APPENDIX A

Project Engagement Materials

December 2025

Manitoba Hydro

October 20, 2025

MANITOBA HYDRO – NEEPAWA GAS TRANSMISSION PROJECT

Dear Landowner,

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 19-kilometre, 6-inch steel natural gas pipeline. The proposed route extends from an existing valve site located approximately 22.5 kilometres south of Neepawa, running 19 kilometres north to another control structure located 3.5 kilometres south of the town. It will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation, supporting the system's ability to meet current and future demand in the area.

The proposed natural gas pipeline 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, October 21 from 5 – 8 pm – IN-PERSON (280 Davidson St, Neepawa, MB)
- Wednesday, October 22 from 12 – 1 pm - VIRTUAL
- Thursday, October 23 from 7 – 8 pm - VIRTUAL

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

If you have any questions or wish to schedule a meeting, please feel free to contact me by email at KOze@hydro.mb.ca or by phone at 204-574-8497.

Kind regards,

Kale Oze

Kale Oze
Environmental Specialist
Manitoba Hydro | 360 Portage Avenue
Winnipeg, MB
R3C 0G8, Canada

2025 09 26
[Insert Address here]

Dear [Insert name here]

Subject: Manitoba Hydro – Neepawa gas transmission project

I am reaching out to begin a conversation with the RM of [Insert here] regarding a proposed gas transmission project and to better understand your preferred approach to engagement.

Manitoba Hydro is planning to construct a 19-kilometre, 6-inch steel natural gas pipeline. The proposed route extends from an existing valve site located approximately 22.5 kilometres south of Neepawa, running 19 kilometres north to another control structure located 3.5 kilometres south of the town. It will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation, supporting the system's ability to meet current and future demand in the area.

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 the RM of [Insert here] would like to be engaged throughout this process. Your input will help guide our approach and support meaningful dialogue.

For your reference, attached is a map of the project area. 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 information sessions 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, October 21 from 5 – 8 pm – **in person** (280 Davidson St, Neepawa, MB)
- Wednesday, October 22 from 12 – 1 pm - **virtual**
- Thursday, October 23 from 7 – 8 pm - **virtual**

To register for any of the virtual information sessions, and for additional project updates and information, please visit the project webpage at: http://www.hydro.mb.ca/neepawa-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

Kale Oze
Environmental Specialist
Manitoba Hydro | 360 Portage Avenue
Winnipeg, MB
R3C 0G8, Canada

2025 09 26

Town of Neepawa
275 Hamilton Street, PO Box 339
Neepawa, MB
R0J 1H0
neepawa@wcgwave.ca and parrott.mg@gmail.com and
gmb.hedley@neepawagladstonecoop.com

Dear Councillor Parrott and Councillor Hedley,

Subject: Manitoba Hydro – Neepawa gas transmission project

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

Manitoba Hydro is planning to construct a 19-kilometre, 6-inch steel natural gas pipeline. The proposed route extends from an existing valve site located approximately 22.5 kilometres south of Neepawa, running 19 kilometres north to another control structure located 3.5 kilometres south of the town. It will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation, supporting the system's ability to meet current and future demand in the area.

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 the Town of Neepawa 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 information sessions 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, October 21 from 5 – 8 pm – **in person** (280 Davidson St, Neepawa, MB)
- Wednesday, October 22 from 12 – 1 pm - **virtual**
- Thursday, October 23 from 7 – 8 pm - **virtual**

To register for any of the virtual open houses, and for additional project updates and information, please visit the project webpage at: http://www.hydro.mb.ca/neepawa-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

Kale Oze
Environmental Specialist
Manitoba Hydro | 360 Portage Avenue
Winnipeg, MB
R3C 0G8, Canada

2025 09 26

[Insert Address here]

Dear [Insert Leadership Representative here]

Subject: Manitoba Hydro – Neepawa Gas Transmission Project

I am reaching out to begin a conversation with [Insert interested party name here] regarding a proposed natural gas transmission project and to better understand your preferred approach to engagement.

Manitoba Hydro is planning the Neepawa Gas Transmission Project, a proposed 19-kilometre, 6-inch steel natural gas pipeline. The line will extend from an existing valve site located approximately 22.5 kilometres south of Neepawa, running 19 kilometres north to another control structure located 3.5 kilometres south of the town. It will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation, supporting the system's ability to meet current and future demand in the area.A map of the project area is attached for your reference. The green line indicates the preferred route.

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 name here] would like to be engaged throughout this process. We also welcome the opportunity to meet with your Nation to begin discussions about the project and understand key concerns and interest. Your input will help guide our approach and support meaningful dialogue. Additionally, if training, employment, and business opportunities related to this project are of interest, please let us know as we can include this in a potential project meeting.

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

- Tuesday, October 21 from 5 – 8 pm – in-person (280 Davidson St, Neepawa, MB)
- Wednesday, October 22 from 12 – 1 pm – virtual
- Thursday, October 23 from 5 – 8 pm – virtual

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

If preferred, we could also host an open house in your nation. Please let us know if your nation would like an open house.

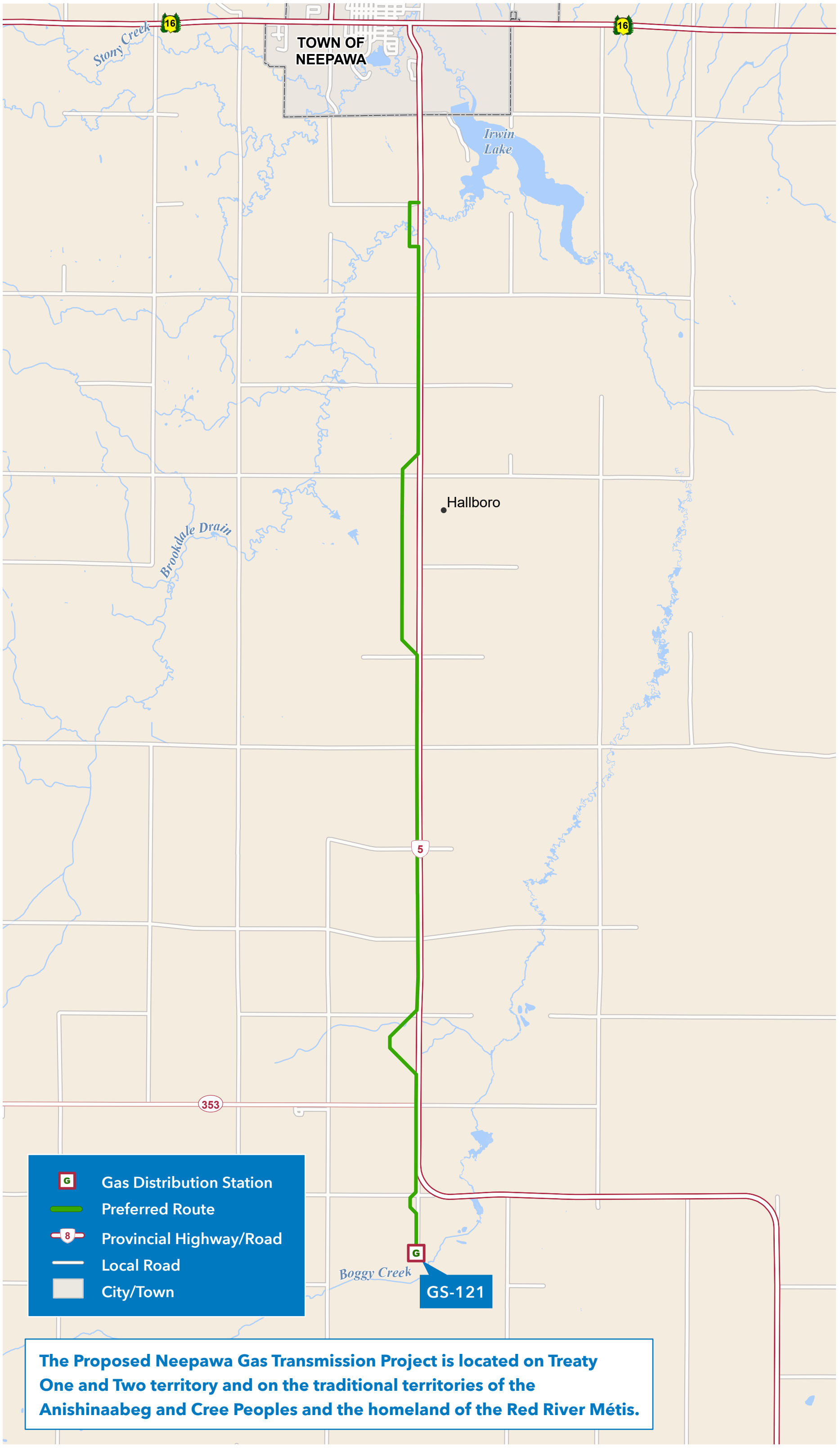
Please feel free to contact me by email at afitzsimmons@hydro.mb.ca or by phone at204-430-7206 to share your preferences or to arrange a time to meet.

Sincerely,

Andrew Fitzsimmons

Indigenous Engagement Officer
Manitoba Hydro
360 Portage Avenue
Winnipeg, MB
R3C 0G4, Canada

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


16
16
Stony Creek
TOWN OF NEEPAWA
Irwin Lake
Hallboro
Brookdale Drain
5
353
Boggy Creek
GS-121
Gas Distribution Station
Preferred Route
8
Provincial Highway/Road
Local Road
City/Town
The Proposed Neepawa Gas Transmission Project is located on Treaty One and Two territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

Neepawa Gas Transmission Project

Manitoba Hydro

November 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 Neepawa Gas Transmission Project is located on Treaty 1 and Treaty 2 lands, the original territories of the Anishinaabeg, Anishininewak, Dakota Oyate, 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 each of these nations have and share with us throughout the project.

Purpose of the meeting

- Share project information
- Answer questions
- Listen to feedback

About the project

- **Overview**: 19 km, 6-inch steel natural gas transmission line extending from an existing valve site 22.5 km south of Neepawa, running 19 km north to a control structure located 3.5 km south of Neepawa
- **Construction methods**: trenching and horizontal directional drilling
- **Regulatory classification**: Class 2 Development according to *The Environment Act* (Manitoba)
  - An Environmental Assessment Proposal will be submitted to Manitoba Environment and Climate Change for approval

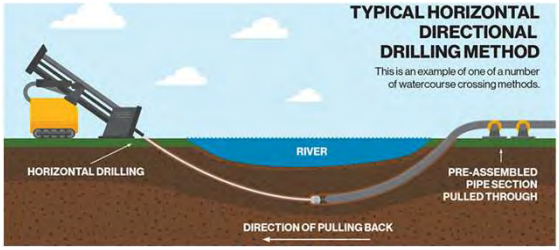
Purpose

- The purpose of this project is to increase the supply of natural gas to the Neepawa region 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

Construction methods: Trenching

Construction methods: Horizontal directional drilling (HDD)



Horizontal directional drilling (HDD)

Who are we engaging with?

- First Nations and the Manitoba Métis Federation
- The Municipality of North Cypress-Langford
- The Town of Neepawa
- Landowners
- General public

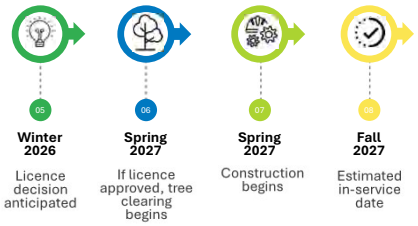
Potential project impacts

- Traffic, access and safety management
- Removal of trees
- Noise disturbance
- Land management
- Potential to find heritage resources during construction
- Land use and future development considerations

Anticipated schedule

01	02	03	04	05
September 2025	**December 2025**	**2025-2026**	**Spring 2026**	**Winter 2026**
Start of engagement process	File environmental assessment proposal	Regulatory Review	Property appraisals completed for compensation	Licence decision anticipated

Anticipated schedule



Next steps

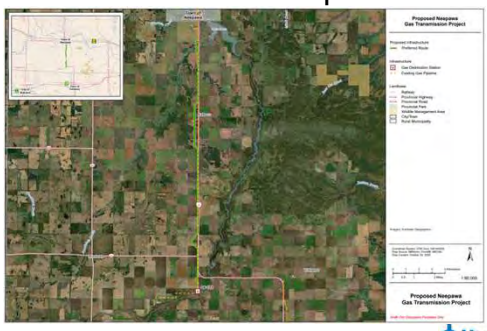
- Continue engagement for the project
- Prepare environmental assessment report
- Meet with landowners
- Host a field tour
- Conduct heritage work

Questions, concerns, feedback?

Key contact at Manitoba Hydro:

Kale Oze
Environmental Specialist
Phone: 204-574-8497
Email: KOze@hydro.mb.ca

Detailed map



Neepawa gas transmission project

Revision No. 1

Date	Time	Format
2025-10-21	5 p.m. to 8 p.m.	Information session

Facilitator	Notetaker	Location
Kale Oze	Michaela Peyson	In-person

Purpose / Summary An opportunity for participants to learn more about the Neepawa gas transmission project and share feedback.

Attendees

Name	Affiliation
Participant	Landowner
Participant	Landowner
Participant	Adjacent landowner
Annie Martel	Manitoba Hydro
Barry Good	Manitoba Hydro
Crystal Greenlay	Manitoba Hydro
Kale Oze	Manitoba Hydro
Kris McKinnon	Manitoba Hydro
Lindsay Thompson	Manitoba Hydro
Jodine MacDuff	Manitoba Hydro
Michaela Peyson	Manitoba Hydro
Ryan Delgaty	Manitoba Hydro
Phil Robertson	Manitoba Hydro

Action items

Action Item	Responsible	Status
Share a copy of the presentation with the landowners.	Manitoba Hydro	Ongoing
Share a copy of the What we heard document with the landowners.	Manitoba Hydro	Ongoing

Discussion points

Category	Summary of discussion
Business and Operations	A participant inquired about what their property and surrounding area would look like once construction is complete. • A Manitoba Hydro representative noted that each mile there would be a checkpoint stand, warning signs, and control points.
Business and Operations	A participant noted that they may pass their property down to their children, who might be interested in subdividing it. If a road is added near the fence line, they would need to understand how gas service could be provided to the subdivided lots. • A Manitoba Hydro representative confirmed that the proposed gas pipeline would be situated closer to the planned subdivision, and that a tap off the Neepawa gas transmission line may be feasible. Gas service planning would consider several factors, including proximity to existing infrastructure, right-of-way access, regulatory requirements, and potential impacts on existing service lines. It is important to note that the presence of an easement does not guarantee access to natural gas service, as connection feasibility depends on technical and regulatory assessments.
Business and Operations	A participant asked whether there would be enough space on their property to add a new access road. • A Manitoba Hydro representative measured the distance from the easement to the tree line (edge of property) and confirmed that there is sufficient space to accommodate a new access road (approximately 66 m).
Construction & operation	A participant asked whether the gas line would impact future hydroelectric distribution infrastructure. • A Manitoba Hydro representative shared that the proposed gas pipeline would not interfere with the placement or operation of a future electric distribution line. Both systems are designed to

	coexist within shared corridors, as Manitoba Hydro designs these utilities to maintain appropriate horizontal and vertical clearances to allow safe operation.
Construction & operation	A participant inquired about the anticipated completion date for the project. • A Manitoba Hydro representative explained the project timeline: environmental assessment proposal submission in December 2025, anticipated decision in December 2026, if an environment act license was received then construction would start spring 2027 with in-service fall 2027.
Power supply	A participant asked about the purpose of the project • A Manitoba Hydro representative explained that the proposed pipeline is intended to support growing customer demand for natural gas service in Neepawa. The existing infrastructure is nearing capacity, necessitating expansion to support ongoing regional development.
Construction & operation	A participant inquired whether construction, such as building a road, can occur over the gas pipeline. • A Manitoba Hydro representative provided a property map showing current and proposed easements, along with allowable uses.
	A participant inquired about what construction methods would be used for driveways. • A Manitoba Hydro representative explained that in the area where the proposed road would connect to the existing roadway, directional drilling would be used. This method involves drilling a curved tunnel beneath the designated area, allowing the pipeline to be installed without disturbing the surface. Directional drilling is a standard technique used to safely place infrastructure under roads, drains, and other sensitive areas while maintaining required depth and separation from existing utilities.

Note: The above is considered to be a true and accurate recording of all items discussed. Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

The following storyboards were displayed at the open house engagement session in Neepawa.

Open House

Neepawa Gas Transmission Project

Manitoba Hydro energy for life

What is the project?

A new 6-inch steel natural gas transmission line will run approximately 19 kilometres (km), starting from an existing valve site located about 22.5 km south of Neepawa and ending at a control structure approximately 3.5 km south of the town.

Why are we doing this?

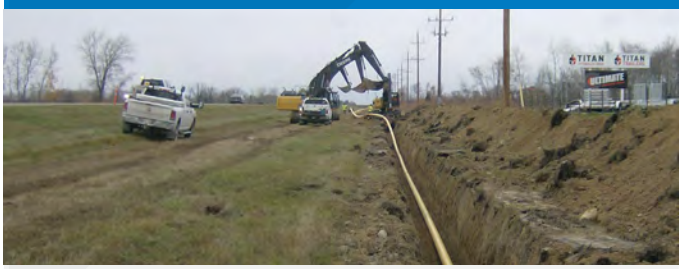
The Neepawa region is experiencing ongoing growth, which is increasing demand for natural gas. The existing infrastructure is nearing capacity, necessitating expansion to support ongoing regional development. Key drivers of this demand include urban growth, the expansion of cereal crop production, and a shift by some users from alternative energy sources to natural gas.

When is it happening?

- **December 2025**
  File environmental assessment for regulatory review
- **December 2026**
  Licensing decision (Anticipated)
- **Spring 2027**
  Construction (If licence is approved)
- **Fall 2027**
  Estimated in-service date

Manitoba Hydro energy for life

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.**

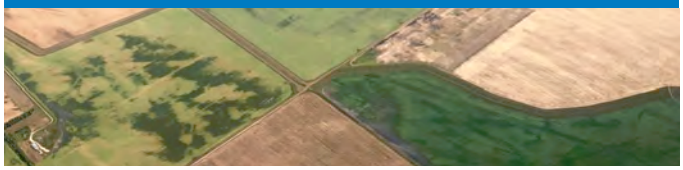
Horizontal Directional Drilling is a method used to install underground utilities, like pipelines. A tunnel that follows an arc shape is drilled under the designated area, and the pipeline is pulled through this tunnel, coming out on the opposite side.

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

Manitoba Hydro energy for life

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 these valued components and identify ways to reduce or prevent potential negative impacts.

Manitoba Hydro energy for life

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.

Manitoba Hydro energy for life

Project Details

The anticipated length of the gas transmission line is approximately 19 km.

Where the proposed gas transmission line runs parallel to existing gas transmission lines, a 25-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.

Manitoba Hydro energy for life

Keep in touch

- If you have any further questions or concerns, 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**

Scan this QR code to visit the project webpage.

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

Manitoba Hydro energy for life

Neepawa gas transmission project

Revision No. 1

Date	Time	Format
2025-10-22	12 p.m. to 1 p.m.	Information session

Facilitator	Notetaker	Location
Kale Oze	Michaela Peyson	Virtual - Microsoft Teams

Purpose / Summary

An opportunity for participants to learn more about the Neepawa gas transmission project and share feedback.

Attendees

Name	Affiliation
Participant	Landowner
Barry Good	Manitoba Hydro
Kale Oze	Manitoba Hydro
Kris McKinnon	Manitoba Hydro
Jodine MacDuff	Manitoba Hydro
Michaela Peyson	Manitoba Hydro
Phil Robertson	Manitoba Hydro
Ryan Delgaty	Manitoba Hydro
Scott Entz	Manitoba Hydro

Action items

Action Item	Responsible	Status
Share a copy of the presentation with the landowner.	Manitoba Hydro	Ongoing
Share a copy of the What we heard document with the landowners.	Manitoba Hydro	Ongoing

Discussion points

Category	Summary of discussion
Construction & operation	A participant inquired about when construction would take place. • A Manitoba Hydro representative shared that if an environment act license is received, construction is anticipated to begin spring of 2027, with an anticipated in-service date of fall 2027.
Access	A participant inquired about access to their property and construction methods around their driveway. • A Manitoba Hydro representative shared that access to their property would be maintained as best as possible.
Construction & operation	A participant asked whether the existing 4-inch gas pipeline would be removed or if the new pipeline would run parallel to the existing infrastructure. • A Manitoba Hydro representative confirmed that the new gas pipeline will be installed parallel to the existing one, situated between the current right-of-way and the proposed right-of-way.
Construction & operation	A participant inquired whether the existing gas pipeline would remain in service after the new one is constructed. • A Manitoba Hydro representative confirmed that the existing gas pipeline will continue to be in service.
Construction & operation	A participant asked whether driveways would be drilled, noting that when the municipality installed a new water line, it was trenched across their driveway and has never been the same. They wanted to ensure similar methods wouldn't be used for the proposed gas pipeline. • A Manitoba Hydro representative responded that the gas pipeline will be installed using horizontal drilling beneath driveways, which should avoid any impact to driveways. They also noted that this method should not affect trees; however, there is a thinner tree line toward the north of the property that may extend into the easement. If clearing is required, it will be minimal.

Construction & operation	A participant asked why construction is planned for spring rather than fall, noting concerns about restrictions due to migratory birds. • A Manitoba Hydro representative explained that summer provides ideal ground conditions for construction. Any necessary tree removal will occur before the nesting season, and mitigation measures will be in place to protect any ground-nesting birds. Construction is scheduled during unfrozen ground conditions, which are optimal for the work.

Note: The above is considered to be a true and accurate recording of all items discussed. Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

Neepawa Gas Transmission Project – landowner meeting

Revision No. #1

Date	Time	Format
2025-11-14	10:00 am	Meeting

Facilitator	Notetaker	Location
Kale Oze	Kale Oze	Virtual - Microsoft Teams

Purpose / Summary	To address concerns regarding future land use and easement requirements for parcel NE-33-13-15-W, review the proposed pipeline easement details, and discuss potential impacts on the property moving forward.

Attendees

Name	Affiliation
Landowner	Landowner, Business owner
Kale Oze	Manitoba Hydro
Ryan Delgaty	Manitoba Hydro
Barry Good	Manitoba Hydro

Action items

Action Item	Responsible	Status
Manitoba Hydro representative to take feedback to Property and determine what compensation would be.	Manitoba Hydro	Pending (Appraisal results expected late winter/early spring 2026)
Manitoba Hydro representative to review possibility of moving the line to the eastern edge of the property along the treeline.	Manitoba Hydro	In progress

Discussion points

Category	Summary of discussion
Business and operations	the landowner expressed concern about future development and resale value of the property, noting that placing a pipeline in the proposed location could reduce property demand, which is currently high for this type of property.
Socioeconomic	• A Manitoba Hydro representative explained that appraisals are done for easement areas (30 metres), not the entire property, and will take feedback to Property and share with the appraiser to determine if this impacts compensation. • A Manitoba Hydro representative noted that appraisal results will not be available until late winter/early spring 2026; if compensation is not acceptable, rerouting along the treeline could be considered.
Planning and process	The landowner indicated willingness to consider moving the line to the eastern edge along the treeline. A Manitoba Hydro representative will review the feasibility of this option.

Note: The above is considered to be a true and accurate recording of all items discussed. Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

Neepawa gas transmission project

Revision No. 1

Date	Time	Format
2025-11-19	12 p.m. to 1 p.m.	Information session

Facilitator	Notetaker	Location
Kale Oze	Michaela Peyson	Virtual - Microsoft Teams

Purpose / Summary	An opportunity for participants to learn more about the Neepawa gas transmission project and share feedback.

Attendees

Name	Affiliation
Participant	Manitoba Environment and Climate Change
Participant	Sno-Man Inc
Participant	Beef Producers of Manitoba
Participant	Prairie Mountain Snowdrifters
Participant	Keystone Agricultural Producers
Participant	Prairie Mountain Snowdrifters
Participant	Manitoba Agriculture
Kale Oze	Manitoba Hydro
Jodine MacDuff	Manitoba Hydro
Michaela Peyson	Manitoba Hydro
Ryan Delgaty	Manitoba Hydro

Action items

Action Item	Responsible	Status
Share a copy of the presentation with participants.	Manitoba Hydro	Closed

Share a copy of the What we heard document with participants.	Manitoba Hydro	Open

Discussion points

Category	Summary of discussion
Planning and Process	A participant inquired about the pipeline's route in relation to the Langford community pasture, specifically whether it passes through or bypasses the area. • A participant confirmed that the pipeline does not cross or connect to this property.
Construction & Operation	A participant asked if construction would be completed before the winter season. • A Manitoba Hydro representative responded that if an Environment Act license is received, construction is anticipated to be completed in the fall of 2027. Work will continue as long as conditions allow, pausing if temperatures drop significantly or the ground becomes too cold or muddy. Construction is unlikely to proceed through the winter; however, if unfavorable weather conditions occur earlier, the schedule may be extended. The contractor may choose to continue through winter with any work that can reasonably be completed, but welding generally cannot be performed in cold conditions, and enclosing and heating large sections of the site would be impractical for a project of this size.
Socioeconomic	A participant asked about potential impacts on snowmobile use, including whether construction would affect snowmobile routes or crossings. • A Manitoba Hydro representative shared they do not anticipate any issues. The pipeline will only intersect Trail 13 at one location, near Road 80N. We expect to use directional drilling at this crossing, and there should be no need for excavation at this site, allowing snowmobiles to continue crossing without disruption.
Planning and Process	A participant asked if the upcoming environmental assessment next month would include an Environment Act proposal. • A Manitoba Hydro representative confirmed that Manitoba Hydro plans to file an Environment Act Proposal that will include the environmental assessment report for the project, next month (i.e., in December 2025).
Environment	A participant asked whether, in addition to the Brookdale Drain being considered for directional drilling, are there any other water bodies or

	wetlands along the route. The area of concern is between SE 33-13-15W and NE 28-13-15W • A Manitoba Hydro representative explained that one area near the property jut-outs is heavily forested and extremely swampy, making trenching impossible and preventing access by boat or ATV. The plan is to bore under this section at a depth of approximately 2–3 meters to avoid disturbance. The contractor will take measures to prevent the pipeline from floating, and given that the soil supports trees, it is expected to provide sufficient stability to hold the pipeline securely.
Environment	A participant asked if Manitoba Hydro has monitoring systems in place, specifically pressure monitoring to detect early leaks or spills. • A Manitoba Hydro representative confirmed that monitoring is conducted at Gate Station 121 to detect any leaks. Additionally, leak surveyors regularly inspect the line using highly sensitive equipment capable of detecting even small amounts of methane.
Environment	A participant asked whether mitigation measures will be in place during construction, including buffers around water bodies. • A Manitoba Hydro representative confirmed that mitigation measures are included in the construction contract and must be followed by contractors. Additionally, an Environmental Protection Plan (EnvPP) will be developed to identify sensitive sites and mitigation measures are required.
Business and Operations	A participant noted the presence of irrigation pivots in the area surrounding the proposed line, some of which can be associated with tile drainage. The participant asked if Manitoba Hydro is working with farmers to better understand if these systems would be impacted by the proposed line. • A Manitoba Hydro representative confirmed that the team has been engaging with landowners to discuss parcel-related concerns and any potential impacts. These conversations will take place through one-on-one meetings with landowners to gather a thorough understanding of site-specific considerations.

Note: Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

Neepawa gas transmission project: Landowner meeting

Revision No. 1

Date	Time	Format
2025-11-27	2:20 pm to 2:50 pm	Field visit

Facilitator	Notetaker	Location
Ryan Delgaty	Michaela Peyson	In-person

Purpose / Summary	To review existing infrastructure on parcels SE-33-12-15-W and NE-33-12-15-W, including power cables and water lines and discuss the gas pipeline in relation to future agricultural plans.

Attendees

Name	Affiliation
Participant	Landowner
Participant	Representative
Ryan Delgaty	Manitoba Hydro
Scott Enz	Manitoba Hydro
Michaela Peyson	Manitoba Hydro

Action items

Action Item	Responsible	Status
Confirm water and power line specifics closer to construction.	Manitoba Hydro	**Open**

Discussion points

Category	Summary of discussion
Business and operations	A landowner shared that a three-phase power cable runs to the pivot and was already in place prior to the purchase of parcel SE-33-12-15-W. The cables are approximately three feet deep, used during the spring, summer, and fall seasons, and the pivot on this parcel operates on a three-year rotation. • A Manitoba Hydro representative marked the approximate location of the power cable on the drawing and indicated that the landowner's contact information will be added to the construction plans for site verification prior to the start of construction.
Business and operations	A landowner shared that there are water lines in several locations on parcels SE-33-12-15-W and NE-33-12-15-W. The lines are 8 inches in diameter, approximately 3 feet deep, and used only during summer operations. The landowner also confirmed that there is no tile drainage present on the parcel. • A Manitoba Hydro representative marked the approximate location of the power cable on the drawing and indicated that the landowner's contact information will be added to the construction plans for site verification prior to the start of construction.
Business and operations	A landowner inquired about the average depth of the gas pipeline, noting that they plan to plant potatoes in 2026 and will deep till approximately 12–14 inches. • A Manitoba Hydro representative indicated that the average depth of the gas pipeline is approximately 3 to 5 feet. Construction is scheduled to begin in the spring, and depending on planting timelines, compensation for crop damages would be provided, if necessary.

Note: The above is considered to be a true and accurate recording of all items discussed. Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

Neepawa gas transmission project: Landowner meeting

Revision No. 1

Date	Time	Format
2025-11-27	2:50 pm to 3:15 pm	Field visit

Facilitator	Notetaker	Location
Ryan Delgaty	Michaela Peyson	In-person

Purpose / Summary	To review existing water lines on parcels NW-3-13-15-W, which supplies parcels SE-9-13-15-W and NE-4-13-15-W, and discuss the gas pipeline in relation to future agricultural plans.

