuloides*) and various shrubs, while drier sites typically include bur oak (*Quercus macrocarpa*) and grassland communities. Common grasses in the ecoregion include fescue (*Festuca* spp.), June grass (*Koeleria macrantha*), Kentucky bluegrass (*Poa pratensis*), and wheat grasses (*Elymus* spp.). Slough grasses (*Beckmannia syzigachne*), marsh reed grass (*Calamagrostis canadensis*), sedges (*Carex* spp.), cattails (*Typha* spp.) and willows (*Salix* spp.) are found on poorly drained sites. Numerous other shrubs and herbs also occupy the ecoregion.

Lake Manitoba Plain Ecoregion

The regional landscape of the Lake Manitoba Plain is characterized by level to rolling or gently undulating terrain. Soils are dominantly Black Chernozems developed on till, glaciolacustrine and alluvial materials. Vertisolic and Gleysolic soils are present on glaciolacustrine sediments. The regional climate consists of long, cold winters and short, warm summers. The mean annual precipitation ranges from 485 to 540 mm. In this very flat region of the Red River Valley, the lack of slope results in localized flooding from heavy rains and perennial spring flooding (Dillon Consulting 2012).

The Lake Manitoba Plain Ecoregion previously was comprised of prairie grasslands and stands of trembling aspen and bur oak; however domestic crops and pastureland have now replaced much of the natural vegetation. Some groves remain along with deciduous forest remnants of aspen, balsam poplar (*Populus balsamifera*), American elm (*Ulmus americana*), green ash (*Fraxinus pennsylvanica*) and Manitoba maple (*Acer negundo*) on moist sites. Bur oak and grassland communities dominate drier sites. Stands of trees could also be intermixed with shrubs such as willows, Saskatoon (*Amelanchier alnifolia*), red-osier dogwood (*Cornus sericea*), and snowberry (*Symphoricarpos occidentalis*), and various herbs. Grasses in the region include fescue, wheat grass, June grass and Kentucky bluegrass. Poorly drained areas support slough grass, marsh reed grass, sedges, cattails, and willows.

Further ecological descriptions of the ecodistricts located in the Aspen Parkland and Lake Manitoba Plain Ecoregions are provided in Appendix III.

3.2 Land Cover Classification

Within the regional assessment area, 12 land/land use cover classes (including one class with the absence of data) were identified from the Manitoba Land Cover Classification. Table 3-2 shows the broad land/land use cover types determined for each of the assessment areas. These classes included native vegetation of coniferous and deciduous forest, marsh wetland, and range and grassland. The water body class included lakes, rivers and streams. Agricultural cropland, cultural features, roads and trails, and exposed land (sand and gravel) were also identified.

Agricultural field represented the dominant land cover within the regional and local assessment areas with 131,643.22 ha (85.09%) and 5,384.60 ha (84.0%), respectively. Range and grassland occupied the next greatest cover, with similar percent values between both assessment areas (5.98% regionally and 8.53% locally). Of the local area land use cover, roads and trails represented 250.43 ha (3.91%), followed by deciduous forest with 110.85 ha (1.73%) and water body with 66.02 ha (1.03%). Similarly, within the Project Development Area, agriculture field dominated the land cover with 81.48 ha (87.93%),

followed by range and grassland with 4.0 ha (4.32%), deciduous forest with 2.88 ha (3.11%), and roads and trails with 2.05 ha (2.21%). The distribution of the land/land use cover classes is illustrated in Map 3-2 (Appendix II).

Table 3-2. Land use/land cover class area (ha) and percent (%) coverage in the study area.

Land Use/ Land Cover Class	Regional Assessment Area		Local Assessment Area		Project Development Area	
	Ha	%	Ha	%	Ha	%
Agri-Forage Field	2,001.14	1.29	31.53	0.49	1.79	1.93
Agricultural Field	131,643.22	85.09	5,384.60	84.00	81.48	87.93
Coniferous Forest	0.09	<0.00	0.00	0.00	0.00	0.00
Cultural Features	2,326.07	1.50	19.41	0.30	0.00	0.00
Deciduous Forest	2,787.55	1.80	110.85	1.73	2.88	3.11
No Data	141.07	0.09	0.00	0.00	0.00	0.00
Open Deciduous Forest	7.02	<0.00	0.00	0.00	0.00	0.00
Range and Grassland	9,245.87	5.98	546.67	8.53	4.00	4.32
Roads Trails Rail Lines	5,724.38	3.70	250.43	3.91	2.05	2.21
Sand and Gravel	9.45	0.01	0.00	0.00	0.00	0.00
Water Body	683.40	0.44	66.02	1.03	0.47	0.51
Wetland - Marsh	148.62	0.10	0.36	0.01	0.00	0.00
Total	154,717.88	100	6,409.87	100	92.66	100

Grasslands

Across North America, grassland ecosystems once existed over large areas (Sampson and Knopf 1994), yet few undisturbed natural areas remain today, as losses to grasslands have exceeded those of other major biomes (Hoekstra et al. 2005). Prior to cultivation, the study area existed largely as grassland, immediately surrounded by the Aspen-Oak Section where the boreal forest met the prairie landscape (Rowe 1959). In this broad transition zone, the deciduous element of the boreal forest intermixed with groveland and prairie elements (Rowe 1959).

The Red River Valley in south-central Manitoba was a vast area of tall-grass prairie, preceding the arrival of European settlers (Manitoba Government 2025c). Nearly all of the soils were considered prime agricultural land in the region (Dillon Consulting 2012). Today, the tall grass prairie in Manitoba is reduced to less than 1% of its original size (6,000 square kilometres), making it one of the rarest and most endangered ecosystems in the world (Manitoba Habitat Heritage Corporation 2018). Although at a slower pace, losses to grasslands continue in some areas. The health and persistence of native grasslands, is

threatened by a combination of agricultural expansion, trembling aspen encroachment, invasion of exotic species, and inappropriate grazing management (Manitoba Government 2025c). Despite these pressures, remnant grasslands remain important habitats for endangered and threatened plant and animal species.

Regarded as the most productive prairie type in North America, tall-grass prairie today is home to a considerable amount of plant species, ranging from 200 to over 460 species, including flowers, grasses, trees and shrubs (NatureNorth n.d.; Manitoba Government 2025c). Plants typical of this grassland type would have included big bluestem (*Andropogon gerardii*), prairie dropseed (*Sporobolus heterolepis*), prairie cord grass (*Sporobolus michauxianus*), blue-eyed grass (*Sisyrinchium* spp.), yellow stargrass (*Hypoxis hirsuta*), black-eyed susan (*Rudbeckia hirta*), blazing stars (*Liatris* spp.), goldenrods (*Solidago* spp.) and several orchids (e.g., small white lady's slipper - *Cypripedium candidum*; western prairie fringed-orchid -*Platanthera praeclara*) (Manitoba Government 2025c).

3.3 Vegetation and Botanical Resources

3.3.1 Vegetation Community Types

Thirty-four sites were surveyed in the study area to describe the vegetation. The distribution of all sites visited is shown in Map 3-3 (Appendix II). The vegetation was grouped into three broad types including treed, creeks and drains, and herbaceous. To further characterize the local vegetation, 32 sites were classed into five community types based on similarities in vegetation composition and structure, recorded from road allowances. Two remaining sites were unclassified, the rail line and a proposed connection point on the east side of Winkler. Vegetation communities are summarized in Table 3-3a, with a description following for each community type. All species were referenced with common and scientific names. For species recorded in field surveys, refer to the flora list in Appendix IV.

Table 3-3a. Vegetation community types surveyed in the study area.

Vegetation Community	Site	Number of Sites	Total Species	Mean Species
Treed				
Cottonwood - Manitoba Maple/Smooth Brome	15, 16, 32	3	28	12.7
Green Ash/Graminoid	8, 18, 21, 23, 25, 27, 29, 34	8	38	10.4
Creeks and Drains				
Manitoba Maple-Willow/Graminoid	3, 14	2	24	17.5
Cat-tail - Reed Canarygrass	9, 22, 24	3	17	9.0
Herbaceous				

Smooth Brome - Kentucky Bluegrass Ditch	1, 2, 4, 5, 6, 7, 10,11, 12, 13, 17, 26, 28, 30, 31, 33	16	59	11.6

Cottonwood-Manitoba Maple/Smooth Brome

Three sites were grouped in the Cottonwood-Manitoba Maple/Smooth Brome community, distinguished by open cover (>25-60%) of the hardwood treed canopy and dominance of smooth brome (*Bromus inermis*) in the herb stratum (Photograph 3-3a). Willow species (*Salix interior; Salix* spp.) were present in the tall shrub layer (1 to 3m). Other species recorded at the sites included Virginia creeper (*Parthenocissus quinquefolia*), Canada anemone (*Anemonastrum canadense*), common dandelion (*Taraxacum officinale*), Canada thistle (*Cirsium arvense*), lesser burdock (*Arctium minus*) and leafy spurge (*Euphorbia virgata*). Overall, vegetation diversity in these sites was moderate with 28 species. This treed community occurred along the preferred route. Cottonwood (*Populus deltoides*) and common milkweed (*Asclepias syriaca*) are Vulnerable species recorded in this vegetation community.

Photograph 3-3a. Cottonwood-Manitoba Maple/Smooth Brome community type.

Green Ash/Graminoid

The Green Ash/Graminoid community type occurred as a shelterbelt in the study area. Graminoids dominated the understory of the narrow-treed areas with smooth brome and Kentucky bluegrass (*Poa pratensis*), and reduced cover of reed canarygrass (*Phalaris arundinaceae*). Frequent species included silverweed (*Potentilla anserina*), alfalfa (*Medicago sativa*), common dandelion, Canada thistle and field sow-thistle (*Sonchus arvensis*). Two sites were treed with green ash (*Fraxinus pennsylvanica*) while a similar shelterbelt occurred with hybrid poplar (*Populus* sp.) trees, and was grouped with this type because of similar ground vegetation. This community type occurred along the preferred route (Photograph 3-3b). Common milkweed (Vulnerable species) was recorded in this vegetation community.

Photograph 3-3b. Green Ash/Graminoid community type.

Manitoba Maple-Willow/Graminoid

The Manitoba Maple-Willow/Graminoid community included two sites distinguished by surface water (Buffalo Creek and Hespeler Drain) with very sparse to closed-canopied (>60%) cover of tall shrubs bordering the water margins (Photograph 3-3c). Other shrubs recorded were green ash and prickly rose (*Rosa acicularis*). Graminoid cover of grasses and soft-stemmed bulrush (*Schoenoplectus tabernaemontani*), as well as cat-tails (*Typha* spp.) was typically high in these areas. Varying amounts of herbs were also present in this

community including curly dock (*Rumex crispus*), lesser burdock, and leafy spurge. This community type occurred along the preferred route.

Photograph 3-3c. Manitoba Maple-Willow/Graminoid community type.

Cat-tail-Reed Canarygrass

In this vegetation type, cat-tails were dominant with widespread reed canarygrass (Photograph 3-3d). This plant community occurred along three water drains visited in the study area. Frequent species also recorded were sedges (*Carex* sp.), slender stinging nettle (*Urtica gracilis*), curly dock and leafy spurge. Low shrubs (>1m) recorded along the drain margins included prickly rose and western snowberry (*Symphoricarpos occidentalis*). Overall, vegetation diversity across these sites was relatively low with 17 species (9.0 average). This vegetation was associated with standing or slow-moving water that was permanently or seasonally flooded. Similar marsh wetlands may experience water level drawdowns which will result in portions drying up seasonally and exposing sediments (National Wetlands Working Group 1997). The Cat-tail -Reed Canarygrass vegetation type occurred along the preferred route.

Photograph 3-3d. Cat-tail-Reed Canarygrass community type.

Smooth Brome-Kentucky Bluegrass

The Smooth Brome-Kentucky Bluegrass community type occurred in the ditches of road allowances, adjacent primarily to agricultural land (Photograph 3-3e). Sixteen sites were visited in the study area to represent this vegetation. Sites dominantly consisted of graminoids (i.e., smooth brome and Kentucky bluegrass); other grasses recorded were quack-grass (*Elymus repens*), slender wildrye (*Elymus trachycaulis*), foxtail barley (*Hordeum jubatum*) and reed canarygrass. Fifty-nine plant species were recorded in these sites, with a mean of 11.6 species per site. Widespread forbs were alfalfa (*Medicago sativa*), common dandelion, prostrate knotweed (*Polygonum aviculare*), Canada thistle, white sweet clover (*Melilotus albus*) and curly dock. Thirty-nine other forbs were recorded in this vegetation type; prickly rose was a common low shrub (<1m). This community type occurred along the preferred route. Vulnerable species - common milkweed and narrow-leaved cat-tail (*Typha angustifolia*) were recorded in this vegetation community.

Photograph 3-3e. Smooth Brome-Kentucky Bluegrass community type.

3.3.2 Plants and Distribution of Species

Thirty-four sites were visited in the field, where plant species composition was recorded along the preferred route and study area (see Map 3-3, Appendix II). A total of 80 plant taxa were recorded with 74 plants identified to the species level (Appendix IV). All plants were grouped by primitive vasculars (e.g., horsetails), gymnosperms (conifers) and angiosperms (flowering plants), with angiosperms being the largest (Table 3-3b). There were 78 angiosperms recorded (18 monocotyledons and 60 dicotyledons), one gymnosperm and one primitive vascular.

Table 3-3b. Botanical resources in the study area.

Plant Group	Number of Species	Percent
Primitive Vasculars	1	1.3
Gymnosperms	1	1.3
Angiosperms		
Monocots	18	22.5
Dicots	60	75.0
Total	80	100

Vascular plants were distributed among 27 families, with the angiosperms representing 25 of these. The Aster (Asteraceae) family was the largest with 14 plant taxa, followed by the

Grass (Poaceae) and Pea (Fabaceae) families, with 12 and 11 taxa, respectively. Five species were observed in each of the Smartweed (Polygonaceae) and Willow (Salicaceae) families. The gymnosperms were represented by the Pine (Pinaceae) family while the Horsetail family (Equisetaceae) was the only primitive vascular.

3.3.3 Species of Conservation Concern

According to provincial sources (MBCDC), there are 129 plant species of conservation concern (SCC) that can be expected to range within the Lake Manitoba Plain Ecoregion (Manitoba Government 2025a). Only a small portion (<3%) of the regional assessment area falls within the Aspen Parkland Ecoregion, where 148 plant species of conservation concern range. Currently, there are 15 plant species at risk in these ecoregions, listed with either the *Endangered Species and Ecosystems Act*, *Species at Risk Act*, or the Committee on the Status of Endangered Wildlife in Canada, see Table 3-3c.

Occurring in southern Manitoba, tall-grass prairie is also an endangered ecosystem, and is home to a variety of flora, including rare species (Manitoba Government 2025c). Although few natural areas exist in the planning district (Dillon Consulting 2012), the Morden, Stanley, Thompson and Winkler Development Plan aims to ensure the protection of natural areas and habitats where endangered flora and fauna are recognized (WSP and Dillon Consulting 2014). Concurringly, the protection of grasslands, wetlands, trees and shrublands is important to the planning district (Dillon Consulting 2012).

Table 3-3c. Plant species listed at risk in the Aspen Parkland and Lake Manitoba Plain Ecoregions.

Scientific Name	Common Name	ESEA	SARA	COSEWIC
Agalinis aspera[1,2]	Rough Agalinis	Endangered	Endangered	Endangered
Agalinis gattingeri[2]	Gattinger's Agalinis	Endangered	Endangered	Endangered
Bouteloua dactyloides[1]	Buffalograss	Threatened	Special Concern	Special Concern
Celtis occidentalis[1,2]	Hackberry	Threatened	-	-
Chenopodium subglabrum[1]	Smooth Goosefoot	Endangered	Threatened	Threatened
Cypripedium candidum[1,2]	Small White Lady's-slipper	Endangered	Threatened	Threatened
Dalea villosa var. *villosa*[1,2]	Hairy Prairie-clover	Threatened	Special Concern	Special Concern
Fraxinus nigra[2]	Black Ash	-	-	Threatened
Solidago riddellii[2]	Riddell's Goldenrod	Threatened	Special Concern	Special Concern
Spiranthes magnicamporum[1]	Great Plains Ladies'-tresses	Endangered	-	-
Symphyotrichum sericeum[2]	Western Silvery Aster	Threatened	Threatened	Threatened

Teloschistes chrysophthalmus[1,2]	Golden-eye Lichen	-	Special Concern	Special Concern
Tradescantia occidentalis var. *occidentalis*[1]	Western Spiderwort	Threatened	Threatened	Threatened
Vernonia fasciculata[2]	Fascicled Ironweed	Endangered	Endangered	Endangered
Veronicastrum virginicum[2]	Culver's-root	Threatened	-	-

[1]Aspen Parkland Ecoregion, [2]Lake Manitoba Plain Ecoregion.

Based on provincial records (MBCDC), one plant species of conservation concern was known to occur within the study area. American pellitory (*Parietaria pensylvanica*) is ranked Vulnerable to Apparently Secure (S3S4) with six historical occurrences (1950's) known to occur within the study area.

Three species of conservation concern were recorded during the 2025 surveys for the project (Table 3-3d). These species included common milkweed (*Asclepia syriaca*), narrow-leaved cat-tail (*Typha angustifolia*) and cottonwood (*Populus deltoides*), all ranked Vulnerable by the Manitoba Conservation Data Centre. These species were observed along roadsides, drains, and as treed vegetation. Photographs 3-3f, 3-3g and 3-3h show common milkweed, narrow-leaved cat-tail and cottonwood, captured during fieldwork.

Although several locations of common milkweed were observed during surveys for the project, milkweeds are also an ecologically important species for the monarch butterfly (*Danaus plexippus*). The monarch butterfly was designated as Endangered by the Committee on the Status of Endangered Wildlife in Canada in 2016. In 2022, the monarch butterfly was added to the International Union for the Conservation of Nature's "Red List" of Threatened species and categorized as Endangered — two steps from extinct (Monarch Joint Venture 2024). Their status changed in 2023 from Endangered to Vulnerable, highlighting the imperative need for continuous data collection and evaluation. In December 2023, the Government of Canada listed the monarch as an endangered species under the federal *Species at Risk Act* (Government of Canada 2025a). The Morden, Stanley, Thompson and Winkler Development Plan recognizes the value of natural areas and sensitive habitats from incompatible development (WSP and Dillon Consulting 2014).

Table 3-3d. Species of conservation concern recorded in the study area, 2025.				
Scientific Name	**Common Name**	**Rank**	**Site**	**Vegetation**
Vulnerable Species (S3S4 to S3S5)				
Asclepia syriaca	Common Milkweed	S3S4	1, 5, 8, 13, 16, 17, 21, 24, 25, 26, 27, 29, 30, 31, 33	Herbaceous road allowance; treed areas
Typha angustifolia	Narrow-leaved Cat-tail	S3S4	13, 26, 28	Herbaceous road allowance; treed areas
Populus deltoides	Cottonwood	S3S5	6, 15, 16, 27, 32	Treed areas

Note: Ranking (Manitoba Government 2025a).

Photograph 3-3f. Common milkweed observed at Site 31.

Photograph 3-3g. Narrow-leaved cat-tail recorded at Site 13.

Photograph 3-3h. Cottonwood trees observed at Site 15.

3.3.4 Invasive Species

Across all surveys, 43 species were considered non-native or invasive plants (see Table 3-3e). Thirty-seven species were ranked SNA (conservation status rank not applicable), five species had conservation ranks Vulnerable to Secure (S3S4 to S5), and one species was ranked SU or unrankable (Manitoba Government 2025a). Of these plants, 17 species were considered invasive plants with the Canadian Food Inspection Agency (2008), while nine species were listed with the Invasive Species Council of Manitoba (2025).

In Manitoba, the Noxious Weeds Regulation lists approximately 90 plant species as noxious under the Noxious Weeds Act, with Tier I noxious weeds as the most threatening species. Of the species recorded, three were designated Tier 2 Noxious weeds, common tansy (*Tanacetum vulgare*), leafy spurge (*Euphorbia virgata*) and nodding thistle (*Cardus nutans*). Thirteen other species were considered Tier 3 Noxious weeds (Manitoba Government 2025d). Photographs 3-3i, 3-3j and 3-3k show common tansy, leafy spurge and nodding thistle, observed in the field.

Although ranked Vulnerable in the province, common milkweed (*Asclepias syriaca*) is also a noxious species (Tier 3) that may be harmful to livestock if ingested. Milkweed occurrences in the study area were identified above in Table 3-3d.

Most prominently represented families of non-native, invasive and noxious species together were the Asteraceae, Fabaceae, Poaceae, Amaranthaceae and Polygonaceae. Many non-native, invasive and noxious plant species were abundant along roadside ditches.

Table 3-3e. Invasive, noxious and non-native species observed in the study area.

Species	Common Name	MBCDC Rank[1]	Authority[2]
Amaranthus retroflexus	Redroot Pigweed	SNA	CFIA
Ambrosia artemisifolia	Common Ragweed	S5	NWA
Ambrosia trifida	Giant Ragweed	S4	NWA
Arctium minus	Lesser Burdock	SNA	ISCM, NWA
Artemisia absinthium	Absinthe Wormwood	SNA	CFIA, NWA
Asclepias syriaca	Common Milkweed	S3S4	NWA
Bassia scoparia	Summer Cypress	SNA	NWA
Bromus inermis	Smooth Brome	SNA	CFIA
Capsella bursa-pastoris	Shepherd's Purse	SNA	CFIA
Caragana arborescens	Siberian Peashrub	SNA	MBCDC
Cardus nutans	Nodding Thistle	SNA	ISCM, NWA
Chenopodium album	Common Lamb's-quarters	SNA	CFIA, NWA
Cirsium arvense	Canada Thistle	SNA	CFIA, ISCM, NWA
Convolvulus arvensis	Field Bindweed	SNA	ISCM

Dactylis glomerata	Orchard Grass	SNA	CFIA
Elymus repens	Quackgrass	SNA	CFIA
Euphorbia virgata	Leafy Spurge	SNA	CFIA, ISCM, NWA
Fagopyrum tataricum	Tartary Buckwheat	SNA	CFIA
Hordeum jubatum	Wild Barley	S5	NWA
Lactuca serriola	Prickly Lettuce	SNA	NWA
Lolium perenne	Perennial Ryegrass	SNA	MBCDC
Malva pusilla	Running Mallow	SNA	MBCDC
Matricaria discoidea	Pineapple Weed	SNA	MBCDC
Medicago lupulina	Black Medick	SNA	MBCDC
Medicago sativa	Alfalfa	SNA	CFIA
Melilotus albus	White Sweet Clover	SNA	CFIA
Melilotus officinalis	Yellow Sweet Clover	SNA	CFIA
Parthenocissus quinquefolia	Virginia Creeper	SNA	MBCDC
Phleum pratense	Meadow Timothy	SNA	MBCDC
Plantago major	Common Plantain	SNA	MBCDC
Polygonum aviculare	Prostrate Knotweed	SU	MBCDC
Rumex crispus	Curled Dock	SNA	MBCDC
Sonchus arvensis	Field Sow-thistle	SNA	CFIA, ISCM, NWA
Tanacetum vulgare	Common Tansy	SNA	CFIA, ISCM, NWA
Taraxacum officinale	Common Dandelion	SNA	NWA
Thlaspi arvense	Field Pennycress	SNA	CFIA, NWA
Tragopogon dubius	Yellow Goat's-beard	SNA	MBCDC
Trifolium hybridum	Alsike Clover	SNA	MBCDC
Trifolium pratense	Red Clover	SNA	CFIA
Trifolium repens	White Clover	SNA	MBCDC
Typha angustifolia	Narrow-leaved Cat-tail	S3S4	ISCM
Ulmus pumila	Siberian Elm	SNA	MBCDC
Vicia cracca	Tufted Vetch	SNA	ISCM

1 (Rank): S3 – Vulnerable; S4 – Apparently Secure; S5 – Secure; SNA – Rank Not Applicable; SU – Unrankable.
2 (Authority): Manitoba Conservation Data Centre (MBCDC), Canadian Food Inspection Agency (CFIA), Noxious Weeds Act (NWA), Invasive Species Council of Manitoba (ISCM).

Photograph 3-3i. Common tansy observed at Site 13.

Photograph 3-3j. Leafy spurge observed along the preferred route.

Photograph 3-3k. Nodding thistle recorded at Site 32.

3.3.5 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 proposed transmission line is located on Treaty 1 lands, the original territories of the Anishinaabeg, Anishininewak and Ininewak, and the National Homeland of the Red River Métis. Manitoba Hydro acknowledges these nations who have occupied and cared for these lands for thousands of years and their longstanding cultural and spiritual connections with the land. Through this we recognize the importance of learning and considering the unique perspectives these nations share throughout the project.

At least 20 plant species with traditional value were recorded during surveys for the proposed project. Existing studies were used as the foundation for identifying traditional use plants for the project (Marles et al. 2000, Szwaluk Environmental Consulting and Newman 2017). Traditional species included trees, shrubs and herbs observed throughout the study area. Frequently recorded traditional species (occurred in at least 5 sites) were Manitoba maple (*Acer negundo*), prickly rose (*Rosa acicularis*), common dandelion (*Taraxacum officinale*), common lamb's-quarters (*Chenopodium album*), alsike clover (*Trifolium*

hybridum) and common cat-tail (*Typha latifolia*). Also recorded, but less frequent were traditional species such as field horsetail (*Equisetum arvense*), pineapple weed (*Matricaria discoidea*), and common plantain (*Plantago major*). A list of flora recorded from all surveys is included in Appendix IV.

4.0 RECOMMENDATIONS

1. Where clearing of trees is required along the preferred route, it is recommended to use low disturbance clearing methods to retain existing vegetation to the extent possible.

2. Tree felling and removal should be confined with the limits of the right-of-way, to not damage adjacent vegetation.

3. Care should be taken in any clearing of shelterbelts. Fourteen shelterbelts occur along the preferred route, and these areas are important for reducing soil erosion, providing wildlife habitat, and aesthetics. It is recommended that only required trees be removed in shelterbelts, to allow for safe construction of the project, as identified by Manitoba Hydro. Shelterbelt plantings are encouraged in the planning district to reduce wind and water erosion (Dillon Consulting 2012).

4. It is recommended that low ground disturbance clearing occur during construction activities at creeks and water drains. Lands subject to flooding, erosion or bank instability should remain in their natural state, as per the regional development plan (WSP and Dillon Consulting 2014). As well, natural tree and vegetation cover shall be preserved to reduce erosion and bank stability. A 30 m vegetation buffer from the high-water mark shall be maintained for riparian habitat (WSP and Dillon Consulting 2014; Rhineland Municipality 2021), and development is not permitted within 15 m of a first or second order drain (Rhineland Municipality 2021).

5. The project area supports low diversity of habitat types, avoiding stands native vegetation, as nearly all soils along and adjacent to the preferred route are cultivated for agriculture. Three species of conservation concern were observed during plant surveys, including common milkweed which is ecologically important for the vulnerable monarch butterfly (Table 4-1). Where possible, minimize ground disturbance in areas of species of conservation concern, along the preferred route.

Table 4-1. Species of conservation concern recorded in the study area, with rank and location.