Attendees

Name	Affiliation
Participant	Landowner
Participant	Landowner
Ryan Delgaty	Manitoba Hydro
Scott Enz	Manitoba Hydro
Michaela Peyson	Manitoba Hydro

Action items

Action Item	Responsible	Status
Confirm water line specifics closer to construction.	Manitoba Hydro	**Open**

Discussion points

Category	Summary of discussion
Business and operations	A landowner shared that a water pipeline on parcel NW-3-13-15-W crosses the road and supplies parcels SE-9-13-15-W and NE-4-13-15-W. The pipeline is used during the spring, summer, and fall seasons, and is buried approximately three to four feet deep, crossing the highway. The landowner confirmed there is no cable present, only pipe. • A Manitoba Hydro representative marked the approximate location of the water line on the drawing and indicated that the landowner's contact information will be added to the construction plans for site verification prior to the start of construction.
Business and operations	A landowner asked when construction on the gas pipeline is scheduled to begin. • A Manitoba Hydro representative noted that construction is expected to begin in spring 2027, with completion targeted for fall 2027. However, the timeline may vary depending on contractor scheduling and resource availability.
Business and operations	A landowner inquired about the offset from their property. • A Manitoba Hydro representative confirmed that the pipeline will be set back 10 metres from the property line.
Business and operations	A landowner expressed interest in potentially connecting to the transmission pipeline for a future farm tap to parcel SE-16-13-15-W. • A Manitoba Hydro representative acknowledged that this may be possible once the line is built, noting that it would require a separate process. Should interest remain, the landowner is welcome to reach out at that time.

Note: The above is considered to be a true and accurate recording of all items discussed. Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

Neepawa gas transmission line: Field tour

Revision No. 1

Date	Time	Format
2025-11-27	10 am – 1 pm	Field visit

Facilitator	Notetaker	Location
Ryan Delgaty	Andrew Fitzsimmons and Michaela Peyson	Neepawa, MB

Purpose / summary

The tour provided an on-site overview of the Neepawa gas transmission line, highlighting key infrastructure components, safety measures, and operational processes. Participants gained insight into system design, construction methods, and the role of the transmission line in supporting regional energy needs.

Attendees

Name	Affiliation
Participant	Long Plain First Nation
Participant	Long Plain First Nation
Participant	Keeseekowenin Ojibway First Nation
Participant	Manitoba Métis Federation
Participant	Peguis First Nation
Participant	Peguis First Nation
Participant	Rolling River First Nation
Ryan Delgaty	Manitoba Hydro – Gas Design
Scott Entz	Manitoba Hydro – Gas Design
Andrew Fitzsimmons	Manitoba Hydro – Partnerships & Projects Support
Michaela Peyson	Manitoba Hydro – T&DEE

Action items

Action Item	Responsible	Status
Explore options for early workforce planning and communication of job requirements prior to tendering.	Manitoba Hydro	**Open**
Arrange a training, employment, and business opportunities meeting with all interested First Nations engaged on the Neepawa gas transmission line project.	Manitoba Hydro	**Open**

Discussion points

Category	Summary of discussion
Business and operations	A participant asked about the diameter, length of the gas pipeline, and right-of-way width. • A Manitoba Hydro representative explained that the Neepawa Gas Transmission Project involves a proposed approximately 19-kilometre, six-inch steel natural gas pipeline. Where the proposed gas transmission line runs parallel to existing gas transmission lines, a 25-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.
Business and operations	A participant asked about the depth of the gas pipeline near Brookdale drain. • A Manitoba Hydro representative explained that the depth will vary; around the creek, it will be drilled to approximately a minimum of 5 metres. However, the final depth will depend on the results of geotechnical investigations.
Socioeconomic	A participant noted that the area near Brookdale Drain may have been a historical bison hunting site, where bison were driven into the valley as part of traditional harvesting practices. They suggested this could increase the likelihood of finding remnants and possibly artifacts in the area. • Manitoba Hydro thanked the participant for this information and noted that it will be considered as

	part of the heritage fieldwork planned for spring 2026.
Business and operations	A participant asked about the process for acquiring land when the gas pipeline crosses private property and whether Manitoba Hydro leases the land. • A Manitoba Hydro representative explained that land for the gas pipeline is acquired either through fee simple ownership or by statutory easement. A property representative will contact landowners directly to discuss the amount of land required for the project. Property owners are compensated at current market value for the land acquired and, where applicable, for any structures located on the property.
Business and operations	A participant asked whether the construction work for the project is carried out internally by Manitoba Hydro or if external contractors are hired, and also inquired about when the project will be tendered. • A Manitoba Hydro representative explained that the project will be tendered in winter 2026, and a primary contractor will be selected in spring 2027 to carry out the work. The contractor may engage additional subcontractors as needed. Manitoba Hydro will oversee the process to ensure compliance with project requirements and standards.
Business and operations	A participant asked about the anticipated start date for construction on the project and the expected duration of the work. • A Manitoba Hydro representative noted that construction is expected to begin in spring 2027 and is anticipated to take approximately six months, with completion targeted for fall 2027. However, the timeline may vary depending on contractor scheduling and resource availability.
Planning and Process	A participant asked about landowners' perspectives on the project and how they are responding to the proposed plans. • A Manitoba Hydro representative explained that engagement with landowners is ongoing, and feedback has generally focused on understanding project details, timelines, and potential impacts.

	Property-specific impacts and compensation are being discussed with property representatives.
Environment	A participant inquired about the Brookdale Drain and its path of flow. • A Manitoba Hydro representative explained that the Brookdale Drain helps manage surface water in the area, flowing east to west at the pipeline crossing and connecting to Lake Irwin, which is part of the Whitemud Watershed.
Socioeconomic	A participant inquired about which contractor is responsible for the heritage work on the project, and why they were selected. • A Manitoba Hydro representative explained that InterGroup Consultants has been selected as the heritage contractor for the Neepawa Gas Transmission Project. InterGroup is one of two consultants hired under a framework agreement for archaeological services for Manitoba Hydro projects.
Business and operations	A participant asked whether the entire project would be completed using boring techniques. • A Manitoba Hydro representative explained that the majority of the pipeline will be installed using trenching, which is the standard method for gas pipeline construction. However, in environmentally sensitive areas, such as water crossings or locations with significant habitat, the pipeline will be installed using horizontal directional drilling (HDD) to minimize surface disturbance. All topsoil removed during trenching will be carefully segregated and replaced after backfilling to restore the land as close as possible to its original condition.
Business and operations	A participant asked whether the gas pipeline is lined with any material. • A Manitoba Hydro representative explained that the pipeline itself is constructed from coated steel and does not require an internal lining. However, trench

	padding may be applied in certain areas to protect the pipe, and in some cases, pea gravel may be used around the pipeline to provide additional support.
Business and operations	A participant asked whether there would be any laydown areas for the project. • A Manitoba Hydro representative explained that two potential locations are currently being assessed: one is an old farmyard, and the other is a field to the north that may serve as marshalling areas. These sites would be used exclusively for staging and storage, such as trailers, equipment, and material, and for access purposes. No construction activities will occur at these locations. Manitoba Hydro noted that temporary access agreements will need to be developed with property owners for these sites
Socioeconomic	A participant expressed interest in creating opportunities to train high school students so they can meet qualifications for future job requirements. They noted that having a detailed work breakdown well in advance of construction would help align training programs with project needs. For example, training students to achieve Class 2 welding certification could enable them to participate in low-risk tasks on the project. This proactive approach would help build local capacity and ensure that communities are prepared to meet workforce demand. • A Manitoba Hydro representative acknowledged the emphasis on early workforce planning and training opportunities. Gas pipeline construction typically involves roles such as general labourers for site preparation and trenching, equipment operators for heavy machinery, certified welders for joining steel pipeline sections, pipefitters, support roles, quality assurance inspectors. Manitoba Hydro will explore ways to communicate these requirements and timelines prior to tendering to help communities prepare for participation.

Non-project specific discussion points

Category	Summary of discussion
Socioeconomic	A participant expressed the importance of Manitoba Hydro continuing to improve commitments to Indigenous hiring and procurement, specifically for the First Nations engaged on the project. These agreements could emphasize creating meaningful opportunities for First Nations workers and supporting long-term job retention. Targets that could be tracked and reported could include: • Percentage of First Nations employees on the project; • Percentage of local First Nations employees at each level, from entry-level to management; • Percentage of total procurement spend with businesses owned by local First Nations; and • Phase-by-phase reporting of First Nations employment, including local representation, to ensure transparency. It was suggested that contractors who do not meet these targets may be subject to measures aimed at encouraging improvement, which could include temporary limitations on eligibility for future Manitoba Hydro contracts. • Manitoba Hydro representatives will review these recommendations as part of our ongoing efforts to enhance Indigenous participation in our projects, and we will look into setting up a meeting with our Training, Employment, and Business Opportunities department to explore next steps.
Socioeconomic	A participant suggested that Manitoba Hydro could host regular meetings with First Nations leadership to discuss upcoming training, employment, and business opportunities across all projects. • Manitoba Hydro representatives thanked the participant for this suggestion and noted that we will take this recommendation into consideration as we review ways to improve engagement and provide First Nations leadership with timely and accurate information.
Socioeconomic	A participant expressed that Manitoba Hydro should consider offering more training opportunities for First Nations in Southern Manitoba. They noted that increased access to skills development programs could help prepare community

	members for future employment on projects and support long-term economic participation. • Manitoba Hydro representatives thanked the participant for sharing this feedback and noted that we will take this recommendation into consideration and explore connecting with our training, employment, and business opportunities team to discuss potential approaches.
Socioeconomic	A participant recommended that Manitoba Hydro engage Indigenous governments earlier in project planning to incorporate cultural, spiritual, environmental, and training, business, and employment considerations. They noted that if engagement begins only after a project map is shared, it may be perceived as too late in the planning process. • Manitoba Hydro representatives acknowledged the importance of early engagement with Indigenous governments to incorporate cultural, spiritual, environmental, and economic considerations. It is recognized that timing can influence the effectiveness of engagement and appreciate the insight provided on how earlier involvement may support preparation for potential opportunities.
Indigenous relations	A participant expressed interest in having more opportunities for direct collaboration with Manitoba Hydro decision-makers and noted that relying solely on engagement staff can sometimes make it challenging to move discussions forward. • A Manitoba Hydro representative acknowledged this concern.
Socioeconomic	A participant expressed interest in equity participation in all transmission/generation projects, suggesting that equity should become the default approach. The representative shared that Indigenous interest in the wind development project and the Brandon Dispatchable Capacity project is viewed as an opportunity to demonstrate Manitoba Hydro's commitment to reconciliation. • A Manitoba Hydro representative acknowledged this concern. • A Manitoba Hydro representative also explained that the Brandon Dispatchable Capacity project is intended as a solution for power generation during high energy demand or low energy generation, such as droughts or

	other adverse conditions. This project is designed as a reliability-focused measure for intermittent use, which is significantly different than other power-generating infrastructure such as hydroelectric dams.
Socioeconomic	A participant expressed concern that heritage legislation led by the Historic Resources Branch may not fully support processes needed to advance comprehensive archaeological work and understanding. • A Manitoba Hydro representative acknowledged this concern.
Socioeconomic	A participant expressed that Manitoba Hydro should offer more localized Indigenous Cultural Awareness Training (ICAT) on each project, developed and delivered by impacted First Nations. They noted that in northern Manitoba, ICAT is often supported by First Nations and suggested using that as a model. • A Manitoba Hydro representative acknowledged this concern.
Planning and process	A participant expressed concern that work related to the Dominion City to Altona project may have started before heritage assessments were completed. • A Manitoba Hydro representative responded that work on the Dominion City to Altona project has not yet begun. The participant emphasized that no groundwork or vegetation clearing should begin until heritage reviews are completed.
Planning and process	Multiple participants expressed that there are barriers to job retention for Indigenous employees and a perception that retention favours non-Indigenous employees. • Manitoba Hydro representatives will review these recommendations as part of our ongoing efforts to enhance Indigenous participation in our projects, and we will look into setting up a meeting with our Training, Employment, and Business Opportunities department to explore next steps.
Planning and process	Multiple participants expressed that Manitoba Hydro and contractors too often ignore accountability issues for First Nations employees (e.g., lateness, substance issues, sleeping on the job), creating a perception that Indigenous workers are

	only hired for quotas and preventing pride and confidence in their work. • Manitoba Hydro representatives will review these recommendations as part of our ongoing efforts to enhance Indigenous participation in our projects, including tracking and reporting, and we will look into setting up a meeting with our Training, Employment, and Business Opportunities department to explore next steps.

Note: Should any discrepancy or inconsistency be noted, advise the notetaker within two weeks of receiving the document.

Neepawa gas transmission project

Engagement feedback summary

Key engagement themes

Socioeconomic

Participants shared themes around cultural heritage considerations, workforce development opportunities, and economic impacts such as compensation for easements, crop damage, and pasture loss. Participants also expressed interest in local employment and training opportunities, highlighting the potential for workforce development and community benefits.

Environment

Participants shared concerns about environmental impacts, including timing around migratory birds, water crossings, and wetland protection, as well as biosecurity risks, weed management, soil handling, and leak detection.

Business and Operations

Participants shared concerns about construction methods, timing, and disruption to agriculture, along with questions about contractor selection, staging areas, property impacts, and coordination with irrigation and future water lines.

Planning and Process

Participants shared questions about route selection, regulatory approvals, and implications for future land development, including building restrictions and subdivision plans.

Engagement activities

Our engagement process for the project ran from September through December 2025. During this time, we shared project information and gathered feedback on the preferred route for the natural gas pipeline.

For this project we engaged with:

- First Nation and Métis audiences
- Affected and adjacent landowners
- Communities and Rural Municipalities
- Local businesses, and the public

3 Virtual information sessions

1 In-person open house

1 In-person field tour

3 Meetings with landowners

Feedback gathered helped us better understand concerns, interests, and potential impacts, as well as identify mitigation measures to inform the environmental assessment and route alignment decisions.

Next steps

We submitted the Environment Act Proposal with Manitoba Environment and Climate Change for regulatory review in December 2025 and are awaiting a licensing decision. Following Manitoba Environment and Climate Change's decision, we will notify the engaged audiences of the outcome.

Contact us for related inquiries

projects@hydro.mb.ca

1-877-343-1631

Manitoba Hydro
energy for life

Neepawa gas transmission project

Engagement feedback summary

What we heard

Table 1 below summarizes what participants shared and how Manitoba Hydro has considered these inputs in project planning and decision-making.

Feedback	Outcomes
Concerns about biosecurity risks, including anthrax and weed management, and requests for engagement with Manitoba Agriculture and adherence to best practices.	Manitoba Hydro will implement the Manitoba Hydro biosecurity policy and procedures to mitigate biosecurity risks.
Requests to minimize disruption to cattle operations and protect agricultural infrastructure (corrals, barns, watering systems, pivots) during construction.	Manitoba Hydro will work with landowners to minimize disruption to farming operations where possible and confirm locations of in-ground infrastructure to prevent damage.
Questions about pipeline specifications, construction methods, and restoration practices.	Manitoba Hydro will provide detailed project specifications (length, diameter, right-of-way width, depth) and confirm that construction methods will be used appropriately, with topsoil segregation and restoration after construction.
Concerns about land acquisition, compensation for crop damage, and long-term forage loss.	Manitoba Hydro will continue direct discussions with property owners regarding easements and compensation.
Interest in cultural heritage protection and concerns about heritage methodology.	Manitoba Hydro will consider input into heritage fieldwork planning and continue discussions with interested nations.
Requests for workforce development opportunities and early communication of job requirements.	Contract measures will promote opportunities for Indigenous people and businesses including employment and training opportunities.

Table 1. Summary of engagement feedback and associated project outcomes.

Contact us for related inquiries

projects@hydro.mb.ca

1-877-343-1631

Manitoba Hydro
energy for life

APPENDIX B

Heritage Technical Report

December 2025

Manitoba Hydro

Neepawa Gas Transmission Project
Heritage Technical Report

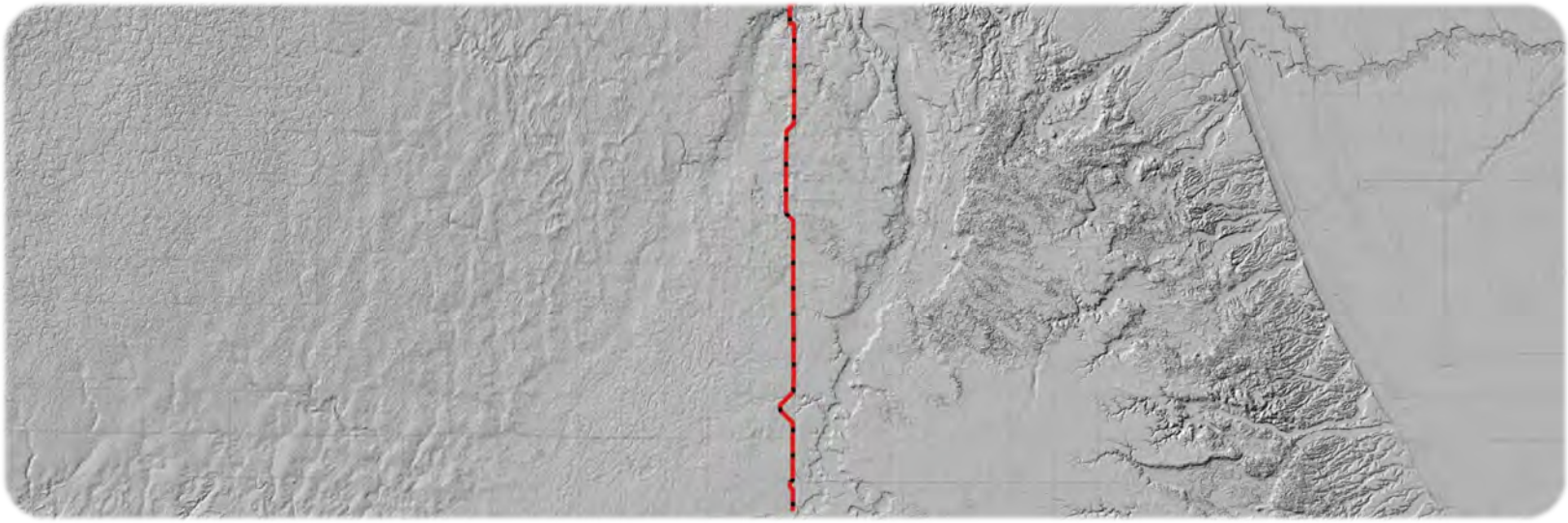
Prepared for:

Manitoba Hydro

c/o Megan Anger

360 Portage Avenue (Floor 18)

Winnipeg, MB R3C 0G8



Prepared by:

INTERGROUP CONSULTANTS LTD.

300-259 Portage Avenue

Winnipeg, MB R3B 2A9

December 12, 2025

InterGroup

CONSULTANTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

1.0 INTRODUCTION

Manitoba Hydro is proposing the Neepawa Gas Transmission project, a 19-kilometer (km) steel natural gas pipeline that will stretch from an existing valve site south of Neepawa, connecting to another control structure north of town, and integrating with TransCanada (TC) Energy Corporation's infrastructure (the Project). The primary objective of this initiative is to increase the availability of natural gas in the region, thereby meeting the escalating demands of the customer base. The proposed pipeline is located in the Rural Municipality of North Cypress-Langford to the south of the town of Neepawa on Treaty 1 and Treaty 2 lands. This project is classified as a Class 2 development under *The Environment Act*.

The following is a characterization report of known and potential heritage resource concerns along the proposed preferred route. Development of the heritage technical report involved acquiring the locations of previously recorded archaeological sites, registered century farms, and a compiled list of municipally, provincially, and federally designated sites and plaques. A review of historic trails was conducted, and known cemeteries was compiled.

1.1 PROJECT CONTEXT

Recognizing the potential effects of ground disturbances on heritage resources is essential for understating possible impacts.

Construction methods for this Class 2 Project include trenching and horizontal direct drilling. Trenching involves digging a narrow rectangular-shaped hole, approximately 1.3m deep, and installing the pipeline within it, about 1m below the surface. Horizontal directional drilling is used to install underground utilities like pipelines or cables, where a tunnel is drilled under the designated area and the utility is pulled through. Both methods create ground disturbance with trenching being more intensive and having a greater impact relative to horizontal directional drilling. However, horizontal directional drilling is not suitable in all situations such as when certain sediments are encountered which do not maintain their structure to allow a pipe/cable to be inserted through the drilled tunnel due to collapse or infill. In such scenarios, trenching may be the only suitable installation method for an underground utility.

1.2 NATURAL ENVIRONMENT

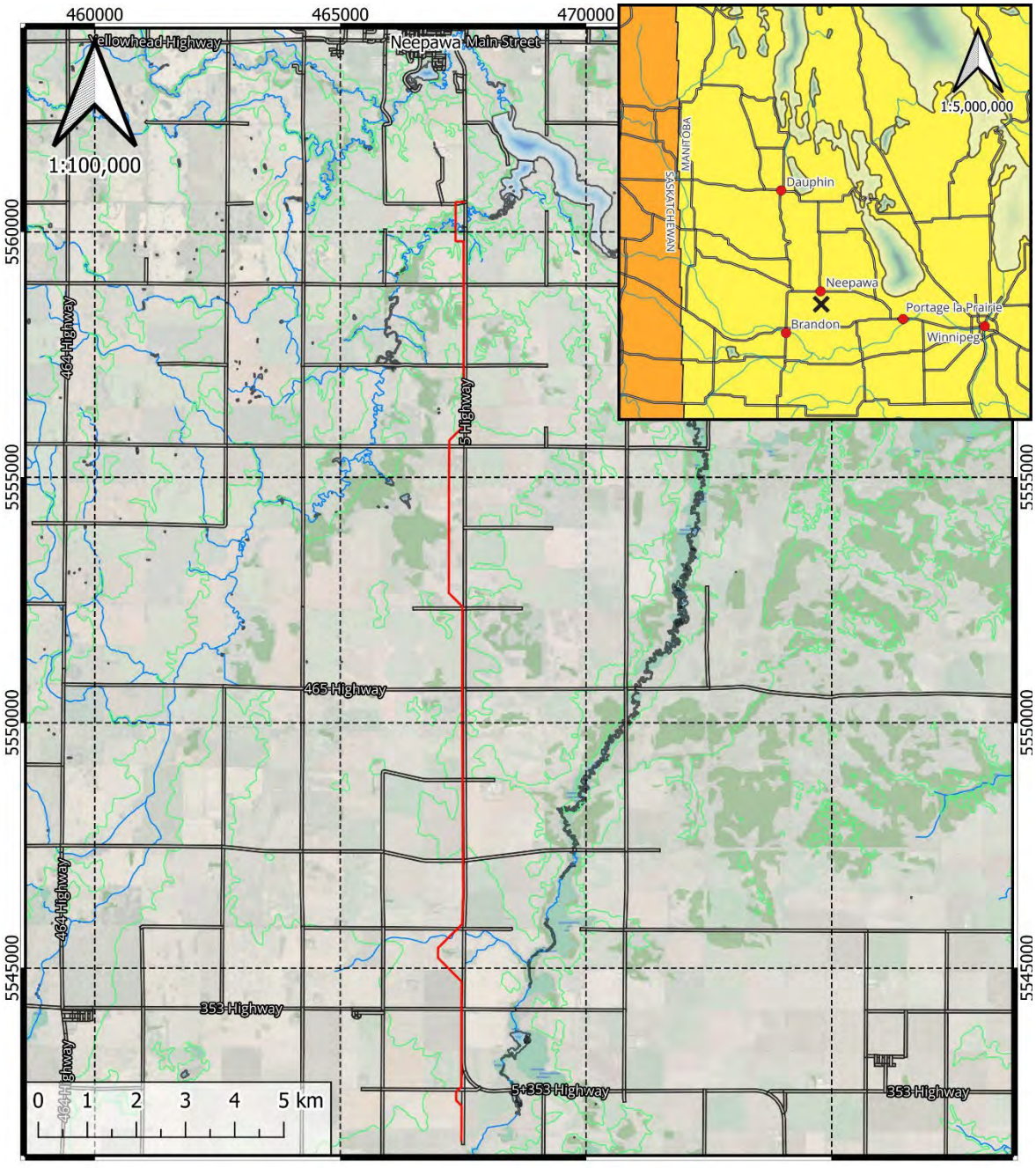
An examination of the natural environment that has shaped the Project area is important for providing context to the regions cultural heritage and features that may be encountered during the Project.

The Project Area is located to the between 3.5-22.5km south of the city of Neepawa (Map 1). The general environment is part of the Prairies Ecozone and more specifically the Shilo and Carberry Ecodistricts. The Prairies Ecozone extends from the United States of America border, in a general north-west direction to Lake Dauphin (Map 2). The characteristic wildlife of the Ecozone in Manitoba consists of elk (*Cervus canadensis*), coyote (*Canis latrans*), badger (*Taxidea taxus*), white-tailed jack rabbit (*Lepus townsendii*), ground squirrel (*Alpine marmot*), and northern pocket gopher (*Thomomys talpoides*). The characteristic bird species consist of ferruginous hawk (*Buteo regalis*) and sage grouse (*Centrocercus urophasianus*). It also serves as a major breeding, staging, and nesting habitat for ducks, geese, waterfowl, and other shorebirds, even though the wetlands have been significantly reduced due to development and cultivation. The most common amphibian is the red sided (*Thamnophis sirtalis*) and western plains garter snakes (*Thamnophis radix*).

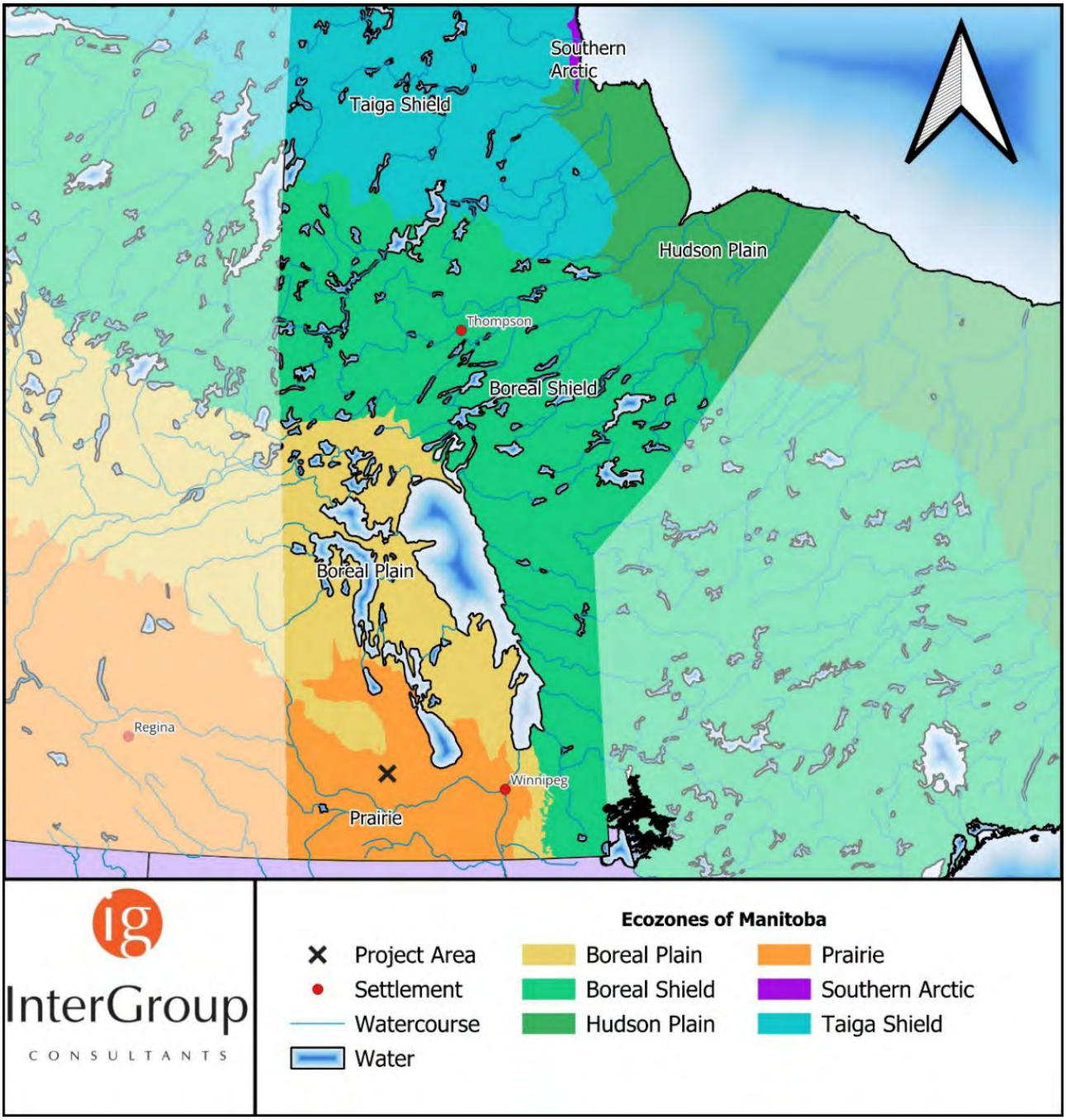
The Shilo Ecodistrict is located in a subdivision of the Grassland Transition Ecoclimatic Region that lies between the driest subdivision to the southwest and the most humid subdivision to the east and northeast. The climate is characterized by short, warm summers and long, cold winters. The sediments consist for a large part of fine to coarse sand deposited by glacial meltwaters. Soil development is minimal due to these shifting sands only having stabilized recently. The vegetation is characteristic of aspen parkland with trembling aspen groves in moist locations and maples and ash growing along larger waterways. The dominant ground cover consists of mostly mixed prairie grasses, but also includes creeping and common juniper and bearberries. The principal water source in the Shilo Ecodistrict comes from good quality ground water. Neepawa is the largest community in the ecodistrict and serves as its major service centre (Smith *et al.* 1998).

The Carberry Ecodistrict is in a subdivision of the Grassland Transition Ecoclimatic Region that lies between the driest area to the southwest and the more humid area to the east. The climate is characterized by short, warm summers and long, cold winters. The ecodistrict consists largely of shallow, medium textured glaciolacustrine sediments overlying stratified deltaic sands. Well drained, thick Black Chernozenic soils predominate on loam to clay loam surface sediments which overlay stratified sandy and gravelly deltaic deposits. The native vegetation in the ecodistrict has been almost entirely replaced by cultivated fields. Prior to cultivation, the ecodistrict would have been covered by tall prairie grasses and associated herbs with small groves of aspen or willow. The principal water source is good quality groundwater from the Carberry aquifer which provides sufficient water for commercial irrigation of corn and potatoes. Carberry is the major settlement within the Carberry Ecodistrict (Smith *et al.* 1998).

Map 1: Project Area



Map 2: Ecozones of Manitoba



1.3 PALEO-ENVIRONMENT

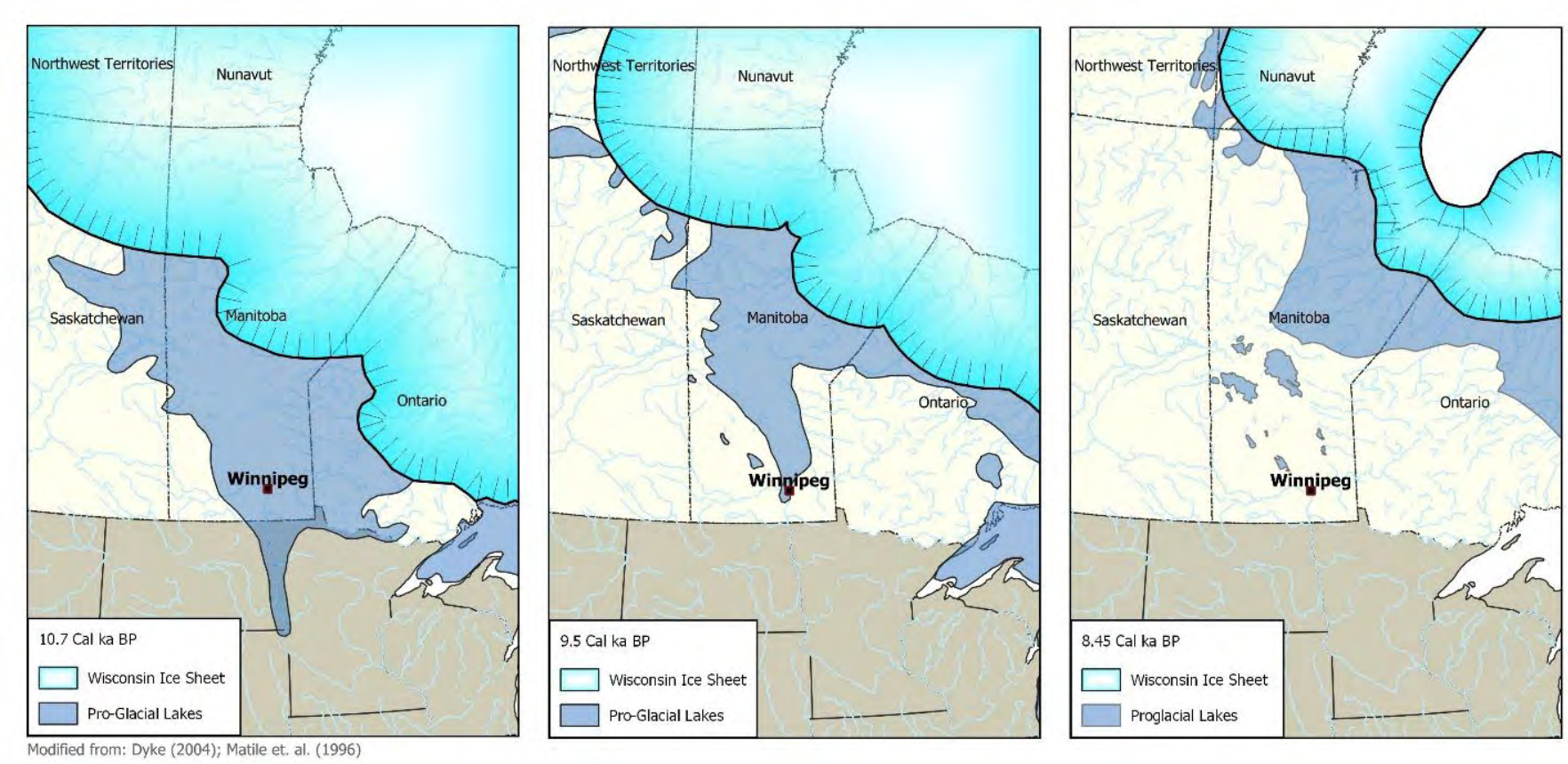
The last great Ice Age, known as 'the Wisconsin Glaciation,' was responsible for creating the topography of Manitoba as it is known today. At its highest extent, the ice formed a glacier over two kilometres thick over the Project area (Ledohoski 2009). By 18,000 years ago (ya), the glacier began to melt and by 10,700 ya[1], it had fully retreated from what is now southcentral Manitoba. The glacial melt waters collected along portions of the ice fronts, forming huge lakes. The largest of these glacial lakes was called Glacial Lake Agassiz. The Manitoba Escarpment forms the edge of the extent of Glacial Lake Agassiz and separated the Agassiz basin from the elevated areas to the west (Teller and Last 1981). Glacial Lake Agassiz would gradually drain from the Project area via several outlets as the Wisconsin Ice sheet retreated in a generally north-east direction. The Project area become subaerial by approximately 9,500 ya. It is important to note that Lake Manitoba was still undergoing rapid post glacial changes and its shoreline would not resemble its current extent until 5,000 ya. This was due to differential isostatic rebound of the northern half of the Lake Manitoba basin 'tilting' and forcing water to pool in its southern extent. This pooling and filling of the southern half of the basin was aided by periodic switching of the Assiniboine River, from its current Red River outlet to emptying into Lake Manitoba, as evidenced by buried fluvial deposits from sediment cores (Last and Teller 2002).

Following the retreat of the Wisconsin ice sheet and draining of the large interior proglacial lakes, dry cold air flowing from the still nearby ice mass created a boreal coniferous forest with large and expansive stands of conifers such as spruce (Fagan 2000). This environment persisted and aridity increased until approximately 7,000 ya when, the boreal coniferous forest gave way to a more established open prairie. This new environment referred to as the prairie peninsula featured a decrease in precipitation, increased temperatures, and increased the salinity in lakes and ponds (Fagan 2000; Oetelaar 2011). Bison populations began to move north from the southern plains following the retreat of the boreal forests. This climatic aridity persisted until approximately 4,000 ya (Nicholson and Webster 2011) when climatic conditions began to become similar to current conditions. This period is often referred to as the Neoglacial period and features a milder mixed prairie parkland environment with small stands of deciduous oaks and aspen and expanses of open tall grasslands (Kay 1998).

Figure 1 shows the deglaciation of Manitoba.

[1] ya = Years Ago

Figure 1: Deglaciation of Manitoba (Modified from Dyke 2004, Matile *et al.* 1998)



Modified from: Dyke (2004); Matile et. al. (1996)

InterGroup CONSULTANTS

1.4 CULTURAL CONTEXT

The cultural chronology for Manitoba is based on technological innovations and historical happenings. It comprises two major time periods: the Indigenous Period and Indigenous-European Period. The Indigenous Period dates from ca. 300-12,000 ya, while the Indigenous-European Period dates from after 1700 (*ca.* 300 years ago to present), when Europeans and fur traders entered the area.

1.4.1 Indigenous Period

1.4.1.1 Early Indigenous Period (*ca.* 12,000 – 8,000 years ago)

Deglaciation of what is now Manitoba likely began approximately 12,000 years ago in the southwestern portion of the province. This period marks the earliest confirmed era of human activity in Manitoba. The peoples who would have occupied this area were bison hunters, who followed the herds into the newly formed grassland areas from the south and the west (Pettipas and Buchner 1983). Southwestern Manitoba is home to the Manitoba escarpment, which was habitable during this period. East of the Escarpment was the lowlands which were dominated by glacial ice sheets or Glacial Lake Agassiz (Pettipas 2011). The glacial lake covered an area up to 2 million km^2 (Boyd 2007). The massive volume of water created by glacial melting resulted in the creation of spillways and channels. These spillways and channels carved steep valley walls into the landscape as they emptied into Lake Agassiz (Asessippi Provincial Park n.d.).

Indigenous people relied on a hunter gatherer way of life during the Early Indigenous Period. These hunter gatherers lived in small, economically self-sufficient groups. An important piece of the hunter gatherer toolkit during this period was the spear or lanceolate point which was critical to the big game hunting strategy of the Early Indigenous Period (Markham 2013).

1.4.1.2 Middle Indigenous Period (*ca.* 8,000 – 2,000 years ago)

The Middle Indigenous Period is marked by a period of warmer and drier environmental conditions, which resulted in the northward expansion of the treeline over 200 kilometres north of the present forest limit. In southern Manitoba, deciduous trees moved further north, marking the initial occurrence of aspen parklands (Pettipas 2014). The increasing number of plant resources, expanding fish resources, and a broad range of game animals, required slightly different adaptive systems and subsistence strategies.

Several important cultural adaptations occurred within the Middle Indigenous Period (Wright 1995), including the appearance of notched or stemmed projectile points, end scrapers, ground stone adzes and other cutting implements. The appearance of novelle style projectile points and the introduction of the atlatl (a spear extender, which provided leverage to the spear thus increasing the velocity and accuracy of the projectile) suggest adaptive technological changes for procuring food resources. Raw materials used by the Middle Indigenous Period people became much more diverse, including the appearance and use of native copper which was used for making tools and adornments (Pettipas 1984). The peoples using such tools are considered by archaeologists to be mainly hunters and fishers who subsisted on a seasonally diverse diet of large and small game, fish, and local plants (Wright 1995).

1.4.1.3 Late Indigenous Period (*ca*. 2,000 – 350 years ago)

The introduction of Indigenous clay pottery, adoption of the bow and arrow, construction of elaborate burial mounds and cultivation of maize and other crops marks the differentiation between the Late Indigenous Period (*ca*. 350-2,500 years ago) and Middle Indigenous Period. This period is also referred to as Woodland, which has shown to have first developed in eastern North America before moving westward. In Manitoba, the Woodland Period is further divided into two further periods, Initial (*ca*. 2,500 years ago) and Terminal (*ca*. 1,000 years ago) which are based on vessel construction and stylistic attributes.

The Initial Woodland people using pottery are represented by the Besant-Sonota type vessels. The vessels were conical to coconut shaped with cord roughened to plain exteriors (Paquin 2020). The Besant-Sonota vessels were created using a lump modelled or slab construction technique that was later paddled to remove air pockets. The paste itself is coarse and dense with large pieces (4mm) of crushed granite temper (Paquin 2020). Besant-Sonota pottery features round, flat, flat and sloping, flat with overhang, exterior bevel and exterior or interior bulge lip styles. Punctates and bosses are the most common decoration and occur most frequently on vessels in a single encircling band. Other decorations that sometimes occur are dentate, cord wrapped tool impressions, stamps, and fingernail impressions (Paquin 2020). The oldest calibrated date for Besant-Sonota pottery is 1942 B.P.[2] (Paquin 2020).

The Terminal Woodland tradition contains several important pottery types that represent local variations that made them distinctive. Although pottery construction is believed to use similar techniques, there are signature differences within this tradition. For the Project area, Blackduck, Selkirk, and Sandy Lake pottery types are the main derivatives. The peoples associated with these types of pottery constructed globular shaped vessels made from masses of wet clay, using a lamination technique. Archaeologists believe that these pots were pre-formed in a woven bag that left a distinct fabric impression on the exterior. Vessel rims, necks, and lips were embellished with combinations of design attributes such as decorative punctates, small cord-wrapped-stick impressions, or incising (Pettipas 1984). It is thought that the makers of Sandy Lake ware were probably 'Siouan'. This is assumed based on Sandy Lake ware being recovered from sites identified as being occupied by the Dakota and in association with early French fur trade goods (Lakehead University 2021; Taylor-Hollings 1999).

The Late Indigenous Period cultures were also characterized by burying their dead in linear or circular mounds (Syms 1978) and agricultural activities (Malainey 2020, Syms and Halwas 2019).

Although cultivation of maize suggests a sedentary lifestyle, hunting bison remained dominant across the prairies. Subsistence within the forest consisted of hunting, fishing, and wild rice gathering. These foraging economies maintained trading relationships and cultural exchanges with other groups. In addition to clay pottery, Woodland sites contain a variety of stone tools including scrapers, drills, hammerstones, stone pipes, and triangular-shaped projectile points, as well as tools manufactured from bone, wood, and antler (Wright 1972, Stoltman 1973, Pettipas 1984).

[2] B.P. = Before Present

1.4.2 Indigenous – European Period

The Indigenous-European Period began with the influx of European explores and fur traders. The fur trade was a vast and commercial enterprise that played a formative role in the creation and development of Canada. The social and commercial relations bound Indigenous peoples and newcomers together. Fur-trade marriages created kinship networks essential to the fur trade and gave rise to the Métis people. Mixed Indigenous and European heritage is not the sole defining characteristic of the Metis people who have a distinct collective identity, customs, and way of life that are unique and different from their original Indigenous and European roots. The contribution made by Indigenous people and the Métis was integral to the success of the fur trade.

From 1670 to 1870, the vast territory of the Hudson Bay drainage basin was known as Rupert's Land, the exclusive commercial domain of the Hudson's Bay Company (HBC) and the primary trapping grounds of the fur trade (Canada's History Society 2023). During this time many traditional items were quickly replaced with more durable European counterparts: clay vessels with copper and sheet-iron kettles; stone tools with steel knives, porcupine quills, and other natural adornments with glass beads. The French had begun to establish trading posts in the west. In 1738, La Vérendrye and his sons established Fort la Reine on the Assiniboine River near present day Portage la Prairie (Burpee 1927). The fur trading post served as the base of operations for much exploration north and west and was chosen in part to intercept the trade of the Indigenous traders crossing the portage to Lake Manitoba en route to the English posts on Hudson Bay. From the fort, explorers made their way to Lac des Prairies (Lake Manitoba) and Lake Winnipegosis, Lake Winnipeg, the Saskatchewan River, and the Missouri River. Abandoned in 1749, the fort was reconstructed in 1751 and burnt down a year later (Goldsborough 2019).

These western fur trade posts would be abandoned due to the conflict with Great Britain in the Seven Years War. Following the war and the conquest of New France by Great Britain in 1763, the western fur trade routes lay largely abandoned. Thomas Curry and James Finlay were the first English explorers to enter the west after the fall of New France. Thomas Curry reached Fort Bourbon to the west of Cedar Lake in 1766. James Finaly ascended the Saskatchewan River in 1767 and built a trading post at Lower Fort Nipawee which was one of the furthest French trading posts. Other traders were noted to have gone as far as Fort La Reine on the Assiniboine in 1767. Other noted post include Adhomar's Fort which was located approximately 9.6km to the east of present day Portage la Prairie, Fort Aux Trembles which was built on the Assiniboine River by present day Brandon and surrendered in 1780, Brandon House which was built in 1784 near present day Brandon, and Dauphin Lake House/Fort Dauphin which was relocated to Ochre River from Dauphin Lake (Voorhis 1930).

As trade routes became established throughout the interior, European goods such as ceramics, cooper pots, glass bottles, metal nails and tools became more conspicuous in the regional cultural inventory. This incremental change in the availability of European trade goods is reflected in today's archaeological record.

The main rival to the HBC was the North West Company (NWCo) founded in 1779. The competition between the NWCo for control of the fur trade led to the establishment of numerous trade houses, which ultimately increased trade opportunities for Indigenous trappers. The NWCo traders explored the Red and Assiniboine Rivers, the Saskatchewan River and followed the Churchill River (Voorhis 1930).

The coalition of the Hudson's Bay Company and the North West companies in 1821 ended over 25 years of fierce competition between the two establishments and created a fur trading monopoly that covered one quarter of North America. This amalgamation also resulted in a tendency for some bands to congregate near a specific post, causing a more sedentary life way.

In 1811, the HBC granted an area of about 185 000 km² to Lord Selkirk for the establishment of a colony at the Red River. With the immigration of European settlers came the mentality of an agricultural people who believed in allotting land in terms of equality and uniformity, this resulted in the implementation of the River Lot/Parish Lot system along the banks of the Red, the Assiniboine and other Manitoba rivers (Manitoba Agricultural Services Corporation 2023).

In 1867, the British colonies were united under the *British North American Act* to become the Dominion of Canada. (McIntosh and McConnell 2023). In 1869, the HBC sold Rupert's Land to the Dominion of Canada, increasing the government's land five-fold (Manitoba Agricultural Services Corporation 2023). To settle the prairies, the government proposed the American grid system to contain townships of 64 sections, each comprised of 800 acres. Following resistance from some Métis under Louis Riel, the government decided to use a system with 640 acres per square mile and townships of only 36 sections (Manitoba Agricultural Services Corporation 2023). To resolve the struggle for self-determination between people of the Red River Colony and the federal government, the *Manitoba Act* (1870) established the Province of Manitoba (Rea and Scott 2021). Shortly after, the government signed treaties with First Nations and offered land scrip to Métis children. The numbered treaties signed with Canada mark a significant change in the cultural landscape of the prairie provinces.

1.4.2.1 Neepawa

The first European settlers to arrive in what is today, the Town of Neepawa, were the Graham family. The Graham family came from Listowel, Ontario, in 1877, along the North Fort Ellice Trail seeking farming opportunities (Town of Neepawa 2024). The Fort Ellice Trail was a popular travel route that linked the Red River settlement to Fort Edmonton about 1450 km to the northwest (Government of Manitoba 2024). The Fort Ellice Trail is another name for the Carlton Trail which has also been known as the Saskatchewan Trail. The Carlton Trail was the first highway to the west. Many European settlers travelled along this trail in Red River Carts. When the weather was warm and dry groups of settlers could travel about 20 km a day along the Carlton Trail (Hall 1969).

Later, in 1880, two businessmen, J. Hamilton and John A. Davidson arrived in Neepawa. They purchased land and established a general store (Town of Neepawa 2024). In 1882, the Manitoba and Northwestern Railway (M&NW) had arrived at Gladstone. Davidson and Hamilton wanted the railway to pass through Neepawa to facilitate community growth and through a land grant and bonus of $16,000 the M&NW railway came through Neepawa. Neepawa was incorporated and named in 1883 after the Cree word for "plenty". After the arrival of the railway, businesses began popping up adjacent to the rail line. In 1902, the Canadian National Railway (formerly the Canadian Northern Railway) was also established in Neepawa. Neepawa's growth was slower than neighboring places like Portage la Prairie and Brandon. In 1883, the population was 308, in 1921 the population was 1864 (Town of Neepawa 2024). As of 2021, the population has risen to 5685 (Statistics Canada 2024). Neepawa's early success was based on the town being a railway hub and trading center for wheat (Town of Neepawa 2024).

2.0 PROVINICAL LEGISLATION

Heritage resources are defined in the *Heritage Resources Act* (Government of Manitoba, 1986) as "a heritage site, a heritage object, and any work or assembly of works of nature or of human endeavor that is of value for its archaeological, paleontological, pre-historic, historic, cultural, natural scientific or aesthetic features, and may be in the form of sites or objects or a combination thereof."

Non-forensic human remains are also defined within the *Heritage Resources Act* as "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."

Heritage resources are managed by Manitoba's Historic Resources Branch of Sport, Culture, Heritage, and Tourism. Any development that has the potential to disturb heritage resources requires a Heritage Resource Impact Assessment (HRIA) to determine location, size, and mitigation procedures for any potential heritage resources. Human remains that have become exposed through human activity such as development or forces of nature such as erosion fall under the purview of the Department of Sport, Culture, Heritage, and Tourism. The treatment of human remains is detailed and regulated within the *Policy Respecting the Reporting, Exhumation and Reburial of Found Human Remains* of 1987. If the human remains are determined to be forensic in nature, then The *Fatality Inquiries Act* of 1990 takes precedence, and the remains fall under the jurisdiction of the corresponding police force.

3.0 DETERMINING HERITAGE RESOURCE POTENTIAL

The evaluation of heritage resource potential is grounded in an assessment of archaeological site locations, historical land use data, and landscape characteristics that impact the distribution of archaeological sites. The criteria for evaluating archaeological potential are achieved by reviewing current land use, archival maps, photos, LiDAR, and mapping potential locations (e.g., types of landforms, nearness to documented heritage resources, proximity to historic settlement, proximity water). The results of this qualitative review are then used to determine the archaeological potential within the proposed Project footprint using ArcGIS. For the purposes of this study, archaeological potential is defined as the likelihood of past activities having produced tangible evidence and property which may contain archaeological resources.

Lands are characterized as having high, moderate, moderate-low, or low heritage resource potential. These categories can inform the scope/level of effort and approaches recommended for future archaeological studies, monitoring and mitigation activities, as well as basic heritage resource management. Generally, the higher the characterization, the greater the level of archaeological investigation is expected by regulatory authorities. High potential areas are lands exhibiting many attributes that support past cultural activities and where one would expect significant finds during any level of ground disturbance. The less attributes exhibited, the lower the potential. Lands with higher archaeological potential would require more in-depth investigation, while archaeological investigations are not normally recommended for lands categorized as having low archaeological potential.

3.1 ARCHAEOLOGICAL SITES

Ancient land use practices can be observed within the archaeological record. In relation to cultural ecology, archaeologists examine how past cultures lived on particular landscapes or in a particular environment at a particular past time (Cromley 1994). Within this landscape, certain features and areas contain tangible evidence of past people. Heritage resources were characterized for the general area based on the locations of previously recorded, archaeological sites, registered century farms, and a compiled list of municipally and provincially designated sites. A search of historic trails as well was as a list of known cemeteries was also compiled. An area of 10km around the Project footprint was reviewed for all aforementioned aspects of determining heritage resource potential. This boundary was selected as it is an intermediate balancing both a narrow Project focused view and an expansive generalized area view. Within this 10km area, archaeological sites, century farms, plaques, and recognized cemeteries are provided within 1km, 2km, and 3km, and 5km of the Project footprint to demonstrate the proximity of these indicators of heritage resource potential to the Project where actual ground disturbance will actually occur directly or indirectly (*e.g.* increased vehicle traffic).

The archaeological record provides physical and documented evidence of different cultural occupations that have occurred over millennia. In Manitoba, information concerning archaeological sites is stored in an Archaeological Sites Database maintained by the Manitoba Historic Resources Branch (HRB).

A review of existing registered archaeological sites within 10km of the Project footprint was undertaken. A request was sent to the HRB to review the archaeological site inventory for registered sites within the Project area. There is a total of 95 registered sites within 10km of the Project area of which six (n=6) are within 1km, 16 within 2km, 31 within 3km, and 55 within 5km (Map 3, Table 1).

The sites within 1km of the Project Area include sites that predominantly date to the Indigenous Period and consists of lithics with the most notable find consisting of a utilized flake from EaLu-005. A World War II era site (EaLu-059) resides within 1km as well. This site consists of a secondary runway for the Service Flying Training School No.33.

The sites (n=16) within 2km consist predominantly of Indigenous Period heritage resources, predominantly lithics, dating as far back as the Middle Indigenous Period. Hanna, Oxbow, and Pelican Lake projectile points have been recovered from EbLu-026 and Sonota, McKean, Oxbow, and Pelican Lake projectile points have been recovered in EaLu-036. Unspecified Indigenous Period ceramics have been recovered from EaLu-036 in addition to the noted lithics. There are no further Indigenous-European Period sites noted within 2km beyond the aforementioned World War II runway (EaLu-059).

The sites (n=31) within 3km consist predominantly of Indigenous Period heritage resources. The sites contain a greater variety of heritage resources with more sites containing Indigenous Period ceramics including EaLu-004 where Laurel and Blackduck are recovered, Ealu-015, EaLu-024 where Blackduck is recovered, and EaLu-041 where fabric impressed pottery is recovered. Indigenous Period lithics are still the dominant heritage resources found within the area and diagnostic artifacts indicated a presence dating back to the Middle Indigenous Period. In addition to the previously noted projectile point variants found within 2km of the Project area, Avonlea projectile points were recovered from archaeological site EaLu-

054. There are no further Indigenous-European Period sites noted within 3km of the Project area beyond the noted World War II runway (EaLu-059).

A total of 55 archaeological sites is within 5km of the Project Area. In addition to the aforementioned sites, an Agate Basin projectile point was recovered from archaeological site EaLu-049 which is located within 5km of the Project footprint. This site dates to the Early Indigenous Period and also contains an Indigenous-European Period component with ferrous heritage resources. This site indicates human occupation in the area from the earliest stages of Manitoba's history after it was freed from its frozen past and glacial Lake Agassiz to the arrival of Europeans in the area.

The totality of the artifact assemblage observed within 10km of the Project area predominantly consists of Indigenous Period lithics. However, the area also contained two (n=2) further World War II ear structures between 5km to 10km from the Project footprint. The first is archaeological site EbLv-014. This site consists of a school for the Elementary Flying Training School No. 35 which was used by the Royal Airforce following a move from Moncton, New Brunswick. The school operated from May 1942 and closed in January 1944. The second is archaeological site DlLu-012. The site consists of the Service Flying Training School No. 33 secondary landing field.

There is a one (n=1) burial site (EaLv-001) located within 10km of the Project area. It is not at risk based on the current Project footprint.

There is a large number (n=95) of sites found in proximity (within 10km) to the Project area dating from the Early Indigenous Period to World War II. This indicates a continuous occupation/land use of the Project area and the increased archaeological potential in area.

Table 1: Archaeological Sites recorded within 10km of Project Footprint

Red text indicates that the archaeological site is more than 5km away from the Project footprint.			
Borden	**Site Type**	**Period**	**Description**
DlLu-012	Other	Late Indigenous-European Period	A World War II era airfield.
EaLt-010	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics including a biface.
EaLt-013	Campsite	Indigenous Period Indigenous-European Period	Surface collection of Indigenous Period lithics and copper pot fragments.
EaLu-001	Workshop	Indigenous Period	Surface collection of Indigenous Period lithics.
EaLu-002	Campsite	Not Available	A poorly recorded site.
EaLu-003	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics.
EaLu-004	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics including Avonlea and side-notched projectile points and Indigenous Period ceramics including Laurel and Blackduck.
EaLu-005	Uninterpreted	Indigenous Period	Collection of Indigenous Period lithics.
EaLu-006	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-007	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-008	Isolated Find	Late Indigenous Period	Surface collection of Indigenous Period lithics including triangular projectile points.
EaLu-009	Campsite	Indigenous Period	Surface collection of Indigenous Period ceramics including fabric impressed.
EaLu-010	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics including a triangular projectile points.
EaLu-011	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics and ceramics.
EaLu-012	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics including Avonlea projectile point.
EaLu-013	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics and ceramics including Blackduck.
EaLu-014	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-015	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics and ceramics.
EaLu-016	Campsite Hunting/Fishing	Indigenous Period Indigenous-European Period	Surface collection of a copper vessel.
EaLu-017	Campsite	Middle Indigenous Period	Surface collection of Indigenous Period lithics including a McKean projectile point.
EaLu-018	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics and ceramics including cord wrapped.
EaLu-019	Campsite	Not Available	A poorly recorded site.
EaLu-020	Campsite	Not Available	A poorly recorded site.
EaLu-021	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-022	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-023	Campsite	Not Available	Surface collection containing "flakes of bone".