Common Name	Rank	UTM
Common Milkweed	S3S4	14U 604819 E and 5443202 N
Common Milkweed	S3S4	14U 600885 E and 5444297 N
Common Milkweed	S3S4	14U 594078 E and 5444749 N

Common Milkweed	S3S4	14U 579600 E and 5444493 N
Common Milkweed	S3S4	14U 579571 E and 5446198 N
Common Milkweed	S3S4	14U 579523 E and 5447760 N
Common Milkweed	S3S4	14U 594322 E and 5443953 N
Common Milkweed	S3S4	14U 587117 E and 5446254 N
Common Milkweed	S3S4	14U 600875 E and 5444021 N
Common Milkweed	S3S4	14U 597602 E and 5443777 N
Common Milkweed	S3S4	14U 592703 E and 5443917 N
Common Milkweed	S3S4	14U 589393 E and 5446277 N
Common Milkweed	S3S4	14U 584441 E and 5446188 N
Common Milkweed	S3S4	14U 581224 E and 5445992 N
Common Milkweed	S3S4	14U 591865 E and 5444700 N
Narrow-leaved Cat-tail	S3S4	14U 579600 E and 5444493 N
Narrow-leaved Cat-tail	S3S4	14U 597602 E and 5443777 N
Narrow-leaved Cat-tail	S3S4	14U 591002 E and 5446352 N
Cottonwood	S3S5	14U 599874 E and 5444827 N
Cottonwood	S3S5	14U 579554 E and 5446197 N
Cottonwood	S3S5	14U 579571 E and 5446198 N
Cottonwood	S3S5	14U 592707 E and 5444166 N
Cottonwood	S3S5	14U 579975 E and 5446197 N

6. It is recommended to conduct construction activities during winter or dry ground conditions, to reduce the movement of non-native, invasive and noxious plant species along the preferred route. Vegetation management (i.e., manual or mechanical) for locations of Tier 2 noxious plant species is recommended along the preferred route, prior to construction activities (Table 4-2). Where chemical control of targeted species is required, all regulatory requirements and licence conditions should be followed.

Table 4-2. Locations of noxious Tier 2 plants recorded in the study area.

Common Name	UTM
Leafy Spurge	14U 594078 E and 5444749 N
Leafy Spurge	14U 593559 E and 5444727 N
Leafy Spurge	14U 587768 E and 5444711 N
Leafy Spurge	14U 582863 E and 5444541 N
Leafy Spurge	14U 579600 E and 5444493 N
Leafy Spurge	14U 579556 E and 5446165 N
Leafy Spurge	14U 579571 E and 5446198 N
Leafy Spurge	14U 579523 E and 5447760 N
Leafy Spurge	14U 597557 E and 5445635 N
Leafy Spurge	14U 591002 E and 5446352 N
Leafy Spurge	14U 579975 E and 5446197 N
Common Tansy	14U 579600 E and 5444493 N
Nodding Thistle	14U 602518 E and 5443788 N
Nodding Thistle	14U 600875 E and 5444021 N
Nodding Thistle	14U 579975 E and 5446197 N

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APPENDIX I. Definitions of selected technical terms.

Abundance-Dominance – This term expresses the number of individuals of a plant species and their coverage in a phytosociological survey; it is based on the coverage of individuals for classes with a coverage higher than 5% and on the abundance for classes with a lower percentage (Cauboue et al. 1996).

Angiosperm – A seed borne in a vessel (carpel); thus one of a group of plants whose seeds are borne within a mature ovary or fruit (Raven et al. 1992).

Boreal – Pertaining to the north; a climatic and ecological zone that occurs south of the subarctic, but north of the temperate hardwood forests of eastern North America, the parkland of the Great Plains region, and the montane forests of the Canadian cordillera (Cauboue et al. 1996).

Canopy – The more or less continuous cover of branches and foliage formed by the crowns of trees (Cauboue et al. 1996).

Canopy Closure – The degree of canopy cover relative to openings (Cauboue et al. 1996).

Classification – The systematic grouping and organization of objects, usually in a hierarchical manner (Cauboue et al. 1996).

Community-Type – A group of vegetation stands that share common characteristics, an abstract plant community (Cauboue et al. 1996).

Cover – The area of ground covered with plants of one or more species, usually expressed as a percentage (Cauboue et al. 1996).

Deciduous – Refers to perennial plants from which the leaves abscise and fall off at the end of the growing season (Cauboue et al. 1996).

Dicotyledon – One of the two divisions of the Angiosperms; the embryo has two cotyledons, the leaves are usually net-veined, the stems have open bundles, and the flower parts are usually in fours or fives (Usher 1996).

Ecoregion – An area characterized by a distinctive regional climate as expressed by vegetation (Cauboue et al. 1996).

Endangered Species - A species that is facing imminent extirpation or extinction (Government of Canada 2025b).

Extirpated Species - A species that no longer exists in the wild in Canada, but exists elsewhere in the wild (Government of Canada 2025b).

Flora – A list of the plant species present in an area (Cauboue et al. 1996).

Forb – A broad-leaved, non-woody plant that dies back to the ground after each growing season (Johnson et al. 1995).

Forest – A relatively large assemblage of tree-dominated stands (Cauboue et al. 1996).

Graminoid – A narrow-leaved plant that is grass-like; the term refers to grasses and plants that look like grasses (Cauboue et al. 1996).

Grassland – Vegetation consisting primarily of grass species occurring on sites that are arid or at least well drained (Cauboue et al. 1996).

Gymnosperm – A seed plant with seeds not enclosed in the ovary; the conifers are the most familiar group (Raven et al. 1992).

Habitat – The place in which an animal or plant lives; the sum of environmental circumstances in the place inhabited by an organism, population or community (Cauboue et al. 1996).

Herb (Herbaceous) – A plant without woody above-ground parts, the stems dying back to the ground each year (Johnson et al. 1995).

Invasive – Invasive species are plants that are growing outside of their country or region of origin and are out-competing or even replacing native plants (Invasive Species Council of Manitoba 2025).

Monocotyledon – A class of the Angiosperms; the seeds have a single cotyledon, the floral parts are in three or multiples of three, and the leaves have parallel veins (Usher 1996).

Noxious Weed – A plant that is designated as a tier 1, tier 2 or tier 3 noxious weed in the regulations and includes the seed of a noxious weed, whether it is still attached to the noxious weed or is separate from it (Manitoba Government 2025d).

Pteridophyte – A division of the plant kingdom including ferns and their allies (horsetails and clubmosses).

Rare Species – Any indigenous species of flora that, because of its biological characteristics, or because it occurs at the fringe of its range, or for some other reasons, exists in low

numbers or in very restricted areas of Canada but is not a threatened species (Cauboue et al. 1996).

Shrub – A perennial plant usually with a woody stem, shorter than a tree, often with a multi-stemmed base (Cauboue et al. 1996).

Site – The place or category of places, considered from an environmental perspective, that determines the type and quality of plants that can grow there (Cauboue et al. 1996).

Species – A group of organisms having a common ancestry that are able to reproduce only among themselves; a general definition that does not account for hybridization (Cauboue et al. 1996).

Species of Special Concern – A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats (Government of Canada 2025b).

Stand – A collection of plants having a relatively uniform composition and structure, and age in the case of forests (Cauboue et al. 1996).

Stratum – A distinct layer within a plant community, a component of structure (Cauboue et al. 1996).

Threatened Species - A species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction (Government of Canada 2025b).

Understory – Vegetation growing beneath taller plants such as trees or tall shrubs (Cauboue et al. 1996).

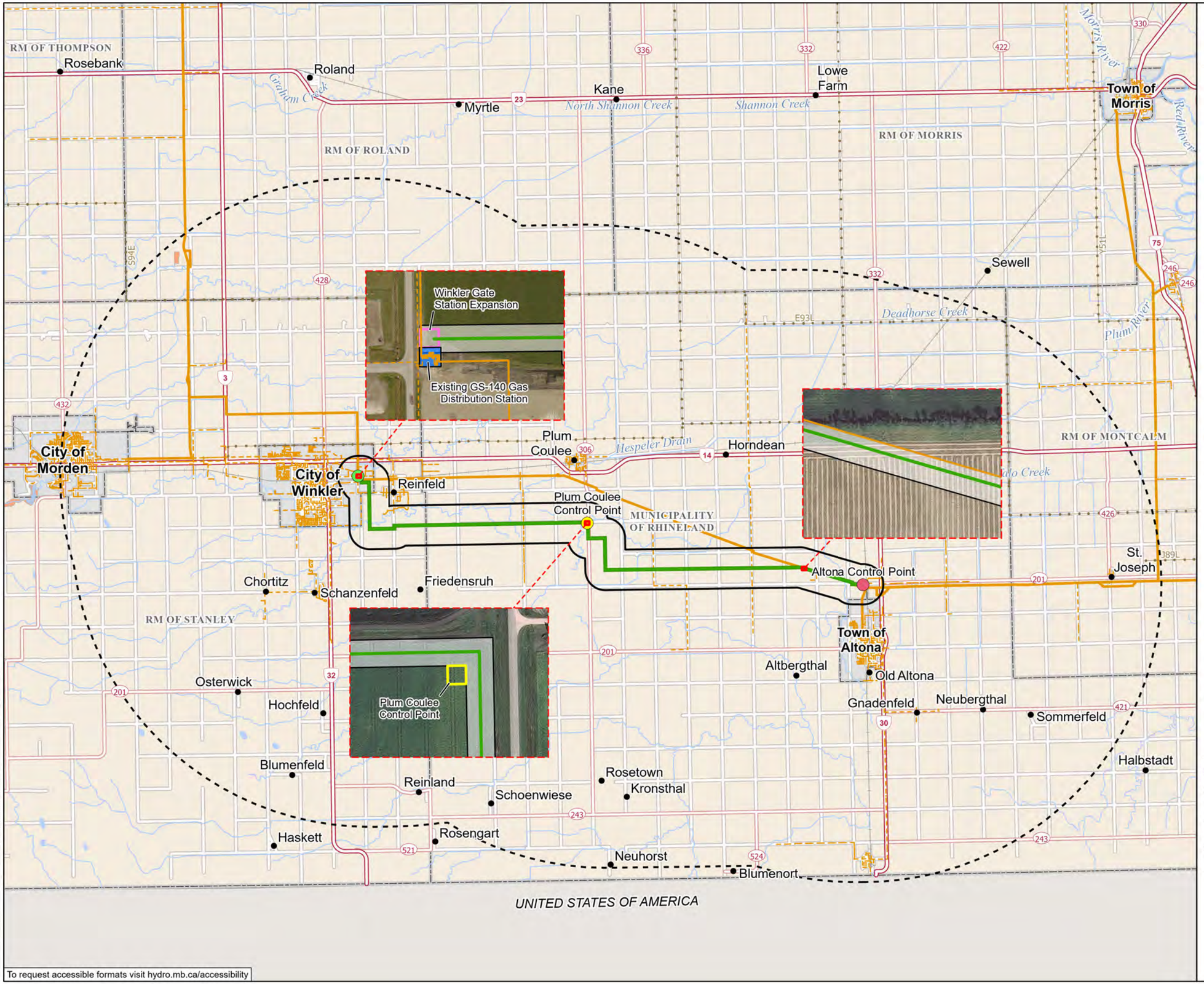
Vascular Plant – A plant having a vascular system (Usher 1996).

Vegetation – The general cover of plants growing on a landscape (Cauboue et al. 1996).

Vegetation Type – In phytosociology, the lowest possible level to be described (Cauboue et al. 1996).

Wetland – Land that is saturated with water long enough to promote hydric soils or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to wet environments (Cauboue et al. 1996).

APPENDIX II. Report maps.



Altona to Winkler Gas Transmission Project

Project Infrastructure

- Altona Control Point
- Plum Coulee Control Point
- Winkler Gate Station
- Preferred Route
- Plum Coulee Control Point Footprint
- Winkler Gate Station Expansion Footprint
- Project Development Area

Assessment Areas

- Local Assessment Area (1 km buffer around PDA)
- Regional Assessment Area (15 km buffer around PDA)

Existing Infrastructure

- Transmission Pressure Gas Line
- Existing Gas Pipeline
- Existing ≤230kV Transmission Line
- Existing 500kV Transmission Line
- Gas Distribution Station

Landbase

- Community
- Railway
- Provincial Highway
- Provincial Road
- Local Road
- First Nation Reserve
- City/Town
- Rural Municipality
- Crown Land
- Provincial Park

Manitoba Hydro acknowledges that the Altona to Winkler gas transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg, Dakota and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: July 18, 2025

N

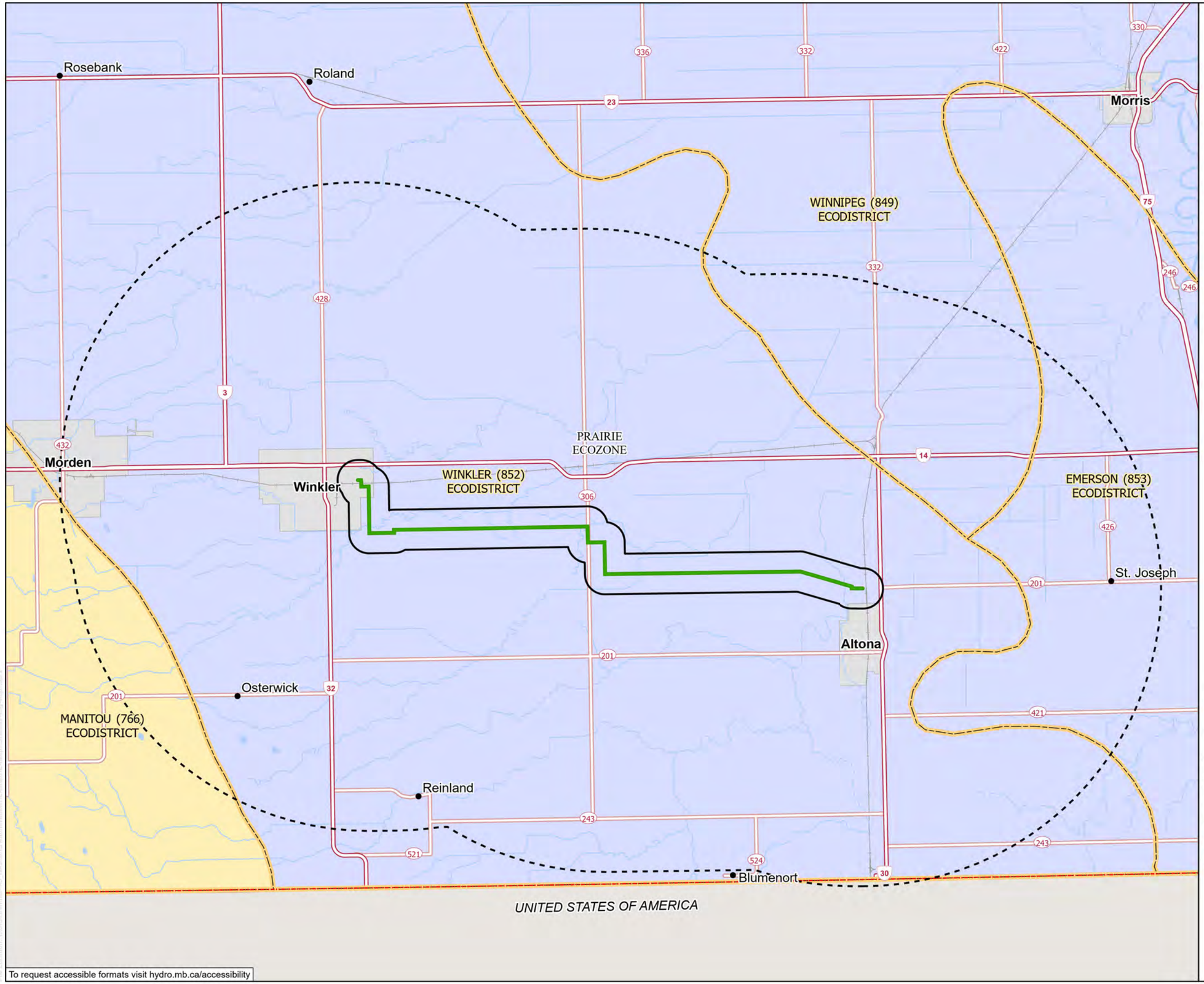
0 4 8 Kilometres
0 2.5 5 Miles

1:185,000

Altona to Winkler
Proposed Preferred Route and Infrastructure

Map 1-2

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



Altona to Winkler Gas Transmission Project

Project Infrastructure
- Preferred Route

Assessment Area
- Local Assessment Area (1 km buffer around PDA)
- Regional Assessment Area (15 km buffer around PDA)

Ecoregions and Ecodistricts
- Aspen Parkland
- Lake Manitoba Plain
- Ecodistrict
- Ecozone

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Reserve

Manitoba Hydro acknowledges that the Altona to Winkler gas transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg, Dakota and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: July 18, 2025

N

0 4 8 Kilometres
0 2.5 5 Miles

1:185,000

Ecozones, Ecoregions, and Ecodistricts

Map 3-1

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

Altona to Winkler Gas Transmission Project

Rosebank
Roland
Town of Morris
City of Morden
City of Winkler
Osterwick
Reinland
Blumenort
Town of Altona
St. Joseph
UNITED STATES OF AMERICA

Project Infrastructure
- Preferred Route

Assessment Area
- Local Assessment Area (1 km buffer around PDA)
- Regional Assessment Area (15 km buffer around PDA)

Land Cover Classification
- Agricultural Cropland
- Bare Rock, Gravel and Sand
- Coniferous Forest
- Cultural Features
- Deciduous Forest
- Forage Crops
- Forest Cutover
- Marsh and Fens
- Mixedwood Forest
- Open Decidious Forest
- Range and Grassland
- Treed and Open Bogs
- Water

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road

Manitoba Hydro acknowledges that the Altona to Winkler gas transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg, Dakota and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: July 18, 2025

N

0 4 8 Kilometres
0 2.5 5 Miles

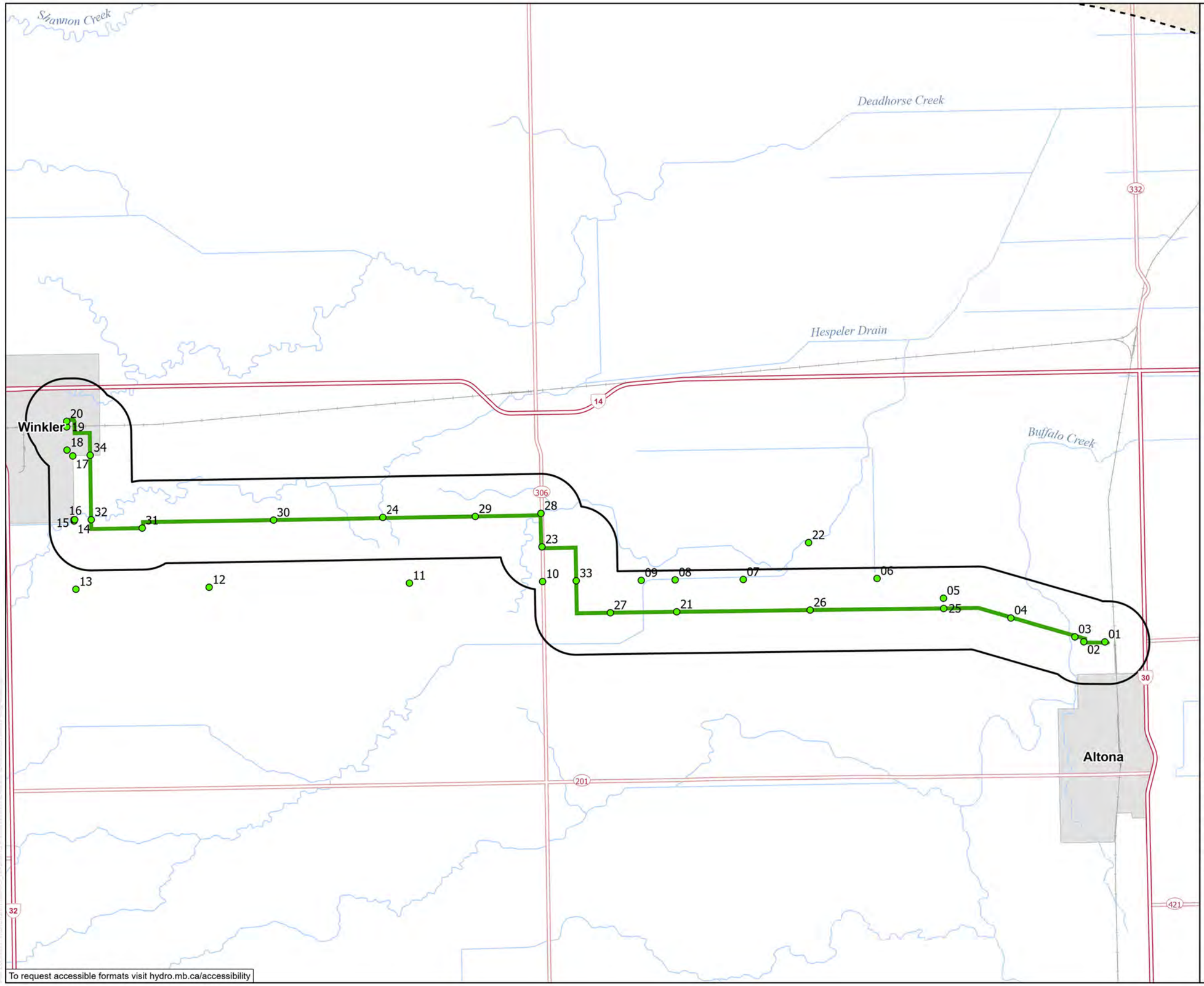
1:185,000

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

Land Cover Classification

Map 3-2

Altona to Winkler Gas Transmission Project



Project Infrastructure
- Preferred Route

Assessment Area
- Local Assessment Area (1 km buffer around PDA)
- Regional Assessment Area (15 km buffer around PDA)

Vegetation Survey
- Survey Site

Landbase
- Community
- Railway
- Provincial Highway
- Provincial Road
- First Nation Reserve
- City/Town

Manitoba Hydro acknowledges that the Altona to Winkler gas transmission line is located on Treaty One territory and on the traditional territories of the Anishinaabeg, Dakota and Cree Peoples and the homeland of the Red River Métis.

Coordinate System: UTM Zone 14N NAD83
Data Source: MBHydro, ProvMB, NRCAN
Date: July 18, 2025

N

0 2 4 Kilometres
0 1 2 Miles

1:90,000

Distribution of Vegetation Survey Sites

Map 3-3

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

APPENDIX III. Ecological landscape classification descriptions of study area ecodistricts, obtained from Smith et al. (1998).

Emerson Ecodistrict

The Emerson Ecodistrict is a small ecodistrict within the Lake Manitoba Plain Ecoregion that borders the United States at its south bound and extends northwards. Most land in this ecodistrict consists largely of cultivated fields used for spring wheat, other cereal grains and oil seeds through the use of dryland production. There are some areas with limited production of potatoes, corn, and garden crops under irrigation mostly from water supplied by the Red River. Areas of native forest can be found along waterways and are characterized by green ash, American elm and Manitoba maple with shrubs such as hazel and Saskatoon. On riverbanks where flooding does not occur, bur oak can be found.

Manitou Ecodistrict

Most of the tall grass prairie has been converted to cultivated land in this ecodistrict. Natural vegetation remains in the ravines and gullies. To the east, the slopes are mixtures of bur oak, aspen, Saskatoon and hazelnut. The western part of the ecodistrict supports similar vegetation on the north and east-facing slopes and mixtures of grass and sages on the drier, south and west-facing slopes. In the central area, the remaining natural vegetation in the alluvial plains consists of American elm, green ash, Manitoba maple, balsam poplar, white birch and willow.

Winkler Ecodistrict

The Winkler Ecodistrict is bordered by the United States to the south and extends northwestward along the Manitoba Escarpment in the Lake Manitoba Plain Ecoregion. The land in this ecodistrict consists largely of cultivated fields used for spring wheat, other cereal grains, and oil seeds. There are some areas with limited production of potatoes. Corn and garden crops are grown under irrigation mostly from water supplied by the Red River. Along waterways, areas of native forest are characterized by green ash, American elm, and Manitoba maple with tall shrubs. Bur oak can be found along riverbanks.

Winnipeg Ecodistrict

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

APPENDIX IV. List of flora recorded from surveys.

Family/Species	Common Name	MB Rank
VASCULAR SPECIES		
Pteridophytes – Ferns and Allies		
EQUISETACEAE	HORSETAIL FAMILY	
Equisetum arvense	Field Horsetail	S5
Gymnosperms		
PINACEAE	PINE FAMILY	
Picea glauca	White Spruce	S5
Angiosperms - Monocotyledons		
CYPERACEAE	SEDGE FAMILY	
Carex sp.	Sedge	
Eleocharis palustris	Creeping Spikerush	S5
Schoenoplectus tabernaemontani	Soft-stemmed Bulrush	S5
POACEAE	GRASS FAMILY	
Ambrosia artemisifolia	Common Ragweed	S5
Ambrosia trifida	Giant Ragweed	S4
Bromus inermis	Smooth Brome	SNA
Dactylis glomerata	Orchard Grass	SNA
Elymus repens	Quackgrass	SNA
Elymus trachycaulus	Slender Wildrye	S5
Hordeum jubatum	Foxtail Barley	S5
Lolium perenne	Perennial Ryegrass	SNA
Phalaris arundinaceae	Reed Canarygrass	S5
Phleum pratense	Meadow Timothy	SNA
Phragmites australis	Common Reedgrass	S5
Poa pratensis	Kentucky Bluegrass	S5
TYPHACEAE	CAT-TAIL FAMILY	
Typha angustifolia	Narrow-leaved Cat-tail	S3S4
Typha latifolia	Common Cat-tail	S4S5
Typha sp.	Cat-tail	
Angiosperms – Dicotyledons		
AMARANTHACEAE	AMARANTH FAMILY	
Amaranthus retroflexus	Redroot Pigweed	SNA
Bassia scoparia	Summer Cypress	SNA
Chenopodium album	Common Lamb's-quarters	SNA

APIACEAE	PARSLEY FAMILY	
Pastinaca sativa	Wild Parsnip	SNA
APOCYNACEAE	DOGBANE FAMILY	
Apocynum androsaemifolium	Spreading Dogbane	S5
Asclepias sp.	Milkweed	
Asclepias syriaca	Common Milkweed	S3S4
ARACEAE	ARUM FAMILY	
Lemna sp.	Duckweed	
ASTERACEAE	ASTER FAMILY	
Arctium minus	Lesser Burdock	SNA
Artemisia absinthium	Absinthe Wormwood	SNA
Artemisia frigida	Pasture Sage	S4S5
Cardus nutans	Nodding Thistle	SNA
Cirsium arvense	Canada Thistle	SNA
Erigeron glabellus	Streamside Fleabane	S5
Lactuca biennis	Tall Blue Lettuce	S4
Lactuca serriola	Prickly Lettuce	SNA
Matricaria discoidea	Pineapple Weed	SNA
Solidago canadensis	Canada Goldenrod	S5
Sonchus arvensis	Field Sow-thistle	SNA
Tanacetum vulgare	Common Tansy	SNA
Taraxacum officinale	Common Dandelion	SNA
Tragopogon dubius	Yellow Goat's-beard	SNA
BRASSICACEAE	MUSTARD FAMILY	
Capsella bursa-pastoris	Shepherd's Purse	SNA
Lepidium densiflorum	Common Pepper-grass	S5
Thlaspi arvense	Field Pennycress	SNA
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY	
Symphoricarpos occidentalis	Western Snowberry	S5
CONVOLVULACEAE	MORNING GLORY FAMILY	
Convolvulus arvensis	Field Bindweed	SNA
EUPHORBIACEAE	SPURGE FAMILY	
Euphorbia virgata	Leafy Spurge	SNA
FABACEAE	PEA FAMILY	

Astragalus canadensis	Canada Milkvetch	S5
Caragana arborescens	Siberian Peashrub	SNA
Medicago lupulina	Black Medick	SNA
Medicago sativa	Alfalfa	SNA
Melilotus albus	White Sweet Clover	SNA
Melilotus officinalis	Yellow Sweet Clover	SNA
Trifolium hybridum	Alsike Clover	SNA
Trifolium pratense	Red Clover	SNA
Trifloium repens	White Clover	SNA
Vicia americana	American Purple Vetch	S5
Vicia cracca	Tufted Vetch	SNA
MALVACEAE	MALLOW FAMILY	
Malva pusilla	Running Mallow	SNA
OLEACEAE	OLIVE FAMILY	
Fraxinus pennsylvanica	Green Ash	S4S5
PLANTAGINACEAE	PLANTAIN FAMILY	
Plantago major	Common Plantain	SNA
POLYGONACEAE	SMARTWEED FAMILY	
Fagopyrum tataricum	Tartary Buckwheat	SNA
Persicaria amphibia	Water Smartweed	S5
Polygonum achoreum	Leathery Knotweed	S4
Polygonum aviculare	Prostrate Knotweed	SU
Rumex crispus	Curled Dock	SNA
RANUNCULACEAE	CROWFOOT FAMILY	
Anemonastrum canadense	Canada Anemone	S5
ROSACEAE	ROSE FAMILY	
Potentilla anserina	Silverweed	S5
Rosa acicularis	Prickly Rose	S5
RUBIACEAE	MADDER FAMILY	
Galium boreale	Northern Bedstraw	S5
SALICACEAE	WILLOW FAMILY	
Populus deltoides	Cottonwood	S3S5
Populus sp.	Hybrid Poplar	
Populus tremuloides	Trembling Aspen	S5
Salix interior	Sandbar Willow	S5

Salix sp.	Willow	
SAPINDACEAE	SOAPBERRY FAMILY	
Acer negundo	Manitoba Maple	S5
ULMACEAE	ELM FAMILY	
Ulmus pumila	Siberian Elm	SNA
URTICACEAE	NETTLE FAMILY	
Urtica gracilis	Slender Stinging Nettle	S5
VITACEAE	GRAPE FAMILY	
Parthenocissus quinquefolia	Virginia Creeper	SNA

APPENDIX V. Plant species observed by survey site.