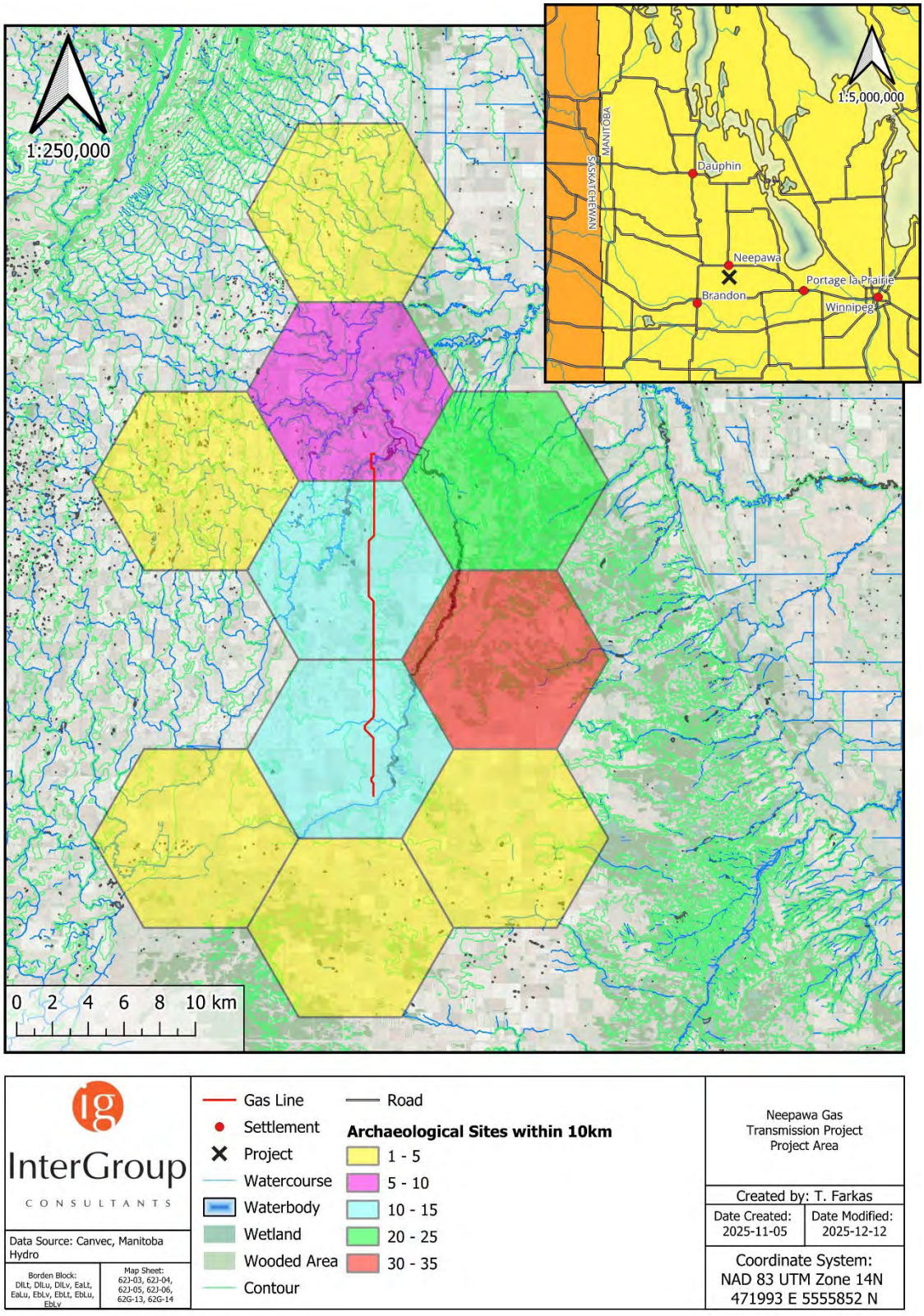
Red text indicates that the archaeological site is more than 5km away from the Project footprint.			
Borden	**Site Type**	**Period**	**Description**
EaLu-024	Campsite	Middle Indigenous Period Late Indigenous Period Indigenous-European Period	Surface collection of Indigenous Period lithics including projectile points and Indigenous Period ceramics including Blackduck. Site contains an Indigenous-European component.
EaLu-025	Campsite	Middle Indigenous Period	Surface collection of Indigenous Period lithics including Oxbow and corner-notched projectile points.
EaLu-026	Isolated Find	Indigenous Period	Surface collection of Indigenous Period lithics.
EaLu-027	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics.
EaLu-028	Isolated Find	Not Available	A poorly recorded site.
EaLu-029	Isolated Find	Middle Indigenous Period	Surface collection of Indigenous Period lithics including a Plano projectile point.
EaLu-030	Isolated Find	Not Available	A poorly recorded site.
EaLu-031	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Oxbow and Pelican Lake projectile points.
EaLu-032	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-033	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-034	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics.
EaLu-035	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-036	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including McKean, Oxbow, Sonota, Besant, and Pelican Lake projectile points and Indigenous Period ceramics.
EaLu-037	Workshop	Not Available	A poorly recorded site.
EaLu-038	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-039	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EaLu-040	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics including side-notched projectile point.
EaLu-041	Campsite	Late Indigenous Period Indigenous-European Period	Surface collection of Indigenous Period ceramics including fabric impressed. Site contains an Indigenous-European component.
EaLu-042	Campsite	Not Available	A poorly recorded site.
EaLu-043	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics.
EaLu-044	Campsite	Not Available	A poorly recorded site.
EaLu-045	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including corner-notched projectile points and ceramics.
EaLu-046	Campsite	Not Available	A poorly recorded site.
EaLu-047	Campsite	Not Available	A poorly recorded site.
EaLu-048	Campsite	Late Indigenous Period Indigenous-European Period	Surface collection of Indigenous and Indigenous-European Period ceramics.

Red text indicates that the archaeological site is more than 5km away from the Project footprint.			
Borden	**Site Type**	**Period**	**Description**
EaLu-049	Campsite	Early Indigenous Period Late Indigenous Period Indigenous-European Period	Surface collection of Indigenous Period lithics including triangular and Agate Basin projectile points and Indigenous-European artifacts.
EaLu-050	Uninterpreted	Indigenous Period	A poorly recorded site.
EaLu-051	Campsite	Indigenous Period Indigenous-European Period	A poorly recorded site.
EaLu-052	Campsite	Late Indigenous Period Indigenous-European Period	Surface collection of Indigenous Period lithics and ceramics. Site contains an Indigenous-European component.
EaLu-053	Campsite	Middle Indigenous Period Late Indigenous Period	A poorly recorded site.
EaLu-054	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Oxbow, McKean, Avonlea, and Prairie projectile points.
EaLu-055	Uninterpreted	Middle Indigenous Period	Surface collection of Indigenous Period lithics including McKean projectile point.
EaLu-056	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including McKean, Besant, and Prairie projectile points.
EaLu-057	Uninterpreted	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Oxbow and Prairie projectile points.
EaLu-058	Uninterpreted	Late Indigenous Period	Surface collection of Indigenous Period lithics including Besant, Avonlea, and Prairie projectile points.
EaLu-059	Other	Late Indigenous-European Period	A World War II era airfield.
EaLv-002	Workshop	Indigenous Period	Surface collection of Indigenous Period lithics including project points.
EaLv-003	Kill Site	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Archaic, Hanna, and Plains side-notched projectile points.
EaLv-004	Workshop	Not Available	A poorly recorded site.
EaLv-006	Uninterpreted	Late Indigenous Period	Surface collection of Indigenous Period lithics including Besant, Avonlea, Pelican Lake and Prairie projectile points.
EbLu-001	Kill Site	Middle Indigenous Period Late Indigenous Period	Collection of Indigenous Period lithics including Oxbow, McKean, and Prairie side-notched projectile points.
EbLu-002	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Oxbow, McKean, Duncan, and Pelican Lake projectile points and Indigenous Period ceramics including Laurel.
EbLu-003	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics.
EbLu-004	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics including side-notched projectile point.
EbLu-005	Isolated Find	Not Available	A poorly recorded site.
EbLu-006	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics including Sonota projectile point.
EbLu-007	Isolated Find	Not Available	A poorly recorded site.
EbLu-008	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics.

Red text indicates that the archaeological site is more than 5km away from the Project footprint.			
Borden	**Site Type**	**Period**	**Description**
EbLu-009	Isolated Find	Late Indigenous Period	Surface collection of Indigenous Period lithics including Pelican Lake projectile points.
EbLu-010	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics.
EbLu-011	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics including Plains triangular projectile points.
EbLu-012	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics including projectile points.
EbLu-013	Isolated Find	Indigenous Period	A poorly recorded site.
EbLu-014	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EbLu-015	Campsite	Not Available	A poorly recorded site.
EbLu-016	Campsite	Not Available	A poorly recorded site.
EbLu-017	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics including an obsidian scraper.
EbLu-018	Campsite	Early Indigenous Period	Surface collection of Indigenous Period lithics including projectile points.
EbLu-019	Campsite	Late Indigenous Period	Surface collection of Indigenous Period lithics.
EbLu-020	Isolated Find	Middle Indigenous Period	Surface collection of Indigenous Period lithics including Oxbow projectile points.
EbLu-021	Campsite	Indigenous Period	A poorly recorded site.
EbLu-022	Campsite	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Pelican Lake and Plains side-notched projectile points.
EbLu-023	Isolated Find	Indigenous Period	Isolated find of Indigenous Period lithics.
EbLu-024	Isolated Find	Indigenous Period	Surface collection of Indigenous Period lithics including a biface.
EbLu-025	Uninterpreted	Indigenous Period	Surface collection of Indigenous Period lithics including projectile points.
EbLu-026	Uninterpreted	Middle Indigenous Period Late Indigenous Period	Surface collection of Indigenous Period lithics including Hanna, Oxbow, Pelican Lake and Plains projectile points.
EbLv-002	Campsite	Indigenous Period	Surface collection of Indigenous Period lithics.
EbLv-003	Isolated Find	Indigenous Period Indigenous-European Period	Isolated find of artifacts.
EbLv-014	Other	Late Indigenous-European Period	A World War II era airfield.

HRB Archaeological Site Data 2025

Map 3: Project Area with Number of Archaeological Sites



3.2 CENTENNIAL FARMS

A review of existing centennial farms within 10km of the Project footprint was undertaken. The requirements to be recognized a centennial farm in Manitoba consist of the land being continuously owned by the direct descendants of the original owner and the minimum land area must be at least 20.23 hectares (50 acres) for the minimum 100 years of the life of the farm.

A total of 21 centennial farms have met these criteria and have been recorded (Table 2). These farms were originally established between 1877 and 1905. A total of one (n=1) centennial farm (Ch. Family Farm) is located within 1km of the Project area and is about 140m from the Project footprint itself. This farm is in very close proximity to the Project footprint. An additional three (n=3) centennial farms are located within 2km of the Project footprint for a total of four (n=4) centennial farms. One (n=1) additional farm is located within 3km of the Project Footprint for a total of five (n=5) centennial farms. A further three (n=3) centennial farms are located within 3-5km from the Project footprint for a total of eight (n=8) centennial farms within 5km of the Project footprint. The remaining 13 centennial farms are located more than 5km from the Project footprint.

Table 2: List of Centennial Farms within 10km of the Project Footprint

Red text indicates that Centennial Farm is more than 5km from Project Footprint

Name	Original Date	Legal Description
Be. Family Farm	1905	W 4-13-15 W
Br. Family Farm	1877	N 25-14-15 W
Ca. Family Farm	1889	NW 25-14-16 W
Ch. Family Farm	1889	SE 28-13-15 W
Dra. Family Farm	1896	SW 26-13-16 W
Dry. Family Farm	1880	S 32-14-14 W
Ha. Family Farm	1905	NE 35-11-16 W
Ha. Family Farm	1904	SE 7-12-15 W
McJ. Family Farm	1891	NW 22-14-15 W
McL. Family Farm	1886	SE 5-15-14 W
Mo. Family Farm	1891	NE 13-14-16 W
Mu. Family Farm	1900	SW 35-13-16 W
Mu. Family Farm	1900	NW 35-13-16 W
Ol. Family Farm	1903	E 32-12-15 W
Ran. Family Farm	1897	NE 31-11-14 W
Ras. Family Farm	1889	NE 31-11-15 W
Ru. Family Farm	1879	NW 30-11-14 W
Su. Family Farm	1904	N 23-13-16 W
Ti. Family Farm	1881	SW 8-14-15 W
Tu. Family Farm	1879	SW 33-12-14 W
We. Family Farm	1877	SW 20-12-14 W SE 20-12-14 W

3.3 PLAQUES

A review of existing plaques within 10km of the Project footprint was undertaken. A total of 15 plaques have been recorded (Table 3). The plaques were designated between 1963 and 2005 with just under half (n=7) located within the town of Neepawa. The remainder are spread between the northern half (n=6) and southern half (n=2) of the Project Area. There are no plaques located within 1km of the Project footprint, one (n=1) plaque (Lake Irwin Park) located within 2km of the Project footprint, and an additional (n=1) plaque (Oberon) located within 3km of the Project footprint. This totals two (n=2) plaques within 3km of the Project footprint. An additional eight (n=8) plaques are located between 3-5km of the Project footprint with many of these located within the town of Neepawa. This totals 11 plaques within 5km of the Project footprint with the remaining four (n=4) located outside of this area but within 10km. No plaques are located in close proximity to the Project Area.

Table 3: List of Plaques within 10km of the Project Footprint

Red text indicates that Plaque is more than 5km from Project footprint.		
ID	**SiteName**	**Designation**
PLAQ71	Beautiful Plains County Court Building	1983
PLAQ72	Beautiful Plains County Court Building	1987
PLAQ143	Brookdale Early Pioneers	1992
PLAQ407	Fort Ellice Trail Junction	1963
PLAQ633	Knox Presbyterian Church	1992
PLAQ660	Laurence, Margaret, House	1989
PLAQ828	Neepawa Agricultural Society Centennial	1982
PLAQ1851	Independent Order of Odd Fellows Building	1995
PLAQ2278	Oberon	2002
PLAQ2279	Dumfries School	N/A
PLAQ2280	Gordon Methodist Church	N/A
PLAQ2282	Stoney Creek School	N/A
PLAQ2284	Osprey School	N/A
PLAQ2337	Lake Irwin Park	1967
PLAQ2481	Layng's Ford	2006

3.4 DESIGNATED SITES

A review of designated sites within 10km of the Project footprint was undertaken. A total of seven (n=7) designated sites have been recorded (Table 4). Sites can be designated by the Municipality, Province of Manitoba, the Federal Government, or a combination of these governing bodies. A total of two (n=2) designated sites (Davidson House and Roxy Theatre) are Municipal Heritage Sites, three (n=3, Margaret Laurence House, Knox Presbyterian Church, Independent Order of Odd Fellows Building Neepawa Lodge No. 16) are Provincial Heritage Sites, one (n=1, Neepawa Canadian National Railway Station) is a National Historic Site of Canada, and one (n=1, Beautiful Plains County Court Building) is both a Provincial Heritage Site and National Historic Site of Canada. All of the designated sites are located within the town of Neepawa and are located more than 3km but within 5km from the Project footprint.

Table 4: Designated Sites within 10km of Project Footprint

ID	Building Name	Designation
M0198	Davidson House	Municipal Heritage Site
M0279	Roxy Theatre	Municipal Heritage Site
P010 F124	Beautiful Plains County Court Building	Provincial Heritage Site National Historic Site of Canada
P025	Margaret Laurence House	Provincial Heritage Site
P044	Knox Presbyterian Church	Provincial Heritage Site
P090	Independent Order of Odd Fellows Building Neepawa Lodge No. 16	Provincial Heritage Site
F2257	Neepawa Canadian National Railway Station	National Historic Site of Canada

3.5 RECOGINIZED CEMETERIES

A review of recognized cemeteries within 10km of the Project footprint was undertaken. There are three (n=3) cemeteries in the Project area (Table 5). The Riverside Cemetery and the Wellwood Cemetery/Turner Cemetery/Graham Cemetery/Munroe Cemetery are located more than 3km but within 5km from the Project footprint. The Morrison Burial Site is a reported cemetery within NE-28-13-15-W1 and does intersect with the proposed Project footprint.

Table 5: List of Recognized Cemeteries in the Project Area

Cemetery	Legal Description
Morrison Burial Site	NE-28-13-15-W1
Riverside Cemetery	NE-33-14-15-W
Wellwood Cemetery/Turner Cemetery/Graham Cemetery/ Munroe Cemetery	SW-36-12-15-W

3.6 MAJOR TRAILS

A review of major trails within 10km of the Project footprint was undertaken. There are three (n=3) major trails (Table 6). The Fort Ellice Trail North and the trail to Grand Valley are located farther than 5km from the Project footprint. The Fort Ellice Trail South intersects the Project footprint.

Table 6: Major Trails and Legal Descriptions within 10km of the Project Footprint[3]

Red text indicates Major Trail is more than 5km from the Project Footprint.	
Historic Trail	**Legal Description**
Fort Ellice Trail North	NE-07-15-15-W1, NE-13-15-15-W1, NW-07-15-15-W1, NW-18-15-14-W1, SE-13-15-15-W1, SE-14-15-15-W1, SE-15-15-15-W1, SE-16-15-15-W1, SE-17-15-15-W1, SW-13-15-15-W1, SW-14-15-15-W1, SW-15-15-15-W1, SW-16-15-15-W1, SW-17-15-15-W1
Fort Ellice Trail South	NE-05-12-14-W1, NE-07-12-14-W1, NE-13-12-15-W1, NE-14-12-15-W1, NE-22-12-15-W1, NE-29-12-15-W1, NE-34-12-16-W1, NE-35-12-16-W1, NW-05-12-14-W1, NW-07-12-14-W1, NW-13-12-15-W1, NW-23-12-15-W1, NW-28-12-15-W1, NW-29-12-15-W1, NW-35-12-16-W1, NW-36-12-16-W1, SE-03-13-16-W1, SE-04-13-16-W1, SE-05-12-14-W1, SE-07-12-14-W1, SE-13-12-15-W1, SE-23-12-15-W1, SE-27-12-15-W1, SE-28-12-15-W1, SE-31-12-15-W1, SE-36-12-16-W1, SW-03-13-16-W1, SW-04-12-14-W1, SW-08-12-14-W1, SW-08-12-14-W1, SW-23-12-15-W1, SW-27-12-15-W1, SW-28-12-15-W1, SW-31-12-15-W1, SW-36-12-16-W1
Trail to Grand Valley	NE-19-11-15-W1, NE-20-11-15-W1, NE-21-11-15-W1, NE-22-11-15-W1, NW-20-11-15-W1, NW-21-11-15-W1, NW-22-11-15-W1, NW-23-11-15-W1, SW-23-11-15-W1

[3] Please see Section 1.4.2.1 Neepawa for additional details regarding the Fort Ellice Trail and alternative names.

4.0 SUMMARY AND RECOMMENDATIONS

The initial evaluation of the Neepawa Gas Transmission Line Project's heritage resource potential considered various factors, including the locations of documented archaeological sites, historical land use information, and landscape characteristics, all of which either positively or negatively impact archaeological site distribution. Based on the qualitative review, the heritage concerns for the proposed pipeline would be high for much of the study area due to the following:

- According to the archaeological record, the area surrounding the Project footprint has been continually occupied since the Early Indigenous Period as soon as glacial Lake Agassiz receded about *ca.* 10,000 years ago.
- There are 96 registered archaeological sites of which six (n=6) are within 1km, 16 are within 2km, 31 are within 3km, and 55 are within 5km of the Project footprint.
- A centennial farm is located within 140m of the proposed Project footprint and an additional two (n=2) centennial farms are within 3km. A total of eight (n=8) centennial farms are located within 5km of the Project footprint.
- The reported location of the Morrison Burial Site intersects the proposed Project footprint.
- The Fort Ellice Trail southern route intersects the proposed Project footprint.
- While the area has been developed over the pasts 150 years, activities such as agricultural cultivation, gardening, and minor grading are not necessarily considered deep disturbance.
- The Anishinaabe, Dakota, Cree and Métis have standing history in the area.

The Project's heritage resource evaluation has revealed potential impacts on these resources; therefore, a Heritage Resource Impact Assessment (HRIA) is recommended. The HRIA aims to:

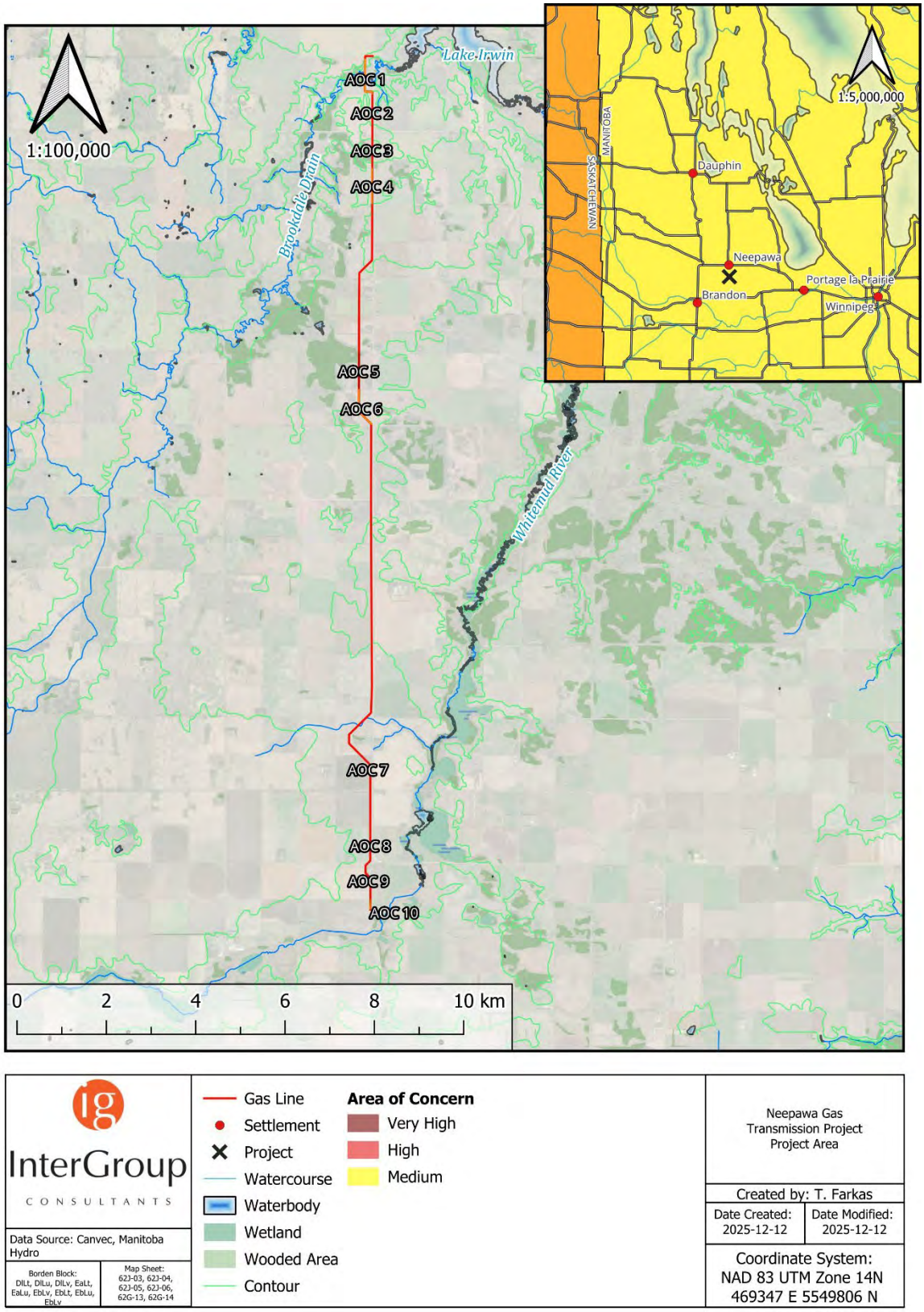
- identify whether artifacts or features are present or absent,
- possibly identify temporal and cultural occupation of found heritage resources, and
- provide recommendations if supplementary archaeological investigations are required.

Based on the qualitative review, a total of ten (n=10) areas of concern (AOC) have been identified, please see Table 7 for location, concern, and reasoning (Maps 4-9). These locations have been identified due to their proximity to existing archaeological sites, reported burials, and other indicators of heritage potential.

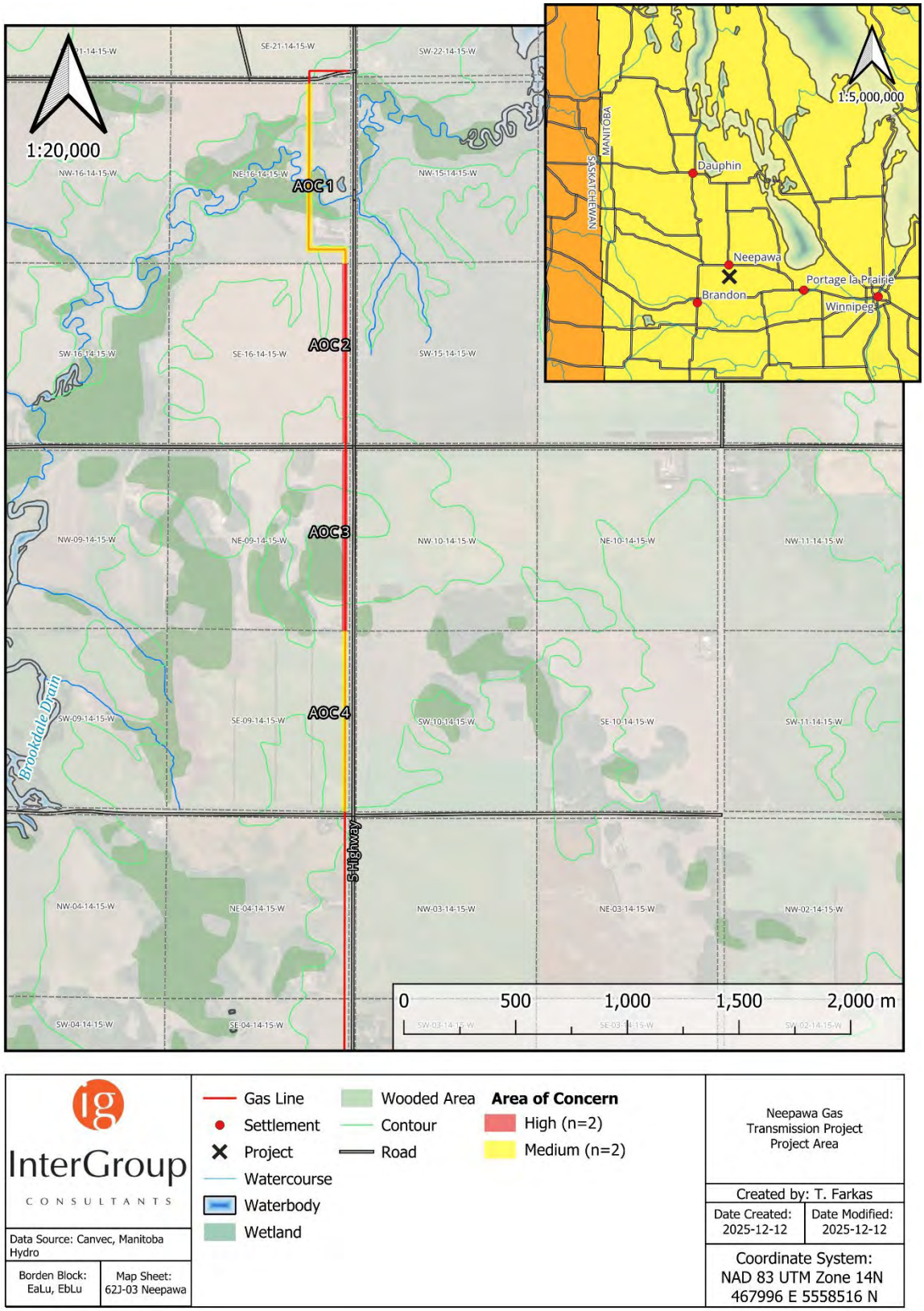
Table 7: Areas of Concern with Location, Concern, and Reasoning

AOC ID	Quarter Section	Concern	Reasoning (All distances provided relative to proposed line)
AOC 1	NE-16-14-15-W	Medium	Archaeological site within 1,000m.
AOC 2	SE-16-14-15-W	High	Archaeological site within 500m.
AOC 3	NE-09-14-15-W	High	Archaeological site within 500m.
AOC 4	SE-09-14-15-W	Medium	Archaeological site within 1,000m.
AOC 5	NE-28-13-15-W	Very High	Reported Burial. Centennial farm within 1000m. Archaeological site within 2500m.
AOC 6	SE-28-13-15-W	Medium	Centennial farm within 150m. Archaeological site within 2,500m.
AOC 7	SE-33-12-15-W	High	Reported burial in adjacent quarter section.
AOC 8	SE-28-12-15-W	High	Intersects major trail. Archaeological sites within 700m.
AOC 9	NE-21-12-15-W	High	Reported burial in adjacent quarter section. Archaeological site within 800m.
AOC 10	SE-21-12-15-W	Medium	Archaeological site within 800m.