Form	Species	Common	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
TR	*Acer negundo*	Manitoba Maple	x		x											x	x	x					x											x		
TR	*Fraxinus pennsylvanica*	Green Ash			x					x	x									x					x		x							x		
TR	*Picea glauca*	White Spruce																									x									
TR	*Populus deltoides*	Cottonwood															x	x																x		
TR	*Populus* sp.	Hybrid Poplar																							x						x					
TR	*Populus tremuloides*	Trembling Aspen			x																															
TR	*Ulmus pumila*	Siberian Elm																																x		
SH	*Apocynum androsaemifolium*	Spreading Dogbane	x																																	
SH	*Caragana arborescens*	Siberian Peashrub																																		
SH	*Parthenocissus quinquefolia*	Virginia Creeper																																x		
SH	*Rosa acicularis*	Prickly Rose	x		x	x	x	x	x						x								x			x		x							
SH	*Salix interior*	Sandbar Willow			x													x																		
SH	*Salix* sp.	Willow			x											x		x																x		
SH	*Symphoricarpos occidentalis*	Western Snowberry			x																					x			x							
GR	*Bromus inermis*	Smooth Brome	x	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x		x		x	x	x	x	x	x	x	x	x	x	x	x	x
GR	*Carex* sp.	Sedge			x						x					x								x		x										
GR	*Dactylis glomerata*	Orchard Grass																																		
GR	*Eleocharis palustris*	Creeping Spikerush													x			x																		
GR	*Elymus repens*	Quackgrass						x							x						x															
GR	*Elymus trachycaulus*	Slender Wildrye	x	x			x								x								x				x	x	x				x	x	
GR	*Hordeum jubatum*	Foxtail Barley	x	x				x															x					x	x			x		x		x
GR	*Lolium perenne*	Perennial Ryegrass				x																														
GR	*Phalaris arundinaceae*	Reed Canarygrass			x		x			x	x															x				x	x	x				
GR	*Phleum pratense*	Meadow Timothy										x		x					x																	
GR	*Phragmites australis*	Common Reedgrass																						x								x				
GR	*Poa pratensis*	Kentucky Bluegrass	x	x	x	x	x	x	x	x		x		x	x	x			x				x		x	x	x	x	x			x	x	x		x
GR	*Schoenoplectus tabernaemontani*	Soft-stemmed Bulrush			x										x											x										
GR	Unknown grass	Grass			x						x					x				x		x		x		x										
FO	*Amaranthus retroflexus*	Redroot Pigweed																					x						x							
FO	*Ambrosia artemisifolia*	Common Ragweed						x																							x				x	
FO	*Ambrosia trifida*	Giant Ragweed						x															x								x				x	
FO	*Anemonastrum canadensis*	Canada Anemone	x				x											x					x						x							
FO	*Arctium minus*	Lesser Burdock														x		x														x		x		
FO	*Artemisia absinthium*	Absinthe Wormwood		x																											x			x	x	
FO	*Artemisia frigida*	Pasture Sage			x							x																								
FO	*Asclepias syriaca*	Common Milkweed	x				x								x			x	x				x			x	x		x		x	x	x		x	
FO	*Astragalus canadensis*	Canada Milkvetch																																x		

Form	Species	Common	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
FO	*Bassia scoparia*	Summer Cypress												x							x														x	
FO	*Capsella bursa-pastoris*	Shepherd's Purse												x																		x				
FO	*Cardus nutans*	Nodding Thistle				x																					x							x		
FO	*Chenopodium album*	Common Lamb's-quarters										x	x			x							x											x		x
FO	*Cirsium arvense*	Canada Thistle	x	x		x	x	x										x	x				x		x		x			x			x		
FO	*Convolvulus arvensis*	Field Bindweed												x																				x		
FO	*Equisetum arvense*	Field Horsetail	x			x																														
FO	*Erigeron glabellus*	Streamside Fleabane			x																															
FO	*Euphorbia virgata*	Leafy Spurge									x		x	x	x	x		x	x					x						x				x		
FO	*Fagopyrum tataricum*	Tartary Buckwheat											x								x															
FO	*Galium boreale*	Northern Bedstraw	x		x											x																				
FO	*Lactuca biennis*	Tall Blue Lettuce				x																					x									
FO	*Lactuca serriola*	Prickly Lettuce											x										x													
FO	*Lemna* sp.	Duckweed			x																															
FO	*Lepidium densiflorum*	Common Pepper-grass																																	x	x
FO	*Malva pusilla*	Running Mallow											x																							
FO	*Matricaria discoidea*	Pineapple Weed																							x					x						
FO	*Medicago lupulina*	Black Medick																																x		
FO	*Medicago sativa*	Alfalfa		x	x	x	x		x	x		x			x	x			x				x		x			x							
FO	*Melilotus albus*	White Sweet Clover	x	x		x	x								x												x		x				x	x		
FO	*Melilotus officinalis*	Yellow Sweet Clover	x	x			x																				x	x						x		
FO	*Pastinaca sativa*	Wild Parsnip																					x					x								
FO	*Persicaria amphibia*	Water Smartweed																												x						
FO	*Plantago major*	Common Plantain				x																	x													x
FO	*Polygonum achoreum*	Leathery Knotweed	x																									x	x		x					
FO	*Polygonum aviculare*	Prostrate Knotweed		x					x			x	x	x	x				x		x		x				x					x				
FO	*Potentilla anserina*	Silverweed				x	x			x															x											
FO	*Rumex crispus*	Curly Dock			x		x			x	x		x	x		x			x				x	x		x				x		x	x	x	x	x
FO	*Solidago canadensis*	Canada Goldenrod													x											x										
FO	*Sonchus arvensis*	Field Sow-thistle				x	x																		x		x			x		x	x	x		
FO	*Tanacetum vulgare*	Common Tansy													x																					
FO	*Taraxacum officinale*	Common Dandelion	x			x	x	x	x	x		x		x				x	x		x	x	x		x		x	x					x		x
FO	*Thlaspi arvense*	Field Pennycress		x				x							x									x											x	
FO	*Tragopogon dubius*	Yellow Goat's-beard	x	x		x			x						x												x									
FO	*Trifolium hybridum*	Alsike Clover	x	x																					x								x	x		x
FO	*Trifolium pratense*	Red Clover		x																																
FO	*Trifloium repens*	White Clover																																		x
FO	*Typha angustifolia*	Narrow-leaved Cat-tail													x															x						
FO	*Typha latifolia*	Common Cat-tail			x						x				x	x										x										

Form	Species	Common	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
FO	*Typha* sp.	Cat-tail													x																					
FO	*Urtica gracilis*	Slender Stinging Nettle																								x										
FO	*Vicia americana*	American Purple Vetch			x		x									x																				
FO	*Vicia cracca*	Tufted Vetch				x																														

Note: Tree (TR), Shrub (SH), Graminoid (GR), Forb (FO).

APPENDIX D

Greenhouse gas assessment report

January 2026

Manitoba Hydro

ALTONA TO WINKLER GAS TRANSMISSION PROJECT – GREENHOUSE GAS ASSESSMENT REPORT

ENERGY RESOURCE PLANNING DEPARTMENT

INTEGRATED RESOURCE PLANNING

PREPARED BY:

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DATE: JANUARY 2026

Manitoba Hydro

REPORT: IRPD 25_05

ACKNOWLEDGMENTS

The following people provided meaningful contributions to this report:

- **Jordan Cruise** (Greenhouse Gas Analysis Engineer, Energy Resource Planning Department, Asset Planning & Delivery) led the Dominion City to Altona Gas (DC to Altona) Transmission Project greenhouse gas assessment of project infrastructure and was the primary report author.
- **K. Michael Shaw** (Section Head – Greenhouse Gas Expertise, Energy Resource Planning Department, Asset Planning & Delivery) led the Dominion City to Altona (DC to Altona) Gas Transmission Project greenhouse gas assessment of market responses and was the primary technical and report reviewer.
- **Scott Chang** (Renewable Portfolio Analyst, Energy Resource Planning Department, Asset Planning & Delivery)) provided review of all sections of the document.
- **Lhili Kolbauer** (Engineering Co-op Student, Energy Resource Planning Department, Asset Planning & Delivery) provided review of all sections of the document.
- **Amy Stevenson** (Environmental Assessment Officer, Transmission & Distribution Environment and Engagement Department, Asset Planning & Delivery) was the primary point of contact for questions and project information related to this greenhouse gas assessment. Provided review of relevant sections

- **Nick Bruce** (Engineering Design Technologist, Gas Engineering and Construction Department, Asset Planning & Delivery) provided estimates and details for all construction activities and construction material procurement, was the main contact for construction-related questions, and provided review of relevant report sections.
- **Kristina Koenig** (Energy Resource Planning Department Manager, Integrated Resource Planning Division, Asset Planning & Delivery) provided managerial review.
- **Lindsay Melvin** (Integrated Resource Planning Division Director, Asset Planning & Delivery) approved the report for release.

EXECUTIVE SUMMARY

A GHG Assessment for Phase 2 of the South Loop Project was undertaken to support the environmental assessment compiled as part of the Environment Act Proposal for the project. The table below details estimates of the lifecycle GHG emissions of Phase 2 of the South Loop Project over its assumed 50-year life span.

Activity	t CO_2e/km	t CO_2e	% of total
Construction: Material Supply Chain	110.63	3,419	26%
Construction: On-Site Energy	94.55	2,922	23%
Construction: Land Use Change	13.57	419	3%
Construction: Labour Transport	15.33	474	4%
Construction: Project Commissioning	0.02	1	0%
Post Construction: Pipeline Operations	182.42	5,637	43%
Post Construction: Pipeline Decommissioning	3.14	97	1%
Total	**419.67**	**12,968**	

Manitoba Hydro's natural gas planning and reliability analysis is based on peak natural gas demand and not annual natural gas throughput. Annual natural gas throughput is not forecast on a regional segment level, and therefore upstream and downstream greenhouse gas emissions from natural gas demand that results from the Phase 2 South Loop Project cannot be included in this Greenhouse Gas Assessment.

A qualitative acknowledgement of Potential Market Responses resulting from the South Loop Project is included in this report. By providing additional natural gas capacity along the South Loop, the South Loop Project will likely increase natural gas emissions, may decrease diesel and propane emissions, and may decrease regional electricity generation emissions; however, it is not concluded that any of these GHG effects are additional. Manitoba Hydro is not asserting that the South Loop Project will result in a reduction in global GHG emissions by facilitating fuel switching to natural gas.

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1 INTRODUCTION

1.1 Company Profile

Manitoba Hydro and its wholly owned subsidiaries (“Manitoba Hydro”), including Centra Gas Manitoba Inc. (“Centra”), is a provincial Crown Corporation and one of the largest integrated electricity and natural gas distribution utilities in Canada.

In the year end March 31, 2024, Centra distributed natural gas to 298,639 residential, commercial, and industrial customers in Manitoba [1].

1.2 Project Purpose and Description

The South Loop pipeline system (“South Loop”) is a two-way feed, Centra-owned, natural gas distribution system servicing nearly 11,000 customers. The South Loop is fed from the Dominion City Primary Gate Station and Oakville Primary Gate Station, connecting to the TC Energy Emerson Lateral and Empress lines, respectively. The South Loop services Carman, Morden, Winkler, Altona, Morris, and several other small towns/villages, and large agricultural customers along the route.

South Loop operations have exceeded planning criteria for some time. A best-efforts operating pressure agreement with TC Energy, which currently provides higher than tariff pressures to the South Loop, has been necessary to meet ongoing customer reliability requirements. TC Energy is expecting Centra to implement near-term upgrades to the South Loop so that peak South Loop capacity can be met at minimum contract pressure (i.e., not higher than tariff pressures).

Natural gas service growth on the South Loop has been significant since 2017 and is expected to continue growing. A combination of urban, agricultural, and industrial

growth has been observed, with grain dryers being a primary source of increased peak load.

The Altona to Winkler Gas Transmission Project (Project) will both increase the capacity and reliability of the South Loop and is Phase 2 of the South Loop Project. A Greenhouse Gas Assessment (GHG Assessment) was completed for Phase 1, the Dominion City to Altona Gas Transmission Project. A separate GHG Assessment has been completed for Phase 2 and is presented in this report. Phases 1 and 2 together will allow the South Loop to reliably meet both existing and future design loads at minimum contract pressure as some existing pipeline sections on the South Loop have noted reliability concerns.

The Project consists of the construction and installation of a new approximately 31-kilometer ("km")[1] underground 8" steel natural gas pipeline to supply additional capacity to the South Loop to serve growing businesses in the Altona-Winkler area. Approximately 3.4 km of the Project will run parallel to the existing pipeline, the remaining length will require a new route to reach the Winkler gate station.

Additional Project and South Loop details can be found in other Environmental Assessment (EA) documentation included in the Environment Act Proposals prepared for submission to Manitoba Environment and Climate Change and posting on their Public Registry.

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[1] This GHG Assessment was conducted based on the preferred route (i.e., preliminary route). The final preferred route may be adjusted in response to information learned through the EA and project engagement process, therefore the length and location of the final route may differ slightly from what was considered in this Assessment.

1.3 GHG Assessment/Report Organization

The Project's GHG Assessment divided Project effects into two main categories:

1) Project Infrastructure – Section 2
2) Potential Market Responses – Section 3

The primary focus of the EA is the Project infrastructure (e.g., the 31 km pipeline). As with GHG Assessments of other Manitoba Hydro projects [2, 3, 4, 5], it was determined that greenhouse gas life cycle assessment (GHG LCA) would be the appropriate tool to capture both primary and secondary effects related to Project infrastructure, including embedded GHG emissions (emissions).

Additional potential secondary effects from the Project could include demand-side market responses to the upgrading of Manitoba Hydro's Natural Gas Distribution System. Potential market responses related to the natural gas being distributed through the Project's infrastructure are acknowledged separately from the GHG LCA. However, due to the unavailability of forecasted natural gas consumption data for the Project's local area, the GHG acknowledgements of potential market response effects are qualitative in nature. Upstream and downstream emissions from natural gas distributed in the Project's infrastructure cannot be quantitatively included in this assessment as this data is not available. Refer to subsection 3.2 – Natural Gas Planning for further details.

The intended use of this report is to function as a point of reference for the EA of the Project, documenting the GHG emissions (emissions) estimates, estimation methodologies, and assumptions. This Assessment is intended to help interested parties understand the near- and long-term emissions implications of the Project. A summary of this GHG Assessment is included the relevant chapter of the EA.

2 PROJECT INFRASTRUCTURE

2.1 LCA Objective

Infrastructure installed as the result of the Project will have GHG effects throughout its life, from construction to decommissioning. The Project GHG LCA includes estimates of construction-related emissions, supply chain emissions, ongoing operation and maintenance emissions, and flaring emissions during decommissioning. The functional unit selected for emissions representation in this LCA is **tonnes of carbon dioxide equivalents per km of the installed pipeline** (**t CO_2e/km**). Emissions are also presented on an absolute basis, in tonnes of carbon dioxide equivalents (t CO_2e) in square brackets for added clarity.

Where possible and reasonable, the Project GHG LCA draws on methodologies from GHG LCAs of other Manitoba Hydro projects [2, 3, 4, 5], and the GHG LCA principles therein. Despite the fundamental differences between this Project and other Manitoba Hydro projects cited,[2] many of the principles and methodologies are applicable to this Project.

The Project GHG LCA relies on readily available construction information and lifecycle emission factors ("EFs"). This approach was deemed reasonable because, although a more comprehensive analysis might provide greater accuracy, this was not considered necessary for a project where construction-related emissions are relatively small (compared to total operational emissions of Manitoba Hydro's Natural Gas Distribution

[2] With the exception of the GHG Assessment for Phase 1 of the South Loop project.

System). Where detailed construction and system information was readily available, it has been incorporated.

2.2 LCA Boundaries

This GHG LCA considers relevant construction emissions and relevant post-construction emissions. The boundaries on construction-related emissions include supply chain emissions, on-site energy use, worker transportation to and from the Project site, and emissions from pipeline commissioning. From a Corporate[3] GHG Accounting [6] perspective, this LCA will consider emissions that could fall both inside and outside of Manitoba Hydro's direct GHG emissions inventory, from an operational control perspective, since construction for the Project will be completed by a third party.

The boundaries on post-construction emissions include emissions from activities that occur during pipeline operation, such as flaring, venting, and combustion of natural gas during pipeline distribution operations. Downstream emissions related to Manitoba Hydro's customers' end-use of natural gas are not considered in the Project Infrastructure portion of this GHG Assessment. These emissions are qualitatively acknowledged in Potential Market Responses – Section 3. From a Corporate GHG Accounting and an operational control perspective, post-construction-related emissions

[3] Corporate GHG accounting and project GHG accounting are distinct methodologies and cannot be used in place of each other. The references to corporate accounting in this GHG Assessment are used to enhance the reader's understanding and are not intended to imply that corporate accounting methodologies have been used in place of project accounting methodologies.

only consider emissions that could potentially occur in Manitoba Hydro's Scope 1 emissions inventory.

Upon the decommissioning of the Project, it is assumed that the pipeline will remain *in situ.* Therefore, the construction-related emissions from decommissioning are assumed to be negligible compared to construction-related and operational emissions. However, the de-energizing and flaring emissions during the decommissioning phase are considered in post-construction-related emissions in this LCA.

These differences in boundaries between the two identified phases (i.e., construction and post-construction) are deemed appropriate as they reflect the direct emissions associated with Manitoba Hydro's decision to construct, operate, and maintain the Project over its assumed lifespan but not the wider economy's decisions related to the use of natural gas as an energy source, which are considered in Section 3 (Market Responses).

As discussed in Section 3.1, a "do-nothing" alternative was not considered a viable baseline alternative to the Project. Manitoba Hydro did not identify a baseline scenario that differed from the Project scenario (i.e., the Project); however, to provide meaningful insight, GHG LCA assessment results are presented as absolute emissions (i.e., emissions are compared against a "do-nothing" scenario where the Project does not occur), not net emissions relative to a differing baseline scenario.

2.3 LCA Emissions Summaries

The following subsubsections present both the construction-related emissions and the post-construction-related emissions that fall within the established LCA boundaries. Construction- and post-construction-related emissions are aggregated at the end of this subsection to present final LCA emissions values.

2.3.1 Summary of Construction-Related 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 construction life cycle emissions per functional unit for the Project are 234.11 t CO_2e/km [7,234 t CO_2e]. Absolute GHG emissions from the Project are similar to those for Phase 1 (which was 7,548 t CO_2e). While Phase 1 assumed no clearing would be required, Phase 2 assumes the clearing of approximately 2.88 hectares of deciduous forested area, resulting in land use change emissions.

Similar construction timelines were assumed for both the Project and Phase 1, therefore the GHG emissions from higher for the Project when considering the functional unit, as the Phase 2 installed pipeline length is shorter than the Phase 1 installed length. It was confirmed with subject matter experts that the assumed 12-month construction period was appropriate for both Phase 1 and 2 of the South Loop Project at the time of developing their respective LCAs.

Aggregated emissions are presented to the nearest 10-kg increments when represented as a per kilometer, or per year ratio, and to the 1-tonne increments when represented in absolute terms. This is only done for comparison purposes; it is not intended to imply that this level of accuracy was achieved in the LCA.

Most construction-related emissions result from *Construction: Material Supply Chain* emissions embedded in the materials of the Project's components (e.g., steel pipe) followed by *Construction: On-Site Energy* emissions.

Table 1: Construction-Related Emissions Summary Table

Activity	t CO_2e/km	t CO_2e	% of total[4]
Construction: Material Supply Chain	110.63	3,419	47%
Construction: On-Site Energy	94.55	2,922	40%
Construction: Land Use Change	13.57	419	6%
Construction: Worker Transport	15.33	474	7%
Construction: Project Commissioning	0.02	1	0%
Total	**110.63**	**7,234**	

Table 2 disaggregates the *Construction: Material Supply Chain* emissions from Table 1 into *Material Manufacturing* and *Materials Transportation*. It is estimated that *Materials Manufacturing* emissions are significantly greater than *Materials Transportation* emissions. Table 2 shows that *Materials Transportation* emissions are estimated to comprise less than 10% of the *Construction: Material Supply Chain* category, even with conservative sourcing and processing location assumptions. It was not assumed that recycled steel was used in the manufacturing of the pipeline components. However, if recycled steel was used, it would likely result in significant emissions reduction in the *Materials Manufacturing* category as shown below in Table 2.

Table 2: Project Supply Chain Emissions Disaggregated by Subcategories

Supply chain category	t CO2e/km	t CO2e	% of total
Materials Manufacturing	100.14	3,094	91%
Materials Transportation	10.49	324	9%
Total	**110.63**	**3,419**	

It has been assumed that there is negligible net below-ground carbon change due to the Project. While the Project right-of-way ("ROW") at the time of developing this LCA

[4] Throughout the document, column totals may not sum due to rounding.

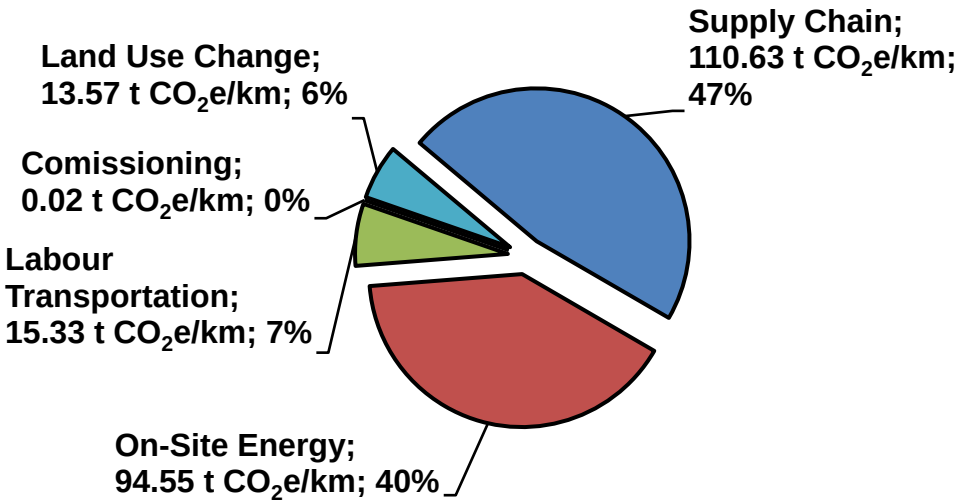
requires the clearing of approximately 2.88 hectares [~7 acres] of deciduous forested area, the below ground carbon change in this area was negligible. Other than the 2.88 hectares requiring clearing, the pipeline will be installed predominantly on lands used for agricultural purposes; no permanent clearing of above-ground biomass will be required in these areas, which cover approximately 89.79 hectares [~222 acres] of the total 92.66 hectares [~229] required for the Project.

Although the pipeline will occupy approximately 0.038 m^2 [58 in^2] in cross-section, and approximately 31 km in length, resulting in a material volume of displaced soil, it is assumed that all excavated materials are used to cover the pipeline after installation and distributed along the ROW. It is assumed that no excavated materials are removed from the Project site. Additionally, it is assumed that soil carbon content fluctuates year-to-year due to the agricultural activities that occur on the land, and the carbon content of the soil is not sensitive to the pipeline installation in this environment. The assumption of negligible net below-ground carbon change would not be valid if the pipeline were fully installed in previously undisturbed soils.

Steel manufacturing is an emissions-intensive industry resulting in approximately 91% of the *Construction: Material Supply Chain* category, or 100.14 t CO_2e/km [3,094 t CO_2e] for this Project. It is therefore expected that if a longer route is selected or required, the increase in emissions in the *Construction: Material Supply Chain* category would be statistically significant.

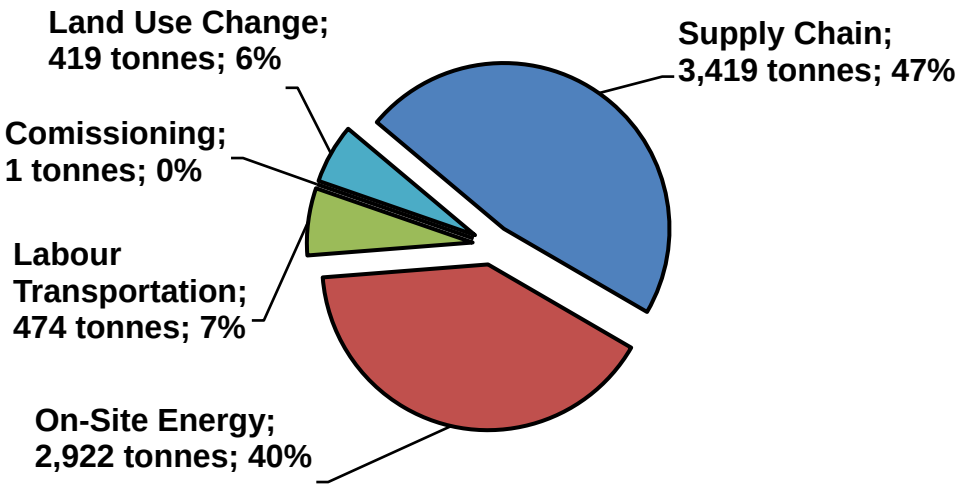
Emissions from the *Construction: On-Site Energy* category is estimated to be 94.55 t CO_2e/km [2,922 t CO_2e]. For context[5], this is ~13% of the annual emissions from Manitoba Hydro's 2023 fleet vehicle fuel consumption (~23,000 t CO_2e in 2023) [7].

Figure 1: Visual Representation of Construction Emissions per km (t CO_2e/km)



[5]As the construction of the Project will be contracted out, emissions from on-site energy use will not be inventoried in Manitoba Hydro's future scope 1 emissions inventory.

Figure 2: Visual Representation of Gross Construction Emissions (in CO_2e)



2.3.2 Summary of Post-Construction-Related Life Cycle Emissions

Only emissions from direct pipeline operations are considered for the LCA. Downstream emissions related to Manitoba Hydro's customers' end-use of natural gas are not considered in the LCA portion of this GHG Assessment. Downstream emissions are considered in Section 3 (Market Responses). Emissions considered in this subsubsection are the vented, combusted, and flared emissions that are likely to occur over the operational[6] lifespan and the decommissioning phase of the pipeline.

[6] Operational emissions will be included in Manitoba Hydro's annual scope 1 GHG reporting.

Table 3: Post-Construction-Related Emissions Summary Table

Activity	t CO_2e/km	t CO_2e	% of total
Post Construction: Pipeline Operations	182.42	5,637	98%
Post Construction: Pipeline Decommissioning	3.14	97	2%
Total	**185.56**	**5,734**	

Only the flaring and de-energizing of the pipeline are considered in this LCA during the *Post Construction: Pipeline Decommissioning* category. The EA for the Project indicates that the pipeline will be capped and remain *in situ* after decommissioning; therefore, any other emissions during the decommissioning phase are assumed to be minimal relative to the de-energizing and flaring. A flaring efficiency of 98%, an industry standard, was assumed for the calculation of decommissioning emissions.

The *in situ* decommissioned pipeline is assumed to be not filled with concrete, but rather with an inert gas/air. It is expected that if the *in situ* decommissioned pipeline were to be filled with concrete, it would have a material impact on the decommissioning emissions, as Portland cement is an emissions-intensive construction material.

Over the assumed 50-year pipeline lifespan, the *Post Construction: Pipeline Operations* emissions, which include fugitive, vented, flared, and combusted natural gas that occurs during pipeline operations, comprise 98% of the total post-construction-related emissions at 182.42 t CO_2e/km [5,637 t CO_2e].

Figure 3: Visual Representation of Post-Construction-Related Emissions per km (t CO_2e/km)

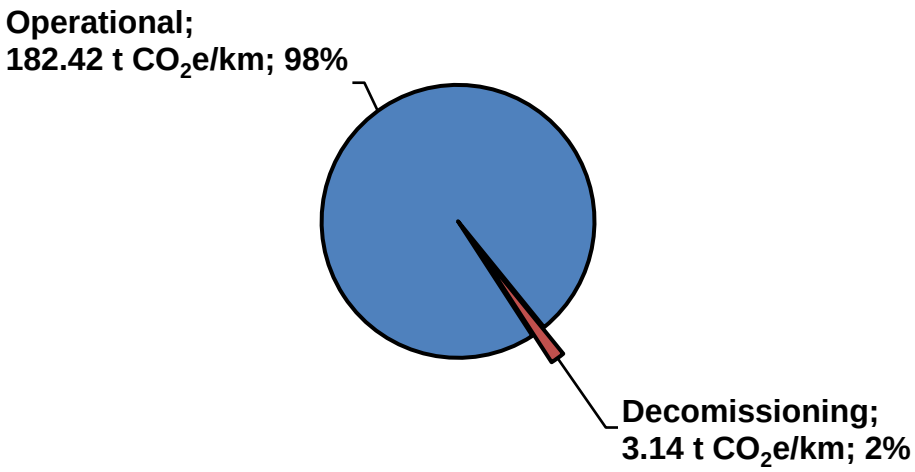
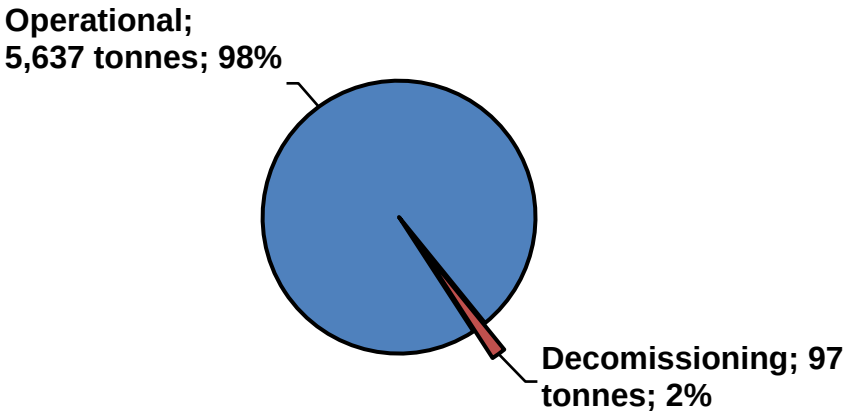


Figure 4:Visual Representation of Gross Post-Construction-Related Emissions (in CO_2e)



2.3.3 Total Life Cycle Emissions

Considering both construction-related and post-construction-related emissions, the total LCA emissions for the Project are estimated to be 419.67 t CO_2e/km [12,968 t CO_2e] over the 50-year assumed lifespan of the Project.

Table 4: LCA Emissions Summary Table

Activity	t CO_2e/km	t CO_2e	% of total
Construction: Material Supply Chain	110.63	3,419	26%
Construction: On-Site Energy	94.55	2,922	23%
Construction: Land Use Change	13.57	419	3%
Construction: Labour Transport	15.33	474	4%
Construction: Project Commissioning	0.02	1	0%
Post Construction: Pipeline Operations	182.42	5,637	43%
Post Construction: Pipeline Decommissioning	3.14	97	1%
Total	**419.67**	**12,968**	

When the full profile of LCA emissions is considered, *Post Construction: Pipeline Operations* is the single largest emissions category over the 50-year assumed lifespan, accounting for almost half of the total considered LCA emissions. While 50 years was the assumed lifespan, the pipeline may be in use for longer than 50 years. If this occurs, it is expected that the incremental emissions from *Post Construction: Pipeline Operations* would have a material contribution to the total emissions from the Project. For each year the pipeline operates, it is expected to contribute 3.65 t CO_2e/km [112.74 t CO_2e].

Figure 5: Visual Representation of Total LCA Emissions per km (t CO_2e/km)

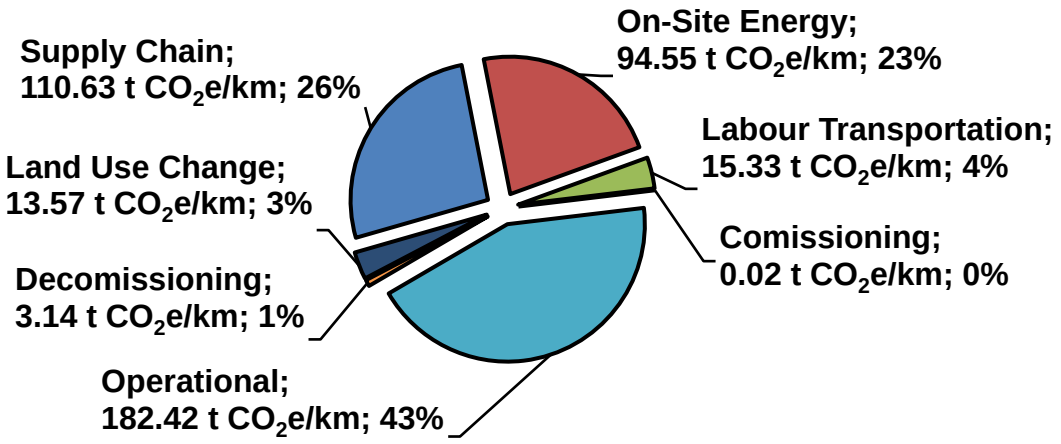
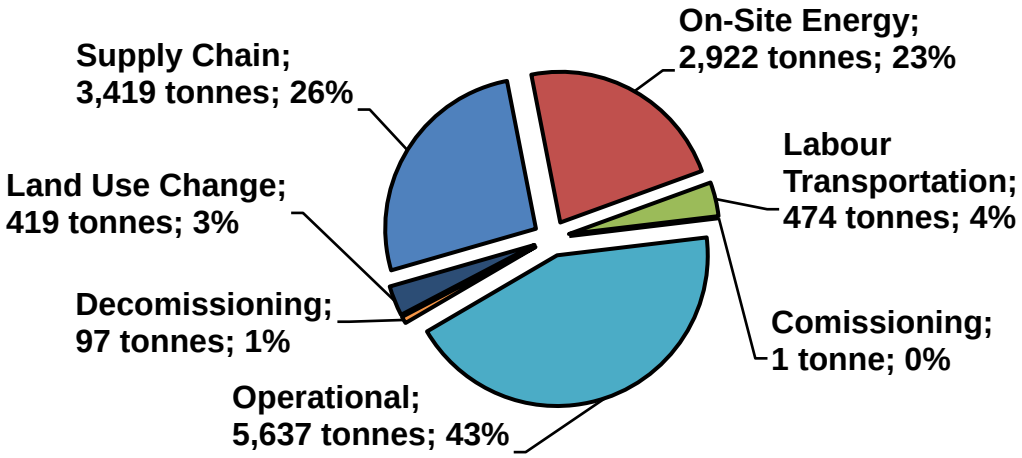


Figure 6: Visual Representation of Total LCA Emissions (in CO_2e)



Amortizing emissions over the 50-year assumed lifespan of the Project results in the following emissions contributions per year by each considered category:

Table 5: LCA Emissions Summary Table Amortized Over Project Lifespan

Activity	t CO_2e/km per year	t CO_2e per year	% of total
Construction: Material Supply Chain	2.21	68	26%
Construction: On-Site Energy	1.89	58	23%
Construction: Land Use Change	0.27	8	3%
Construction: Labour Transport	0.31	9	4%
Construction: Project Commissioning	0.00	0	0%
Post Construction: Pipeline Operations	3.65	113	43%
Post Construction: Pipeline Decommissioning	0.06	2	1%
Total	**8.39**	**259**	

For context, the 259 t CO_2e per year of emissions that could result from the Project is roughly equivalent to 0.00122% of total Manitoba emissions in 2023 [8]. While approximately 26% of the emissions that would result from the Project are assumed to occur outside of Manitoba and Canada, this comparison is included to provide context and a frame of reference for the estimated amortized lifecycle emissions from the Project.

2.3.4 Total Life Cycle Emissions – Phase 1 and Phase 2

For transparency, the combined LCA assessment results of both Phase 1 (38 km, Dominion City to Altona) [5] and Phase 2 (31 km, Altona to Winkler) of the South Loop Project are presented in this section. Considering both construction-related and post-construction-related emissions, the total considered LCA emissions from both Phase 1 and Phase 2 of the South Loop Project are estimated to be 391.38 t CO_2e/km [26,966 t CO_2e] over the 50-year assumed lifespan of the Project. The following table summed

absolute GHG emissions from Phase 1 and Phase 2 by category and divided by the combined length of Phase 1 and 2 to represent GHG emissions on a t CO_2e/km basis.

Table 6: LCA Emissions Summary Table for the South Loop Project (Phase 1 and Phase 2)

Activity	t CO_2e/km	t CO_2e	% of total
Construction: Material Supply Chain	110.63	7,622	28%
Construction: On-Site Energy	84.81	5,843	22%
Construction: Land Use Change	6.08	419	2%
Construction: Labour Transport	13.00	895	3%
Construction: Project Commissioning	0.02	2	0%
Post Construction: Pipeline Operations	173.70	11,968	44%
Post Construction: Pipeline Decommissioning	3.14	216	1%
Total	**391.38**	**26,966**	

Table 7: LCA Emissions Summary Table for the South Loop Project (Phase 1 and Phase 2) Amortized Over Project Lifespan

Activity	t CO_2e/km per year	t CO_2e per year	% of total
Construction: Material Supply Chain	2.21	152	28%
Construction: On-Site Energy	1.70	117	22%
Construction: Land Use Change	0.12	8	2%
Construction: Labour Transport	0.26	18	3%
Construction: Project Commissioning	0.00	0	0%
Post Construction: Pipeline Operations	3.47	239	44%
Post Construction: Pipeline Decommissioning	0.06	4	1%
Total	**7.83**	**539**	

For context, the 539 t CO_2e per year of emissions that could result from the Phase 1 and Phase 2 of the South Loop is roughly equivalent to 0.00253% of total Manitoba

emissions in 2023 [8]. While approximately 28% of the emissions that would result from the Project are assumed to occur outside of Manitoba and Canada, this comparison is included to provide context and a frame of reference for the estimated amortized lifecycle emissions from the Project.

2.4 LCA Emissions Methodology

Due to the scale of the Project, and uncertainty related to construction contracts and arrangements, it was considered reasonable to use readily available construction information and LCA EFs and not undertake any comprehensive, fully project-specific analyses specifically for this GHG Assessment. However, where detailed construction information was readily available, it has been incorporated.

Assumptions related to the construction of the Project are based on both project-specific details and other publicly available pipeline LCAs which were used as a reference [9]. Additionally, assumptions from Phase 1 of the South Loop Project [5] were incorporated for consistency between the two analyses. This is the second GHG assessment Manitoba Hydro has performed for a natural gas pipeline construction project. The first GHG assessment for a natural gas pipeline project was Phase 1 of the South Loop Project.

Construction assumptions incorporated into this GHG Assessment are intended for emissions estimation purposes only. Construction estimates in this GHG Assessment should not be taken as an indicator of the workforce required for construction. Both the workforce required and the time it takes to complete the project will be a function of the experience and available resources of the construction contractor.

For this LCA, GHG emissions have been disaggregated into construction-related emissions and post-construction-related emissions to better understand the emissions profile of the Project.

2.4.1 Construction Emissions

Construction activities for the Project have been broken down into four aggregated activities:

- Material supply chain
    - Embodied (i.e., “embedded”) emissions in construction materials.
- Transportation of materials to the Project site
- On-site energy use (i.e., fuel consumed by construction equipment)
- Worker transportation to and from the Project site
- Pipeline commissioning

2.4.1.1 Material Supply Chain Emissions

Key material supply chain assumptions used in this LCA are as follows:

- The Project will be 31 km long.
- The Project is designed with an 8.625” [219.1 mm] outer diameter steel pipe with a wall thickness of approximately 0.22” [5.56 mm]. The Project is designed with a Nominal Pipe Size (“NPS”) of 8”.
- Steel pipe will be trucked to the site in 59’ [18 m] sections and will be welded on site before below-grade installation.
- Total steel mass required for the project, including a 10% adder, and considering the discrete lengths in which the steel pipe is procured, is estimated to be 29.3 tonnes/km.

- The assumed logistics of construction material transportation for emissions estimating[7] are as follows:
    - Raw materials are shipped from Türkiye to Montreal, Québec by ocean liner for consistency with previous LCAs [4].
        - Alternative source locations (i.e., sources closer than Türkiye) for the Project steel would likely result in lower transportation emissions, however, for conservatives and consistency with previous LCAs, Türkiye is the assumed source location.
    - Materials are shipped to Edmonton, Alberta by train from Montreal, Québec.
    - Materials are shipped to Red Deer, Alberta by truck for processing.
    - Materials are shipping to Camrose, Alberta by truck for additional processing.
    - Materials are shipped to the Project site in Manitoba by truck.
- For the purpose of the Project Assessment, only steel construction materials were considered in the emissions estimate due to the large mass of steel required for the Project, relative to other materials.

[7] These assumptions were made for conservativeness and consistency based on available information at the time of this assessment. They are not meant to indicate procurement strategies and/or preferences of either Manitoba Hydro or Project vendors/suppliers.

2.4.1.2 On-site Energy Use Emissions

The estimated workforce for the Project, including the mobilization phase, construction, remediation/reclamation, and demobilization is 600 person-months[8], with a total assumed construction timeline of 12 months.

Heavy construction equipment will generally include graders, backhoes, bulldozers, excavators, side boom cranes, horizontal drilling rigs, light-duty trucks, and other equipment,[9] with fuel consumption estimates listed in Table 8 [9]. For the Project Assessment, it is assumed that construction vehicles are left on-site while workers commute to and from the Project site each workday.

[8] Actual workforce and timelines will be a function of contractor resources. Estimates within this Assessment are used to estimate emissions only. Actual construction timelines are assumed to vary from the estimates in this GHG Assessment.

[9] Information supplied and or assumptions confirmed by Manitoba Hydro (including Centra) staff.

Table 8: Heavy Construction Vehicle Fuel Consumption Estimates

Vehicle	Litres/hour	Total Vehicles Used	Utilization Factor Estimates
Graders	40	2	50%
Backhoes	15	3	25%
Bulldozers	65	1	50%
Excavators	31	4	80%
Side Boom Cranes	50	2	50%
Horizontal Drilling Rigs	30	1	50%

Non-heavy construction vehicles (i.e., light-duty trucks) are assumed to consume, on average, twice the 3.4 litres/hour ("L/hr") idle without load rate over 10 hours, or one construction day, in the winter months, for a total of 6.8 L/hr over a 6-month working period. It is assumed that during the summer months, non-heavy construction vehicles are not idling when not in use.

It is assumed that the clearing and digging of the pipeline trench will be completed by graders, bulldozers, excavators, and backhoes. The pipe lengths will be laid out, welded together on site, and installed into the trench using a side boom crane. Assumptions on equipment utilization and fuel usage during the construction phase are presented in Table 12.

2.4.1.3 Land Use Change Emissions

For estimating land use change impacts, this assessment followed similar methods to those used for the LCA of the S65R Tap GHG Assessment [4] and the GHG Mitigation Assessment of R44H [3]. Phase 1 did not include Land Use Change GHG emissions as at the time of the GHG Assessment no forested lands needed to be cleared for the ROW. For the Project, 2.88 hectares (ha) of Deciduous Forest (approximately 7 acres or 0.0288 square kilometers) may require clearing. However, when possible and reasonable, tree clearing will be avoided. GHG emissions from tree clearing have been

conservatively estimated in this Assessment and may be higher than what occurs as a result on the Project. The remaining portion of the ROW within previously disturbed land or other Non-Treed Dominant categories land is shown in Table 9.

From a carbon content ("CC") perspective, only treed areas within the Project's ROW footprint is permanently[10] disturbed. The ROW width used to estimate the treed area that will be cleared for the Project was 30 metres. It is possible that this may change as Manitoba Hydro proceeds with the public engagement process.

It is assumed treed areas will be converted to "Non-Treed" land (Table 9). While this land could convert to a variety of low-lying vegetation land types, the "Non-Treed" carbon content (C) of 15.33 tonne C/ha 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 assume to be minimally disturbed and, when disturbed for construction, are assumed to return to their natural state within the project life."* [2]

[10] Note: The assumption of permanence focuses on the life of the Project. However, ROW impacts can be expected to persist beyond their end of life as well.

Table 9: Before and After CC of Land in Right-of-Way

ROW Section/ EOSD Class	Database Class	Initial Above Ground CC (tonne C/ha)	Area (ha)	Initial Above Ground CC (tonne C)	Post Remediation CC (tonne C/ ha)	Post Remediation CC (tonne C)
Agricultural Field	Non-Treed Dominant	15.33	81.48	1,249.41	15.33	1,249.41
Deciduous Forest	Broadleaf Dominant	55.06	2.88	158.47	15.33	44.13
Forage Crops	Non-Treed Dominant	15.33	1.79	27.38	15.33	27.38
Range and Grassland	Non-Treed Dominant	15.33	3.99	61.25	15.33	61.25
Roads Trails Rail Lines	Non-Treed Dominant	15.33	2.05	31.45	15.33	31.45
Water Body	Non-Treed Dominant	N/A	0.47	N/A	N/A	7.22

When using Equation A (below) for this assessment, the total ROW was used and is also shown in Table 7. Land Use Change emissions from the clearing for the Project ROW are estimated to be 419 tonnes of CO_2.

Equation A CO_2e Emissions from ROW Land Use Change

$$\boldsymbol{CO_2\ emissions\ (tonnes)} = \boldsymbol{Area\ effected\ (hectacre)} * \left[\boldsymbol{Original\ Carbon\ Content}\left(\frac{\boldsymbol{tonnes\ Carbon}}{\boldsymbol{hectacre}}\right) - \boldsymbol{Modified\ Carbon\ Content}\left(\frac{\boldsymbol{tonnes\ Carbon}}{\boldsymbol{hectacre}}\right)\right] * \frac{\mathbf{44}}{\mathbf{12}}$$ [11]

2.4.1.4 Worker Transportation Emissions

It is assumed that crews will commute from Winnipeg to the construction site daily, for a total of ~227 km[12] traveled per workday, round-trip, for commuting purposes. Although local accommodations 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 project GHG accounting [10]. It is assumed that workers will arrive at the construction site using one light-duty truck for every three workers.

[11] Note: 44/12 is the approximate ratio of the molecular weight of CO_2 (44) to that of carbon (12).

[12] The average distance from Winnipeg to Altona and from Winnipeg to Winkler is 114 kilometers.

Figure 7: Visual Representation of Emissions from Fuel Use per km (t CO_2e/km)

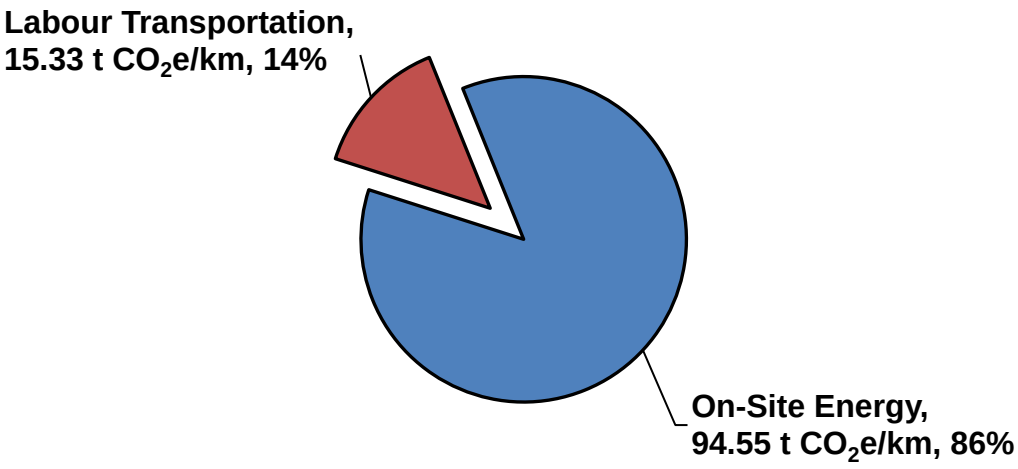
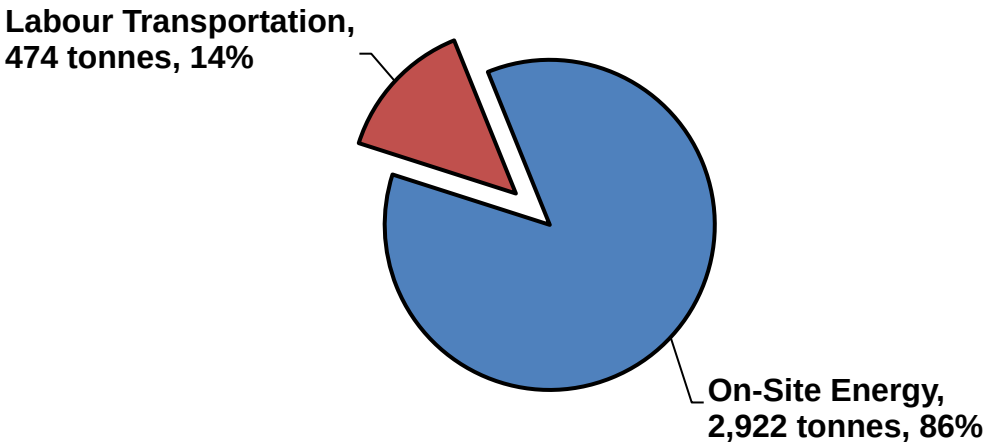


Figure 8: Visual Representation of Emissions from Fuel Use (in CO_2e)



Note that the *Construction: On-Site Energy Emissions* category in Figure 7 and Table 5 comprises the emissions from heavy construction equipment and light-duty vehicles while at the Project site. *Construction: Worker Transportation Emissions* only consider

emissions from worker transport to and from the project site using the assumptions outlined in Table 12.

Figure 7 and Figure 8 presents a high-level visualization of the emissions, in t CO_2e/km and tonnes CO_2e, related to the transportation of construction crews to and from the work site and the emissions from pipeline construction and associated activities. Data and emission factors presented in Table 8, Table 10, and Table 12 are used to estimate GHG emissions from .

2.4.1.5 Pipeline Commissioning Emissions

During the commissioning phase of the Project, an inert gas (typically nitrogen gas) is inserted to replace the air that is in the pipeline. This is done to ensure that natural gas and air are not mixed in the pipeline, which can present safety concerns. Natural gas is purged into the pipeline while energizing to remove the air and purging will stop once the air has been removed from the pipeline. During this process, a small amount of natural gas is vented into the atmosphere.

Publicly available sources were used to estimate the emissions from vented natural gas during the commissioning phase as no Manitoba Hydro-specific data was available at the time of this LCA [9].

2.4.2 Post-Construction Emissions

For this LCA, the post-construction activities that are considered include operational emissions over the lifespan of the project and any emissions that occur during the decommissioning of the pipeline. For clarity, emissions from pipeline commissioning are included in construction-related emissions whereas decommissioning emissions are included in post-construction emissions.

2.4.2.1 Pipeline Operations Emissions

During standard pipeline operations and maintenance, natural gas is flared, vented, or combusted throughout its lifespan. Combustion emissions are part of standard pipeline operations, typically due to the operation of pipeline heaters (downstream combustion emissions related to Manitoba Hydro's customers' end-use of natural gas are not considered in the LCA portion of this GHG Assessment – these are considered in Section 3 (Market Responses)). Flaring and venting can occur when the pipeline is taken out of service for maintenance. Though flaring is the preferred option from an environmental perspective, there are instances where flaring is not possible and natural gas is vented into the atmosphere. Venting may also occur through leaks in seals and fittings in the pipeline over the course of its lifespan.

Operational emissions for the Project were determined by prorating Manitoba Hydro/Centra Gas' total 2023 Natural Gas Distribution System emissions based on pipeline length. Total Natural Gas Distribution System emissions are determined based on component counts, company-specific calculations, and standard industry practice. Depending on the component counts on the Project, this prorating method may over- or underestimate actual operational emissions. However, it is expected that the *Post Construction: Pipeline Operations* will be the largest emission source in this LCA even if the prorating method overestimates the operational emissions.

2.4.2.2 Pipeline Decommissioning Emissions

Only the flaring of the volume of gas under the Project's standard operating pressure was considered for this LCA. Additionally, a flaring efficiency of 98% was assumed with the remaining 2% of natural gas being vented into the atmosphere. Using the Ideal Gas Law, the volume of gas at pipeline operating pressures was converted to a volume at standard conditions and 98% of this volume at standard conditions was multiplied by an appropriate natural gas combustion emission factor. The remaining 2% was assumed to

be 100% methane for simplification and was multiplied by IPCC's Fifth Assessment ("AR5") GWP_{100} for methane[13] [11]. These two values are aggregated in CO_2e to estimate total emissions for the decommissioning phase.

It is assumed that the *in situ* decommissioned pipeline will not be filled with concrete. If the *in situ* decommissioned pipeline were to be filled with concrete, it is expected that this would significantly increase the decommissioning emissions, since cement is an emissions-intensive construction material.

2.4.3 Key GHG Assessment Assumptions and Inputs

Table 10,

Table 11, and Table 12 list the key assumptions used in the estimate of infrastructure emissions. The rationale and assumptions for these values are described in Sections 2.4.1 and 2.4.2.

Table 10: Life Cycle Emissions – Key Input Assumptions

Activity	Emission Factor	Unit	Source
Ocean Transport	15.84	g CO_2e/tonne-km	NREL [12]
Rail Transport	18.97	g CO_2e/tonne-km	NREL [12]
Road Transport by Truck	79.91	g CO_2e//tonne-km	NREL [12]
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 [12]
Forge Steel into Bars/Wire/Other	354.61	g CO_2e/kg steel	Chalmers University [13]
Combust Diesel	2,761.38	g/L of fuel	ECCC [14]
Combust Gasoline	2,315.10	g/L of fuel	ECCC [14]
Produce and Deliver Fuel	979.29	g/L of fuel	ECCC [14]

[13] The GWP_{100} for methane in AR5 is 28.