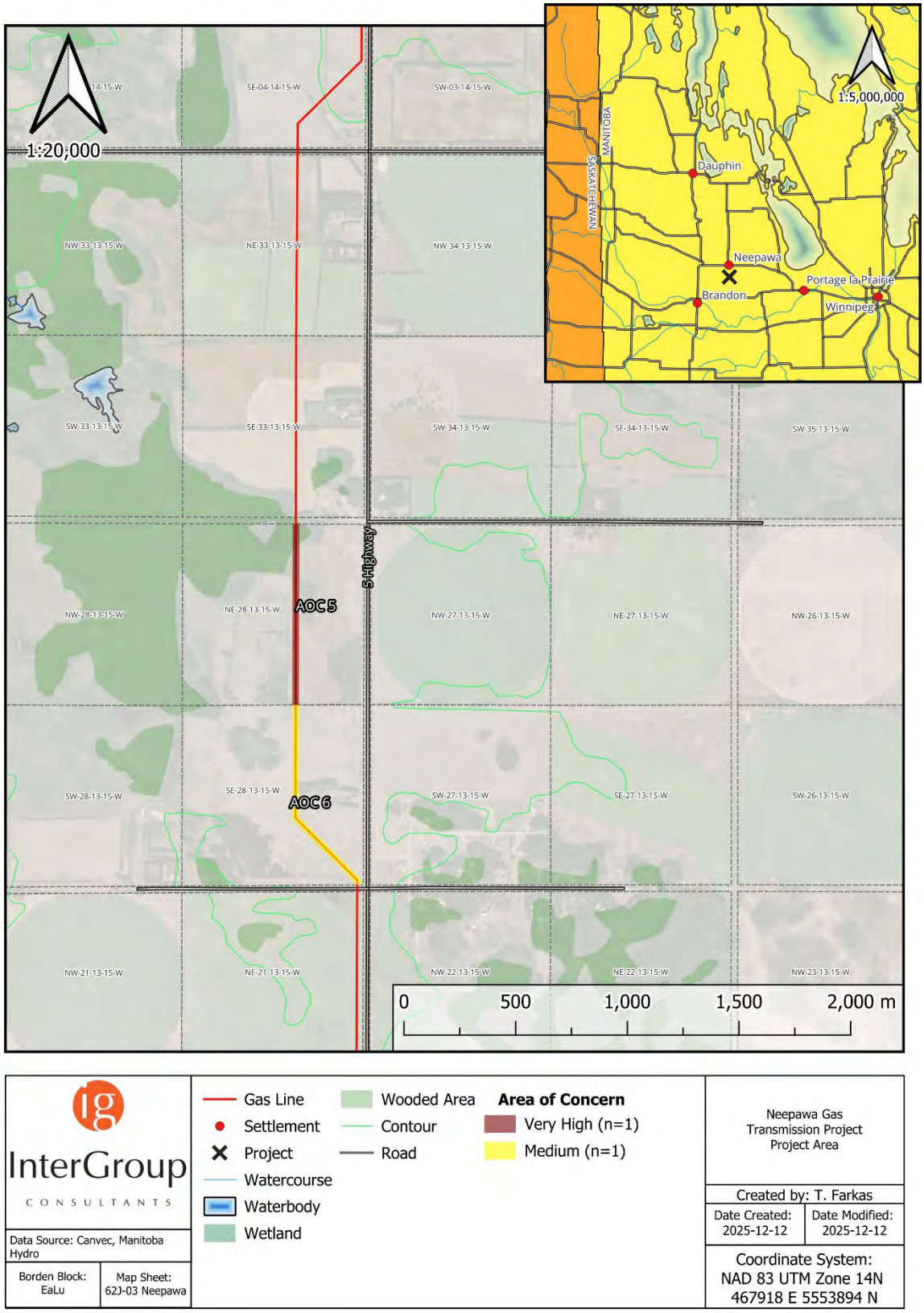
Map 4: Neepawa Gas Line with Areas of Concern Overview



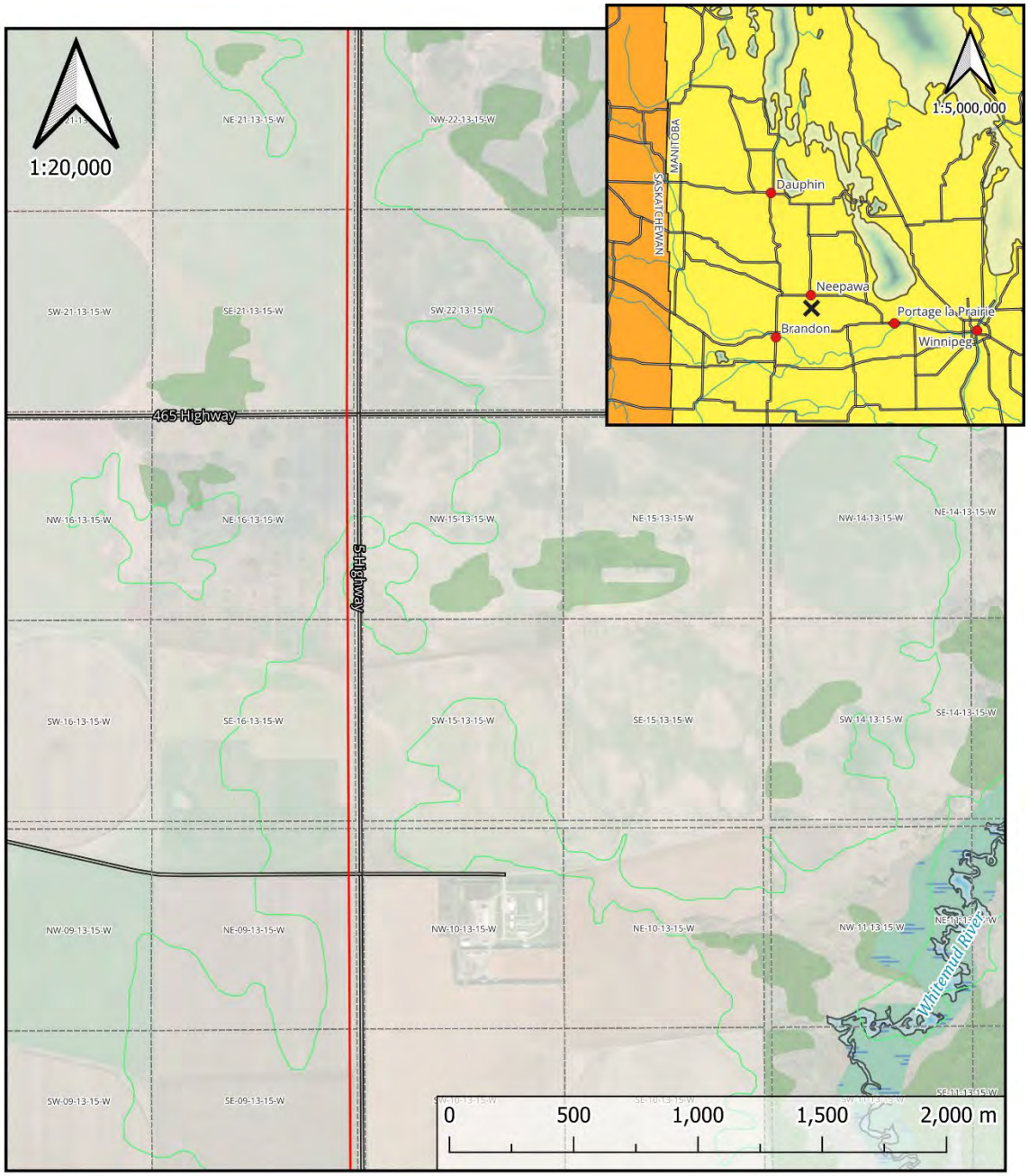
Map 5: Neepawa Gas Line with Areas of Concern Part 1



Map 6: Neepawa Gas Line with Areas of Concern Part 2



Map 7: Neepawa Gas Line with Areas of Concern Part 3



InterGroup CONSULTANTS

Gas Line
Settlement
Project
Watercourse
Waterbody
Wetland
Wooded Area
Contour
Road

Neepawa Gas Transmission Project
Project Area

Data Source: Canvec, Manitoba Hydro

Borden Block: EaLu

Map Sheet: 62J-03 Neepawa

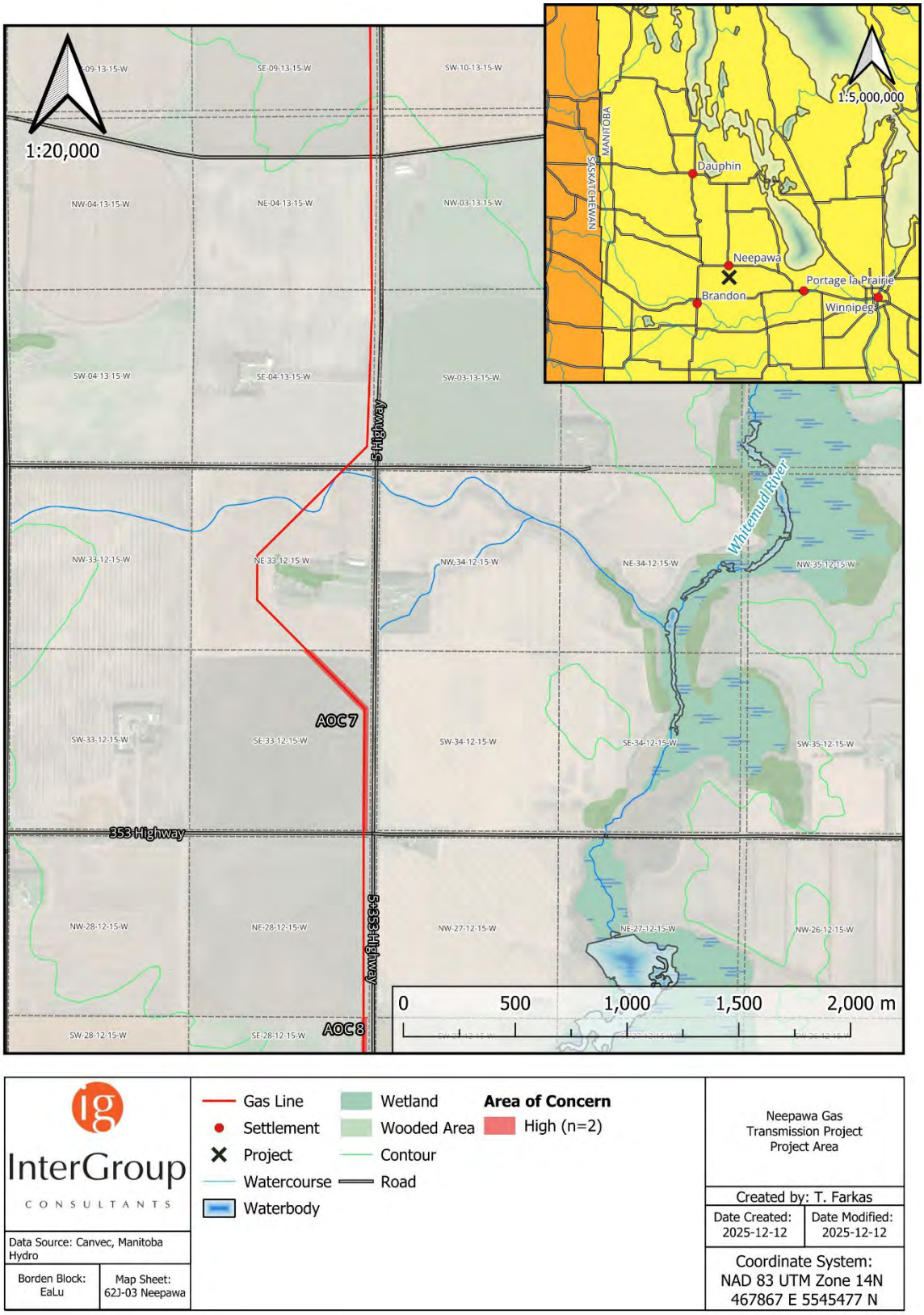
Created by: T. Farkas

Date Created: 2025-12-12

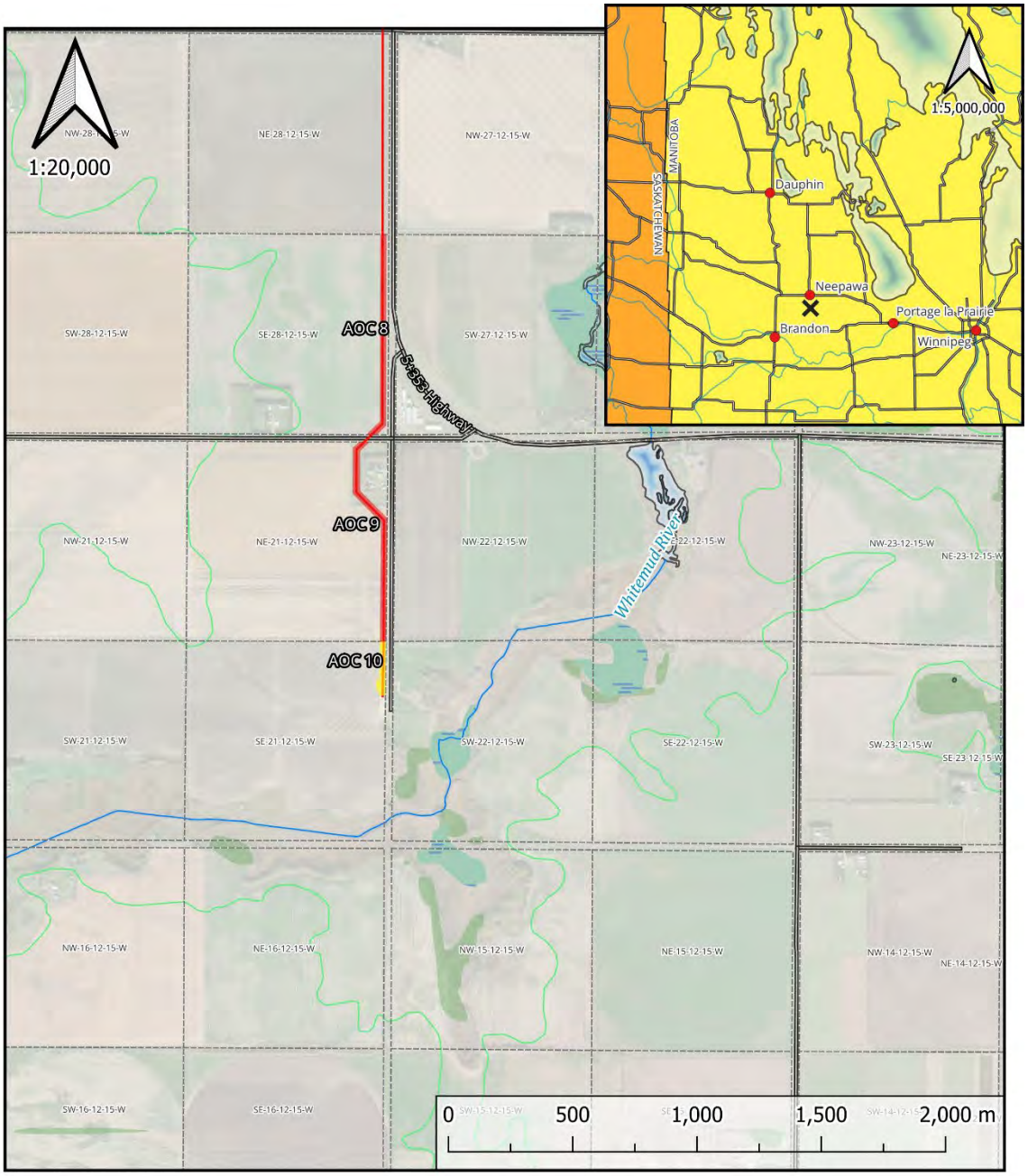
Date Modified: 2025-12-12

Coordinate System: NAD 83 UTM Zone 14N 468116 E 5549935 N

Map 8: Neepawa Gas Line with Area of Concern Part 4



Map 9: Neepawa Gas Line with Areas of Concern Part 5



InterGroup CONSULTANTS

Data Source: Canvec, Manitoba Hydro

Borden Block: EaLu | Map Sheet: 62J-03 Neepawa

Gas Line
Settlement
Project
Watercourse
Waterbody
Wetland
Wooded Area
Contour
Road

Area of Concern
High (n=2)
Medium (n=1)

Neepawa Gas Transmission Project Project Area

Created by: T. Farkas

Date Created: 2025-12-12 | Date Modified: 2025-12-12

Coordinate System: NAD 83 UTM Zone 14N 467953 E 5541871 N

5.0 REFERENCES

Asessippi Provincial Park. n.d. Western Parks. [Online Accessed November 6, 2025] https://www.gov.mb.ca/sd/pubs/parks-protected-spaces/park_info/asessippi_pp.pdf.

Boyd, M. 2007. Paleoindian Geoarchaeology of the Assiniboine Delta of Glacial Lake Agassiz. *Canadian Journal of Archaeology* Volume 31 (3), Pages 198-221.

Burpee, L. J. 1927. *Journals and Letters of Pierre Gaultier de Varennes de la Vérendrye and His Sons, with Correspondence between the Governors of Canada and the French Court, Touching the Search for the Western Sea*. The Champlain Society. Toronto, Ontario. Pages 290-361.

Canada's History Society. 2023. Rupert's Land. [Online Accessed November 6, 2025] Rupert's Land - Canada's History (canadashistory.ca).

Cromley, C. 1994. *Historical Ecology: Cultural Knowledge and Changing Landscapes*. Santa Fe, N.M.: School of American Research Press.

Dyke, A. S. 2004. An outline of North American deglaciation with emphasis on central and northern Canada. Developments in *Quaternary Sciences* Volume 2, Part B, 2004, Pages 373-424.

Fagan, B. 2000. *Ancient North America: The archaeology of a continent*. 3rd ed. Thames and London Ltd. London.

Goldsborough, G. 2019. *Historic Sites of Manitoba: Fort la Reine Monument (RM of Portage la Prairie)*.

Government of Manitoba. 2024. *Manitoba Heritage Council Commemorative Plaques: Fort Ellice Trail Junction.* [Online Accessed November 6, 2025] https://www.gov.mb.ca/chc/hrb/plaques/plaq0405.html

Government of Manitoba. 1990. *The Fatality Inquiries Act*. C.C.S.M. c. F52. Winnipeg, Manitoba. [Online Accessed November 6, 2025] C.C.S.M. c. F52 (gov.mb.ca)

Government of Manitoba. 1987. The Environmental Act. [Online Accessed November 6, 2025] C.C.S.M. c. E125

Government of Manitoba. 1987. *Policy Concerning the Respecting and Reporting, Exhumation and Reburial of Found Human Remains.* Winnipeg. Manitoba. [Online Accessed November 6, 2025] Policy Concerning The Reporting, Exhumation, And Reburial Of Found Human Remains (gov.mb.ca)

Government of Manitoba. 1986. *The Heritage Resources Act*. C.C.S.M. c. H39.1. Winnipeg, Manitoba. [Online - accessed 2025-09-05] C.C.S.M. c. H39.1 (gov.mb.ca).

Hall, F. 1969. Carlton Trail – First Western Highway. *Manitoba Pageant* Vol 14 (3). *Manitoba Historical Archives* [Online Accessed November 6, 2025] https://www.mhs.mb.ca/docs/pageant/14/carltontrail.shtml

Kay, M. 1998 "The Great Plains Setting" in *Archaeology on the Great Plains* ed: W. Raymond Wood. University of Kansas Press

Lakehead University. 2021. Revised Sandy Lake Ware Distribution. [Online Accessed November 6, 2025] https://www.lakeheadu.ca/programs/departments/anthropology/department-research/revised-sandy-lake-ware-distribution

Ledohowski, E. 2009 *The Heritage Landscape of the West Riding Mountain Study Region of Southwestern Manitoba.* Unpublished manuscript, Historic Resources Branch, Manitoba Culture, Heritage & Tourism. Ms on file Manitoba Historic Resources Branch, Wpg, MB.

Malainey, M. E. 2020. *Report on the Testing and Assessment of the Olson site (DgMg-167) Pierson Wildlife Management Area, SE 29-2-27WPM in the Rural Municipality of Two Borders*. Heritage Permit No. A06-19, Wildlife Management Area Use Permit WB22754, Work Permit 2019-03-42-001. Report submitted to Manitoba Historic Resources Branch and Manitoba Sustainable Development and Manitoba Agriculture and Resource Development.

Manitoba Agricultural Services Corporation. 2023. Land Parcel Information. Search for River / Parish Lots. [Online Accessed November 6, 2025] https://www.masc.mb.ca/masc.nsf/land_parcel_info_lots

Markham, S. 2013. Projectile Point Assemblage Variability at the Paleoindian Mackenzie 1 Site, near Thunder Bay, Ontario. Master's thesis, Northern Environments and Cultures, Lakehead University, Thunder Bay.

Matile, G.L.D., Thorleifson, L.H., Grant, N., Burt, A. and Mann, J. 1998: Geology of the Winnipeg region NATMAP project (NTS 62H/W,62I and 52L/W); in Manitoba Energy and Mines, Geological Services, Report of Activities, 1998, p. 161-171.

McIntosh, A. and W.H. McConnell. 2023. Constitution Act, 1867. The Canadian Encyclopedia. [Online Accessed November 6, 2025] https://www.thecanadianencyclopedia.ca/en/article/constitution-act-1867

Nicholson B.A and S. Webster. 2011 "Human Ecology of the Prairie Ecotone ca 3000BP: Post-Hyspathermal Adaptations to the Canadian Prairie Ecozone" In *Human Ecology of the Canadian Prairie Ecozone 1,000 to 3,000BP* ed: B.A. Nicholson Canadian Plains Research Press, University of Regina.

Oetelaar G. 2011 "Human Ecology of the Prairie Ecotone ca 6000BP: Hyspathermal Adaptations to the Canadian Prairie Ecozone?" In *Human Ecology of the Canadian Prairie Ecozone 1,000 to 3,000BP* ed: B.A. Nicholson Canadian Plains Research Press, University of Regina.

Paquin, Todd. 2020. Moose Jaw Museum and Art Gallery Besant Phase Pottery Vessel. *Saskatchewan Archaeological Quarterly*. Volume 6 (3).

Pettipas, L. and A. Buchner. 1983. "Paleo-Indian Prehistory of the Glacial Lake Agassiz Region Southern Manitoba, 11500 to 6500 B.P." In Glacial Lake Agassiz. James T. Teller and Lee Clayton (Eds). Geological Association of Canada, Special Paper 26.

Pettipas, L. 1984. Introducing Manitoba Prehistory. Papers in Manitoba Archaeology Popular Series No. 4. Manitoba Culture, Heritage and Recreation, Winnipeg MB

Pettipas, L. 2011. *Uncovering Early Aboriginal History in Southwestern Manitoba.* Enbridge Pipelines Inc., Canada.

Pettipas, L. 2014. The Shifting Northern Tree Line. Manitoba Archaeological Society. [Online Accessed November 6, 2025] https://manitobaarchaeologicalsociety.ca/sites/default/files/page/pdf/shifting-northern-tree-line-april-2014.pdf.

Rea, J.E. and J. Scott. 2021. Manitoba Act. The Canadian Encyclopedia. [Online Accessed November 6, 2025] https://www.thecanadianencyclopedia.ca/en/article/manitoba-act

Smith, R.E., H. Veldhuis, G.F. Mills, R.G. Eilers, W.R. Fraser, and G.W. Lelyk. 1998. Terrestrial Ecozones, Ecoregions, and Ecodistricts, An Ecological Stratification of Manitoba's Landscapes. Technical Bulletin 98-9E. Land Resource Unit, Brandon Research Centre, Research Branch, Agriculture and Agri-Food Canada, Winnipeg, Manitoba. [Online Accessed November 6, 2025] Terrestrial Ecozones, Ecoregions and Ecodistricts of Manitoba (publications.gc.ca)

Statistics Canada. 2024. *Census Profile*. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released November 15, 2023. [Online Accessed November 6, 2025] https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=neepawa&DGUIDlist=2021A00054615020&GENDERlist=1&STATISTIClist=1&HEADERlist=0.

Stoltman, J. B. 1973. The Laurel Culture in Minnesota. Minnesota Historical Society. Minnesota Prehistoric Archaeology Series 8.

Syms, E. L. 1978. Aboriginal Mounds in Southern Manitoba: An Evaluative Overview. Parks Canada. Manuscript Report Number 323.

Syms, E. L. and S. Halwas, 2019, "The Lockport Site, A History of Recovery: Past, Present and Future." Manitoba Archaeological Journal 29:1-22.

Taylor-Hollings, J. 1999. *The Northwestern Extent of Sandy Lake Ware: A Canadian Perspective*. Unpublished Masters thesis, Dept. of Anthropology and Archaeology, University of Saskatchewan, Saskatoon.

Teller, J. T. and W. M. Last, 1981 *Late Quaternary history of Lake Manitoba*, Canada: Quaternary Research vol. 16 pp 97-116.

Town of Neepawa. 2024. "History and Heritage". [Online Accessed November 6, 2025] https://www.neepawa.ca/history-heritage/

Voorhis, Ernest. 1930. *Historic Forts and Trading Posts of the French Regime and of the English Fur Trading Companies*. Federal Government Dept. of the Interior. Ottawa.

Wright, J.V. 1995. A History of the Native People of Canada. Mercury Series Archaeological Survey of Canada Paper 152. Canadian Museum of Civilization, Hull, PQ.

APPENDIX C

Vegetation Technical Data and Field Report

December 2025

Manitoba Hydro

NEEPAWA GAS TRANSMISSION PROJECT

PRE-CONSTRUCTION VEGETATION TECHNICAL REPORT

Prepared for:

Manitoba Hydro

Prepared by:

Szwaluk Environmental Consulting Ltd.

October 2025

SUMMARY

The proposed Neepawa Gas Transmission Project occurs within the Aspen Parkland and Lake Manitoba Plain Ecoregions, overlying the Carberry, Hamiota, MacGregor, McCreary and Shilo Ecodistricts. The region is comprised dominantly of agricultural lands, with grasslands, woodlands and wetlands representing the natural vegetation remaining across the landscape.

Twenty-five 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 131 plant taxa recorded. The vegetation was grouped into three broad types including treed areas, wetland and roadside herbaceous. To further characterize the local vegetation, stands were classed into six community types based on the field data collected.

Four species of conservation concern were observed during surveys. Among these, late yellow locoweed (*Oxytropis campestris*) is ranked Critically Imperilled (S1?) while three other species are ranked Vulnerable (S3 to S3S5) by the Manitoba Conservation Data Centre, and included narrow-leaved puccoon (*Lithospermum incisum*), narrow-leaved cat-tail (*Typha angustifolia*) and cottonwood (*Populus deltoides*). Historically, bloodroot (*Sanguinaria canadensis*) was known to occur within the study area, ranked Imperilled (S2).

Thirty-two plant species recorded were considered non-native or invasive in the study area. Of these, 10 species were designated Tier 3 noxious weeds. Several non-native and invasive species were abundant and widespread in the study area.

At least 57 plant species with traditional value were recorded during surveys. Traditional species included a variety of trees, shrubs and herbs recorded throughout the study area. Frequently recorded traditional species included trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), Manitoba maple (*Acer negundo*), red-osier dogwood (*Cornus sericea*), chokecherry (*Prunus virginiana*), prickly rose (*Rosa acicularis*), western snowberry (*Symphoricarpos occidentalis*), willows (*Salix* spp.), prairie sage (*Artemisia ludoviciana*) and Canada goldenrod (*Solidago canadensis*).

Table of Contents

LIST OF TABLES

LIST OF MAPS

LIST OF PHOTOGRAPHS

1.0 INTRODUCTION

1.1 Background

The purpose of this study was to assess the vegetation for the proposed Neepawa Gas Transmission Project. Manitoba Hydro is planning to install a 19-kilometre, 6-inch steel natural gas pipeline to increase the supply of natural gas to the Neepawa region in response to growing customer demand. The existing infrastructure is nearing capacity, necessitating expansion to support ongoing regional development. 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.

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 2027.

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 Neepawa Gas Transmission Project lies on the Manitoba Escarpment, near the eastern slopes of the range. While largely dedicated to annual crop production and other agriculture (e.g., pasture, hay fields), grasslands, woodlands and wetlands represent the remaining land cover (AESB and MAFRI 2011). The pipeline will extend from an existing valve site located approximately 22.5 kilometres south of Neepawa, running 19 kilometres north to another control structure located 3.5 kilometres south of the town. It will connect to existing infrastructure owned and operated by TransCanada (TC) Energy Corporation, supporting the system's ability to meet current and future demand in the area. The regional and local assessment areas for the proposed 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., Intergovernmental Affairs 2006; Agriculture and Agri-Food Canada – Agri-Environment Services Branch and Manitoba Agriculture Food and Rural Initiatives (AESB and MAFRI) 2011; Whitemud Watershed Conservation District et al. 2017; Cypress Planning District 2018). 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

To identify potential sample sites for the vegetation survey, spatial data (e.g., KML file with Google Earth Pro) provided by Manitoba Hydro was used to view the study area and preferred route for the project. 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 broad vegetation cover, importance of vegetation types (greater potential to support species of conservation concern), accessibility and disturbance.

Twenty-one sites were originally considered for surveys, due to land use and land cover. All fieldwork was conducted within road allowances, in ditches. Permissions to access private lands were not secured at the time of the survey. Fieldwork was conducted on June 7 and July 9, 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 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.

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 Prairies Ecozone comprises the northern limit of the former open grasslands of the Great Plains of North America (Smith et al. 1998). Within this ecozone, the project overlies the Aspen Parkland and Lake Manitoba Plain Ecoregions (Map 3-1, Appendix II). Among the assessment areas, the Aspen Parkland Ecoregion occupies the greatest area regionally, and the entire study area locally. Table 3-1 shows the area 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						
Carberry	34,983.42	27.13	2,233.95	51.42	25.65	47.36
Hamiota	32,535.90	25.24	0.00	0.00	0.00	0.00
Shilo	51,337.48	39.82	2,110.58	48.58	28.50	52.62
Lake Manitoba Plain Ecoregion						
MacGregor	229.96	0.18	0.00	0.00	0.00	0.00
McCreary	9,842.12	7.63	0.00	0.00	0.00	0.00
Total	128,928.88	100	4,344.52	100	54.16	100

In absence of specific and detailed 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.

The Lake Manitoba Plain Ecoregion historically 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 grasses, 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.

Aspen-Oak Section

The proposed project lies within Aspen-Oak Section, a broad transition zone, where the deciduous element of the boreal forest once forming continuous closed forest occurred intermixed with groveland and prairie elements (Rowe 1959). Trembling aspen is the dominant species occurring as continuous good-growth stands as well as small patches surrounding wetlands, occurring with balsam poplar in moister locations. Bur oak is found on suitable sites, along rivers and south and west slopes. Also occurring in the matrix of poplar dominant species are American elm, Manitoba maple, cottonwood (*Populus deltoides*), basswood (*Tilia americana*), and black ash (*Fraxinus nigra*) and green ash (Rowe 1959). The Mixedwood Section occurs immediately to the south of the Project area, where the relief is a result of pre-glacial and glacial modified landscapes (Rowe 1959). Here, abundance of needle-leaved conifers appear on the rolling upland and lowland deposits.

Whitemud River Watershed

One of the most diverse landscapes in Manitoba is found in the Whitemud River Watershed (Whitemud Watershed Conservation District et al. 2017). Encompassing the gas transmission project, the watershed is over 700,000 ha, bordered by Lake Manitoba to the east, Riding Mountain National Park to the northwest, and extending to Carberry in the south. The topography of this area was shaped by receding glaciers, thousands of years ago,

including prominent features such as the Manitoba Escarpment and sandy soils of the Assiniboine Delta (Whitemud Watershed Conservation District et al. 2017). The Whitemud River Watershed is discussed further in the following section, with reference to existing land cover.

3.2 Land Cover Classification

Within the regional assessment area, 14 land/land use cover classes 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, mixedwood forest, marsh and bog wetland, and range and grassland. Water areas including lakes, rivers, streams and ponds occur under water body (single) and water bodies (collection of areas). Agricultural cropland, cultural features, roads and trails, and exposed land (sand and gravel) were also identified.

Agricultural field represents the greatest land cover in the regional assessment area with 73,779.40 ha (57.2%). Much of the remaining cover in the regional assessment area occurs as range and grassland (23,373.71 ha), deciduous forest (16,017.76 ha) and agri-forage field (6,153.16 ha). In the local assessment area, agricultural field also occurs as the dominant land cover with 2,576.15 ha (59.30%). Similarily, high land cover in the local assessment area is represented by range and grassland (697.66 ha), agri-forage field (344.73 ha) and deciduous forest (304.31 ha). Within the Project Development Area, agricultural field (27.85 ha), agri-forage field (10,68 ha), and range and grassland (9.61 ha) are the dominant cover classes. 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	6,153.16	4.77	344.73	7.93	10.68	19.72
Agricultural Field	73,779.40	57.22	2,576.15	59.30	27.85	51.42
Coniferous Forest	230.64	0.18	0.36	0.01	0.00	0.00
Cultural Features	425.51	0.33	0.00	0.00	0.00	0.00
Deciduous Forest	16,017.76	12.42	304.31	7.00	1.42	2.62
Mixedwood Forest	127.47	0.10	1.35	0.03	0.00	0.00
Open Deciduous Forest	3,155.53	2.45	180.66	4.16	0.70	0.02
Range and Grassland	23,373.71	18.13	697.66	16.06	9.61	17.74
Roads Trails Rail Lines	3,657.00	2.84	132.30	3.05	3.89	7.18
Sand and Gravel	54.48	0.04	0.00	0.00	0.00	0.00
Water Body	571.66	0.44	21.77	0.50	0.00	0.00
Wetland - Marsh	1,332.52	1.03	85.24	1.96	0.00	0.00

Wetland – Treed Bog	50.04	0.04	0.00	0.00	0.00	0.00
Total	128,928.88	100	4,344.52	100	54.16	100

Pasture and Grasslands

The study area overlaps a portion of the Langford Community Pasture, although the preferred route does not intersect this area. The Langford Community Pasture consists of about 20,000 acres of natural land, never broken by prairie settlers for agriculture (Manitoba Habitat Conservancy n.d). Today, community pastures across western Canada provide and opportunity to help conserve habitats such as grasslands, forests and wetlands.

Grassland ecosystems once existed over large areas across North America (Sampson and Knopf 1994), yet few undisturbed natural areas remain today, as losses to grasslands have exceeded those of other major biomes (Hoekstra et al. 2005). The health and persistence of native grasslands such as mixed-grass prairie, 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.

In Manitoba, mixed-grass prairie, generally found within the Aspen Parkland, is a climatic and geographic transition between tall-grass prairie to the south and short-grass prairie to the west. Once covering 24 million hectares from Alberta to Manitoba, today less than 25% of these prairies remain, generally in areas unsuitable for cultivation (Manitoba Government 2025c). Few intact examples remain of mixed-grass prairie in Manitoba.

Occurring in the regional assessment area, approximately 178 hectares of property located 15 km southeast of the Town of Neepawa, has been donated for the conservation of endangered grassland (Nature Conservancy of Canada 2024). The area is known as the "Langford Escarpment" and the Nature Conservancy of Canada along with livestock producers, propose to implement proper grazing management which will be beneficial to the grassland species that occur in this area. In addition to grasslands, other natural vegetation habitats comprised of oak savananah, aspen and oak forest, creeks and wetlands can also be found in the Langford Escarpment (Nature Conservancy of Canada 2024).

Within the Whitemud River Watershed (overlapping the study area), the spatial extent of land cover was analyzed from LANDSAT satellite imagery over a period from 1993 to 2006 (AESB and MAFRI 2011). Over this time, the largest change in land cover was observed in grassland area, where land cover decreased approximately 46,700 ha (22%). These changes were attributed to land conversion from grassland to forage and annual cropland; however,

the greatest factor was natural succession to forest areas (Whitemud Watershed Conservation District et al. 2017). Treed areas increased by 23,400 ha (24%), while wetlands experienced a large decrease in cover of over 4,000 ha or 18%, partially due to drainage and climate variability (AESB and MAFRI 2011).

Forest encroachment in the watershed, primarily by poplar and willow species, is a function of grazing management, weather, drainage and financial pressures (AESB and MAFRI 2011). Tree cover is the third most prominent cover type in the watershed comprising greater than 116,000 ha (or 16%) of the total land cover, with a substantial portion occurring along the escarpment (AESB and MAFRI 2011).

3.3 Vegetation and Botanical Resources

3.3.1 Vegetation Community Types

Twenty-five 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, wetland and herbaceous. To further characterize the local vegetation, sites were classed into six community types based on vegetation composition and structure, recorded from road allowances. Vegetation communities are summarized in Table 3-3a, with a description following for each community type. Existing classification systems were used to support community types where applicable (e.g., Zoladeski et al. 1995; National Wetlands Working Group 1997). 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				
Trembling Aspen/Tall Shrub	2, 19, 25	3	39	17.0
Bur Oak/Tall Shrub	5	1	14	14.0
Hardwood/Graminoid Riparian	3	1	32	32.0
Wetland				
Cat-tail Marsh	13, 14, 18, 20	4	36	14.3
Herbaceous				
Range Grassland	15, 16, 17	3	31	14.7
Smooth Brome-Kentucky Bluegrass	1, 4, 6, 7, 8, 9, 10, 11, 12, 22, 23, 24	12	72	13.6

Trembling Aspen/Tall Shrub

The Trembling Aspen/Tall Shrub community type had an open-canopy (>25-60%) composed dominantly of trembling aspen (*Populus tremuloides*) with a minor presence of bur oak (*Quercus macrocarpa*), balsam poplar (*Populus balsamifera*) and Manitoba maple (*Acer negundo*), see Photograph 3-3a. Of trees measured, trembling aspen height ranged from 11.5 m to 16.5 m tall. Seven species were observed in the tall shrub stratum (1 to 3 m), with open cover of beaked hazelnut (*Corylus cornuta),* chokecherry (*Prunus virginiana*), red-osier dogwood (*Cornus sericea*), beaked willow (*Salix bebbiana*), Manitoba maple, bur oak and aspen. Species with high constancy (>67%) in the herb and low shrub stratum (<1m) included prickly rose (*Rosa acicularis*), shrubby cinquefoil (*Dasiphora fruticosa*), golden alexanders (*Zizia aurea*), pale vetchling (*Lathyrus ochroleucus*), star-flowered Solomon's-seal (*Maianthemum stellatum*), smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*). In total, 39 species were recorded in this vegetation type, across three sites. Abundant leaf litter and woody material accounted for the ground layer. Classification of these stands resembled the Aspen Hardwood type identified by Zoladeski et al. (1995). This plant community occurred along the preferred route.

Photograph 3-3a. Trembling Aspen/Tall Shrub community type.

Bur Oak/Tall Shrub

This community type was a an open-canopied stand composed of bur oak with a presence of green ash (*Fraxinus pennsylvaniva*) and Manitoba maple in the tree layer (Photograph 3-3b). Average bur oak tree height was 11.5 m tall. The well-developed tall shrub layer was composed of widespread beaked hazelnut with trembling aspen. Herbs and low shrubs

included spreading dogbane (*Apocynum androsaemifolium*), prickly rose, western snowberry (*Symphoricarpos occidentalis*), pale vetchling, northern bedstraw (*Galium boreale*), American purple vetch (*Vicia americana*) and Kentucky bluegrass. Abundant leaf litter accounted for the ground layer. This vegetation type was described by one site and was located along the preferred route.

Photograph 3-3b. Bur Oak/Tall Shrub community type.

Hardwood/Graminoid Riparian

The riparian vegetation along the Brookdale Drain southwest of Lake Irwin, consisted of a closed treed canopy with occasional tall shrub cover, and a moderately-well developed herb and low shrub layer dominated by graminoids (Photograph 3-3c). The tree layer was composed of hardwood species that included green ash, Manitoba maple, cottonwood (*Populus deltoides*), with trembling aspen, paper birch (*Betula papyrifera*), bur oak and balsam poplar also observed. Tall shrubs (1 to 3 m height) recorded were Manitoba maple, pin cherry (*Prunus pensylvanica*), chokecherry, red-osier dogwood and willows (*Salix* spp.). The herb and low shrub layer had greater than 15 species recorded. Western snowberry, silverberry (*Elaeagnus commutata*) and prickly rose were common low shrubs. Forbs were scattered in occurrence with frequent species that included Canada goldenrod (*Solidago canadensis*), American purple vetch, field horsetail (*Equisetum arvense*), evening-primrose (*Oenothera biennis*) and yellow lady's-slipper (*Cypripedium parviflorum*). Graminoids included a mixture of grasses with sedges (*Carex* spp.) This vegetation type was observed near the preferred route, east of PTH 5.

Photograph 3-3c. Hardwood/Graminoid Riparian vegetation in the study area.

Cat-tail Marsh

This community type was a low to intermediate height (approximately 1 m), closed-canopied (>60% cover) lowland dominated by common cat-tail (*Typha latifolia*). Four sites were classed as Cat-tail Marsh vegetation in the study area, three of which were located along Boggy Creek and one along the Brookdale Drain. Occasional tall shrubs recorded were sandbar willow (*Salix interior*), chokecherry, red-osier dogwood and balsam poplar. Widespread to frequently occurring herbs were small-fruited bulrush (*Scirpus microcarpus*), hairy hedge-nettle (*Stachys pilosa*), northern bugleweed (*Lycopus uniflorus*), slender stinging nettle (*Urtica gracilis*), water smartweed (*Persicaria amphibia*), duckweed (*Lemna* sp.), grasses and sedges. Thirty-six species were recorded across these wetland sites. This vegetation was associated with areas of standing or slow-moving water that was permanently or seasonally flooded. Marsh wetlands may experience water level drawdowns which will result in portions drying up and exposing the sediments (National Wetlands Working Group 1997). An example of the Cat-tail Marsh vegetation in the study area is shown in Photograph 3-3d.

Photograph 3-3d. Marsh Wetland community type.

Range Grassland

The Range Grassland vegetation was a low-growing (<1 m) community type that consisted of mixed grasses and other herbaceous vegetation (Photograph 3-3e). The topography was a rolling landscape with sandy soils. A total of 31 species were recorded in surveys across three sites. Graminoids included a mixture of fescue (*Festuca* sp.), slender wildrye (*Elymus trachycaulis*) and Kentucky bluegrass. Widespread forbs recorded were prairie sage (*Artemisia ludoviciana*), smooth aster (*Symphyotrichum laeve*), field wormwood (*Artemisia campestris*), three-flowered avens (*Geum triflorum*), pasture sage (*Artemisia frigida*), small-flowered wallflower (*Erysimum inconspicuum*) and bastard toadflax. Low shrub (<1 m) species were sporadic with white meadowsweet (*Spiraea alba*), western snowberry, prickly rose and spreading dogbane. The Range Grassland community was bordered by stands of trembling aspen. Two species of conservation concern were recorded in this community type, not located along the preferred route.

Photograph 3e. Range Grassland community type.

Smooth Brome-Kentucky Bluegrass

In this community type, vegetation was surveyed along roadside allowances (Photograph 3-3f). Twelve sites surveyed were grouped together to represent the Smooth Brome-Kentucky Bluegrass vegetation that dominated the ditches. These sites typically supported plants of low height (<1 m), mixed with varying amounts of herbs and low shrubs; occasional trees were also observed. In total, 72 plant species were recorded across these sites. Of these, 11 shrub species were observed, of which two frequently occurred, prickly rose and western snowberry; spreading dogbane, silverberry and willows were observed in more than one site. Herbaceous species with high constancy (>50% of sites) included prairie sage, Canada goldenrod (*Solidago canadensis*) and alfalfa (*Medicago sativa*). Forty-six other herbs (forbs and graminoids) were recorded in these roadside sites. Roadside vegetation was surveyed adjacent to agricultural fields, forest stands and shelterbelts. This plant community occurred along the preferred route.

Photograph 3-3f. Smooth Brome-Kentucky Bluegrass vegetation.

3.3.2 Plants and Distribution of Species

Twenty-five 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 131 plant taxa were recorded with 123 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 126 angiosperms recorded (22 monocotyledons and 104 dicotyledons), two primitive vasculars, and three gymnosperms.

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

Plant Group	Number of Species	Percent
Primitive Vasculars	2	0.02
Gymnosperms	3	0.02
Angiosperms		
Monocots	22	16.8
Dicots	104	79.4
Total	131	100

Vascular plants were distributed among 45 families, with the angiosperms representing 42 of these. The Aster family (Asterceae) was the largest with 24 plant taxa, followed by the Pea (Fabaceae), Rose (Rosaceae) and Grass (Poaceae) families, with 15, 12 and nine taxa, respectively. Six or more species were observed in each of the Willow (Salicaceae) and Sedge (Cyperaceae) families. The gymnosperms were distributed among two families, the Cypress

(Cupressaceae) and Pine (Pinaceae), while the Horsetail family (Equisetaceae) was the only primitive vascular.

3.3.3 Species of Conservation Concern

According to provincial sources (MBCDC), there were 148 plant species of conservation concern (SCC) that can be expected to range within the Aspen Parkland Ecoregion and 129 SCC within the Lake Manitoba Plain Ecoregion (Manitoba Government 2025a). Currently, there are 15 species at risk in these ecoregions together, listed with either the *Endangered Species and Ecosystems Act*, *Species at Risk Act*, or the Committee on the Status of Endangered Wildlife in Canada (nine in the Aspen Parkland and 11 in the Lake Manitoba Plain), see Table 3-3c. According to the Whitemud Watershed Conservation District et al. (2017), the Whitemud River Watershed supports a number of ecologically important sites, including protected areas. Mixed-grass prairie is also known to occur in the region, and is home to a variety of flora, including rare species (Manitoba Government 2025).

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. Bloodroot (*Sanguinaria canadensis*) is ranked Imperilled (S2) and was known to occur within a 5 km radius of the study area. The occurrence of bloodroot was observed in 2020, however the viability of species occurrences or the ecological integrity of the community is poorly estimated.

Four species of conservation concern were recorded during the 2025 surveys, summarized in Table 3-3d. Among these, late yellow locoweed (*Oxytropis campestris*) is ranked Critically Imperilled (S1?) by the Manitoba Conservation Data Centre. Late yellow locoweed was observed in the regional assessment area, not along the preferred route.

Three other species are ranked Vulnerable (S3 to S3S5) in the study area, and were observed along roadsides, wetlands and forest vegetation. Species included narrow-leaved puccoon (*Lithospermum incisum*), narrow-leaved cat-tail (*Typha angustifolia*) and cottonwood (*Populus deltoides*). Only cottonwood was observed along the preferred route. At Site 1, measured cottonwood tree height was 26.5 m tall. Photographs 3-3g and 3-3h show narrow-leaved puccoon and narrow-leaved cat-tail in the study area, respectively.

Table 3-3d. Species of conservation concern recorded in the study area, 2025.

Scientific Name	Common Name	Rank	Site	Vegetation
Critically Imperilled Species (S1?)				
Oxytropis campestris	Late Yellow Locoweed	S1?	15	Rangeland
Vulnerable Species (S3 to S3S5)				
Lithospermum incisum	Narrow-leaved Puccoon	S3	15	Rangeland
Typha angustifolia	Narrow-leaved Cat-tail	S3S4	20	Marsh
Populus deltoides	Cottonwood	S3S5	1, 3	Roadside, Riparian

Note: Ranking (Manitoba Government 2025a).

Photograph 3-3g. Narrow-leaved puccoon observed at Site 15.

Photograph 3-3h. Narrow-leaved cat-tail observed at Site 20.

3.3.4 Invasive Species

Across all surveys, 32 species were considered non-native or invasive plants (see Table 3-3e). Twenty-eight species were ranked SNA (conservation status rank not applicable), two species were ranked SU or unrankable, and one species was ranked S3S4 or Vulnerable (Manitoba Government 2025a). Of these plants, 13 species were considered invasive plants with the Canadian Food Inspection Agency (2008), while four 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, 10 were designated Tier 3 Noxious weeds (Manitoba Government 2025d). Photograph 3-3i shows invasive yellow sweet clover occurring roadside mixed with smooth brome, white sweet clover and yellow goat's-beard, observed in the study area.

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

Species	Common Name	MBCDC Rank[1]	Authority[2]
Achillea millefolium	Common Yarrow	SNA	MBCDC
Amaranthus retroflexus	Redroot Pigweed	SNA	CFIA
Artemisia absinthium	Absinthe Wormwood	SNA	CFIA, 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
Chenopodium album	Common Lamb's-quarters	SNA	CFIA, NWA
Cirsium arvense	Canada Thistle	SNA	CFIA, ISCM, NWA

Crepis tectorum	Narrow-leaved Hawksbeard	SNA	NWA
Descurainia sophia	Flixweed	SNA	CFIA, NWA
Elymus repens	Quackgrass	SNA	CFIA
Lactuca serriola	Prickly Lettuce	SNA	NWA
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
Potentilla argentea	Silvery Cinquefoil	SNA	MBCDC
Scirpus atrovirens	Dark-green Bulrush	SU	MBCDC
Sonchus arvensis	Field Sow-thistle	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 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. Yellow sweet clover observed in the study area.

Most prominently represented families of noxious, invasive and non-native species together were Asteraceae and Fabaceae with eight species each, followed by the Amaranthaceae, Brassicaceae and Poaceae families with three species in each. Many non-native and invasive plant species were abundant and widespread in roadside ditches.

The spread of invasive species throughout the region, decreasing the integrity of natural habitat and adversely effecting biodiversity of native plants is a concern of the Whitemud River Watershed (Whitemud Watershed Conservation District et al. 2017). Similarily, the Neepawa and Area Planning District recognize the value of natural areas and sensitive habitats from incompatible uses (Intergovernmental Affairs 2006). Invasive species recorded in this region that have been a major concern of the Whitemud River Watershed (Whitemud Watershed Conservation District et al. 2017) include leafy spurge (*Euphorbia virgata*), narrow-leaved cattail (*Typha angustifolia*) and Siberian elm (*Ulmus pumila*). Leafy spurge is a Tier 2 noxious species in Manitoba, found in pastures, agricultural lands, roadside ditches and riparian areas. Narrow-leaved cattails are prolific seed producers with male and female flowers occurring on the same plant, and are found in wetlands, meadows, streams, drains and lakeshores. Narrow-leaved cattail is listed by the Invasive Species Council of Manitoba (2025). Siberian elm is a deciduous tree that can invade disturbed prairies and establish quickly in sparsely vegetated areas. The control of invasive species is a goal for conservation of soils and natural areas of the Whitemud River Watershed (Whitemud Watershed Conservation District et al. 2017). Narrow-leaved cat-tail and Siberian elm were both observed during pre-construction surveys.

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 pipeline is located on Treaty 1 and Treaty 2 lands, the original territories of the Anishinaabeg, Anishininewak, 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 57 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 and 2023). Traditional species included a variety of trees, shrubs and herbs observed

throughout the study area. Frequently recorded traditional trees and shrubs (occurred in at least six sites) were trembling aspen (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), Manitoba maple (*Acer negundo*), red-osier dogwood (*Cornus sericea*), chokecherry (*Prunus virginiana*), prickly rose (*Rosa acicularis*), western snowberry (*Symphoricarpos occidentalis*), and willow species (*Salix* spp.). Traditional forbs common across sites were prairie sage (*Artemisia ludoviciana*) and Canada goldenrod (*Solidago canadensis*). Also recorded, but less frequent were notable traditional species such as pin cherry (*Prunus pensylvanica*), Saskatoon (*Amelanchier alnifolia*), velvet-leaf blueberry (*Vaccinium myrtilloides*) and common yarrow (*Achillea millefolium*). 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. Clearing of trees and removal of understory vegetation cover in areas of fragile soils and adjacent to water bodies is discouraged (Cypress Planning District 2018).

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. Four shelterbelts were observed 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.

4. It is recommended that low ground disturbance clearing occur during construction activities at creeks and water drains. A vegetation buffer of 300 feet wide from the high-water mark of spawning creeks and streams is encouraged to protect riparian areas (Cypress Planning District 2018). Areas susceptible to erosion and run-off problems should retain tree cover as per the Neepawa and Area Planning District (Intergovernmental Affairs 2006).

5. Four species of conservation concern were observed during plant surveys in the study area. 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	Site	UTM
Late Yellow Locoweed	S1?	15	14U 473019 E and 5550781 N
Narrow-leaved Puccoon	S3	15	14U 473019 E and 5550781 N
Narrow-leaved Cat-tail	S3S4	20	14U 465640 E and 5555664 N

Cottonwood	S3S5	1	14U 467521 E and 5560672 N
Cottonwood	S3S5	3	14U 467613 E and 5559929 N
Cottonwood	S3S5	3	14U 467530 E and 5559936 N

Note: Ranking (Manitoba Government 2025a).

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.

5.0 REFERENCES

Agriculture and Agri-Food Canada – Agri-Environment Services Branch (AESB) and Manitoba Agriculture Food and Rural Initiatives (MAFRI). 2011. Agriculture Land Use and Management in the Whitemud River Watershed. https://www.gov.mb.ca/sd/water/watershed/iwmp/whitemud/documentation/aesb_mafri_2011_05_17.pdf

Alberta Native Plant Council. 2012. ANPC Guidelines for Rare Vascular Plant Surveys in Alberta – 2012 Update. Alberta Native Plant Council, Edmonton, AB.

Canadian Food Inspection Agency. 2008. Invasive Alien Plants in Canada. Ottawa, ON. 72pp.

Cauboue, M., Strong, W.L., Archambault, L. and Sims, R.A. 1996. Terminology of Ecological Land Classification in Canada. Natural Resources Canada, Canadian Forest Service – Quebec. Sainte-Foy, Quebec. Information Report LAU-X-114E.

COSEWIC. 2025. Committee on the Status of Endangered Wildlife in Canada. http://www.cosewic.ca/index.php/en-ca/

Cypress Planning District. 2018. Development Plan By-Law No. 67. https://www.cypressplanningdistrict.com/bylaws

Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford.

Government of Canada. 2025a. Species at Risk Act. https://laws-lois.justice.gc.ca/eng/acts/s-15.3/

Government of Canada. 2025b. Species at Risk public registry: glossary of terms. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/glossary-terms.html

Hoekstra, J.M., T.M. Boucher, T.H. Ricketts and C. Roberts. 2005. Confronting a biome crisis: global disparities of habitat loss and protection. Ecology Letters 8: 23–29.

Intergovernmental Affairs. 2006. The Neepawa and Area Planning District Development Plan. Prepared for: The Neepawa and Area District Planning Board. Brandon Office. https://www.neepawa.ca/wp-content/uploads/2016/09/NAPDDevelopmentPlan-AdoptedJanuary172008.pdf

Invasive Species Council of Manitoba. 2025. http://invasivespeciesmanitoba.com/site/

Johnson, D., Kershaw, L., MacKinnon, A. and Pojar, J. 1995. Plants of the Western Boreal Forest and Aspen Parkland. Natural Resources Canada, Canadian Forest Service. Lone Pine, Edmonton, Alberta.

Manitoba Government. 2025a. Manitoba Conservation Data Centre. https://www.gov.mb.ca/nrnd/fish-wildlife/cdc/index.html

Manitoba Government. 2025b. The Endangered Species and Ecosystems Act. https://web2.gov.mb.ca/laws/statutes/ccsm/e111.php?lang=en

Manitoba Government. 2025c. Critical Wildlife Habitat Program. https://www.gov.mb.ca/nrnd/fish-wildlife/wildlife/habitat-conservation/index.html

Manitoba Government. 2025d. The Noxious Weeds Act. https://web2.gov.mb.ca/laws/statutes/ccsm/n110.php

Manitoba Habitat Conservancy. No Date. The Langford Community Pasture. https://mbhabitat.ca/the-langford-community-pasture/

Marles, R.J., C. Clavelle, L. Monteleone, N. Tays and D. Burns. 2000. Aboriginal Plant Use in Canada's Boreal Forest. Natural Resources Canada, UBC Press, Vancouver, BC. 368 pp.

Monarch Joint Venture. 2024. IUCN Changes Migratory Monarch Status from Endangered to Vulnerable. https://monarchjointventure.org/blog/iucn-changes-migratory-monarch-status-from-endangered-to-vulnerable

National Wetlands Working Group. 1997. The Canadian Wetland Classification System, 2nd Edition. Warner, B.G. and C.D.A. Rubec (eds.), Wetlands Research Centre, University of Waterloo, Waterloo, ON, Canada. 68 pp.

Nature Conservancy of Canada. 2024. Conserving endangered grasslands on a working landscape. https://www.natureconservancy.ca/en/where-wework/manitoba/news/nature-conservancy-of-canada-2.html

Raven, P.H, Ray, F.E. and Eichhorn, S.E. 1992. Biology of Plants. Fifth Edition. Worth Publishers Inc. New York, New York.

Rowe, J.S. 1959. Forest Regions of Canada. Department of Northern Affairs and National Resources, Forestry Branch. Ottawa, ON. Bulletin 123.

Samson, F. and F. Knopf. 1994. Prairie conservation in North America. BioScience 44(6): 418-421.

Smith, R.E., H. Veldhuis, G.F. Mills, R.G. Eilers, W.R. Fraser, and G.W. Lelyk. 1998. Terrestrial Ecozones, Ecoregions and Ecodistricts of Manitoba. An Ecological Stratification of Manitoba's Landscapes. Land Resource Unit. Brandon Research Centre, Research Branch. Agriculture and Agri-Food Canada. Technical Bulletin 1998-9E.

Strong, W.L, E.T. Oswald, and D.J. Downing. 1990. The Canadian Vegetation Classification System, First Approximation, Ecological Land Classification Series No. 25. Environment Canada, National Vegetation Working Group, Ottawa, 22 pp.

Szwaluk Environmental Consulting Ltd. and Newman. 2017. Manitoba-Minnesota Transmission Project Botanical and Vegetation Pre-construction Survey. Prepared for Manitoba Hydro.

Szwaluk Environmental Consulting Ltd. and Newman. 2023. R44H Radisson to Henday Transmission Project Vegetation Monitoring (Year II). Prepared for Manitoba Hydro.

Usher, G. 1996. The Wordsworth Dictionary of Botany. Wordsworth Editions Ltd. Hertfordshire, England.

Whitemud Watershed Conservation District, Province of Manitoba, Stakeholder Organizations, and Watershed Residents. 2017. Whitemud River Integrated Watershed Management Plan. https://whitemudwatershed.ca/wp-content/uploads/2025/05/whitemud_wcd_final_lr.pdf

Zoladeski, C.A., G.M. Wickware, R.J. Delorme, R.A. Sims, and I.G.W. Corns 1995. Forest ecosystem classification for Manitoba: field guide. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. Special Report 2. 205 pp.

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.

Neepawa 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)

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

Manitoba Hydro acknowledges that the Neepawa gas transmission line is located on Treaty 1 and Treaty 2 territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

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

N

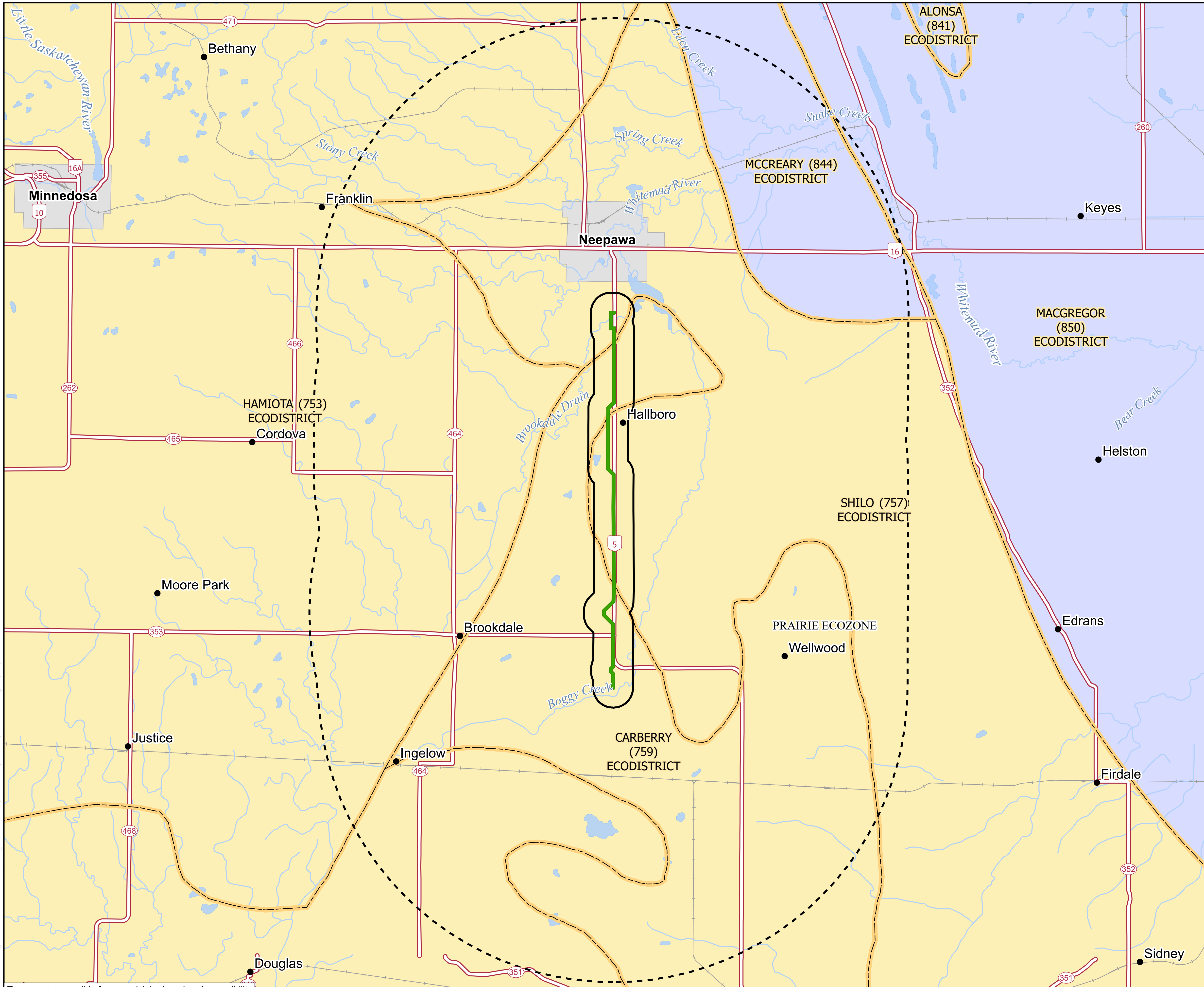
0 4 8 Kilometres
0 2.5 5 Miles

1:190,000

Map 1-2: Neepawa Gas Transmission Project Area

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

File Location: \\pocdata\Tbe1\GIS\Oriental\PRJ_GAS\2025 Neepawa\EAMaps\EAMaps\Snyaluk-VogMaps.aprx



Neepawa 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
- 8 Provincial Highway/Road
- First Nation Reserve
- City/Town

Manitoba Hydro acknowledges that the Neepawa gas transmission line is located on Treaty 1 and Treaty 2 territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

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

N

0 4 8 Kilometres
0 2.5 5 Miles

1:190,000

Map 3-1:
Ecoregions and Ecodistricts

Neepawa 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)

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/Road

Manitoba Hydro acknowledges that the Neepawa gas transmission line is located on Treaty 1 and Treaty 2 territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

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

N

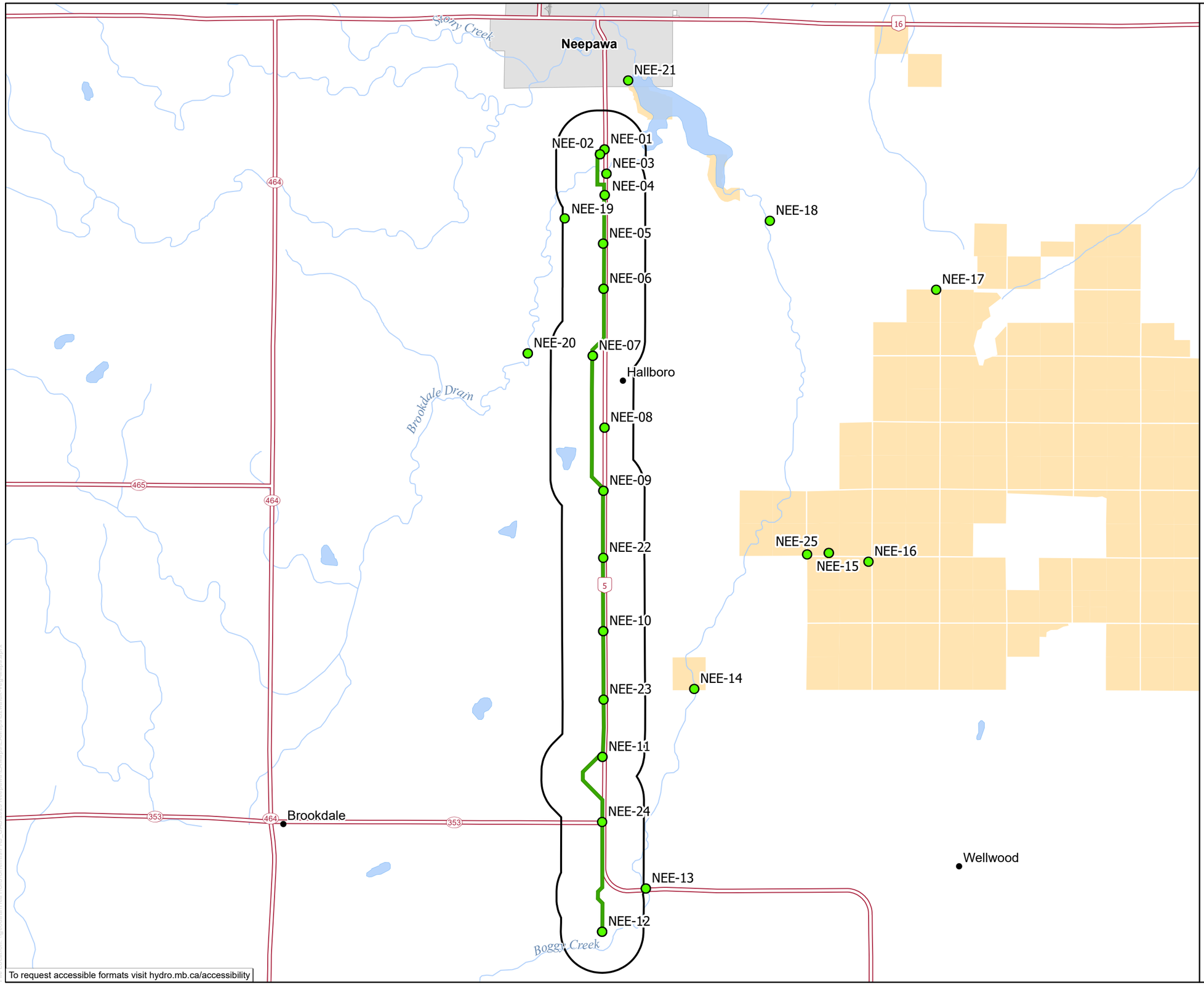
0 4 8 Kilometres
0 2.5 5 Miles

1:190,000

Map 3-2:
Land Cover Classification

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

File Location: \\pedata\Tiles1\GIS\Oriente\PRJ_GAS\2025 Neepawa\EA Maps\EAMaps\Snowbuk\Map Maps.aprx



Neepawa 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/Road
- First Nation Reserve
- Provincial Park
- Provincial Crown Land

Manitoba Hydro acknowledges that the Neepawa gas transmission line is located on Treaty 1 and Treaty 2 territory and on the traditional territories of the Anishinaabeg and Cree Peoples and the homeland of the Red River Métis.