Table 11: Life Cycle Emissions – Material Transport Assumptions

Assumption	Value	Unit	Source
Türkiye[14] to Montreal by Ocean	8,900	km	sea-distances.org
Montreal to Edmonton by Rail	3,000	km	rome2rio.com
Edmonton to Red Deer by Truck	200	km	Google Maps
Red Deer to Camrose by Tuck	100	km	Google Maps
Camrose to Site by Truck	1,300	km	Google Maps

Table 12: Life Cycle Emissions – Construction-related Assumptions

Assumption	Value	Unit	Source
Pipeline Mass – Steel	29.3	tonnes/km	Manitoba Hydro
Light Duty Truck Mileage	0.2	L/km	Manitoba Hydro
Vehicle Idling	6.8	L/hour	Oak Ridge National Lab
Heavy Construction fuel use[15]	248.0	L/hour	Manitoba Hydro
Hours per Construction Day	10	hours	Manitoba Hydro
Construction Days Per Month	22	days	Manitoba Hydro
Vehicle Ratio	3	Persons/vehicle	Manitoba Hydro
Construction Labour	13,200	person-days	Manitoba Hydro

[14] İzmir assumed as seaport location in Türkiye.

[15] Calculated using data presented in Table 8.

3 POTENTIAL MARKET RESPONSES

The Phase 1 assessment [5] of potential market responses is applicable to, but not additional to, Phase 2, and is included within this report for consistency and clarity. With the exception of Phase 1 of the South Loop [5], GHG assessments of other Manitoba Hydro construction projects [2, 15, 16] have only considered potential market responses related to regional electricity generators (i.e., “generation effects”). Outside of electricity generation, GHG effects (e.g., fuel switching, load growth) related to the end-uses of energy have not been considered.

These other Manitoba Hydro projects were electrical transmission and electrical generation projects, not natural gas pipeline projects. Phase 1 and 2 of the South Loop Project will expand Centra’s system’s capacity, allowing more Manitoba customers to connect to the natural gas system. This could, potentially, impact customers’ fuel choices and any resulting GHG effects.

Phase 1 and 2 of the South Loop Project’s assessment of potential market responses uses project accounting methodology [10]. Analysis indicates that establishing a baseline scenario, without the Phase 1 and 2 of the South Loop Project, is highly speculative and does not lend itself to accurate GHG assertions; however, in support of transparency, this section presents a more qualitative discussion of potential market responses to Phase 1 and 2 of the South Loop Project. Some quantification of potential GHG effects is included to provide scale/context.

3.1 Baseline Candidate Alternatives

“Baseline candidates are alternative technologies or practices, within a specified geographic area and temporal range, that could provide the same product or service as a project activity” [10].

The South Loop Project is providing the following attributes, which would be required by any baseline scenario:

- It is allowing Centra to meet its existing design loading.
- It is enhancing the reliability of the existing system.
- It is serving expected load growth (i.e., an increase in design loading).

A do-nothing alternative was not considered a viable baseline alternative as Manitoba Hydro is expected to maintain reliable systems for its existing natural gas and electricity customers. Theoretically, Manitoba Hydro could have pursued an option that met existing design load (assuming minimum contract pressure from TC Energy) but did not accommodate new load growth; however, there was no business case to do so, and this would be counter to Manitoba Hydro's long-standing practice of providing natural gas and/or electric service to all customer services within the province where reasonable.

Manitoba Hydro analyzed three capacity upgrade options to service load growth: 1) Liquified natural gas peak shaving, 2) natural gas compression, and 3) transmission pipeline looping, with the South Loop Project being selected. Assuming they provide the same design load, all these options would result in the same market response. The only difference in GHG effects would relate to project infrastructure. Assessing these alternatives was not included in the scope of the LCA, however some high-level observations are as follows:

- The peak shaving and compression alternative would likely result in lower construction emissions as they require less infrastructure than what is required for the full ~69 km South Loop Project.
- The peak shaving and compression alternatives would likely result in higher post-construction emissions.

  - Both the compression and peak shaving options have material operational energy requirements, whereas pipeline looping has minimal operational energy requirements.
- The peak shaving option would result in wasted fuel as about 2% of liquid natural gas is lost due to boil-off monthly; and the well-to-wheel efficiency of liquid natural gas is poorer than that of natural gas, in general.

The cost to electrify some of the anticipated load growth, as an alternative, was considered as part of Manitoba Hydro's corporate value framework evaluation of increasing capacity along the South Loop; however, high level cost estimates, based on marginal values of electric energy and capacity, suggested the cost could potentially be an order of magnitude higher than the cost of the South Loop Project. In the absence of provincial policy explicitly restricting capacity expansion along Centra's system, electrification is not a reasonable baseline scenario.

3.2 Natural Gas Planning

Manitoba Hydro's natural gas planning and reliability assessments of the natural gas transmission and distribution system is based on capacity, or the ability of the system to deliver instantaneous energy. The Gas Planning group utilizes a hydraulic model to determine pressure and flow characteristics of any given portion of the network based on the instantaneous energy demands of the customer base for that portion of the network under study.

The primary variables in these analyses are pressure, flow, and temperature. In Manitoba, temperature is the main driver of energy consumption. Colder temperatures require more gas volume to serve space heating requirements. Volumetric flow is measured in "thousands of standard cubic feet per hour," or mcfh. The greater these flows are, the greater the pressure drop on the network will be.

The pressure drop on the network is a key parameter that Gas Planning uses to determine if a given network is sufficiently sized. If, under a worst-case design scenario, the end-pressure at any point in the modeled network slips below the allowable pressure needed to sustain the gas network, a planning upgrade is triggered. The allowable end pressures in a network are set to meet the needs of the natural gas-fired appliances operated by many types of customers on the network, especially large commercial, industrial, and institutional customers.

Planning upgrades can be simplified as adding more pipe to a given network, by either paralleling an existing line (looping) or extending new pipe to service growth in a previously underserved area. By appropriately looping an existing line, that portion of the network can support larger peak demands for higher flows, while maintaining sufficient design pressures during those peak days, thus improving the capacity of the network.

Peak demand gas flows are not reflective of the total amount of natural gas that flows through the system each year (throughput). Manitoba Hydro does not use or estimate annual throughput of natural gas in its regional transmission and distribution system as a planning criterium. Annual throughput, or volume of natural gas consumed, is only forecast at a provincial level and is not part of natural gas project planning. Therefore, upstream, and downstream emissions that directly result from Project market responses cannot be estimated.

Additionally, the ability of the system to deliver higher mcfh does not imply that more natural gas will be consumed in the system. Technologies and programs such as dual fuel heating systems with heat pumps and a natural gas furnace, replacing low-efficiency natural gas furnaces with high-efficiency furnaces, and other energy efficiency measures may decrease annual natural gas consumption. However, they may not lower peak demand. Manitoba Hydro is not asserting that the Project, in isolation, will increase

or decrease natural gas consumption in the community as insufficient data is available to make any assertion. It is likely that there will be an increase in emissions in the near term, however with long term regional forecasts unavailable, it is not possible to make an assertion that emissions will increase.

3.3 Provincial Natural Gas Policy

Manitoba Hydro has a long-standing practice of expanding its natural gas distribution system when there was an adequate business case to do so, such as:

- If incremental near-term revenue would offset any expansion costs.
- If customers were willing to cover the cost of expansion.

With annual natural gas space heating costs being lower than other fossil fuels and electric resistance heating [17], there have been many circumstances where there has been an adequate business case for Manitoba Hydro and/or its customers to expand the Natural Gas Distribution System.

The provincial government has net-zero targets, which may require a long-term reduction in the end-use of natural gas in the province of Manitoba. The second objective in Manitoba's Affordable Energy Plan [18], which is a policy document that *"supports our path to net zero emissions by 2050",* encourages strategies that result in less GHG emissions from the heating of homes and buildings in Manitoba. As an example strategy, current Manitoba Hydro analysis [19] indicates dual-fuel space heating options (e.g., where air-source heat pumps are combined with gas furnaces) could be cost-effective options to reduce provincial emissions and annual throughput; however, a dual-fuel strategy would still require natural gas to meet Manitoba's demand during the winter peak.

Since the Phase 1 EA and GHG assessment of the South Loop was submitted [5], the Province of Manitoba released Manitoba's Path to Net-Zero [20] which further

emphasizes the reduction in fossil fuel emissions through efficiency programming and *“transitioning away from fossil fuels when are where we can.”* For clarity, while annual throughput may be reduced significantly, peak gas system design load may not, and the existence of the Project is not, in itself, inconsistent with Manitoba’s Path to Net-Zero.

According to the Canadian Energy Regulator’s Energy Future 2023 report [21], natural gas remains a fuel source in the residential, commercial, and industrial sectors at both the national and Manitoba levels by 2050, under both the Global Net-Zero and Canada Net-Zero scenario. While there is a meaningful decline in both the residential and commercial natural gas usage in Manitoba in the Canadian Energy Regulator’s analysis, it does not decline to zero, and the report indicates that natural gas may be used in these sectors in 2050. There is minor change in industrial natural gas usage over the study horizon. The Canadian Energy Regulator’s findings are aligned with a key learning from Manitoba Hydro’s 2023 IRP, that use of natural gas assets and gaseous fuels are an integral part of the energy transition in Manitoba.

While the Project was based, in part, on a projection of peak demand growth, it is possible that future provincial policy may result in a long-term reduction in annual natural gas throughput. If that is the case, then the Project will cause a negligible, or no, long-term market response. Irrespective of potential long-term reductions in annual natural gas throughput, the Project is required to meet near-term customer needs.

3.4 South Loop Load Growth

Anticipated load growth along the South Loop will be due to the urban expansion of Morden, Winkler, Altona, and Morris, a high concentration of new grain dryer installations, and existing agricultural energy demand switching to natural gas from more emissions-intensive fuels (e.g., propane, diesel/fuel oil). Most growth in peak demand on the South Loop system is anticipated to be due to large

commercial/agricultural growth (e.g., new grain dryers and existing grain dryers switching fuels), not urban growth (e.g., residential space heating).

For clarity, natural gas distribution system design is based on a peak design load, or the maximum amount of system throughput during the peak loading hour of the year. It is not based on annual throughput. Anticipated increases in annual throughput depend on the load profiles of individual customers.

Urban Load Growth: Over the next 15 years, urban load growth is estimated to increase peak on the South Loop by 158 mcfh (millions of cubic feet per hour). One mcfh can typically supply approximately 12 residential customers at peak winter conditions. Using that assumption, the estimated increase is roughly equivalent to 1,900 residential customers. Assuming 1,630 cubic metres per year per customer [17], based on an assumption of high-efficiency furnace, this would be roughly equivalent to three million cubic meters per year (i.e., 0.14% of current annual natural gas throughput of Manitoba Hydro's Natural Gas Distribution System).

Commercial/Agricultural Growth: Over the next 15 years, commercial/agricultural load growth is estimated to increase peak on the South Loop by 210 mcfh. A substantial amount of load growth will be due to both grain dryers[16] that do impact the system design peak as well as grain dryers that do not impact the system design peak (it assumed some grain dryer load will be placed in a "seasonal rate class"). The South Loop Project will facilitate both types of load growth as some natural gas loads will require a supply that is both firm and seasonal.

Currently, Manitoba Hydro does not have detailed data regarding potential future annual throughput (in cubic metres per year) from new commercial/agricultural load along the

[16] A seasonal load tied to crop harvest and post-harvest grain processing requirements.

South Loop. To provide high level context, three million cubic meters per year (the equivalent of 1,900 residential customers) will be assumed, matching the high-level estimate of urban load growth.

3.5 Market Alternatives

Manitoba customers with natural gas connections have natural gas distributed to them via Manitoba Hydro (i.e., Centra). Where natural gas distribution infrastructure is not available, Manitobans must choose different energy sources for their heating needs. These include electricity, propane, diesel, biofuels, and other fuels.

Urban Load: In Manitoba, the primary alternative to the use of natural gas for space heat is the use of electricity for space heat. Over the short-term (i.e., the next 5 to 7 years), since it only affects the operating margin [22], Manitoba Hydro assumes incremental electricity use results in generation effects of 0.82 kg CO_2e/kWh, based on an emission factor for "Non-Baseload Factors used for Avoided Emissions" [17] in eGRID's Upper Midwest region [23].

Over the long-term, this baseline emissions rate [22] will reduce as Manitoba Hydro builds new electricity generation resources to meet increases in provincial electrical load. Eventually, incremental electricity use will almost entirely affect the build margin [22], which could be near, or even below, 0 kg CO_2e/kWh. Manitoba Hydro does not

[17] These emission factors do not include GHG effects upstream of electricity generators.

currently have a long-term projection of baseline emission rates. [15][18] A projection is being developed as a part of Manitoba Hydro's ongoing planning.

Table 13 presents an estimate of annual space heating emissions produced by both one (average) residential customer as well as 1,900 customers (the high-level estimate of 15 years of urban load growth along the South Loop). Estimates are based on assumptions listed in Table 14 and Table 15. For conservativeness, it was assumed all new electrical customers would install either air source heat pumps (ASHPs) or ground source heat pumps (GSHPs). In a baseline scenario where all urban load growth was replaced by electrification (instead of the South Loop Project), annual urban load emissions would be between 2.2 and 5.9 tonnes CO_2e higher per customer than under the Project Scenario. Over the long-term, annual urban load emissions could potentially be up to 3.2 tonnes CO_2e lower per customer than under the Project Scenario.

[18] A detailed discussion of generation effects and potential long-term avoided emission factors in regions neighbouring Manitoba can be found in the Pointe du Bois Unit Replacement Project - Greenhouse Gas Mitigation Assessment.

Table 13: Annual Space Heating Emissions (t CO_2e) – Average Single Family Residential Customers [17]

Heating Fuel	Per Customer	Per 1,900 Customers
Propane (95% Efficiency)	3.81	7,233
Natural Gas (95% Efficiency)	3.21	6,101
Diesel/Fuel Oil (95% Efficiency)	4.51	8,577
Short-Term Electricity (Conventional ASHP – 120% Efficiency)	11.35	21,557
Short-Term Electricity (Cold Climate ASHP – 150% Efficiency)	9.07	17,236
Short-Term Electricity (GSHPs – 250% Efficiency)	5.45	10,348

Table 14: Annual Space Heating Requirements – Avg Single Family Customer [17]

Heating Fuel	Quantity	Unit
Propane (95% Efficiency)	2,465	litres
Natural Gas (95% Efficiency)	1,630	m^3
Diesel/Fuel Oil (95% Efficiency)	1,635	litres
Electricity (Conventional ASHP – 120% Efficiency)	13,842	kWh
Electricity (Cold Climate ASHP – 150% Efficiency)	11,067	kWh
Electricity (Ground Source Heat Pump – 250% Efficiency)	6,644	kWh

Table 15: Direct Emission Factors – Space Heating Fossil Fuels[19]

Heating Fuel	Emission Factor	Unit	Source
Propane	1.54	kg/L	ECCC [14]
Natural Gas	1.97	kg/m^3	MH
Diesel/Fuel Oil	2.76	kg/L	ECCC [14]

[19] These emission factors do not include upstream GHG effects.

Commercial/Agricultural Growth: Unlike residential space heating, the alternative to agricultural natural gas heating (e.g., grain drying and barn heating) is often propane or diesel/fuel oil, not electricity. It is assumed that connecting large agricultural and commercial facilities will enable fuel switching away from these more emissions-intensive fuels (Table 13).

A baseline scenario where commercial/agricultural growth relied on propane or diesel/fuel oil instead of natural gas could potentially result in 1,000 to 2,500 tonnes CO_2e more emissions annually, in the 15th year of the forecast. For comparison, total LCA emissions related to South Loop Project infrastructure are estimated to average 539 tonnes CO_2e annually (Table 5).

3.6 Market Response Conclusions

In considering the various baseline candidate alternatives, Manitoba Hydro did not identify a baseline scenario that differed from the Project Scenario. The South Loop needs to be upgraded to meet existing design load requirements (at minimum TC Energy contract pressure), several new customers already have approval to connect to the South Loop, the South Loop Project has a strong business case, and there is currently no provincial policy in place to restrict reasonable (i.e., business case justified) expansion of Manitoba's natural gas distribution system's capacity.

By providing additional natural gas capacity along the South Loop, the South Loop Project will likely increase natural gas emissions (both direct and indirect), decrease diesel and propane emissions, and decrease regional electricity generation emissions; however, it is not concluded that any of these GHG effects are additional. Manitoba Hydro is not asserting that the South Loop Project will result in a reduction in global GHG emissions by facilitating fuel switching to natural gas.

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APPENDIX E

Cultural and heritage resources protection plan

January 2026

Manitoba Hydro






CULTURAL AND HERITAGE RESOURCES PROTECTION PLAN

Contacts:
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Available in accessible formats upon request.

Document Owners:
Transmission & Distribution Environment and Engagement (T&DEE), Indigenous and Community Relations (ICR), as part of the Indigenous & Community Relations and Environmental Stewardship Division (ICRES)

Version - Final
*Note: T&DEE will revisit the document for updates and changes on an annual basis beginning in January of each calendar year.

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 encounters. Manitoba Hydro expects workers to report any findings to the Manitoba Hydro On-Site Supervisor or designate.

Chance Find Protocol

If you unearth or recover cultural or heritage resources during your work you must:

1. **STOP WORK** at the location.
2. **DO NOT TOUCH** or disturb the artifact/object.
3. **CORDON OFF THE AREA** using flagging tape, creating a 30 metre radius buffer circle around the artifact/object.
4. **RECORD** the encounter by taking photos and recording the GPS coordinates of the object, unless directed otherwise by the project archaeologist.
5. **CONTACT THE ON-SITE SUPERVISOR OR LEAD IMMEDIATELY.** Send them a description of the artifact/object and the information collected in step 4 above. They will determine the next steps required, including contacting engaged Nations if deemed required.
6. **DO NOT RESUME WORK** within the buffer area until the project archaeologist provides instructions to do so.

If an artifact is at immediate risk of being lost, disturbed, or destroyed: stop work and collect the artifact by placing it into a clean, dry container (e.g. a plastic bag) prior to completing steps 2-6 above.

Key Contacts

The Manitoba Hydro Indigenous & Community Relations and Environmental Stewardship Division (ICRES) is prepared to offer the required support to On-Site Supervisors including archaeological services and an Indigenous liaisonto preserve and protect cultural and heritage resources.

Transmission and Distribution can be contacted at 204-391-7355 or manger@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.

Land Acknowledgement

Manitoba Hydro operates throughout Manitoba, on the original territories of the Anishinaabe, Anishininew, Cree, Dakota, and Dene peoples and the National Homeland of the Red River Métis.

We also acknowledge the ancestral lands of the Inuit in northern Manitoba.

The legacy of the past remains a strong influence on Manitoba Hydro's relationships with Indigenous communities today, and we remain committed to establishing and maintaining strong, mutually beneficial relationships with Indigenous communities as we move forward in the spirit of reconciliation.

Indigenous Relations Commitment Statement

We operate throughout Manitoba, on the original territories of the Anishinaabe, Anishininew, Cree, Dakota, and Dene peoples, and on the national homeland of the Red River Métis. We are committed to respecting and supporting Indigenous peoples in all aspects of our business.

Indigenous peoples have a strong cultural and spiritual connection to the lands and waters, dating back to time immemorial. We acknowledge the impacts of our projects and operations and we are committed to working collaboratively to strengthen and improve our relationships with Indigenous communities. We support the advancement of reconciliation with Indigenous peoples in Manitoba and we will work to contribute to reconciliation efforts in our interactions with Indigenous peoples and communities.

We commit that:

- We will provide education to our employees regarding Indigenous peoples, cultures, and history, including the history of hydroelectric development in Manitoba and the effect of this development on Indigenous peoples and communities.
- We will work with Indigenous communities to understand their evolving energy needs and seek to provide customer service that reflects this understanding.
- We will provide timely and meaningful engagement and communication with affected Indigenous communities during project development and ongoing

operations.

- We will work collaboratively with Indigenous communities to address the adverse impacts of our projects and operations.
- We will collaborate with Indigenous communities in order to understand and be guided by their Indigenous Knowledge as it relates to our projects.
- We will promote safety on project-affected waterways, through water level notifications, community safety programming, and other measures.
- We will encourage the participation of Indigenous businesses and people in our procurement.
- We will promote and support the equitable representation of Indigenous people in our workforce.

Table of Contents

1.0 Introduction

This Cultural and Heritage Resources Protection Plan (CHRPP) outlines protection measures and protocols that Manitoba Hydro, its contractors and/or consultants will undertake in the event of the encounter of previously unrecorded cultural and heritage resources during work on the project.

This document focuses on managing risk of unearthing tangible heritage resources (referred to as heritage resources from this point forward), that is, the range of heritage objects and sites that can be identified according to the Manitoba **Heritage Resources Act** (1986).

The CHRPP sets out Manitoba Hydro's commitment to safeguard **cultural** and **heritage resources** and appropriately manage **human remains** or heritage objects encountered or disturbed during the development of Projects. Manitoba Hydro acknowledges the need for careful protection and respect for all heritage resources and other components of the cultural landscape as well as for all human remains regardless of the person they represent. The following core concepts as well as existing legislation were integrated into this CHRPP. As such, this Plan presents guidelines and provides further details regarding the protection of cultural and heritage resources and found human remains should they be unearthed or encountered during project activities.

Several core concepts were incorporated into the CHRPP regarding the specific terms, conditions, protocols, guidelines, recommendations and good practice:

- Value and Respect for First Nations and Métis Cultural Heritage;
- Stewardship;
- Meaningful Involvement;
- Consistency with Existing Legislation; and
- Culturally Appropriate Application of Protocol.

The above concepts are also intended to refer to a transparent, collaborative practice of maintaining and sharing a written record respecting the treatment of cultural and heritage resources that are encountered during Project activities.

The CHRPP is a tool designed to add further protection to cultural and heritage resource sites found within the Project area. Importantly, the CHRPP identifies and describes protective measures for sites or features and integrates a cultural

dimension to reflect the importance of Indigenous culture on heritage resources.

Note that 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 5.0.

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.

1.1 Regulatory and policy setting

The Project must adhere to *The Heritage Resources Act (Manitoba)* (1986) and the addendum, the *Policy Concerning the Reporting, Exhumation and Reburial of Found Human Remains* (1987). This CHRPP is consistent with and does not replace *The Heritage Resources Act* (*The Act*) or the Policy. In effect, it builds on the protective measures afforded by *The Act* and presents a culturally appropriate plan.

All relevant Manitoba Hydro employees and contractors and their employees working on the Project will be made aware of the contents of this Plan, and copies will be available at the on-site office.

1.2 Implementation

The goal of the CHRPP is to act as a reference manual to describe key actions in the event of encountering a 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.

Appendix B includes a protocol template that interested communities and organizations can complete to augment and enhance this CHRPP.

1.3 On-site project management structure

Manitoba Hydro staff, its contractors and/or consultants will be required to undertake activities, steps, procedures and measures set out in the flowchart located in Section 3.1 of this document should cultural or heritage resources or human remains be encountered during the construction, operation or maintenance of the project.

Manitoba Hydro expects workers to remain vigilant and to report any findings to the

Manitoba Hydro On-Site Supervisor or designate. The On-Site Supervisor or designate will be responsible for any on-site activities related to implementation of the CHRPP. The Manitoba Hydro Indigenous & Community Relations and Environmental Stewardship Division (ICRES) will provide support to the On-Site Supervisor or designate and act as a liaison between the On-Site Supervisor or designate, the project archaeologist, and any designated representatives from engaged Nations and the MMF to protect cultural and heritage resources and human remains. The project archaeologist will be hired by Manitoba Hydro and work with the Indigenous & Community Relations and Environmental Stewardship Division (ICRES), as well as the HRB and engaged Nations and the MMF to direct the cautious investigation and documentation of any encountered heritage resources. The HRB will oversee non-physical anthropological techniques, evaluate sites and findings presented by the archaeologist, ensure provincial standards are met, and liaise with the RCMP if necessary. Should any sacred or ceremonial objects be unearthed, Manitoba Hydro will contact the engaged Nations on the project, and the MMF to notify them of the encounter. The engaged nations and the MMF are responsible for determining if ceremony should occur, and making the appropriate arrangements for such in a reasonable timeframe.

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In order to conduct any type of archaeological or heritage resource investigation, a heritage permit must be secured from the Historic Resources Branch (HRB) (Manitoba Culture, Heritage and Tourism) who is charged with the issuance and management of heritage permits. Permits can only be issued to Registered Archaeologists. In consultation with the Project Archaeologist, engaged First Nations and Métis communities and organizations, and Manitoba Hydro, as required, the HRB will issue heritage permits in accordance with conditions and/or requirements of the necessary work. ICRES has access to archaeologists to support any investigation.

1.4 Indigenous Involvement

Cultural and Heritage resources found across Manitoba's landscapes are part of a living heritage carried by Indigenous peoples. These belongings hold deep cultural meaning and cannot be understood apart from the relationships, traditions, oral histories, seasonal movements, and ways of life that give them context. Together, they help shape Manitoba's cultural landscape and reflect the enduring connection between Indigenous communities and the land.

Manitoba Hydro understands the importance of including Indigenous knowledge and perspectives into the plans for protecting cultural and heritage resources. Manitoba Hydro recognizes that this is a shared responsibility, and continues to work with Indigenous peoples, as well as contractors, project archaeologists, and the HRB to further our understanding of, and continue to improve our practices related to culture and heritage.

Manitoba Hydro continues to support meaningful Indigenous involvement in the heritage process through direct participation opportunities including opening projects with ceremonies, fieldwork activities, collaboration with the project archaeologist, and observation of related construction activities .

Manitoba Hydro remains receptive to feedback and is committed to adapting this plan as needed. The organization values the perspectives shared by First Nations and the Manitoba Métis Federation, and continues to integrate heritage and cultural monitoring into its projects as part of a respectful and collaborative approach.

2.0 Heritage Resource Protection Measures

All Project participants will be required to undertake all activities, procedures and measures set out in the following sections should heritage resources or human remains be encountered during the construction of the Project. Heritage resources may be encountered in many different locations, and all workers on the Project should remain vigilant. Project workers are expected to report any findings to the Contract Administrator. Because human remains and archaeological sites are most often found along waterways, the Contract Administrator or delegate should be on-site whenever construction work is occurring in areas identified as having high archaeological potential, for example, work near shorelines.