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

N

0 2 4 Kilometres
0 1 2 Miles

1:90,000

Map 3-3:
Distribution of Vegetation Survey Sites

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

Carberry Ecodistrict

The Carberry Ecodistrict is a fairly level area, supporting vegetation that has been greatly modified by agriculture since settlement. Well drained soils overly deposits of the Assiniboine Delta, resulting in soils excellent cultivation and agriculture. The area previously consisted of tall grass prairie with associated herbs, interspersed with small trembling aspen and willow groves.

Hamiota Ecodistrict

The rolling topography of the ecodistrict is comprised of knolls and depressions. Where agriculture has not displaced the native vegetation in depressions, sedges, rushes and slough grasses occur on the pond edges giving way to willow and aspen in less moist conditions. The uplands support shrubs including prairie rose, silverberry and snowberry culminating in grasslands of grama grass, June grass, pasture sage, anemones and other herbs. Areas in the northern part of the ecodistrict support more trees on moister sites, along waterways and on north and east facing slopes.

MacGregor Ecodistrict

Agriculture has significantly altered the vegetation in this ecodistrict. The native vegetation used to be comprised of tall prairie grasses and sedges dotted with groves of trembling aspen and balsam poplar associated with shrubs including snowberry, red-osier dogwood, Saskatoon, willow and various herbs.

McCreary Ecodistrict

Most of the land in this ecodistrict is under cultivation as pasture, hay and cropland. The native vegetation remaining in imperfectly drained areas includes aspen, balsam poplar,red-osier dogwood and willow. Beach ridges support bur oak, aspen, beaked hazelnut, pi cherry, Saskatoon, grasses and herbs. Sedges, willows and meadow grasses grow in the poorly drained areas while flood plains along rivers support green ash, Manitoba maple, elm, willows, other shrubs and herbs.

Shilo Ecodistrict

The Shilo Ecodistrict has much of the land under cultivation however large tracts of the natural vegetation still remain in Spruce Woods Provincial Park and the Canadian Forces Base Camp Shilo. Natural grasslands cover the drier sites with occasional trees such as bur oak, white spruce and trembling aspen, and shrubs such as hazelnut, creeping juniper and common juniper. Tree and shrub cover becomes heavier on the north facing slopes. Moister sites support balsam poplar, aspen, and a dense shrub cover of red-osier dogwood and alder. Wetter sites occupy willow, alder, and red-osier dogwood with a ground cover of grasses and sedges. River bottom lands support green ash and Manitoba maple. A unique feature of this ecodistrict is the mixed prairie grassland occurring with white spruce and shrubs of juniper and common bearberry.

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
Equisetum hymale	Common Scouring-rush	S5
Gymnosperms		
CUPRESSACEAE	CYPRESS FAMILY	
Juniperus horizontalis	Creeping Juniper	S5
PINACEAE	PINE FAMILY	
Picea glauca	White Spruce	S5
Pinus banksiana	Jack Pine	S5
Angiosperms - Monocotyledons		
ALISMATACEAE	WATER-PLANTAIN FAMILY	
Sagittaria cuneata	Northern Arrowhead	S5
ARACEAE	ARUM FAMILY	
Lemna sp.	Duckweed	
ASPARAGACEAE	ASPARAGUS FAMILY	
Maianthemum stellatum	Star-flowered Solomon's-seal	S5
CYPERACEAE	SEDGE FAMILY	
Carex aquatilis	Water Sedge	S5
Carex sp.	Sedge	
Eleocharis palustris	Creeping Spikerush	S5
Schoenoplectus acutus	Hard-stemmed Bulrush	S4
Scirpus atrovirens	Dark-green Bulrush	SU
Scirpus microcarpus	Small-fruited Bulrush	S5
LILIACEAE	LILY FAMILY	
Lilium philadelphicum	Wood Lily	S4
ORCHIDACEAE	ORCHID FAMILY	
Cypripedium parviflorum	Yellow Lady's-slipper	S5?
POACEAE	GRASS FAMILY	

Bromus inermis	Smooth Brome	SNA
Cinna latifolia	Slender Woodreed	S4S5
Elymus repens	Quackgrass	SNA
Elymus trachycaulus	Slender Wildrye	S5
Festuca sp.	Fescue	
Glyceria grandis	Tall Mannagrass	S5
Phalaris arundinaceae	Reed Canarygrass	S5
Phleum pratense	Meadow Timothy	SNA
Poa pratensis	Kentucky Bluegrass	S5
TYPHACEAE	CAT-TAIL FAMILY	
Typha angustifolia	Narrow-leaved Cat-tail	S3S4
Typha latifolia	Common Cat-tail	S4S5
Angiosperms – Dicotyledons		
AMARANTHACEAE	AMARANTH FAMILY	
Amaranthus retroflexus	Redroot Pigweed	SNA
Bassia scoparia	Summer Cypress	SNA
Chenopodium album	Common Lamb's-quarters	SNA
ANACARDIACEAE	SUMAC FAMILY	
Toxicodendron rydbergii	Poison-ivy	S5
APIACEAE	PARSLEY FAMILY	
Zizia aurea	Golden Alexanders	S4S5
APOCYNACEAE	DOGBANE FAMILY	
Apocynum androsaemifolium	Spreading Dogbane	S5
ASTERACEAE	ASTER FAMILY	
Achillea millefolium	Common Yarrow	SNA
Artemisia absinthium	Absinthe Wormwood	SNA
Artemisia campestris	Field Wormwood	S4S5
Artemisia frigida	Pasture Sage	S4S5
Artemisia ludoviciana	Prairie Sage	S5
Cirsium arvense	Canada Thistle	SNA
Crepis tectorum	Narrow-leaved Hawksbeard	SNA
Heliopsis helianthoides	False Sunflower	S5
Heterotheca villosa	Hairy Goldenaster	S5
Lactuca biennis	Tall Blue Lettuce	S4
Lactuca serriola	Prickly Lettuce	SNA
Rudbeckia hirta	Black-eyed Susan	S5
Senecio sp.	Groundsel	

Solidago canadensis	Canada Goldenrod	S5
Solidago rigida	Stiff Goldenrod	S5
Solidago sp.	Goldenrod	
Sonchus arvensis	Field Sow-thistle	SNA
Symphyotrichum ciliolatum	Lindley's Aster	S5
Symphyotrichum ericoides	White Heath Aster	S4
Symphyotrichum laeve	Smooth Aster	S5
Symphyotrichum puniceum	Purple-stemmed Aster	S5
Taraxacum officinale	Common Dandelion	SNA
Tragopogon dubius	Yellow Goat's-beard	SNA
Xanthium strumarium	Rough Cocklebur	S4
BETULACEAE	BIRCH FAMILY	
Betula papyrifera	Paper Birch	S5
Corylus cornuta	Beaked Hazelnut	S5
BORAGINACEAE	BORAGE FAMILY	
Lithospermum canescens	Hoary Puccoon	S5
Lithospermum incisum	Narrow-leaved Puccoon	S3
BRASSICACEAE	MUSTARD FAMILY	
Capsella bursa-pastoris	Shepherd's Purse	SNA
Descurainia sophia	Flixweed	SNA
Erysimum inconspicuum	Small-flowered Wallflower	S4S5
Lepidium densiflorum	Common Pepper-grass	S5
Thlaspi arvense	Field Pennycress	SNA
CAMPANULACEAE	BELLFLOWER FAMILY	
Campanula rotundifolia	Harebell	S5
CAPRIFOLIACEAE	HONEYSUCKLE FAMILY	
Symphoricarpos occidentalis	Western Snowberry	S5
CARYOPHYLLACEAE	PINK FAMILY	
Stellaria sp.	Stichwort	
CORNACEAE	DOGWOOD FAMILY	
Cornus sericea	Red-osier Dogwood	S5
CUCURBITACEAE	GOURD FAMILY	
Echinocystis lobata	Wild Cucumber	S4S5
ELAEAGNACEAE	OLEASTER FAMILY	

Elaeagnus commutata	Silverberry	S4S5
ERICACEAE	HEATHER FAMILY	
Arctostaphylos uva-ursi	Common Bearberry	S5
Vaccinium myrtilloides	Velvet-leaf Blueberry	S5
FABACEAE	PEA FAMILY	
Astragalus agrestis	Field Milkvetch	S5
Astragalus canadensis	Canada Milkvetch	S5
Caragana arborescens	Siberian Peashrub	SNA
Dalea purpurea	Purple Prairie Clover	S5
Glycyrrhiza lepidota	Wild Licorice	S4S5
Lathyrus ochroleucus	Pale Vetchling	S5
Medicago lupulina	Black Medick	SNA
Medicago sativa	Alfalfa	SNA
Melilotus albus	White Sweet Clover	SNA
Melilotus officinalis	Yellow Sweet Clover	SNA
Oxytropis campestris	Late Yellow Locoweed	S1?
Trifolium hybridum	Alsike Clover	SNA
Trifloium repens	White Clover	SNA
Vicia americana	American Purple Vetch	S5
Vicia cracca	Tufted Vetch	SNA
FAGACEAE	BEECH FAMILY	
Quercus macrocarpa	Bur Oak	S5
GROSSULARIACEAE	CURRENT FAMILY	
Ribes oxyacanthoides	Canada Wild Gooseberry	S5
LAMIACEAE	MINT FAMILY	
Lycopus uniflorus	Northern Bugleweed	S4S5
Mentha canadensis	Canada Mint	S5
Monarda fistulosa	Wild Bergamot	S5
Stachys pilosa	Hairy Hedge-nettle	S5
NYMPHACEAE	WATER-LILY FAMILY	
Nuphar variegata	Yellow Pond-lily	S5
OLEACEAE	OLIVE FAMILY	
Fraxinus pennsylvanica	Green Ash	S4S5
ONAGRACEAE	WILLOWHERB FAMILY	
Oenothera biennis	Evening-primrose	S5

PLANTAGINACEAE	PLANTAIN FAMILY	
Plantago major	Common Plantain	SNA
POLYGONACEAE	SMARTWEED FAMILY	
Persicaria amphibia	Water Smartweed	S5
Polygonum achoreum	Leathery Knotweed	S4
Polygonum aviculare	Prostrate Knotweed	SU
Rumex sp.	Dock	
PRIMULACEAE	PRIMROSE FAMILY	
Lysimachia ciliata	Fringed Loosestrife	S5
RANUNCULACEAE	CROWFOOT FAMILY	
Anemonastrum canadense	Canada Anemone	S5
Thalictrum venulosum	Veiny Meadow-rue	S5
ROSACEAE	ROSE FAMILY	
Amelanchier alnifolia	Saskatoon	S5
Crataegus chrysocarpa	Fireberry Hawthorn	S4S5
Dasiphora fruticosa	Shubby Cinquefoil	S5
Fragaria virginiana	Smooth Wild Strawberry	S5
Geum triflorum	Three-flowered Avens	S4S5
Potentilla argentea	Silvery Cinquefoil	SNA
Potentilla norvegica	Rough Cinquefoil	S5
Prunus pensylvanica	Pin Cherry	S5
Prunus virginiana	Chokecherry	S5
Rosa acicularis	Prickly Rose	S5
Rubus pubescens	Dewberry	S5
Spiraea alba	White Meadowsweet	S5
RUBIACEAE	MADDER FAMILY	
Galium boreale	Northern Bedstraw	S5
SALICACEAE	WILLOW FAMILY	
Populus balsamifera	Balsam Poplar	S5
Populus deltoides	Cottonwood	S3S5
Populus sp.	Hybrid Poplar	
Populus tremuloides	Trembling Aspen	S5
Salix bebbiana	Beaked Willow	S5
Salix interior	Sandbar Willow	S5
Salix sp.	Willow	

SANTALACEAE	SANDALWOOD FAMILY	
Comandra umbellata	Bastard Toadflax	S5
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 site visited.

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
TR	*Acer negundo*	Manitoba Maple	x		x		x								x						x		x				
TR	*Betula papyrifera*	Paper Birch			x																						
TR	*Fraxinus pennsylvanica*	Green Ash					x		x																		
TR	*Picea glauca*	White Spruce	x		x																						
TR	*Pinus banksiana*	Jack Pine	x					x	x																		
TR	*Populus deltoides*	Cottonwood	x		x																						
TR	*Populus balsamifera*	Balsam Poplar	x	x	x										x						x		x				x
TR	*Populus* sp.	Hybrid Poplar							x																		
TR	*Populus tremuloides*	Trembling Aspen	x	x	x		x		x								x	x	x		x						x
TR	*Quercus macrocarpa*	Bur Oak		x	x		x														x						
TR	*Salix* sp.	Willow						x																			
TR	*Ulmus pumila*	Siberian Elm	x																				x				
SH	*Amelanchier alnifolia*	Saskatoon																					x				
SH	*Apocynum androsaemifolium*	Spreading Dogbane	x		x		x											x								x	
SH	*Arctostaphylos uva-ursi*	Common Bearberry	x																								
SH	*Caragana arborescens*	Siberian Peashrub							x																		
SH	*Cornus sericea*	Red-osier Dogwood			x										x	x				x		x	x				x
SH	*Corylus cornuta*	Beaked Hazelnut					x														x						
SH	*Crataegus chrysocarpa*	Fireberry Hawthorn									x												x				
SH	*Dasiphora fruticosa*	Shrubby Cinquefoil																			x						x
SH	*Elaeagnus commutata*	Silverberry			x	x					x																
SH	*Juniperus horizontalis*	Creeping Juniper															x										
SH	*Parthenocissus quinquefolia*	Virginia Creeper																									x
SH	*Prunus pensylvanica*	Pin Cherry			x																						
SH	*Prunus virginiana*	Chokecherry		x	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
SH	*Ribes oxyacanthoides*	Canada Wild Gooseberry														x											
SH	*Rosa acicularis*	Prickly Rose	x	x	x	x	x	x	x		x	x	x			x	x	x	x			x		x			x
SH	*Salix bebbiana*	Beaked Willow	x		x																						x
SH	*Salix interior*	Sandbar Willow	x		x										x	x						x					x
SH	*Salix* sp.	Willow	x										x							x		x					
SH	*Spiraea alba*	White Meadowsweet															x	x									
SH	*Symphoricarpos occidentalis*	Western Snowberry		x	x	x	x				x	x	x		x			x					x	x		x	
SH	*Vaccinium myrtilloides*	Velvet-leaf Blueberry																			x						
GR	*Bromus inermis*	Smooth Brome	x	x	x	x	x	x	x	x	x	x	x	x	x								x	x	x	x	x
GR	*Carex aquatilis*	Water Sedge														x						x					
GR	*Carex* sp.	Sedge													x					x							
GR	*Cinna latifolia*	Slender Woodreed	x																								
GR	*Eleocharis palustris*	Creeping Spikerush														x											
GR	*Elymus repens*	Quackgrass																							x	x	
GR	*Elymus trachycaulus*	Slender Wildrye				x												x									
GR	*Festuca* sp.	Fescue															x	x	x								
GR	*Glyceria grandis*	Tall Mannagrass			x																						
GR	*Phalaris arundinaceae*	Reed Canarygrass	x		x										x					x		x					
GR	*Phleum pratense*	Meadow Timothy	x																								x
GR	*Poa pratensis*	Kentucky Bluegrass	x	x	x	x	x	x	x	x	x	x	x	x			x				x			x	x		
GR	*Schoenoplectus acutus*	Hard-stemmed Bulrush																				x					
GR	*Scirpus atrovirens*	Dark-green Bulrush	x																								
GR	*Scirpus microcarpus*	Small-fruited Bulrush														x											
GR	Unknown grass	Grass									x				x		x					x					
FO	*Achillea millefolium*	Common Yarrow				x											x								x		x
FO	*Amaranthus retroflexus*	Redroot Pigweed										x		x													
FO	*Anemonastrum canadensis*	Canada Anemone																				x	x				x
FO	*Artemisia absinthium*	Absinthe Wormwood																								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
FO	*Artemisia campestris*	Field Wormwood				x		x						x			x		x								
FO	*Artemisia frigida*	Pasture Sage			x												x					x					
FO	*Artemisia ludoviciana*	Prairie Sage	x					x	x	x	x						x	x	x					x			
FO	*Astragalus agrestis*	Field Milkvetch																			x						
FO	*Astragalus canadensis*	Canada Milkvetch	x																								
FO	*Bassia scoparia*	Summer Cypress						x																		x	
FO	*Campanula rotundifolia*	Harebell															x							x			
FO	*Capsella bursa-pastoris*	Shepherd's Purse										x		x													
FO	*Chenopodium album*	Common Lamb's-quarters										x	x	x												x	
FO	*Cirsium arvense*	Canada Thistle	x							x		x	x													x	
FO	*Comandra umbellata*	Bastard Toadflax															x				x						
FO	*Crepis tectorum*	Narrow-leaved Hawksbeard						x						x													
FO	*Cypripedium parviflorum*	Yellow Lady's-slipper	x		x																x						
FO	*Dalea purpurea*	Purple Prairie Clover															x										
FO	*Descurainia sophia*	Flixweed																									
FO	*Echinocystis lobata*	Wild Cucumber																				x					
FO	*Equisetum arvense*	Field Horsetail	x		x										x	x											
FO	*Equisetum hymale*	Common Scouring-rush	x			x					x						x	x	x								
FO	*Erysimum inconspicuum*	Small-flowered Wallflower																	x								
FO	*Fragaria virginiana*	Smooth Wild Strawberry																									x
FO	*Galium boreale*	Northern Bedstraw			x	x	x						x				x							x	x		x
FO	*Geum triflorum*	Three-flowered Avens																x									
FO	*Glycyrrhiza lepidota*	Wild Licorice														x								x			
FO	*Heliopsis helianthoides*	False Sunflower				x																					
FO	*Heterotheca villosa*	Hairy Goldenaster						x		x							x										
FO	*Lactuca biennis*	Tall Blue Lettuce								x																	
FO	*Lactuca serriola*	Prickly Lettuce						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
FO	*Lathyrus ochroleucus*	Pale Vetchling		x			x											x									x
FO	*Lemna* sp.	Duckweed													x	x				x		x					
FO	*Lepidium densiflorum*	Common Pepper-grass												x													
FO	*Lilium philadelphicum*	Wood Lily																									x
FO	*Lithospermum canescens*	Hoary Puccoon	x				x				x							x	x		x						
FO	*Lithospermum incisum*	Narrow-leaved Puccoon															x										
FO	*Lycopus uniflorus*	Northern Bugleweed														x											
FO	*Lysimachia ciliata*	Fringed Loosestrife																									x
FO	*Maianthemum stellatum*	Star-flowered Solomon's-seal																			x						x
FO	*Medicago lupulina*	Black Medick				x																					
FO	*Medicago sativa*	Alfalfa	x	x	x	x		x		x		x	x	x									x				
FO	*Melilotus albus*	White Sweet Clover			x									x													
FO	*Melilotus officinalis*	Yellow Sweet Clover	x																								
FO	*Mentha canadensis*	Canada Mint																				x					
FO	*Monarda fistulosa*	Wild Bergamot															x										
FO	*Nuphar variegata*	Yellow Pond-lily													x												
FO	*Oenothera biennis*	Evening-primrose			x																						
FO	*Oxytropis campestris*	Late Yellow Locoweed															x										
FO	*Persicaria amphibia*	Water Smartweed																				x					
FO	*Plantago major*	Common Plantain														x											
FO	*Polygonum achoreum*	Leathery Knotweed									x	x		x													
FO	*Polygonum aviculare*	Prostrate Knotweed										x		x													
FO	*Potentilla argentea*	Silvery Cinquefoil															x										
FO	*Potentilla norvegica*	Rough Cinquefoil						x																			
FO	*Rubus pubescens*	Dewberry																									x
FO	*Rudbeckia hirta*	Black-eyed Susan																									x
FO	*Rumex* sp.	Dock														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
FO	*Sagittaria cuneata*	Northern Arrowhead			x																						
FO	*Senecio* sp.	Groundsel																									x
FO	*Solidago canadensis*	Canada Goldenrod	x		x	x			x		x	x	x												x		x
FO	*Solidago rigida*	Stiff Goldenrod																						x			
FO	*Solidago* sp.	Goldenrod																									
FO	*Stachys pilosa*	Hairy Hedge-nettle														x											
FO	*Stellaria* sp.	Stichwort																				x					
FO	*Symphyotrichum ciliolatum*	Lindley's Aster	x																								
FO	*Symphyotrichum ericoides*	White Heath Aster									x																
FO	*Symphyotrichum laeve*	Smooth Aster																x									
FO	*Symphyotrichum puniceum*	Purple-stemmed Aster	x		x																						
FO	*Taraxacum officinale*	Common Dandelion	x					x					x	x							x						
FO	*Thalictrum venulosum*	Veiny Meadow-rue																				x					x
FO	*Thlaspi arvense*	Field Pennycress										x	x														
FO	*Toxicodendron rydbergii*	Poison-ivy																x			x						
FO	*Tragopogon dubius*	Yellow Goat's-beard	x	x					x																		
FO	*Trifolium hybridum*	Alsike Clover	x													x											
FO	*Trifloium repens*	White Clover	x																								
FO	*Typha angustifolia*	Narrow-leaved Cat-tail																				x					
FO	*Typha latifolia*	Common Cat-tail													x	x				x		x	x				
FO	*Urtica gracilis*	Slender Stinging Nettle																				x					
FO	*Vicia americana*	American Purple Vetch	x		x		x						x														
FO	*Vicia cracca*	Tufted Vetch			x																						
FO	*Xanthium strumarium*	Rough Cocklebur						x					x	x													
FO	*Zizia aurea*	Golden Alexanders																			x						x

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

APPENDIX D

Greenhouse Gas Assessment Report

December 2025

Manitoba Hydro

NEEPAWA GAS TRANSMISSION PROJECT – GREENHOUSE GAS ASSESSMENT REPORT

ENERGY RESOURCE PLANNING DEPARTMENT

INTEGRATED RESOURCE PLANNING

PREPARED BY:

J. D. CRUISE, P. ENG.

S.M. CHANG, CPA

K.M. SHAW, P. ENG.

REVIEWED BY:

W. L. CHIYOKA, P. AG

S.J. ENTZ, P. ENG

K. A. KOENIG, P. ENG

APPROVED FOR RELEASE BY:

L. M. K. MELVIN, P.ENG.

DATE: DECEMBER 2025

Manitoba Hydro

REPORT: IRPD 25_10

ACKNOWLEDGMENTS

The following people provided meaningful contributions to this report:

- **Jordan Cruise** (Greenhouse Gas Analysis Engineer – Energy Resource Planning Department, Asset Planning & Delivery) co-led lifecycle GHG emissions estimate and was the primary report author.
- **Scott Chang** (Renewable Portfolio Analyst – Energy Resource Planning Department, Asset Planning & Delivery) co-led lifecycle GHG emissions estimate and provided review of all sections of the document.
- **K. Michael Shaw** (Section Head – Greenhouse Gas Expertise, Energy Resource Planning Department, Asset Planning & Delivery) the primary technical reviewer and editor of the report.
- **Amy Stevenson** (Environmental Assessment Officer – Transmission & Distribution Environment and Engagement Department, External & Indigenous Relations, Environment and Communications) was the primary point of contact for questions and information used to develop this greenhouse gas assessment.
- **Wara Chiyoka** (Sr. Environmental Assessment Officer – Transmission & Distribution Environment and Engagement Department, External & Indigenous Relations, Environment and Communications) provided review of relevant sections.
- **Ryan Delgaty** (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.
- **Scott Entz** (Gas Design Engineer – Gas Engineering and Construction Department, Asset Planning & Delivery) primary contact within the Gas Engineer and Construction for technical and engineering related. Provided review and input for relevant sections.

- **Evan Rodgers** (Technical Assistant – Eng Standards & Support Services Department, Asset Planning & Delivery) Provided geospatial data and analysis for the pipeline right-of-way.
- **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

This Greenhouse Gas Assessment for the Neepawa Gas Transmission Project was undertaken to support the environmental assessment compiled as part of the Environment Act Proposal for the project. The table below details lifecycle greenhouse gas emissions estimates of the Neepawa Gas Transmission Project's infrastructure, and its operation over its assumed 50-year life span.

Activity	t CO_2e/km	t CO_2e	% of total
Construction: Material Supply Chain	65.86	1,330	16%
Construction: On-Site Energy	144.71	2,922	34%
Construction: Land Use Change	15.31	309	4%
Construction: Labour Transport	13.54	273	3%
Construction: Project Commissioning	0.02	0	0%
Post Construction: Pipeline Operations	182.42	3,683	43%
Post Construction: Pipeline Decommissioning	0.64	13	0%
Total	**422.51**	**8,530**	

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 Neepawa Gas Transmission Project cannot be included in this Greenhouse Gas Assessment.

A qualitative acknowledgement of Potential Market Responses from the Neepawa Gas Transmission Project is included in this Greenhouse Gas Assessment. However, there is no "do nothing" scenario, and proactive intervention and investment is required to reliably meet existing loads, as well as accommodate growth within the area. While the Neepawa Gas Transmission Project may enable fuel switching from more greenhouse gas emissions intense fossil fuels communal agricultural operations, Manitoba Hydro is not asserting that any resulting greenhouse gas emissions reductions are additional, as the baseline and project scenarios are the same.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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. Any reference to Manitoba Hydro within this report shall be taken to be inclusive of its wholly owned subsidiaries unless explicitly stated otherwise.

Centra distributes natural gas to 298,639 residential, commercial, and industrial customers in Manitoba [1].