2.1 General Protocol Requirements

In general, in the event heritage resources or possible human remains are encountered as a result of construction activities, certain procedures will be standard regardless of the type or timing of the encounter:

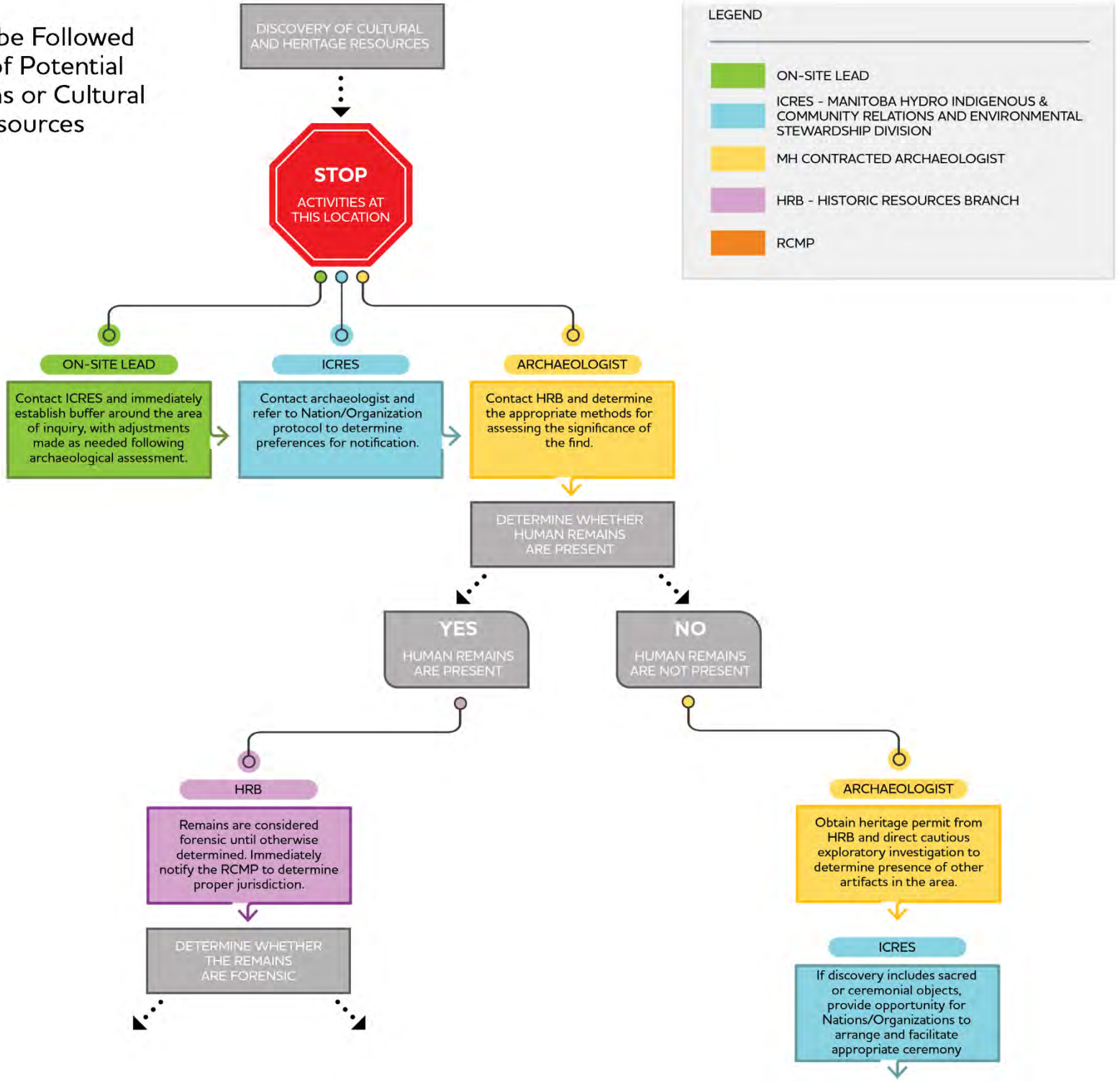
1. In all cases, construction activities will be stopped immediately at the location.
2. Immediately mark the encounter location with flagging tape. A buffer zone should be established around the area of the encounter and cordon off with temporary fencing, on reasonable judgment, but to a minimum distance of 30 meters radius from the center of the location. This buffer zone may be adjusted as the site is investigated. Construction activities may continue elsewhere so long as the heritage resources or human remains are not in harm's way, and the site or related archaeological activities will not be impacted.
3. The Contract Administrator and Nation/Organization Representative will be notified immediately. The Contract Administrator will inform the key contact from ICRES, who will contact the Project Archaeologist. The Project Archaeologist will communicate with the HRB. If human remains are suspected, the HRB will work with the RCMP to conduct an appropriate investigation, where next steps and protocols will be dictated by the RCMP.
4. The Nation/Organization Representative will inform their appropriate contacts to determine their preferred next steps. If a ceremony is deemed appropriate, the Nation/Organization Representatives will be able to conduct a ceremony within a reasonable timeframe.
5. The Project Archaeologist will obtain required heritage permits from the HRB.

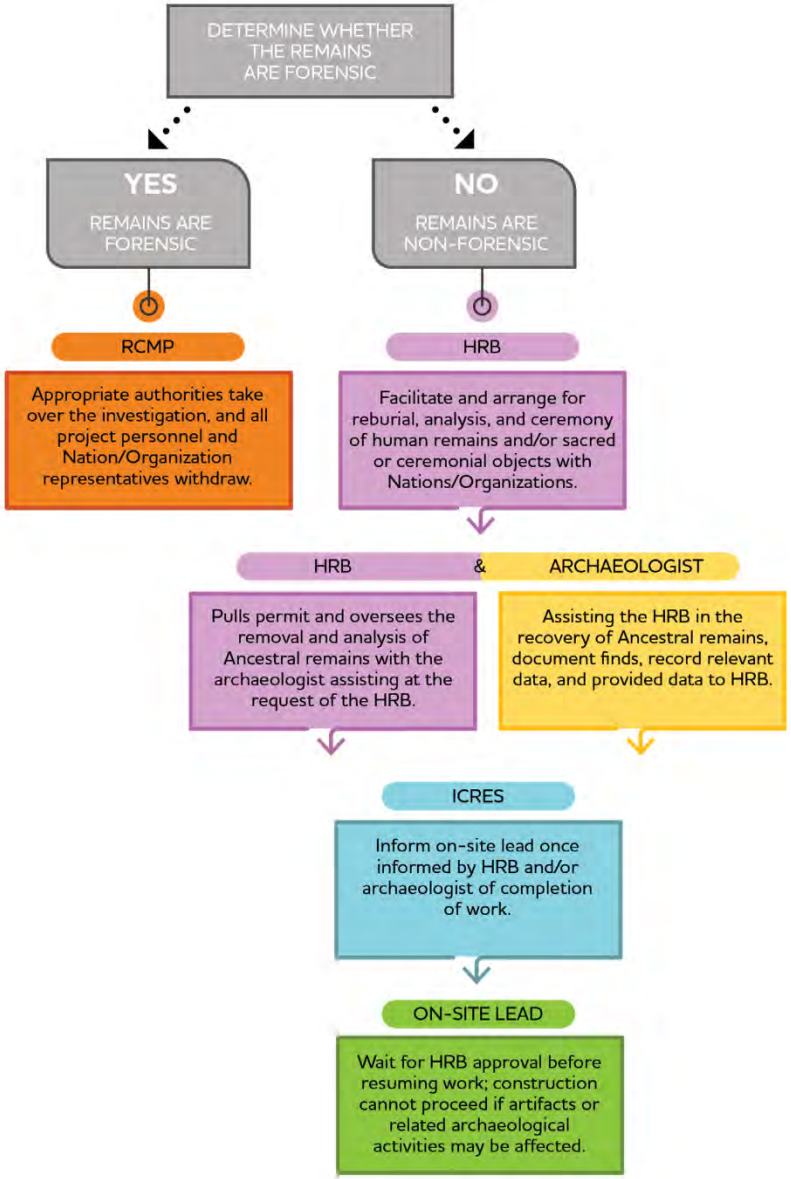
Permits will set the conditions and/or requirements of the necessary work, based on consultation with the Project Archaeologist and the Contract Administrator and Nation/Organization Representative, and will be made known to site staff and affected contractors.

6. Construction activities will recommence at the site once the HRB is satisfied the work is complete and meets provincial standards.

The flowchart below provides a summary of the protocol (practices/procedures) required should cultural or heritage resources, or possible human remains be encountered on site.

Procedures to be Followed for Discovery of Potential Human Remains or Cultural or Heritage Resources





DEFINITIONS

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.

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).

2.2 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 Nation/Organization 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.

2.3 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.

2.4 Cultural resources

For the purposes of this plan, cultural resources are defined 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, Ribbon Trees or other ceremonial sites.

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

2.5 Practices Manitoba Hydro will follow if cultural and heritage resources or human remains 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 flowchart located in Section 3.1 lays out the practices that Manitoba Hydro will follow if cultural and heritage resources are found.

3.0 Reporting and follow-up

The Project Archaeologist will establish and maintain a record of report for each encountered or disturbed heritage object and human remains that will include the **provenience,** 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.

Information about burial sites, sacred sites and other sites traditionally and presently used for cultural and ceremonial purposes will be treated as confidential. Such sites that are identified will be reviewed by engaged Nations or organization, and appropriate cultural measures, will be the responsibility of Nation or organization.

The Project Archaeologist will prepare a report for the HRB, as partial fulfillment of the heritage permit. The report(s) will provide the following information:

- A summary of archaeological testing strategies and finds documented throughout Project field investigations and how finds were managed.
- A record of human remains found (if applicable). 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, honoured, and reinterred the remains.
- A summary of any directions provided by the engaged Nations or organization Representative(s) regarding permission granted to conduct specialized analysis (where such permission is required).
- Any additional information concerning matters of significance related to heritage resources.
- Any recommendations to improve this CHRPP.

Specific information regarding details or locational information of confidential 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 Nation/Organization Representative(s), if applicable, in discussion with the HRB.

The archaeologist may prepare an overview report and provide it to their key contact at ICRES to review with the on-site supervisor and engaged Nations. 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 Nation/Organization Representative(s), HRB and the Manitoba Hydro Indigenous & Community Relations and Environmental Stewardship Division (ICRES) to review the reports.

4.0 Glossary of terms

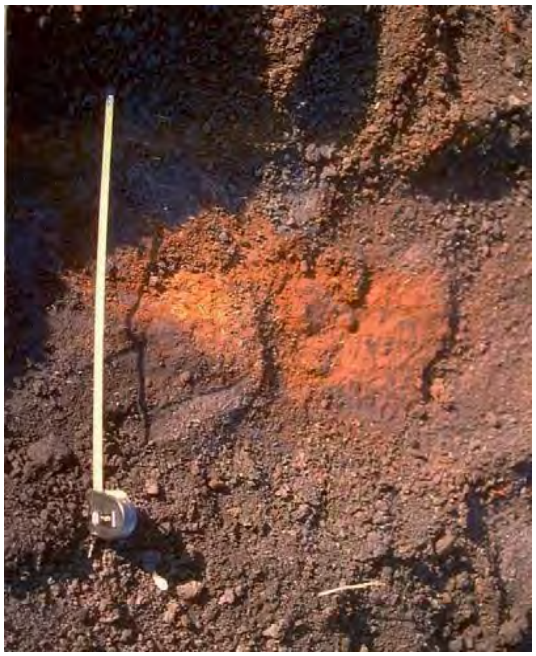
Artifacts	Any object of a historic nature that has been made or modified by a human being.
Caches	Rock features in which supplies were stored.
Cultural Resource	An object, site or location of a traditional or cultural practice that is the focus of traditional or contemporary use and is of continuing 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.
Forensic	Of interest to law enforcement or Office of Chief Medical Examiner.
Funerary goods	Items place 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.
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 found in the exact spot it was probably deposited at some time in the past.

Manitoba's Burials Policy (1987)	Short name of: "The Province of Manitoba Policy Concerning the Reporting, Exhumation, and Reburial of Found Human Remains." This is the 1987 Provincial Cabinet approved policy based on T*he 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	Non-forensic human remains are not of recent origin and are not of interest to law enforcement agencies or the Chief Medical Examiner's Office.
Ochre	An earthy clay coloured by iron oxide – usually red, but can be yellow.
Provenience	The original place of an artifact. Can be measured by two or three-points.
Radiocarbon dating	A method of absolute dating in which the carbon 14 of an object is measured.
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.
Stratum	A layer of soil that is distinct and separate from that above and below it.
***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. 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**.**

Soil Stains – Red **Ochre** or rust stains can be found in the soil. They can be the result of oxidized metal fragments or nails, red ochre nodules or indications of a burial. Do not remove any **artifacts** until archaeological evaluation occurs.	
Soil Stains - Black Black soil stains are indicative of either forest fire burn or human activity or both. Often the burn **stratum** will contain a living floor that has also been burned by forest fire. The presence of burned bone, fire-cracked rock, stone chips, pottery and other objects may be found in the wall profile.	

Soil Stains - White Soil staining can also be found in the form of charcoal flecks and ash from a hearth or fire pit. In this photo charcoal and organic staining is found in a white ash fire pit.	
Occasionally the ground will play tricks on the human eye. In the case of this photo a clump of sod and a piece of driftwood take on the shape of woolly mammoth head.	
Stone Features There are many different kinds of stone alignments that have been construction by humans: way-markers, caches, ceremonial sites, dwelling foundations and tepee rings, and burials are the major rock features that are found during archaeological investigations. In this photo an unidentified rock feature was found during low water levels at a project site.	

Skeletal Elements

In just about every archaeological site, bone of some sort is going to be recovered.

Once the bone is identified as mammal, fish or bird, it can tell can a story. In this photo mammal bone has been exposed in a shovel test pit. The dark organic staining could be the result of decomposition of the animal or human activity site such as animal butchering.

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

Culturally Modified Trees Occasionally evidence of past 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, birchbark biting crafts.	
In this photo a prayer tree is shown, where cloth and ribbons are tied to the tree. Prayer trees are often found nearby areas that hold cultural importance, including where ceremonies and offerings may take place.	
In this photo cut wood has been used to construct an animal trap. Different kinds of wood traps were used for different animals. Large deadfalls are not commonly found these days.	

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.

Metal and Glass Objects

Often metal objects are found abandoned long old portage routes, former dog 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.

Structural Features

The manner in which structural features are constructed can be dated. If such features are encountered the Project Archaeologist will be contacted and will supervise the recording of the data. The reason for this is that there are very few examples of aboriginal architecture and care needs to be taken to ensure that all measurements are recorded accurately.

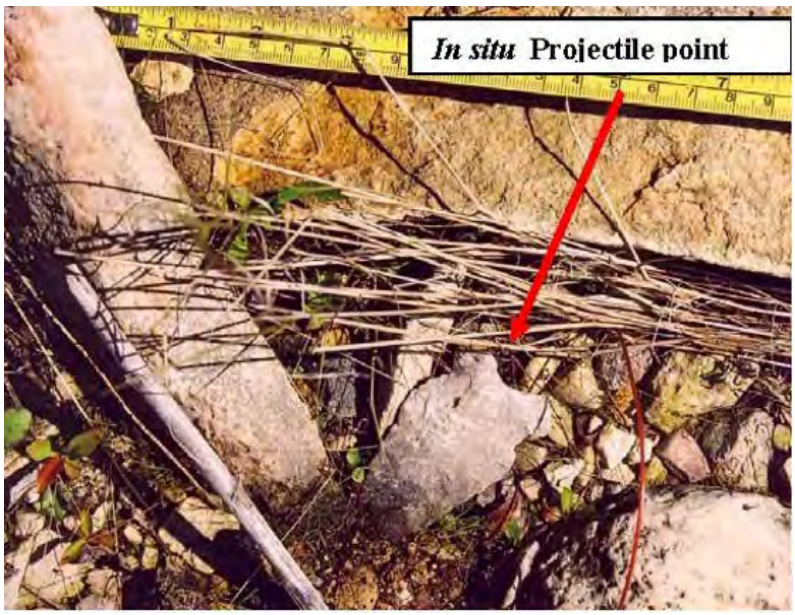
Stone Building Foundation

In situ Artifacts

Projectile points such as this Oxbow Point have been recovered from a project site.

Artifacts will be photographs and left in situ until assessed by the Project Archaeologist. Before collection, the surrounding vegetation and soils will be 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.



Indigenous pottery may also be encountered. In this photo, pottery has been found in the wall of an excavation unit. Note the fabric impressed pattern. Most often only fragments of a vessel are recovered. The most important part is the rim because this is the area where the designs are located. The designs help to relative date the archaeological site. The same procedure is followed for removing the ceramics as with other artifacts.	

Appendix B: Cultural and heritage resource protection protocol

Nation/Organization: _____

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

   Yes ☐ No ☐

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

Human remains	Yes	☐	No	☐
Heritage/cultural resources (pictographs, petroforms, bone tools)	Yes	☐	No	☐

3. Leadership have chosen _____ as the Nation/ Organization representative that Manitoba Hydro should contact for heritage or cultural resources encounters

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 Nation/Organization like to conduct a ceremonial or spiritual activity?

   Yes ☐ No ☐

5. Please sketch the cultural and heritage resource area of interest for the Nation/ Organization on an attached map. This information can be kept confidential.

6. Are you aware of recent encounter 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 Heritage Resources Protection Plan?

   Yes ☐ No ☐

Date: _____

Filled out by (Please print): _____

Signature _____

APPENDIX F

Contractor environmental responsibility bulletins

January 2026

Manitoba Hydro

Manitoba Hydro Environmental Management Policy

Manitoba Hydro recognizes that our operations both affect, and are affected by our environment. The energy services we offer Manitobans rely on natural resources that are of critical importance to us all. This is why environmental leadership is identified as a key principle of our business.

We will consider the environmental impacts of our activities, products and services. To deliver on this commitment effectively, we employ an environmental management system (EMS) that aligns with the ISO 14001 Standard.

Specifically, Manitoba Hydro strives to protect the environment by:

- Ensuring that work performed by our employees and contractors meets environmental regulatory, contractual and voluntary commitments.
- Recognizing the needs and views of our interested parties and ensuring that relevant information is communicated.
- Continuously assessing our environmental risks to ensure we are managing them effectively.
- Reviewing our environmental objectives regularly, seeking opportunities to improve our environmental performance.
- Considering the life cycle impacts of our products and services.
- Ensuring that our employees and contractors receive relevant environmental training.
- Fostering an environment of continual improvement.

[redacted]

President and Chief Executive Officer

Policy Number: P850 Revised: 2020 04 14 Effective: 2020 04 14

Copies are not controlled.

Manitoba Hydro

Hazardous Materials

Contractor Environmental Responsibilities

Application

Applies to work activities that involve the use, storage, and/or transport of hazardous materials.

For information on petroleum storage tanks and fueling activities, refer to the Petroleum Products bulletin.

Description

Hazardous materials include products such as fuel, solvents, coolants, and oils (such as lubricating oil, engine oil, and hydraulic oil).

Hazardous materials must be used, handled, stored, and transported safely during work activities to protect people and the environment.

Environmental Mitigation Measures

Category	ID	Mitigation
Use	1	Non-hazardous products will be used in place of hazardous materials to the extent possible.
	2	An inventory of Workplace Hazardous Information System (WHMIS) controlled substances, including their Safety Data Sheets (SDS) will be maintained at each project site and updated as required.
	3	Contractors that handle hazardous materials must have WHMIS training and provide training records to Manitoba Hydro upon request.
	4	Hazardous materials must be handled, used, stored, labeled and disposed of in accordance with WHMIS.
	5	Contractors are to follow instructions on SDS. Appropriate Personal Protective Equipment (PPE) identified in SDS must be used for each hazardous material.

Version 4.0 // May 2025

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

Manitoba Hydro energy for life

Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Storage	1	Hazardous materials should be kept in a designated hazardous materials storage area when not in use. Storage sites will not be located in gravel pits or quarries.
	2	Outdoor hazardous material storage areas will be located a minimum of 100 m from a water body unless otherwise approved by Manitoba Hydro.
	3	Signs will be posted with information requested from Manitoba Hydro personnel (e.g., hazard warnings, contact info).
	4	Indoor storage of flammable products in use must be in fire resistant enclosed storage cabinets, areas or buildings. No combustibles (e.g., cardboard boxes) or incompatible materials shall be stored in or on the cabinet.
	5	Only compatible hazardous materials can be stored together.
	6	Hazardous materials stored outdoors will be adequately contained and protected from the elements.
	7	Any empty containers or containers no longer in use must be removed to a designated waste area.
	8	Monitor hazardous material containers regularly for leaks and to ensure that labels are visible and legible. Frequency will be determined by Manitoba Hydro. Documentation of inspections shall be kept on site.
	9	Compressed gas cylinders will be stored upright, secured, labeled and segregated appropriately. Each cylinder must have a protective cap.
	10	Batteries and other corrosives shall be appropriately stored and separated from non-compatible materials. Metal shelving shall not be used unless batteries are placed in plastic containment.
Transport	1	All shipping of dangerous goods must be in compliance with the Transportation of Dangerous Good Regulations (SOR 2019/101).

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Heritage Resources

Contractor Environmental Responsibilities

Application

Applies to all projects where ground will be disturbed.

Description

Heritage resources include heritage sites, heritage objects (artifacts), or features. Protecting heritage resources that are known or discovered during construction projects is a legal and social requirement.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Contractors should be aware of the potential for heritage resources to be discovered during construction.
	2	Contractors who are conducting clearing and earth moving activities must look out for heritage resources
	3	If a heritage resource, or suspected heritage resource, is encountered, work must stop at that location immediately. The discovery will be reported to Manitoba Hydro immediately.
	4	If a heritage resource is discovered during the work, an archaeologist hired by Manitoba Hydro or the Province of Manitoba's Historic Resource Branch may establish buffers zones. No work will take place in these buffer zones unless approved by Manitoba Hydro.
	5	All archaeological finds discovered during site preparation and construction will be left in their original position.
	6	No worker will take ownership of any heritage resource discovered during the work.
Known Heritage Sites	1	All known heritage sites in work areas will be buffered and flagged by Manitoba Hydro, a delegate or as specified in the contract prior to work commencing. These areas will not be disturbed.
	2	No work will take place in these buffer zones unless approved by Manitoba Hydro.

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Releases

Contractor Environmental Responsibilities

Application

Releases involve any amount of hazardous materials which escape from its primary means of containment (container, tank, equipment, etc.) that occurs outside of normal work procedures.

Environmental Protection Objective

To safely respond to all releases and remediate contaminated work sites.

Environmental Mitigation Measures

Category	ID	Mitigation
Spill Response Plan	1	Prior to beginning work, the contractor must have a spill response plan prepared, reviewed and accepted by Manitoba Hydro.
	2	The spill response plan must include: • Identifying hazards; • Protecting yourself, containing the spill and securing the site; • Notifying agencies and appropriate people; • Sampling and analysis; • Clean-up; and • Shipping, storage and disposal.
	3	Contractors must be aware of the spill response plan, know how to use it and adhere to it.
Spill Kits	1	Emergency spill kits (absorbent pads and booms) must be conveniently located adjacent to petroleum and hazardous materials use/storage facilities and equipment.
	2	Spill response equipment shall be capable of containing and managing a spill from the largest container or equipment and be suitable for the site location. For example, spill containment booms adjacent to a water body.
	3	Spill response supplies shall be compatible with all types of hazardous materials on site. For example, hydrocarbon pads for oil releases and all-purpose pads for glycol releases.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Spill Response	1	Upon discovery of a release, make sure the scene is safe and then contain the spill according to the spill response plan. Immediately, report release to Manitoba Hydro giving as much information as possible such as: Location, time/date of spill, product type, volume released and proximity to water bodies or sensitive areas.
	2	Mitigate and clean-up the release in accordance with the spill response plan. This must involve: • Collecting all contaminated material and storing it in compatible containment systems until it can be shipped to a waste management facility or industrial waste landfill site. • Shipping and disposal is the responsibility of the contractor/sub-contractor. • Adhere to the *Hazardous Waste Regulation (MR 195/2015)* and the *Transportation of Dangerous Goods Regulations (SOR 2017-137).*
	3	All releases that require immediate notification to a Regulator shall be the responsibility of the contractor. Refer to the *Externally Reportable Quantities* (attached) for reporting requirements.
	4	All waste materials generated during the spill/release clean-up must be properly stored and disposed of.
	5	The contractor will produce a spill/release report. This report will be the basis of all documentation related to the incident and shall be issued to Manitoba Hydro for filing within seven days of the release.
	6	The spill site must be restored to the satisfaction of Manitoba Hydro and/or the Regulator. Samples may be required to confirm the cleanup meets regulatory guidelines.
Remediation	1	All remediation activities must be in compliance with the *Dangerous Goods Handling and Transportation Act, the Contaminated Sites Remediation Act* (and associated Manitoba Conservation and Climate guidelines) and/or Environment and Climate Change Canada requirements, if applicable.
	2	Where soil or surface material is identified as being contaminated, a site-specific remediation plan must be developed for the treatment/disposal of contaminated material, based on contaminant type, volume of contaminated material and need for off-site treatment. Submission of the plan for approval to the Regulator may be required.
	3	Large contaminated soil storage areas must be clearly identified and constructed to contain surface runoff and prevent leaching to soil and groundwater.
	4	Large-scale releases may require a Phase II Environmental Site Assessment (ESA) to be carried out in order to determine the extent of impacts so that a remediation action plan (RAP) can be developed by qualified professionals. The ESA will be conducted in accordance with the Manitoba Environment, Climate and Parks *Environmental Site Assessments in Manitoba Guideline*.

Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Sampling	1	All impacted material removed from the spill area must be sampled to determine contaminant levels (composite sample – Photo 3). The sample results are used to determine the appropriate disposal location for the impacted material. Reference Manitoba Environment, Climate and Parks *Criteria for Acceptance of Contaminated Soil at Waste Disposal Grounds* Guideline.
	2	Responsibility for the sampling will be determined before commencement of project.
	3	Samples must be taken as per laboratory instructions (clean gloves, etc.) and in accordance with the Manitoba Conservation and Climate *Environmental Site Assessments in Manitoba* Guideline.
	4	Upon completion of impacted soil removal, confirmatory samples (discrete – Photo 4) will be taken from the spill area to ensure that remedial activities are complete. No backfilling can commence before sample results meet applicable guidelines. Only clean fill shall be used for backfilling.
	5	Sampling results (with a site sketch) and proof of disposal location will be provided to Manitoba Hydro. Additional information may be required by Manitoba Environment, Climate and Parks or Manitoba Hydro personnel.

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Externally Reportable Releases

IMPORTANT – Internal reporting is required for all quantities released!

Use the following rules when determining if external reporting to the regulator is required. If any of the rules apply, the release **MUST** be externally reported.

RULES FOR EXTERNALLY REPORTABLE RELEASES (FOR ANY TYPE OF HAZARD)

To determine if a release should be reported to the regulator:

1) First determine if any of the rules apply. If so, an Emergency Report must be made by phone to Manitoba Environment, Climate and Parks.

Rule 1	• **Any volume released to a waterway**
Rule 2	• **Any volume released to an environmentally sensitive area**
Rule 3	• **Any volume released that poses or may pose a threat to human health or the environment**

2) If no rules apply, check to see if the release meets or exceeds the quantities on the *'Externally Reportable Quantities for Releases'* table (on page 2 and 3 of this document). If so, report to Manitoba Environment, Climate and Parks.

Emergency reporting in Manitoba to regulators for all notifications *(Manitoba Environment, Climate and Parks, Environment and Climate Change Canada and Transport Canada)* requires calling the Environmental Emergency Reporting Line at (204) 944-4888.

Version 1.0 // November 30, 2022

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Externally Reportable Quantities for Releases

Regulated			
Hazard	**TDG Class** (If Applicable)	**Reportable Quantity by Regulation**	**Reportable Quantity for Notification Purposes**
Explosives (i.e. Dynamite)	1	Any Quantity	—
Compressed Gas			
Flammable (i.e. Aerosols, Propane)	2.1	100 L Container Capacity (refers to water capacity)	—
Flammable — Natural Gas Underground Lines	—	—	Any quantity that causes death, injury, fire, explosion, evacuation, threatens safety of public, highly visible and notable, > 2" diameter lines and >550 kPa (80 psig), or has harmed the environment.
Non-Flammable, Non-Toxic (i.e. Anhydrous Ammonia, Fire Extinguishers)	2.2	100 L Container Capacity (refers to water capacity)	—
Toxic (i.e. Hydrogen Sulphide; Chlorine)	2.3	Any Quantity	—
Corrosive (i.e. Hydrogen Chloride)	2.3	Any Quantity	—
Flammable Liquids (i.e. Gasoline, Acetone, Diesel Fuel, Methanol)	3	100 L	—
Flammable Solids, Spontaneous Combustible and Water-Reactive Substances (i.e. Sulphur, Zinc Dust)	4	1 kg	—
Oxidizing Substances			
Packing Groups I & II (i.e. Sodium Peroxide, Potassium Permanganate)	5.1	1 kg or 1 L	—
Packing Groups III (i.e. Potassium Nitrate)	5.1	50 kg or 50 L	—
Organic Peroxides (i.e. Methyl Ethyl Ketone Peroxide)	5.2	1 kg or 1 L	—
Toxic Substances			
Packing Group I (i.e. Acrylonitrile, Hydrogen Sulfide)	6.1	1 kg or 1 L	—
Packing Group II & III (i.e. Pesticides, Wood Preservative)	6.1	5 kg or 5 L	—

Regulated

Hazard	TDG Class (If Applicable)	Reportable Quantity by Regulation	Reportable Quantity for Notification Purposes
Infectious Substances (i.e. Infectious Substances affecting humans)	6.2	Any Quantity	—
Radioactive Materials (i.e. Nuclear Densometers)	7	Any discharge or radiation exceeding 10 mSv/h at the package surface and 0.2 mSv/h at 1m from the package surface	—
Corrosive (i.e. Hydrofluoric Acid, Battery Fluid, Mercury)	8	5 kg or 5 L	—
Miscellaneous Products, Substances or Organisms (i.e. Lithium Cells & Batteries, Asbestos)	9	50 kg	—
Polychlorinated Biphenyls			
PCB or PCB Contaminated Oil IN USE	9	1 gram	—
PCB Containing Equipment IN STORAGE	9	Any Quantity ≥ 2 ppm	—
Ozone Depleting Substances (i.e. R-11 Refrigerant) ***Report using MOPIA form**	—	10 kg	—

Non Regulated

Hazard	TDG Class (If Applicable)	Reportable Quantity by Regulation	Reportable Quantity for Notification Purposes
Petroleum Products			
Engine Oil	—	—	30 L
Insulating Oil	—	—	100 L
Lubricating & Hydraulic Oil	—	—	50 L
Pesticides (Non-TDG Regulated)			
Concentrate	—	—	10 L
Solutions, Mixtures	—	—	100 L
Antifreeze (Non-TDG Regulated) (Propylene & Ethylene Glycol)	—	—	50 L
Sewage (Solid Sludge or Liquid)	—	—	500 kg or 500 L

CALCULATION FOR PCB GRAMS PER DAY

Determine the number of grams released in PCB spills by multiplying the volume (litres) released, by the concentration (parts-per million) of PCBs in the release, by the density (kilograms/litre) of 0.9 kg/L, and then divide that value by 1000.

$$\frac{(\textbf{Volume Released}\ (L) \times \textbf{Concentration of PCBs}\ (ppm) \times \textbf{0.9}(kg/L)}{1000} = \textbf{PCBs Released}\ (g)$$

Example: A 90L release of insulating oil with a concentration of 10ppm PCBs from a transformer in use.

$$\frac{(\textbf{90}L \times \textbf{10}ppm \times \textbf{0.9}\ kg/L)}{1000} = \textbf{0.81}$$

Therefore this release ***would not*** be reportable to the regulator.

PCB Concentration / Volume of Oil that equates to 1 gram of PCBs being released

Concentration of PCBs in Released Oil	Volume of Oil that equates to 1 gram of PCBs being released
5 ppm	222 litres
10 ppm	111 litres
20 ppm	55 litres
40 ppm	27 litres
45 ppm	24 litres
100 ppm	11 litres

RULES FOR EXTERNALLY REPORTABLE RELEASES OF DANGEROUS GOODS IN TRANSPORT (SURFACE)

To determine if a release of dangerous goods in transport should be reported to the regulator:

1) First determine if the dangerous goods are being transported using the 150 kg Gross Mass Exemption. If not, follow additional steps below. If Gross Mass Exemption is being used, no reporting of a TDG release is required.

2) If the release endangers or could endanger public safety **AND** meets or exceeds the quantities on the 'TDG Externally Reportable Quantities for Releases' table (on page 5 of this document). If so, an Emergency Report must be made by phone to Manitoba Environment, Climate and Parks.

3) If the Emergency Report under #2 is made, **AND** any of the following rules apply, submit a Release Report by phone to CANUTEC, the consignor (shipper), and the Canadian Nuclear Safety Commission (if Class 7 is involved). A written 30-Day Follow-up Report must also be submitted to Transport Canada (contact Enterprise Environment).

Rule 1	• **Death or injuries that require treatment by a health care professional**
Rule 2	• **An evacuation/closure of a facility, road, mail railway line, or main waterway**
Rule 3	• **Integrity of the means of containment is compromised**

Emergency reporting in Manitoba to regulators for all notifications (Manitoba Environment, Climate and Parks, Environment and Climate Chane Canada and Transport Canada) requires calling the Environmental Emergency Reporting Line at (204) 944-4888.

Release reporting to CANUTEC's 24-hour Emergency Telephone (613) 996-6666
Canadian Nuclear Safety Commission duty officer Emergency Line (613) 995-0479

TDG Externally Reportable Quantities for Releases		
Class of Dangerous Good	**Packing Group or Category**	**Quantity**
1	II	Any quantity
2	Not applicable	Any quantity
3, 4, 5, 6.1 or 8	I or II	Any quantity
3, 4, 5, 6.1 or 8	III	30 L or 30 kg
6.2	A or B	Any quantity
7	Not applicable	A level of ionizing radiation greater than the level established in section 39 of the "Packaging and Transport of Nuclear Substance Regulations, 2015"
9	II or III or without packing group	30 L or 30 kg

Vehicles and Equipment

Contractor Environmental Responsibilities

Application

Applies to all projects related to construction waste materials, including solid waste, hazardous waste, and food waste.

Description

Waste reduction, recycling, and proper dispose of generated wastes must be implemented during all construction activities.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Machinery shall arrive on site clean, free of fluid leaks, fully serviced, and in good working order.
	2	Vehicles, equipment, tools and footwear should arrive on site clean i.e. free of at least 90% of visible soil and plant materials.
	3	Minimize the amount of service performed on work sites.
	4	Minimize idling.
	5	Machinery will not be washed at the site unless otherwise approved by Manitoba Hydro.
	6	Vehicles and equipment must stay within the project footprint. Any alternate routes must be approved by Manitoba Hydro.
	7	Drip pans will be placed under heavy machinery if sitting overnight if seeps or leaks are noted.
	8	During the active fire season (April to November), all machinery requires firefighting equipment. Class 1 machines (brush saw, power hand tool, etc.) require one 5lb fire extinguisher; Class 2 machines (loader, drilling equipment, skid steer, service vehicle, etc.) require one 10lb fire extinguisher; and Class 3 machines (chipper, saw mill, wood harvester, etc.) required one 20lbs fire extinguisher, as well as one back tank pump with at least 18L water or a second 20lbs fire extinguisher.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Siting	1	Site selection for maintenance activities shall be done in consultation with, and approved by, Manitoba Hydro.
	2	Regular maintenance and repairs shall be carried out in designated areas on an impermeable surface in a bermed area, and located at least 100m from water bodies, unless otherwise approved by Manitoba Hydro.
Operation	1	Prior to daily use, contractors will perform visual inspections for fuel, oil and fluid leaks.
	2	Suitable collection and containment equipment (e.g., drip trays, tarps, or drums) shall be used for liquid changes and other onsite servicing.
	3	All wastes from maintenance and repair shall be properly collected, labeled, stored, and recycled (when possible). Provisions shall be made for temporary storage of all waste oils and filters, fuels, lubricants, coolants, hydraulic fluid, etc. in accordance with the *Hazardous Waste Regulation (MR 195/2015)*.
	4	Fire prevention equipment (e.g., welding mats, spark arrestors, etc.) shall be used when necessary during active fire season (April to November).
	5	All vehicle and equipment storage/service sites shall be free of spills and construction waste prior to project completion. See Releases bulletin and Waste Management bulletin.

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Waste Management

Contractor Environmental Responsibilities

Application

Applies to all projects related to construction waste materials, including solid waste, hazardous waste, and food waste.

Description

Waste reduction, recycling, and proper dispose of generated wastes must be implemented during all construction activities.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Waste materials should be separated for recycling including oil, tires, metals, batteries, coolants, solvents, etc. and sent to an appropriate recycler.
	2	All waste streams are to be identified and plans for storage at the work site and transport off work sites must be made. Please refer to Hazardous Materials CER.
	3	Borrow pits or quarries will not be used as waste storage sites or disposal sites.
	4	Construction sites will be kept tidy at all times and bins will be provided wherever solid wastes are generated and in accordance with the *Litter Regulation (MR 92/88R)*.
	5	Indiscriminate burning, dumping, littering or abandonment of waste is not permitted.
	6	Construction waste (wood, cardboard, concrete, metal, etc.) is to be sorted and transported to a licensed solid waste or recycling facility; other disposal methods may be appropriate, but must be approved in advance by Manitoba Hydro.
	7	Adequate receptacles will be provided for tobacco butts; attention will be paid to any areas where butts accumulate; these areas will be cleaned up and receptacles will be moved to the problem areas to prevent future litter.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Hazardous Waste	1	Hazardous waste should be stored in a hazardous waste storage area. This area should be inaccessible to unauthorized personnel and be identified through signage, as per the *Hazardous Waste Regulation (MR 195/2015)*.
	2	Hazardous waste storage areas will be inspected by the contractor at least every 30 days. Records of inspections will be kept on site.
	3	Outdoor hazardous waste storage areas will be covered by roofing or another means to protect them from precipitation.
	4	Liquid hazardous waste will be placed on/in secondary containment.
	5	Hazardous waste must be sent for disposal when the storage area is nearing capacity and/or before completion of contract.
Wildlife	1	Where wildlife are prevalent, place all garbage containing food waste (including grease traps) in animal-proof garbage containers, and if required secure in a building and/or use an electric fence as an extra barrier. Food waste will be removed from site on a regular basis.

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Wildlife Protection

Contractor Environmental Responsibilities

Application

Applies to all projects to reduce the potential for impacts to wildlife and their habitat. Includes noise.

Description

Wildlife includes mammals, birds, reptiles, fish, amphibians.

Potential disturbance of wildlife must be minimized during construction and maintenance activities.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Vehicles must not exceed posted speed limits and must adhere to wildlife warning signs.
	2	No firearms will be permitted at the work site.
	3	Hunting and harvesting of fish and wildlife by contractors is not permitted on the project site.
	4	Wildlife will not be fed, befriended or harassed.
	5	Where wildlife are prevalent, place all garbage containing food waste (including grease traps) in animal-proof garbage containers, and if required secure in a building and/or use an electric fence as an extra barrier.
Birds and Nests	1	Construction and maintenance activities that involve the removal of vegetation (e.g. tree clearing, grubbing, brushing, and mowing) shall be avoided during bird breeding season (in Manitoba generally April 1 – August 31) to the extent possible. These dates are a general guide as bird breeding season dates vary throughout Manitoba.
	2	For construction or maintenance activities that occur during the bird breeding season, and have a medium to high risk of disturbing birds and nests (e.g., vegetation clearing, mowing, and/or mulching; or activities with high noise/vibration levels), bird nest sweeps (i.e., a survey of the work area for bird nests) are to be carried out by a qualified individual no more than seven days prior to the work. The contractor will arrange for nest sweeps unless otherwise specified by Manitoba Hydro. Species appropriate buffers will be placed around any nests identified. The contractor will remain outside of the buffers until chicks have fledged.
	3	The contractor will be aware of the potential for nesting,, and will check the work site and equipment daily for nesting birds during the breeding bird season. If a nest is found, including on a piece of equipment, or while undertaking the work, a 30 m buffer will be established and Manitoba Hydro will be contacted. Once the species of bird is identified the buffer size will be adjusted.

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Environmental Mitigation Measures

<table>
<tr><th>Category</th><th>ID</th><th>Mitigation</th></tr>
<tr><td></td><td>4</td><td>Outside the bird breeding season (generally between September 1 and March 31), if a large stick nest or large woodpecker nest cavity is found during construction or maintenance activities (e.g. clearing, pole replacement), the nest must not be disturbed, and Manitoba Hydro must be contacted immediately for further guidance on how to proceed. Some nests such as large stick nests (raptors and herons) and pileated woodpecker nests are protected year round.</td></tr>
<tr><td rowspan="8">All Other Wildlife</td><td>1</td><td>Setbacks and boundaries of known important wildlife sites (i.e. mineral licks and dens) will be identified and flagged by Manitoba Hydro prior to contractor activities. The contractor will not enter these areas.</td></tr>
<tr><td>2</td><td>Problem wildlife will be reported immediately to Manitoba Hydro. Manitoba Hydro will consult with Manitoba Environment, Climate and Parks.</td></tr>
<tr><td>3</td><td>Any suspected sightings/occurrences of rare, threatened or endangered species in work areas will be reported to Manitoba Hydro for evaluation and reporting to the appropriate regulator.</td></tr>
<tr><td>4</td><td>If the contractor encounters a bat colony or an active large mammal den during their work, it will be left undisturbed and reported to Manitoba Hydro. Manitoba Hydro will establish an appropriate buffer and the contractor will remain outside of the buffer.</td></tr>
<tr><td>5</td><td>Any injured or killed wildlife encountered by the contractor at the work site i.e. vehicle collision will be reported to Manitoba Hydro.</td></tr>
<tr><td>6</td><td>If the contractor finds animal traps or bait sites within the work site they will establish a 5 m buffer around the site and contact Manitoba Hydro.</td></tr>
<tr><td>7</td><td>If a beaver dam, lodge or muskrat house impedes construction, the contractor will contact Manitoba Hydro. Manitoba Hydro will contact Manitoba Environment, Climate and Parks to obtain an authorization to remove the beaver dam, lodge or muskrat house and trap out any beavers or muskrats. Manitoba Hydro will alert the contractor when all permits are in place and the dam, lodge or house can be removed. Refer to Fisheries and Oceans Canada's Interim Code of Practice- Beaver Dam Removal.</td></tr>
<tr><td>8</td><td>If during project activities an occupied, large mammal den (such as a bear, wolf or wolverine) is found, it will be reported to Manitoba Hydro immediately.</td></tr>
<tr><td rowspan="3">Fish</td><td>1</td><td>To protect fish minimize the duration of in-water work.</td></tr>
<tr><td>2</td><td>Manitoba Hydro will determine and inform the contractor whether in-water work must avoid spawning periods for fish based on the fish species present. The following table shows the timing periods that may need to be avoided.
<table>
<tr><th></th><th>Spring Spawning Fish</th><th>Summer Spawning Fish</th><th>Fall Spawning Fish</th></tr>
<tr><td>Northern Manitoba</td><td>April 15 to June 30</td><td>May 15 to July 15</td><td>September 1 to May 15</td></tr>
<tr><td>Southern Manitoba</td><td>April 1 to June 15</td><td>May 1 to June 30</td><td>September 15 to April 30</td></tr>
</table></td></tr>
<tr><td>3</td><td>Intakes or outlet pipes must be screened to prevent entrainment or impingement of fish. Refer to the Fisheries and Oceans Canada's Interim Code of Practice- End of pipe fish protection screens for small water intakes in freshwater.</td></tr>
</table>

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Access Trails

Contractor Environmental Responsibilities

Application

Applies when temporary or permanent access trails will be constructed, maintained, or altered

Description

Access trails are needed to allow equipment and personnel into isolated work areas where access does not already exist or where maintenance/upgrades are required.

Disturbance to the ground, wildlife, and their habitat must be minimized when creating new access.

Environmental Mitigation Measures

Category	ID	Mitigation
Existing Access	1	Access to project areas will use existing roads and trails to the extent possible.
	2	Clearing, grading, and other improvements required to use existing access trails, must first be approved by Manitoba Hydro.
New Access Trails	1	Development of new access trails should be kept to a minimum and must be approved by Manitoba Hydro prior to moving forward.
	2	If new access is needed through a Manitoba Infrastructure roadway right of way, approvals must be first obtained from Manitoba Infrastructure. If the contractor is responsible for this approval, it will be stipulated in the contract.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Construction	1	Access trails are to be cleared in a way that minimizes ground disturbance, preferably during frozen ground conditions. See Clearing bulletin.
	2	Access trails will be constructed to a minimum width and length to accommodate the safe movement of traffic.
	3	For access roads and trails that use or cross Manitoba Infrastructure roadways, care will be taken to ensure excessive amounts of material are not tracked onto the roadway. Any clean-up required will be the contractor's responsibility.
Operation and Maintenance	1	Water or dust suppression products approved by Manitoba Hydro will be used to control dust on access roads as required.
	2	Any temporary constructed access and associated debris within an access trail will need to be removed seasonally and once the project is completed.

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Aquatic Invasive Species (AIS)

Contractor Environmental Responsibilities

Application

Applies to work in or adjacent to water that requires the use of watercraft or water-related equipment.

Description

To prevent the spread of AIS, activities, whether work-related or while working on Manitoba Hydro's behalf, must comply with The Manitoba AIS Regulation (173/2015).

Noxious Aquatic Invasive Species (AIS) including zebra mussels, spiny water flea, and black algae occur in specific Manitoba water bodies.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Possession, transportation (intentional or not), deposit and release of AIS in Manitoba, is prohibited.
	2	**Clean, Drain, Dry and Dispose**, general cleaning requirements apply to all Manitoba waters. Before transporting watercraft, trailer and/or water-related equipment away from a water body (lake, river, stream, wetland etc) remove all AIS, aquatic plants, debris, and aquatic mud; drain all water; and ensure bait is disposed of in the garbage.
	3	**Pull the Plug.** Watercraft must be transported with all drain plugs pulled out and valves open, ensuring they can dry and water is not inadvertently moved. Ensure all hard to drain compartments and equipment are completely dry or if necessary decontaminated.
	4	**Know Your Control Zone.** Contractors must be familiar with the Control Zones which have been established in Manitoba, to contain and prevent the further spread of AIS.
	5	**Decontaminate** all watercraft, trailers and water-related equipment used in a control zone, using prescribed methods of hot water, freezing or chemical applications, as per the AIS Regulation. Decontamination requirements are in addition to the general Clean, Drain, Dry and Dispose provisions, applicable when leaving all water bodies.

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Environmental Mitigation Measures

Category	ID	Mitigation
Permits	1	Apply to Manitoba Wildlife and Fisheries Branch for a Transportation Permit to authorize watercraft or water-related equipment encrusted with AIS to be moved away from the source control zone water body, for decontamination at a different location.
Control-Zone Water Bodies (as designated in the AIS Regulation)	1	Ensure decontamination methods are selected, prepared and planned before mobilizing to site, adhering to the *AIS Regulation*.
	2	If moving between multiple water bodies, start work where AIS are not present or furthest point from known AIS occurrence; sequence work locations to ensure work occurs moving from low risk areas to high risk water bodies. Ensure appropriate cleaning and/or decontamination is conducted as required, between sites.
Watercraft Inspection Stations	1	When transporting a watercraft or water-related equipment stop at all operating Watercraft Inspection Station en route, identifiable on the highway by signs or placards. Submit to all inspections and abide by all orders.
AIS Observations	1	Reporting is the law. If you find an AIS outside its control zone, or one that is not otherwise known to occur in that water body or location, you are required to report it to Manitoba Wildlife and Fisheries Branch at www.manitoba.ca/StopAIS or calling Manitoba's Invasive Species hotline at 1-877-867-2470 (toll-free).
	2	Do not transport the suspected AIS from the water body, unless instructed by Manitoba Wildlife and Fisheries Branch. Take pictures, record GPS coordinates, note location and number of specimens along with other relevant information.

Common places where AIS can be found on a boat and trailer.

Mature zebra mussel. Zebra mussels may be as small as a grain of sand and better detected by feel. The distinctive striped pattern may also be absent.

Black algae filaments. Filaments may form large matts that either float or submerge on lake bottoms.

Mass of spiny waterflea. Individuals (top corner) measure 1.0 - 1.5 cm in length when fully grown.

Built-up and Populated Areas

Contractor Environmental Responsibilities

Application

Applies when work is located in cities, towns, and other areas with residences, buildings, and/or structures that may be impacted by construction activities.

Description

To safely minimize impacts to people, the environment and adjacent properties.

Environmental Mitigation Measures

Category	ID	Mitigation
Construction	1	Construction activities and equipment shall be managed to avoid damage and disturbance to adjacent properties, structures and operations.
	2	Mud, dust and vehicle emissions shall be managed in a manner that ensures safe and continuous public activities near construction sites where applicable.
	3	Noisy construction activities where noise and vibration may cause disturbance and stress in built-up areas shall observe all applicable noise bylaws.
	4	Vehicles hauling materials to or from the work site that have the potential for debris or dust emissions should be hauled with the load enclosed by an anchored tarp, heavy plastic sheeting or other suitable material.
	5	Water or dust suppression products approved by Manitoba Hydro will be used to control dust on access roads as required.
	6	All necessary traffic signage, barricading and other appropriate protective measures shall be provided and maintained so as to cause the least risk and inconvenience to pedestrians and traffic in accordance with Municipal and Provincial requirements.

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Directional Drilling

Contractor Environmental Responsibilities

Application

Applies to all projects involving horizontal directional drilling near water.

Description

Directional drilling (horizontal) is used to bore holes and install pipelines, cables, and/or conduits under waterbodies or physical structures (such as roads).

Drilling activities must be conducted in a way that prevents drilling fluids and drilling mud from entering surface water or contaminating the land.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	All precautions shall be conducted to prevent frac-outs when directional drilling under fish-bearing streams.
	2	Drilling activities in permafrost shall be carried out under frozen ground conditions to the extent possible.
Planning	1	A frac-out contingency plan shall be prepared that includes measures to stop work, contain the drilling mud and prevent its further migration into waterbodies.
	2	For gas pipeline projects a written directional drilling plan that meets or exceeds the requirements of CSA Z662 (current edition) shall be prepared prior to the start of drilling.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Construction	1	Drilling equipment and machinery shall not be serviced within 100 m of waterbodies or riparian areas.
	2	Drilling entry and exit points shall not be permitted within established riparian buffer zones and setback distances from waterbodies. Setback distances will be specified in the contract.
	3	Water, to mix the drilling mud, either shall be brought in from off site and stored in tanks at the entry locations or be withdrawn from waterbodies if approved by Manitoba Environment, Climate and Parks.
	4	When obtaining water from fish bearing waterways all pump intakes shall be screened in accordance with Fisheries and Oceans Canada's *Interim Code of Practice- End of pipe fish protection screens for small water intakes in freshwater.*
	5	Waterbodies shall be monitored for signs of surface migration of drilling mud during all phases of the directional drill installation. If detected, the contractor must stop work and report to Manitoba Hydro.
	6	In the event of a frac-out, implement the frac-out contingency plan and notify Manitoba Hydro. Prioritize clean-up activities relative to the risk of potential harm.
	7	Any drilling fluids and waste materials, including drill cuttings, shall be collected and properly disposed of. Under no circumstances should they be allowed to drain into water bodies, riparian areas or wetlands.

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Drilling

Contractor Environmental Responsibilities

Application

Applies to all projects requiring vertical or near-vertical drilling of holes and wells.

Description

Drilling involves the use of specialized drills to bore holes and wells for various activities including soil/rock testing, geothermal development, geotechnical investigation, potable water, and blast holes.

Measures must be taken to ensure that drilling activities do not affect surface water and groundwater.

Environmental Mitigation Measures

Category	ID	Mitigation
Well Drilling	1	All wells, including potable water, monitoring, open loop geothermal, flowing artesian, dewatering, injection, geotechnical, closed loop geothermal, , and associated test holes must be drilled by a well driller who has the proper classification and holds a current license under Manitoba's Groundwater and Water Well Act.
	2	No sewage, surface drainage or other waste will be discharged so that it can enter a well or hole.
Well Drilling & Sealing	1	All wells and test holes must be sealed by a well driller who has the proper classification and holds a current license under Manitoba's Groundwater and Water Well Act. The contractor is responsible for providing well construction and sealing reports to Manitoba Hydro and the Province of Manitoba's Groundwater Management Section within 45 days of construction and sealing of wells. A well or test hole construction report is not required if: • The well or test hole does not interact with an aquifer. • The depth of the well or test hole is under 30 meters. • The well or test hole does not encounter bedrock.
	2	Flowing artesian, injection, contaminated, and saline wells and associated test holes must be sealed by a well driller who has the proper classification holds a current license under Manitoba's Groundwater and Water Well Act. These and all other wells and test holes must be sealed before abandonment in accordance with Part 5 of the Well Standards Regulation.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Borehole Drilling - General	1	Water hoses used to conduct drilling will be screened to prevent harm to fish (see Wildlife bulletin). Use of water hoses and pumps in non-potable waterbodies must conform to aquatic invasive species (AIS) requirements (see Aquatic Invasive Species bulletin).
	2	Water hoses used to conduct drilling will be screened to prevent harm to fish (see Wildlife bulletin).
	3	If contamination is suspected during drilling or sealing work, the contractor must stop work and report to Manitoba Hydro.
	4	Drilling and abandonment of boreholes will be done in such a way that prevents the vertical movement of fluids between permeable water bearing zones penetrated by the borehole. ("Permeable water bearing zone" means a section of rock that produces water, or a zone in which drilling fluid is lost.)
Borehole Drilling on Land	1	Waste generated through drilling activities will be kept on the drilling site. Recirculation tanks will be used to collect drill cuttings for transport to a licensed Waste Management Facility. Water will not be allowed to flow back into a waterbody or onto adjacent land.
	2	Drilling and abandonment of boreholes will be done in such a way that prevents the vertical movement of fluids between permeable water bearing zones penetrated by the borehole. ("Permeable water bearing zone" means a section of rock that produces water, or a zone in which drilling fluid is lost.)
Borehole Drilling in Water	1	Where boreholes are drilled vertically through the bottom of a body of water, drilling will be conducted within a casing that is cored into the rock at the bottom, or an equivalent technique, to provide a sealed work area and prevent drilling mud from entering the watercourse.
	2	Drill cuttings generated will be brought to the surface, filtered and contained on the working platform until the work is complete. Filtered water will be recycled for reuse during drilling. Solids that are retained will be disposed of at a licensed Waste Management Facility.
	3	Where holes are drilled through a body of water into rock, upon completion of the drilling, the borehole will be plugged as describe in the *Act*.
	4	Once the borehole is sealed, the casing can be removed.
Drilling related to Blasting	1	See Blasting and Explosives bulletin.

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Erosion and Sediment Control

Contractor Environmental Responsibilities

Application

Applies to all activities where the surface layer is removed or disturbed and the underlying soil is exposed, and where the land is altered in a way that changes drainage patterns from the site, de-stabilizing the ground surface outside of the project area.

Description

Temporary and permanent controls may be required to reduce soil loss, and down-slope or down-stream impacts.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Maintain existing vegetation in all work areas for as long as possible to reduce the duration of soil exposure; minimize the area disturbed as much as possible.
	2	Avoid work on steep slopes and adjacent to waterbodies to minimize the potential for erosion and the release of sediment to water.
	3	Surface organics that are stripped will be stockpiled and used, where available, to cover bare slopes.
	4	Grade work areas to prevent overland flow/erosion. Consider using lined perimeter ditching to divert water away from bare soil areas.
	5	Straw bales/wattles should not be used outside of southern Manitoba to control erosion because they can be a source of non-native/invasive seeds. Source and location of use of bales and wattles must be approved by Manitoba Hydro to ensure agricultural biosecurity. Refer to the Working in Agricultural Areas bulletin.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Implementation	1	Temporary or permanent erosion and sediment control measures will be put in place in an area disturbed by construction prior to the start of construction activities. Erosion protection measures will remain in place and functional until the site is stabilized, vegetation has established, or permanent erosion control measures are in place.
	2	Temporary and/or permanent erosion protection must be implemented to protect all erodible slopes, such as in road right-of-ways, embankments, shorelines, ditches, material stockpiles and borrow areas.
	3	Temporary and/or permanent erosion measures should be used only where their application is appropriate for a specific area/site. Multiple measures may be required to control erosion. All measures will be installed in accordance with the manufacturer's specifications.
	4	Use of stone rip rap, silt fence barrier, geomembrane/geotextiles and erosion control blanket will follow the latest version of Manitoba Infrastructure's Specifications for erosion control. See Manitoba's "Standard Construction Specifications" website.
	5	Erosion and sediment control must be sufficient to withstand intense rainfall events. If erosion and sediment controls are breached during extreme wet weather events, work in the affected area will be suspended until repairs are completed or improvements are made to controls.
	6	Direct sediment laden water into sediment traps, settling ponds, filters, or a vegetated area that will provide filtration and not directly to a waterbody or exposed soil. Settling ponds will be sized to allow extra storage for snowmelt. Manitoba Hydro may allow coagulant to be used as a settling aid; if it is used, the pond must be lined with an impermeable barrier and all settled solids/barriers will be removed to a licensed waste disposal area when it is taken out of service.
	7	A turbidity curtain should be installed to control sediment suspension when excavation work is taking place in the water to isolate the work area. As per the contract, either Manitoba Hydro or the contractor will test the water quality inside the curtain to confirm if the curtain can be removed.
	8	Only 100% biodegradable erosion control blankets will be accepted for use. In situations where permanent solutions are required exception will be made and specifications will be provided by Manitoba Hydro.
	9	Clean rocks shall be placed by machinery operating from outside of the water. No rocks shall be obtained from below the ordinary high-water mark of any water body.
Monitoring and Maintenance	1	The contractor will be responsible for inspecting, repairing and modifying erosion protection and sediment control installations until permanent control measures are installed or revegetation of disturbed areas is achieved. Daily inspections are required under rainfall events and thaw conditions, otherwise inspections need to occur weekly. The contractor will then be responsible for removal of temporary erosion and sediment control measures. If revegetation extends beyond the duration of the contract, Manitoba Hydro will be responsible for monitoring, maintenance, and removal of erosion and sediment control measures.

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Excavating and Backfilling

Contractor Environmental Responsibilities

Application

Applies to any project where excavation will occur.

Description

Excavating involves the digging of soil and rock to create a suitable trench or hole for further construction works. Backfilling involves filling the trench or hole upon completion.

Measures must be taken to minimize impacts to people, the environment, and adjacent properties during excavating and backfilling.

Environmental Mitigation Measures

Category	ID	Mitigation
Excavation	1	Minimize the area of open excavation(s) and the length of time excavation(s) are left open.
	2	Overburden, topsoil, and subsoil will be piled separately for later use in backfilling, contouring and revegetation.
	3	The excavated material stockpiles will be spaced to allow for drainage.
	4	The side slopes of stockpiles will be placed to minimize washout and erosion.
	5	Excavated material will not be placed in, or adjacent to drainage channels or waterbodies and maintained in a manner not to increase sediment into the watercourse.
	6	Excavated material comprised of erodible materials will be contained (e.g. with a berm) to prevent entrance into water bodies.
	7	Material stockpiles comprised of organics, silt, sand or other fine materials will be sloped at 70 degrees or less to prevent the creation of nesting habitat for bank swallows.
	8	Do not dispose of any waste in the excavation. See Waste Management Bulletin.
	9	Where possible, non-combustible materials (rock, sand, clay and soil) will be placed to maintain a minimum buffer distance of 3 m from the edge to standing timber.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Backfilling	1	Where practical or as specified in the Contract, when soils are backfilled, they are to be replaced in the reverse order from which they were removed.
	2	Re-contour the disturbed areas and restore grades and drainage channels, where possible.
	3	Avoid disturbance to the sod layer when moving the excavated soils during backfill.
	4	Spread topsoil/organics evenly over the disturbed area.

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Petroleum Products

Contractor Environmental Responsibilities

Application

Applies to all projects where petroleum products will be dispensed, stored (in tanks or containers), loaded, unloaded, and/or transported.

Description

Petroleum products such as fuels, oils, and lubricants, are used for construction and maintenance activities in vehicles, equipment, and tools.

Spills of petroleum product must be prevented from impacting the environment.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Contractors will be responsible for the safe use, handling and storage of petroleum products.
	2	All petroleum storage tanks greater than 230 L must be in compliance with the *Storage and Handling of Petroleum and Allied Products Regulation (MR 188/2001).*
	3	Petroleum storage tanks must be sited on level ground at a minimum of 100 m from any water body. Manitoba Hydro must approve this site.
	4	An appropriate spill kit(s) and fire suppression equipment will be kept at petroleum tank storage sites.
	5	There will be no ignition sources in and adjacent to petroleum storage tanks.
	6	All tanks/containers must be designed (storage and/or transport) and certified for the petroleum product they contain. Tanks/containers will have the proper certification marks stamped on the body and be in good condition (no dents, gouges).
	7	Collision protection, such as bollards or berms, will be installed around aboveground storage tanks.
	8	Transportation of petroleum products must adhere to the *Transportation of Dangerous Goods Regulations (SOR/2017-137).*

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Registered Tanks	1	All aboveground tanks with a capacity greater than or equal to 5 000 litres (1 100 gallons) on Provincially regulated land must be registered with Manitoba Environment and Climate Change.
	2	All aboveground tanks with a capacity greater than or equal to 230 litres on Federally regulated land must be registered with Environment and Climate Change Canada (ECCC).
	3	Construction, alteration, and removal of registered tanks will only occur under the supervision of a registered Licensed Petroleum Technician (LPT).
	4	All registered petroleum storage tanks must be inspected by a LPT on an annual basis (i.e. once per calendar year).
Inspections	1	All petroleum product storage tanks/containers will be visually inspected by the contractor each day the site is in operation for leaks.
	2	Tanks greater than 230 L will be inspected as per the Storage and Handling of Petroleum and Allied Products Regulation.
Dispensing/ Refueling	1	Automatic shut-off nozzles must be used when dispensing fuel and conform to the CAN/ULC-S620M Standard. (An automatic shut-off nozzle is any spring-loaded device that closes when manual pressure is released). When not in use, nozzles must have containment.
	2	Petroleum product dispensing systems will be secured and locked by authorized personnel when not in use.
	3	Equipment will be shutdown during re-fueling operations.
	4	Fueling and dispensing operations require the operator to be present and visually observe the process 100% of the time.
	5	Refueling of equipment or storage containers must be a minimum of 100 m away from any water body, unless otherwise approved by Manitoba Hydro.
	6	Smoking is not permitted within 10 m during fuel dispensing operations.
	7	Dispensing hoses must be equipped with breakaway valves.
	8	Gravity-feed mobile or stationary tanks used for dispensing are prohibited from use.
	9	When a storage tank is being refueled, all connection points from the delivery vehicle must have secondary containment.

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Re-vegetation

Contractor Environmental Responsibilities

Application

Applies to construction activities that disturb (clear, grub, strip, or otherwise alter) vegetated land and require re-vegetation

Description

Re-establishment of vegetation is required on lands temporarily disturbed by construction activities.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Re-vegetation should occur as soon as practical after disturbance takes place.
Site Preparation	1	The site must be contoured to allow for drainage, where possible. If project activities allow, pre-construction contours should be restored.
	2	Slopes will be left with a maximum 4:1 (horizontal to vertical) side slopes unless otherwise approved by Manitoba Hydro.
	3	If the disturbed area is hard packed, scarification to loosen soil is required.
	4	Organic material/topsoil that was stripped and stockpiled will be spread back evenly over the disturbed area.
Sod placement (residential properties)	1	It is acceptable to use sod for revegetation, provided the area had an existing grass lawn pre-construction.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Seeding (non-residential)	1	Areas that require seeding to assist rehabilitation will be seeded with a mixture that only contains native and/or non-invasive introduced plant species (e.g., will not contain sweet clover, alfalfa or other invasive species), of low quality food value for mammals, and is of local origin.
	2	Seed mixes will be provided by Manitoba Hydro, prescribed by Manitoba Hydro, or if contractor selection is stipulated in the contract, be approved by Manitoba Hydro prior to purchase.
	3	The genetic origin of the seeds should be from Manitoba or nearby provinces and from a similar climatic region to project site.
	4	Commercial seed providers should produce certificates of analysis from an accredited laboratory that provides seed purity, germination values and source of seeds. The seed should be at least 80% Pure Live Seed and have no prohibitive noxious weeds. There must be one certificate of analysis per seed species in the seed mix. Each bag of seed should be sealed with the seed certificate attached. Seed certificates will be provided to Manitoba Hydro.
	5	Seeding should occur in spring as soon as the ground has reached temperature (5°C). The fall is less desirable, but dormant seeding can occur once the ground temperature has lowered to 5°C.
Site close-out	1	Place barricades or signs to prevent disturbance to re-vegetated areas.

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Stream Crossings

Contractor Environmental Responsibilities

Application

Applies to projects involving a watercourse crossing.

Description

Stream crossings include temporary crossings in winter, ford crossings, and installation of bridges and culverts.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Streams will be crossed at right angles, where practicable, to minimize shoreline disturbance.
	2	A 30 metre buffer of low vegetation from the ordinary high water mark will be left adjacent to the watercourse until immediately preceding construction at that location.
	3	Riprap and fill material placed in or adjacent to watercourses/bodies will be clean to minimize sediment suspension in the water.
	4	Grading stream banks for construction of approaches should not occur. If minor rutting is expected, stream bank and bed protection methods (e.g., swamp mats, pads) should be used, but they should not constrict the flow.
	5	Do not remove gravel, boulders or embedded logs from stream beds or below the ordinary high water mark unless required to install the physical parts of the culvert/crossing.
	6	In-stream use of treated timbers or wood material is not permitted.
	7	Prevent construction materials, such as lumber, nails, etc. from entering the water body.
	8	Vehicles must not be fueled within 100 m of the crossing, unless specifically approved by Manitoba Hydro.

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
	9	Ensure equipment is free of dust/clay/sand/soil before entering a water body.
	10	All water-related equipment and other items for use in or adjacent to water bodies must be free of AIS at all life stages. This includes personal items. See the Aquatic Invasive Species (AIS) bulletin for more information.
	11	Do not wash buckets and equipment in the water body.
	12	All construction debris will be removed from the banks and shoreline and properly disposed above the ordinary high water mark.
	13	For temporary crossings refer to Fisheries and Ocean Canada's *Interim Code of Practice – Temporary Stream Crossings*.
	14	Disturbance to the bed and banks of the watercourse shall be minimized and confined to the immediate work site. Restore banks to pre-construction condition if any disturbance occurs that will inhibit vegetation regrowth or cause erosion and sedimentation.
	15	If in-water work must proceed under flowing water conditions, then the work site shall be isolated from the water while maintaining downstream flow around the isolated site unless otherwise directed by Manitoba Hydro.
Culverts	1	If the stream is fish bearing, culverts must be sized and installed as described in the *Manitoba Stream Crossing Guidelines for the Protection of Fish and Fish Habitat*.
	2	If construction occurs during times when the stream is flowing, an appropriate method of isolating the work area from the watercourse/body will be used allowing "work in the dry". See Dewatering bulletin.
	3	Ensure that culverts are installed on a firm bed and avoid muskeg, frozen earth, permafrost or large rocks. Soft, unsuitable foundation material should be excavated below grade line and backfilled with compacted granular material.
	4	The inlet and outlet of the culvert may have rock placed for protection against scour. The velocity of the water exiting the culvert may be reduced by the use of baffles, rock or stilling pools at the outlet.
Diversion Channels	1	When excavating a diversion channel, work in dry conditions where possible, beginning at the downstream end and moving upstream.
	2	Protect the entire diversion channel with an erosion-resistant lining (i.e., plastic sheeting). Hold the lining in place with stones and stakes to keep water from flowing underneath.
	3	When a diversion channel is no longer required, it should be infilled and stabilized.
	4	Only non-erodible materials will be used to control flow.

Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
Fording and Temporary Crossings	1	Fording of a flowing watercourse with equipment or vehicles is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use.
	2	Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding. The channel width at the crossing site should be no greater than 5 m when measured within the ordinary high water mark.
	3	Temporary crossings can be made out of pre-constructed, standard components (i.e., Bailey bridge) or out of available metal and/or logs.
	4	Temporary in-water crossings shall be completely removed prior to the spring freshet.
	5	When the temporary bridge or culvert is no longer required it should be removed and the site should be restored to its original condition.
	6	Do not use ford if the water depth is greater than the axle height of the vehicle, with the exception of amphibious vehicles.
Ice Bridges & Snow fills	1	Ice bridges will be constructed using clean water, ice and snow. Snow fills will be constructed using clean snow.
	2	Materials such as gravel, rock and loose woody material will not be used.
	3	If logs are required for stabilizing shoreline approaches, they will be clean and bound together, and they will be removed before the spring freshet.
	4	Prior to spring, a v-notch in the centre of the ice bridge will be made to assist with melting / reduce erosion. Compacted snow fill and all crossing materials will be removed below the ordinary high water mark, prior to the spring freshet.
	5	If water is being pumped from a lake or river to build up an ice bridge, the intakes must be screened in accordance with Fisheries and Oceans Canada's *Interim Code of Practice- End of pipe fish protection screens for small water intakes in freshwater.*
	6	Snow fills will not restrict water flow at any time.
	7	Snow fills will not result in alteration (e.g., compaction or rutting) of the bed and bank substrates.

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Vegetation Management

Contractor Environmental Responsibilities

Application

Applies to herbicide application as well as mechanical removal, trimming, or pruning to control vegetation in and around existing Manitoba Hydro Infrastructure.

(Does not include clearing an area for new infrastructure or brushing of an existing transmission or distribution right-of-way – see the Clearing CER).

Description

Vegetation Management refers to activities used to control vegetation in previously cleared areas.

Vegetation management must not affect surrounding areas, water quality, aquatic or wildlife habitat, or cause the spread of tree diseases and pests.

Environmental Mitigation Measures

Category	ID	Mitigation
General	1	Proceed with work on Crown Lands only after a Manitoba Environment and Climate Change work permit has been issued to Manitoba Hydro.
	2	Make every effort to prevent the spread noxious or invasive plant species.
Herbicide Application	1	Contracted herbicide applicators will work under Manitoba Hydro's Pesticide Use Permit.
	2	Herbicides are to be used and applied in accordance with label instructions and Pesticide Use Permit.
	3	Herbicide applicators must possess an applicators licence in order to apply herbicides.
	4	The applicator must use appropriate personal protective equipment.
	5	All known herbicide exclusion areas must be identified, buffered and flagged by Manitoba Hydro or as specified in the contract.

Version 4.0 // May 2025

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Environmental Mitigation Measures		
Category	**ID**	**Mitigation**
	6	Herbicides are not to be applied under windy conditions to avoid spray drift.
	7	Herbicides are not to be applied under wet conditions when surface runoff could become contaminated and enter the natural draining system.
	8	30 m buffer zones are to be established and effectively marked (to ensure integrity) adjacent to water bodies and wetlands when using herbicides.
	9	Natural water sources (rivers, lakes, ditches, streams) as a water source for application purposes may contain aquatic invasive species (AIS). See Aquatic Invasive Species bulletin.
Mechanical Removal	1	Where practical, trees/branches will be felled toward the middle of the rights-of-way or cleared area to avoid damage to standing trees. Trees/branches will not be felled into waterbodies.
	2	Maintain low growth shrubs and herbaceous vegetation to the extent possible. Ground disturbance must be minimized.
	3	Chipped material will be spread and left on site, it shall not be transported off site unless alternate arrangements have been approved by Manitoba Hydro.
Dutch Elm Disease	1	Restrictions and mitigation to prevent the spread of Dutch Elm Disease: • Trimming is prohibited between April 1 to July 31 – Pruning during the ban period is restricted to a maximum distance of two feet from the conductor (Manitoba Hydro only) • Cut the stump below ground level or treat it with herbicide • Do not place elm wood in firewood piles • Mark wood with appropriate marking tape if left for pick up • Dispose of elm logs at an approved location only • Bury, burn or chip (5 cm or less) all elm wood • Disinfect all arborist tools with a 10% household bleach solution when moving from one elm tree to another
Emerald Ash Borer and Cottony Ash Psyllid	1	Restrictions and mitigation to prevent the spread of emerald ash borer and cottony ash psyllid: • Restrict movement of ash tree materials, including logs, branches, woodchips, nursery stock/trees and firewood out of the City of Winnipeg • If emerald ash borer is suspected, it must be reported to Manitoba Environment and Climate Change for confirmation • Ash trees are to be chipped only

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Working Agricultural Areas

Contractor Environmental Responsibilities

Application

Applies when work will occur within areas where agricultural production takes place (such as crops or livestock), or on accesses to these areas. Does not apply when work is carried out on a public right-of-way or gravel/pavement.

Description

This bulletin includes Manitoba Hydro's Agricultural Biosecurity Procedure.

Minimizing the creation of new access, and prevention of biosecurity impacts, must observed during construction and maintenance activities.

Environmental Mitigation Measures

Category	ID	Mitigation
Construction	1	In advance of commencing any project activities (including access points, livestock penning, etc.), any necessary access on agricultural lands shall be approved by the landowner. All fences and gates shall be left in "as-found" condition.
	2	Existing access to agricultural lands shall be utilized to the extent possible.
	3	Construction areas and sites shall be assessed for compaction and if required shall be deep cultivated by the Contractor to mitigate any compaction prior to returning them to agricultural use. Subject to landowner approval.
	4	Replace excavated soils to their original condition/order utilizing the lift method that keeps stripped topsoil and subsoil layers separated.
	5	Re-contour the disturbed areas and restore original grades and drainage channels.
	6	Conform to the *Manitoba Hydro Agricultural Biosecurity Standard Operating Procedure* (attached).
	7	Contractor must modify their work practices when encountering saturated or thawed soils in which equipment has created ruts in topsoil which exceeds 80% of the topsoil depth for more than 15 m in length; or when admixing (mixing of topsoil and subsoils) begins taking place. Measures may include: use of wide tracked equipment, use of construction work mats, delaying the work until dryer conditions.

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Version 5.0 // October 2025

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Applies To: Manitoba Hydro Staff and Contractors	**Process Owner:** T&D Environment and Engagement
Division: Project Management	**Effective Date:** 2023-03-14
Document Type: Procedure	**Revision No.:** 0

Agricultural Biosecurity Standard Operating Procedure (SOP)

Note: Available in accessible formats upon request

Overview

This procedure provides guidance and direction in managing agricultural biosecurity risks of diseases, pests, and invasive species that pose a risk to agricultural operations.

This procedure applies to Manitoba Hydro employees, subsidiaries and contractors who are required to perform work in livestock and agricultural settings. The procedure is geographically specific to:

- Land zoned for agricultural use by the provincial government, a municipality, planning commission or planning district, with apparent crop or livestock systems.
- Manitoba Hydro's service area (gas & electric).

What is agricultural biosecurity?

Agricultural biosecurity is the protection of crops and livestock systems against the threats to production from invasive organisms (diseases, pests, and invasive species). Human activity is one of the factors in the spread of invasive organisms. For more information, see Agricultural Biosecurity Policy P853 (externally available upon request).

Exceptions

The procedure is not applicable if one or more of the following conditions exists:

- Land is zoned commercial, industrial, or residential.
- Work is carried out on gravel or pavement.
- Work is carried out on a public right of way.
- Work is carried out on property owned by Manitoba Hydro.
- In emergency situations, *The Manitoba Hydro Act* and *The Gas Allocation Act* will prevail to return services to normal operating condition. The definition for an 'emergency' is found in the Definitions section of this procedure.

Note: All efforts will be made to assess the risks to livestock, agricultural land, and personal safety to determine the most appropriate actions to be taken.

Performed By

- All Manitoba Hydro employees and contractors who carry out work in livestock and agricultural settings are required to follow this procedure and must be able to communicate the requirements to customers if asked.
    - Employees must be trained in this procedure every three years.

Note: Managers or their delegates must monitor compliance with the procedure. Prime contractors are required to have their own biosecurity procedures that meet or exceed the requirements of this SOP.

Before You Begin

- Seek alternatives that will reduce or eliminate the need to enter or work on agricultural land.
- Where practical, communicate with landowners or producers prior to beginning work on or adjacent to private property. This is the landowner or producer's opportunity to voice any concerns, including those related to biosecurity.
    - Record all actions and procedures followed when entering a livestock setting or crop setting to maintain personal safety and manage biosecurity risks.

Procedure

This procedure is divided into two sections:

Work in livestock settings

This section outlines various scenarios when a landowner or producer does not have an established protocol.

Scenario 1: Livestock producer is within a controlled access zone

1. Visually inspect, manually clean, and disinfect tools and footwear before entering and leaving the producer's field or controlled access zone (**CAZ**), unless the producer or site manager's tools were used, and boot covers were worn. Disinfectants are recommended to be a 1% VIRKON solution, Lysol, or other approved disinfectant (see Appendix A).
2. Visually inspect and mechanically clean vehicles by removing visible dust, soil, and plant materials using brushes, brooms, and/or shovels, unless vehicles are not used on the producer's field or within the **CAZ**. Pressure washing vehicles may be necessary if heavily soiled.

3. Record all actions and procedures followed to maintain personal safety and manage biosecurity risks using a work order, job plan (tailboard), environmental checklist, or MHUS handhelds (Itron).
4. Upon request, disclose to producers the last date the **CAZ** of another facility was accessed.

A biosecurity kit is available through Central Stores (SAP material code 05-83-90). The kit contains all of the items noted above with the exception of brooms, shovels and Lysol.

Safety Data Sheets (SDS) for all disinfectants are available through the 3E Protect online system. The system can be accessed through the 'EHSM' portal page and selecting the '3E Protect- Safety Data Sheets' quick link.

Scenario 2: Livestock producer is not within a CAZ (or it is unknown), or the producer does not have their own biosecurity protocol but request staff or contractors practice biosecurity.
If the established point of entry is not clear, consult with the producer or site manager to determine the best point of entry onto the property, and the best mode of transportation. Many livestock producers have established **CAZ** with clearly identified access points.

When travelling by foot, stay on established pathways (paved, hard-packed ground, or gravel).

Follow the procedure below:

1. Put on new boot covers before leaving the vehicle and do not remove them until getting back to the vehicle.
   - Boot covers are required in **livestock settings** if you have to leave an established pathway.
   - It is recommended that boot covers be used at all times when working in **livestock operations**.
   - NOTE: Boot covers are known to be a slip hazard under some ground conditions (slippery on snow and ice). Should boot covers pose a safety concern an MH employee can choose to:
     - Wear crampons (removable cleats) over the boot covers and disinfect them after use.
     - Work with producer to ensure the ground or pathway is made safe (grit, sand etc.).
     - A producer may also supply borrowed footwear while working on site.

2. Keep used boot covers in a garbage bag in the vehicle and dispose of them at the end of the day.

Note: Access to the Restricted Access Zone (**RAZ**) is controlled by the producer. Follow their directions so long as they do not pose a safety or environment risk.

Working in crop settings

This section outlines various scenarios when a landowner or producer does not have an established protocol.

Scenario 1: Crop setting is within an elevated risk area

An elevated risk area is where:

- There is a confirmed presence of invasive species as determined by the landowner (e.g. clubroot).
- There are wet conditions with disturbed soil (significant accumulation of soil on vehicles and equipment).
- Work takes place in fields where it is apparent hog manure has been recently spread (within the last year).
- There is heightened sensitivity around a particular project and/or from a particular customer or group of customers.

Follow the procedure below:

1. Mechanically clean vehicles, equipment, tools and footwear to remove at least 90% of visible dust, soil and plant materials. Vehicles, equipment, tools and footwear should enter and exit fields in a clean condition.
    a. Mechanically clean using brushes, brooms, and shovels from: interior and exterior of vehicles and equipment; shovels, augers and vehicle tires; and clothes, personal protective equipment, and boots.
    b. If mechanical cleaning is not sufficient, disinfection of vehicles, equipment, footwear and tools for footwear is required; using 1% Virkon solution, Lysol or other approved disinfectant (see Appendix A).
2. If mechanical cleaning is not sufficient to remove 90% of the soil, washing (pressure or mobile) is the next step in reducing biosecurity risk. Where possible and practical, washing is preferable at the field approach, but can be completed off site. Use of compressed air is also acceptable where equipment is outfitted with this capability (e.g., digger derricks).
3. Record all actions and procedures followed to maintain personal safety and manage biosecurity risks using a work order, job plan (tailboard), or environmental checklist.

Scenario 2: Crop setting is not within an elevated risk area or an unknown elevated risk area.

Ensure vehicles, equipment, tools and footwear are free of at least 90% of visible dust, soil and plant material before entering an agricultural setting.

Health and safety concerns

If existing biosecurity protocols contradict provincial safety regulations, Manitoba Hydro Safe Work Procedures (SWPs), and/or Manitoba Hydro's approved Personal Protective Equipment (PPE), advise the producer that the work cannot be carried out until the safety concern(s) are resolved.

- If showering before entering and leaving a livestock facility is part of a producer's established biosecurity protocol, the shower and associated facilities must be visibly clean and meet Manitoba Workplace Health and Safety (WH&S) Regulation 217/2006 Part 4 General Workplace Requirements (4.7 – 4.11).
- If the facilities are not visibly clean or do not meet the WH&S requirements, advise the producer that the work cannot be performed until the safety concern(s) are resolved.
- Only Manitoba Hydro-approved PPE may be used or worn by Manitoba Hydro employees.
- Staff are reminded that any disinfectant chemicals used must be approved for use within Manitoba Hydro and a current SDS must be available. If the chemical is not approved, it cannot be used.

Definitions

- **Agricultural Biosecurity Policy P853:** Manitoba Hydro's Agricultural Biosecurity policy (available upon request).
- **Controlled access zone (CAZ):** A zone defined by a livestock producer to control entry onto their property. Typically, there will only be one point of access. Everything past the access point but outside of any RAZ (see below) is in the controlled access zone.
- **Restricted access zone (RAZ):** A zone defined by a livestock producer to control entry into barns.
- **Livestock setting**: A property or portion of a property where livestock are kept.
- **Crop setting**: A property or portion of a property where crops such as corn, wheat or canola are grown.
- **Hog operation**: A livestock setting operating as a commercial farm where hogs are raised. Potential biosecurity risks are much higher on these properties.
- **Emergency**: a present or imminent situation or condition that requires prompt action to prevent or limit the following: the loss of life; harm or damage to safety, health or welfare of people; damage to property or the environment.
- **EHSM**: Environmental Health Safety Management system- EHSM is Manitoba Hydro's Environment, Health, Safety Management System using the SAP Platform, and is used to record and track incidents that occur throughout the enterprise, and the corrective actions assigned to prevent the incident from re-occurring.
- **3E Protect online system:** An externally maintained digital library of Safety Data Sheets.

Revision History

Revision Number	Revision Date	Revision Author	Revision Description
0	2023-03-14	Kris Watts	Rev. 0 approved and published

Appendix A – Disinfectants Approved by Manitoba Hydro

Product Name	SAP Material Code	Product Use	Usage Notes
Vikron	05-21-98	**Crop settings**	SAP material code is for tablet form and product requires mixing. Liquid loses effectiveness over time. Do not store in vehicles when temperatures are below freezing.
Lysol spray	Various	**Livestock settings**	Can corrode metal including tire rims.
Accel (also known as 'Prevail')	06-24-70	Recommended for **livestock settings** only	Recommended for use only when temperatures are above freezing. Seek direction from environmental staff if using in winter conditions.
Synergize	Not available – see usage notes*	Recommended for **livestock settings** only	*This product is approved for use, but not stocked by Manitoba Hydro. Many hog producers use this product. Follow all directions on SDS.