1.2 Project Purpose and Description

Neepawa and surrounding areas are supplied natural gas through a single, 4-inch steel pipeline system with one-way feed from a TC Energy sales tap. The area has experienced notable growth for several years. Capacity limitations in the natural gas transmission system were first identified in 2021. Hydraulic modelling indicates that the pipeline and gate station assets are operating at capacity as the community continues to grow. Considering approved and planned developments in the near term, investment in natural gas infrastructure is required to support this growth.

According to 2021 census data, Neepawa is the third fastest growing community in Manitoba, and the 13th fastest growing community in Canada. Between 2016 and 2021 the population of Neepawa grew by 23%. In addition, Neepawa's municipal government has communicated plans for several commercial, institutional, and residential developments in the next 5 to 10 years, indicating continued growth within the community. Considering these planned developments in the community, investment in natural gas infrastructure is required to cost-effectively support these developments and to ensure that existing demand is reliably met. The Neepawa Gas Transmission (the Project) will both increase the capacity and reliability of the natural gas supply in Neepawa and the surrounding area.

An approximately 20 km, 6-inch nominal steel natural gas transmission pipeline[1] length was selected as it fully plans for forecasted growth on the periphery of Neepawa where several communal agricultural operations are expected to connect to the natural gas distribution system within the next 5 to 10 years. As proactive intervention to reliably serve both existing load and projected growth is required, Manitoba Hydro did not identify a project scenario that differed from the baseline scenario. Manitoba Hydro is also asserting that “do nothing” scenario is not a realistic scenario despite presenting emissions on an absolute basis in this document.

A Greenhouse Gas Assessment (GHG Assessment) was completed for the Project and is presented in this document. Additional Project details can be found in the environmental assessment (EA) report for the project for which this report will be an appendix. The noted EA report will be submitted as part of the Environment Act Proposal filed with Manitoba Environment and Climate Change, in pursuit of an Environment Act Licence to construct and operate the Project.

[1] This GHG Assessment was conducted based on Manitoba Hydro’s preferred route (i.e., preliminary route). The final route may be adjusted in response to information learned through the environmental assessment (EA) and associated project engagement undertaken for the Project. Therefore, the length and location of the final route may differ from what was considered in this GHG 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 GHG Assessment is the Project infrastructure (e.g., the approximately 20 km pipeline). As with GHG Assessments of other Manitoba Hydro projects [2, 3, 4, 5, 6], it was determined that GHG life cycle assessment (LCA) would be the appropriate tool to capture both primary and secondary effects related to Project infrastructure and operation, including embedded and supply chain 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 emissions estimates, estimation methodologies, and assumptions. This GHG 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 in Chapter 13 of the EA report.

2 PROJECT INFRASTRUCTURE

2.1 GHG LCA Objective

The Project's infrastructure will have GHG effects throughout its lifecycle including manufacturing, construction, and decommissioning phases. The Project LCA includes estimates of construction-related emissions, supply chain emissions, ongoing operation and maintenance emissions, and flaring emissions during decommissioning. The primary objective for the LCA portion of this assessment is to estimate these emissions and represent them using the functional unit selected for this assessment.

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. Emissions for the LCA analysis are not presented incremental to a baseline but are presented on a gross basis.

Where possible and reasonable, the Project LCA draws on methodologies from LCAs of other Manitoba Hydro projects [2, 3, 4, 5, 6] and the LCA principles therein. Despite the fundamental differences between this Project and most of the other Manitoba Hydro projects cited,[2] the principles and methodologies are applicable to this Project.

The Project LCA relies on readily available construction information and LCA 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 small, relative to total operational emissions of Manitoba Hydro's Natural Gas Distribution System. Where detailed construction and system information was readily available, it has been incorporated.

[2] Apart from the GHG Assessment of the South Loop project [3].

2.2 LCA Boundaries

This LCA considers relevant construction-related emissions and relevant post-construction-related 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 an operational control, Corporate[3] GHG Accounting [7] perspective, this LCA will consider emissions that could fall both inside and outside of Manitoba Hydro's direct emissions inventory, since construction of the Project will be completed by a third party.

The boundaries on post-construction-related emissions include emissions from activities that occur during pipeline operation, such as flaring, venting, and combustion of natural gas during pipeline distribution operations. Upstream and downstream emissions related to Manitoba Hydro's customers' end-use of natural gas are not considered in the Section 2 – Project Infrastructure of this GHG Assessment, and are acknowledged qualitatively in Section 3 – Potential Market Responses.

From a Corporate GHG Accounting and an operational control perspective, post-construction-related emissions only consider emissions that could potentially occur in Manitoba Hydro's Scope 1 emissions inventory as at this point in the pipeline's lifecycle it is fully owned and operated by Manitoba Hydro.

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,

[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 understandings and are not intended to imply that Corporate accounting methodologies have been used in place of Project accounting methodologies.

potential emissions from de-energizing and flaring during the decommissioning phase are considered in post-construction-related emissions in the LCA.

These boundary differences between the construction and post-construction phases are considered appropriate because they capture the direct emissions from Manitoba Hydro's decision to construct, operate, and maintain the Project over its assumed lifespan. The boundary differences exclude broader economic decisions regarding the use of natural gas as an energy source, which are acknowledged in Section 3 – Potential Market Responses.

As discussed in Section 1 – Introduction, 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; however, to provide meaningful insight, LCA assessment results are presented an absolute basis and not on a net basis (i.e., emissions are compared against a "do-nothing" scenario where the Project does not occur).

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 for the constructed-related life cycle emission phase, indicating the order of magnitude of potential emissions. Aggregated construction life cycle emissions per functional unit for the Project are 239.45 t CO_2e/km [4,834 t CO_2e].

Similar construction timelines were assumed for previous natural gas transmission projects [3]. It was confirmed with subject matter experts that the assumed 12-month

construction period was appropriate for the Project's GHG LCA. The actual construction timeline will be a function of third-party contractor resources, amongst other things outside of Manitoba Hydro's direct control. Therefore, actual emissions that occur during pipeline installation may differ from what is presented in this assessment.

Aggregated emissions are presented to the nearest 10-kg increments when represented as a per kilometer, or per year ratio, and to 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: On Site Energy* for Project construction, followed by *Construction: Material Supply Chain* which includes embodied emissions in the materials of the Project's components (e.g., steel pipe manufacturing and shipping to site).

Table 1: Construction-Related Emissions Summary Table

Activity	t CO_2e/km	t CO_2e	% of total
Construction: Material Supply Chain	65.86	1,330	28%
Construction: On-Site Energy	144.71	2,922	60%
Construction: Land Use Change	15.31	309	6%
Construction: Labour Transport	13.54	273	6%
Construction: Project Commissioning	0.02	0[4]	0%
Total	**239.45**	**4,834**	

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

[4] For this report, some values round to zero, but are non-zero values. A true value of zero is represented as a dash "-".

comprise approximately 10% of the *Construction: Material Supply Chain* category, even with conservative country of origin 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 appreciable emissions reduction in the *Materials Manufacturing* category as shown below in Table 2.

Table 2: Project Supply Chain Emissions Disaggregated by Subcategories

Activity	t CO_2e/km	t CO_2e	% of total
Materials Manufacturing	58.95	1,190	90%
Materials Transport	6.91	139	10%
Total	**65.86**	**1,330**	

Steel manufacturing is an emissions-intensive industry resulting in approximately 90% of the *Construction: Material Supply Chain* category, or 58.95 t CO_2e/km [1,190 t CO_2e] for this Project. It is therefore expected that if a longer route or larger diameter pipe 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 are estimated to be 144.71 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) [8].

It was assumed that the Project required the clearing of approximately 2.12 hectares of deciduous forested area, resulting in land use change emissions. It is possible that less forested area will be cleared for the Project as trees may only be cut on an "as-needed" basis. However, following the GHG Accounting principle of conservative, for the GHG assessment of the Project it was assumed that all 2.12 hectares of deciduous forest are cleared resulting in a Land Use Change emissions estimate of 15.31 t CO_2e/km [309 t

[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.

CO_2e] for *Construction: Land Use Change* emissions. See Table 7 for the breakdown of the land categories in the assumed right-of-way (ROW) for the Project.

It has been assumed that there is negligible net below-ground carbon change due to the Project. While the Project ROW at the time of developing this LCA requires the clearing of approximately 2.12 hectares [~5 acres] of deciduous forested area, the below ground carbon change in this area was negligible. There are no organic soils[6] within the proposed ROW. Other than the 2.12 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 52.03 hectares [~129 acres] of the total 54.15 hectares [~134 acres] required for the Project.

Although the pipeline will occupy approximately 0.022 m^2 [34 in^2] in cross-section, and approximately 20 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 therefore the carbon content of the soil is not sensitive to the pipeline installation in the project development area. The assumption of negligible net below-ground carbon change would not be valid if the pipeline were primarily installed in previously undisturbed soils

[6] Organic soils are soils that are composed of largely organic materials and contain more than 17% organic C (30% or more organic matter) by weight (Soil Classification Working Group). Organic soils include most of the soils commonly referred to as peat, muck, or bog and fen soils [31].

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

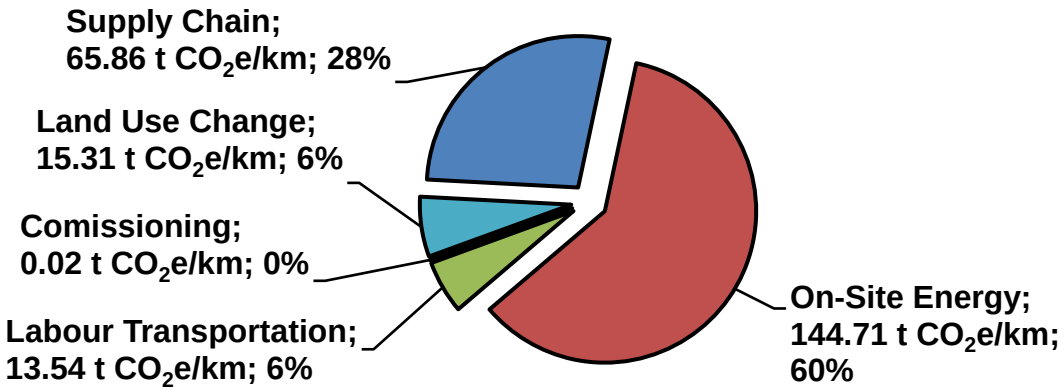
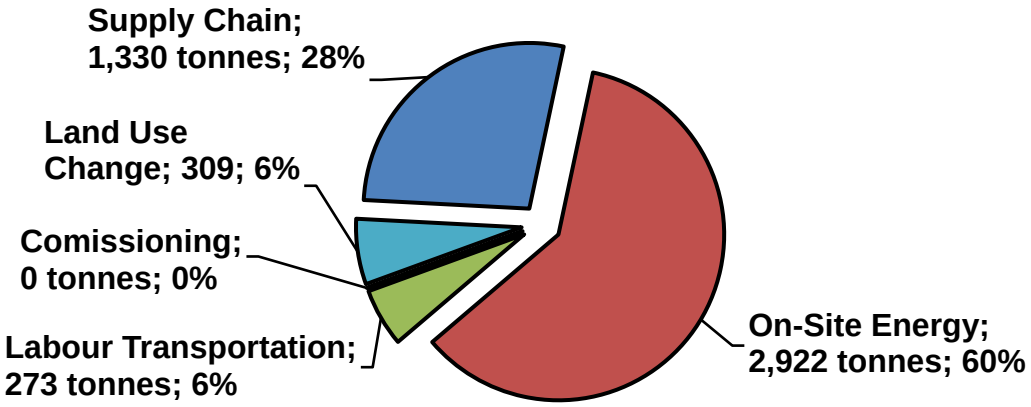


Figure 2: Visual Representation of Gross Construction Emissions (in CO_2e)



2.3.2 Summary of Post-Construction-Related Life Cycle Emissions

Only emissions from direct pipeline operations are considered for the LCA. Upstream and downstream emissions related to Manitoba Hydro's customers' end-use of natural gas are not considered in the LCA portion of this GHG Assessment. Upstream and downstream emissions are acknowledged qualitatively in Section 3 – Potential Market Responses.

Emissions considered in this subsubsection are vented, fugitive, and combusted emissions[7] that are likely to occur over the operational[8] lifespan of the Project. Emissions estimates from de-energizing the pipeline are part of the decommissioning process are also included in this subsubsection.

Table 3: Post-Construction-Related Emissions Summary Table

Activity	t CO_2e/km	t CO_2e	% of total
Post Construction: Pipeline Operations	182.42	3,683	100%
Post Construction: Pipeline Decommissioning	0.64	13	0%
Total	**183.06**	**3,696**	

Only the flaring and de-energizing of the pipeline are considered in this LCA during the *Post Construction: Pipeline Decommissioning* category. An industry standard flaring efficiency of 98% was used in the calculation of decommissioning emissions.

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. The *in situ*

[7] Combusted emissions comprise natural gas flaring and other combustion processes required for pipeline operation.

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

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 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 >99% of the total post-construction-related emissions of 182.42 t CO_2e/km [3,683 t CO_2e].

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

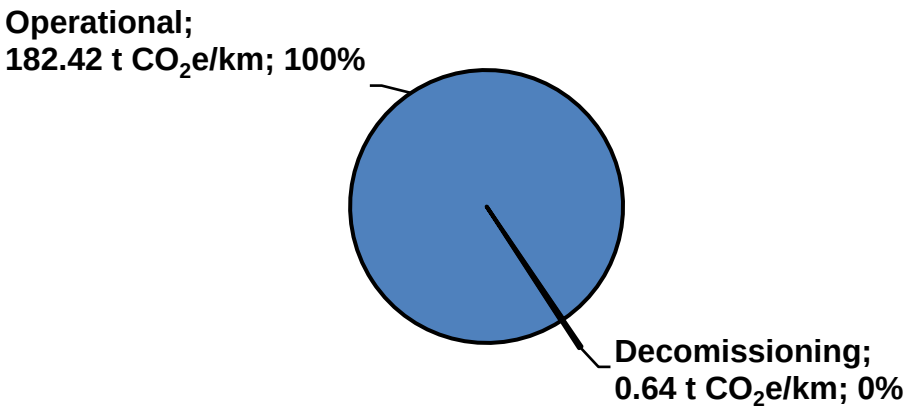
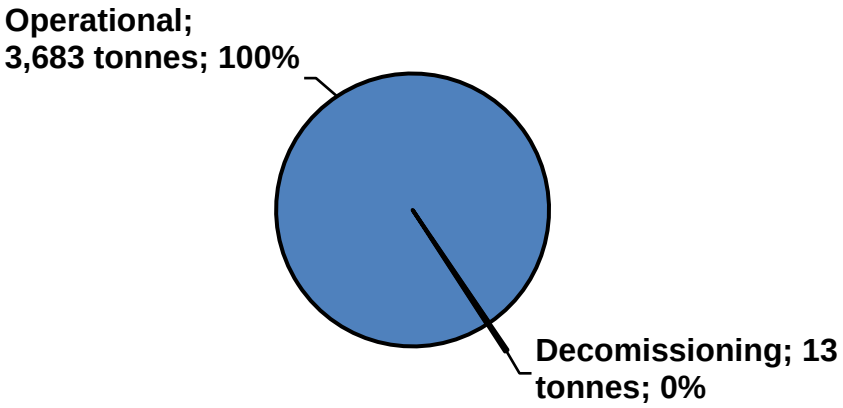


Figure 4:Visual Representation of Gross Post-Construction-Related Emissions (in CO_2e)



As a percentage, *Pipeline Operations: Decommissioning* results in less emissions than other natural gas pipeline assessments Manitoba Hydro has performed. This is because the Project is forecast to operate at a lower pressure, and the pipe is a smaller diameter than what was forecast for projects identified in previous assessments [3]. Therefore, less flaring is required during the de-energizing phase of pipeline decommissioning.

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 422.51 t CO_2e/km [8,530 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	65.86	1,330	16%
Construction: On-Site Energy	144.71	2,922	34%
Construction: Land Use Change	15.31	309	4%
Construction: Labour Transport	13.54	273	3%
Construction: Project Commissioning	0.02	0	0%
Post Construction: Pipeline Operations	182.42	3,683	43%
Post Construction: Pipeline Decommissioning	0.64	13	0%
Total	**422.51**	**8,530**	

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 approximately 43% of the 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/yr [73.66 t CO_2e/yr].

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

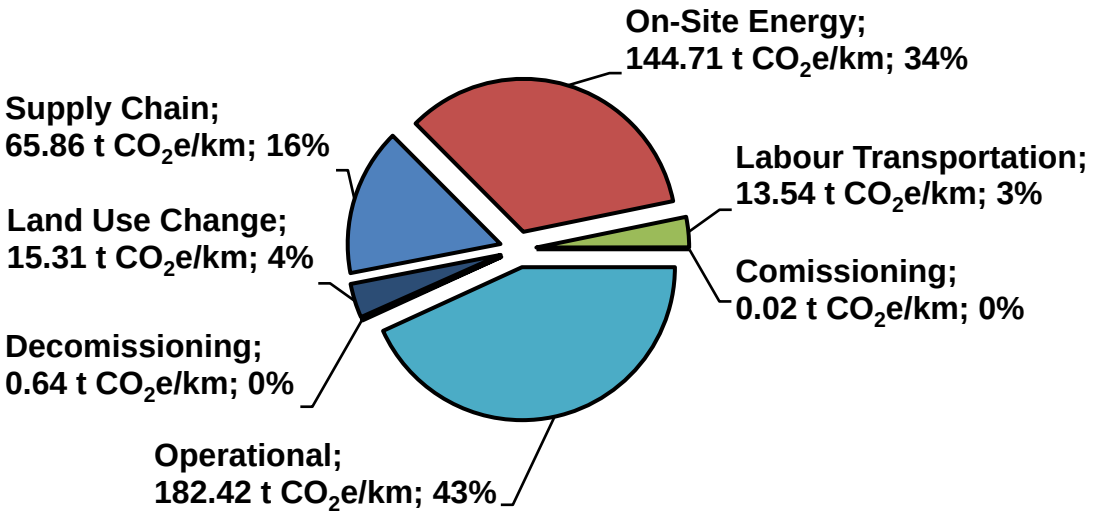
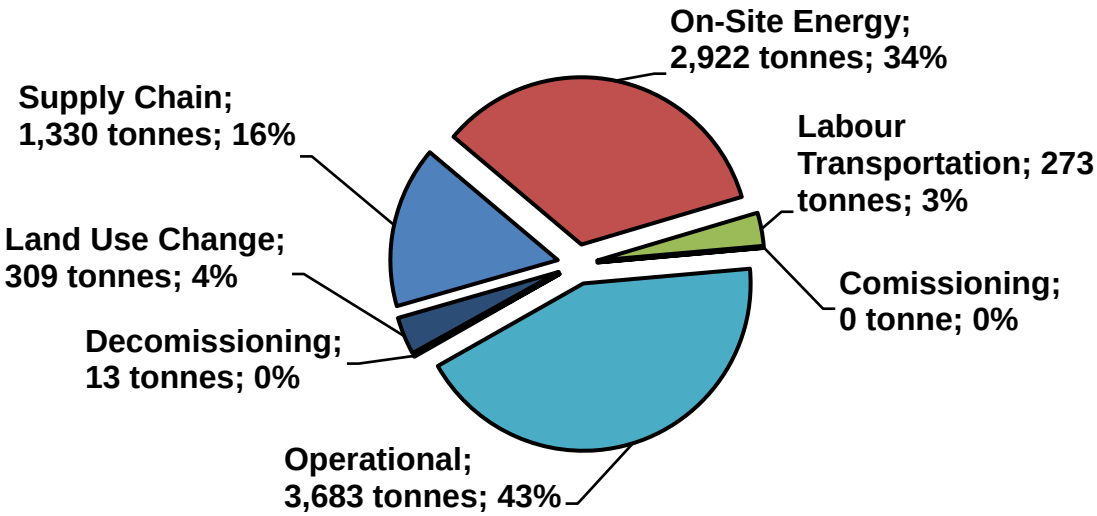


Figure 6: Visual Representation of Total LCA Emissions (in CO_2e)



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	1.32	26.60	16%
Construction: On-Site Energy	2.89	58.43	34%
Construction: Land Use Change	0.31	6.18	4%
Construction: Labour Transport	0.27	5.47	3%
Construction: Project Commissioning	0.00	0.01	0%
Post Construction: Pipeline Operations	3.65	73.66	43%
Post Construction: Pipeline Decommissioning	0.01	0.26	0%
Total	**8.45**	**170.61**	

For context, the 170.61 t CO_2e per year of emissions that could result from the Project is roughly equivalent to 0.00080% of total Manitoba emissions in 2023 [9]. While approximately 16% 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 GHG LCAs which were used as a point of reference [3, 10].

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 indication 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 third-party contractor.

2.4.1 Construction Emissions

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

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

2.4.1.1 Material Supply Chain Emissions

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

- The installed length of the Project is 20.19 km long.
- The Project is designed with a 6.626” [168.30 mm] outer diameter steel pipe with a wall thickness of approximately 0.19” [4.78 mm]. The Project is designed with a Nominal Pipe Size (NPS) of 6”.
- 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% contingency, and considering the discrete lengths in which the steel pipe is procured, is estimated to be 21.2 tonnes of steel procured/installed pipeline km.

- The assumed logistics of construction material transportation for emissions estimating[9] are as follows:
    - Raw materials are shipped from Türkiye to Montreal, Québec by ocean liner for consistency with previous LCAs [3, 6].
        - Alternative source locations (i.e., sources closer than Türkiye) for the Project steel would result in lower transportation emissions, however, for conservativeness 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 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.

[9] 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 for the purposes of this assessment, including the mobilization phase, construction, remediation/reclamation, and demobilization is 600 person-months,[10] 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, with fuel consumption estimates listed in Table 6 [10]. For the Project GHG Assessment, it is assumed that construction vehicles are left on-site while workers commute to and from the Project site each workday.

Table 6: 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.

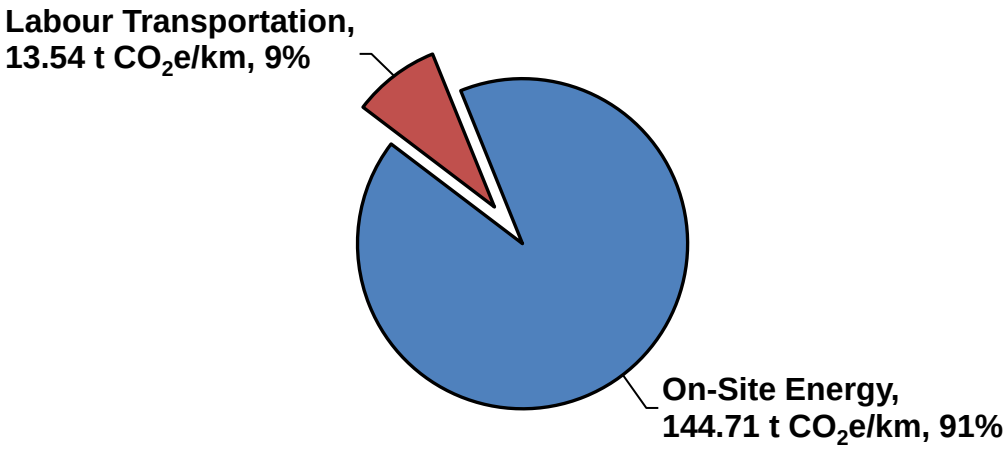
[10] Actual workforce and timelines will be a function of contractor resources. Estimates within this Assessment are used to estimate emissions only. Actual construction timelines will likely differ from the estimates in this GHG Assessment.

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 10.

2.4.1.3 Labour Transportation Emissions

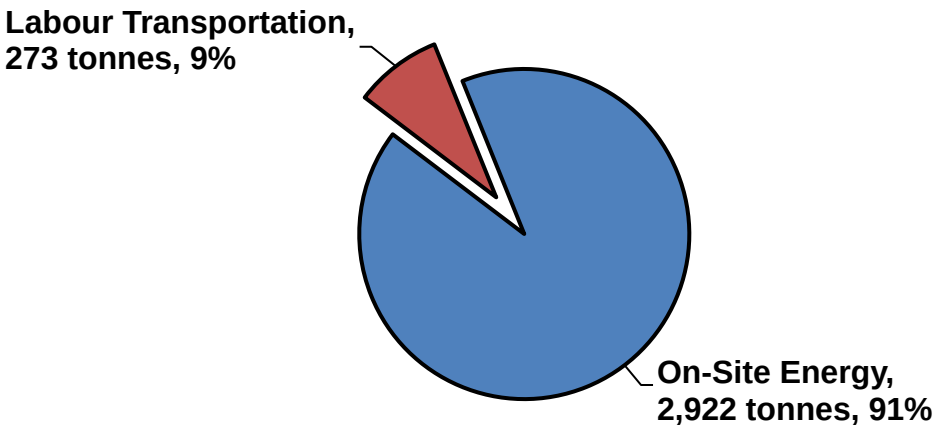
It is assumed that crews will round-trip commute from Brandon to the construction site daily, for a total of ~131 km[11] traveled per workday. Although accommodations closer to the Project site may be used, assuming daily commutes from Brandon results in a higher but still realistic estimate of emissions from worker transport to and from the site. This assumption is consistent with the principle of conservativeness required of project GHG accounting [11]. It is assumed that workers will arrive on site using one light-duty truck for every three workers.

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



[11] The average distance from Brandon to closest and furthest end of the pipeline ~66 km kilometers.

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



Note that the *Construction: On-Site Energy Emissions* category 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 10.

Figure 7 and Figure 8 presents a high-level visualization of the emissions, in t CO_2e/km of installed pipeline, and total tonnes CO_2e from the use of fossil fuels during the construction phase of the Project. Both the transportation of construction crews to and from the work site and the emissions from pipeline construction and associated activities are considered. Data and emission factors presented in Table 6, Table 8, and Table 10 are used to estimate emissions from fossil fuel use during the construction phase of the Project.

2.4.1.4 Land Use Change Emissions

For estimating land use change impacts, this assessment followed similar methods to those used in previous assessments performed by Manitoba Hydro [2, 5, 6, 12]. For the

Project, 2.12 hectares of Deciduous Forest (approximately 5 acres or 0.0212 square kilometers) may require clearing. However, when possible and reasonable, tree clearing will be avoided. 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 is within previously disturbed land or other Non-Treed Dominant categories land is shown in Table 7.

From a carbon content (CC) perspective, only treed areas within the Project's ROW footprint are permanently[12] disturbed. The ROW width used to estimate the treed area that will be cleared varies along the length of the Project but has an average width of 27 m. It is possible that this may change as Manitoba Hydro proceeds with the public engagement process. GIS software was used to establish the ROW and identify the land classes along the ROW, with date shown below in Table 7.

It is assumed treed areas will be converted to "Non-Treed" land. While this land could convert to a variety of low-lying vegetation land types, the "Non-Treed" CC 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."* [12]

[12] 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 7: 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 15.31 t CO_2/km [309 t CO_2].

Equation A CO_2e Emissions from ROW Land Use Change

$$\boldsymbol{CO_2\ emissions\ (tonnes)} = \boldsymbol{Area\ effected\ (hectacre)} * \left[\boldsymbol{Original\ Carbon\ Content}\left(\frac{\boldsymbol{tonnes\ Carbon}}{\boldsymbol{hectacre}}\right) - \boldsymbol{Modified\ Carbon\ Content}\left(\frac{\boldsymbol{tonnes\ Carbon}}{\boldsymbol{hectacre}}\right)\right] * \frac{\mathbf{44}}{\mathbf{12}}$$ [13]

2.4.1.5 Pipeline Commissioning Emissions

During the commissioning phase of the Project an inert gas, typically nitrogen, 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. Nitrogen gas is purged into the pipeline to remove the air, and purging will stop once oxygen levels are safe for natural gas introduction. Natural gas is then introduced upstream into the inert system to energize the pipeline and push the inert gas through and out of the system. During this process, a small amount of natural gas may be vented to the atmosphere.

A publicly available source was 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 [10].

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

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

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 as these are acknowledged in Section 3 – Potential Market Responses.

Flaring and intentional 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. Fugitive 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[14] [13]. 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.

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

2.4.3 Key GHG Assessment Assumptions and Inputs

Table 8, Table 9, and Table 10 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 8: Life Cycle Emissions – Key Input Assumptions

Activity	Emission Factor	Unit	Source
Ocean Transport	15.84	g CO_2e/tonne-km	NREL [14]
Rail Transport	18.97	g CO_2e/tonne-km	NREL [14]
Road Transport by Truck	79.91	g CO_2e//tonne-km	NREL [14]
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 [14]
Forge Steel into Bars/Wire/Other	354.61	g CO_2e/kg steel	Chalmers University [15]
Combust Diesel	2,761.38	g/L of fuel	ECCC [16]
Combust Gasoline	2,315.10	g/L of fuel	ECCC [16]
Produce and Deliver Fuel	979.29	g/L of fuel	ECCC [16]

Table 9: Life Cycle Emissions – Material Transport Assumptions

Assumption	Value	Unit	Source
Türkiye[15] 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 Truck	100	km	Google Maps
Camrose to Project Site by Truck	1,300	km	Google Maps

[15] İzmir assumed as seaport location in Türkiye.

Table 10: 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	3.4	L/hour	Oak Ridge National Lab
Heavy Construction fuel use[16]	248	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

[16] Calculated using data presented in Table 6.

3 POTENTIAL MARKET RESPONSES

With the exception of the South Loop LCA [3], GHG assessments of other Manitoba Hydro construction projects [4, 12, 17] 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 distribution pipeline projects. This Project will expand Centra's system's capacity to Neepawa, to reliably meet current load and to allow more Manitoba customers to connect to the natural gas system. However, analysis indicates that for the Project, the baseline scenario and project scenario are identical, therefore and no GHG effects are additional.

3.1 Neepawa Load Growth

Neepawa is a rapidly growing community located in the Manitoba Escarpment. According to census data from 2021, Neepawa is the third fastest growing community in Manitoba and the thirteenth nationwide. Between 2016 and 2021 the community population grew approximately 23%. Several new residential, commercial, institutional, and industrial developments are planned or ongoing in the community, with construction underway or scheduled to begin over the next few years and as a result, the energy demand in the community is also growing. The 20-year projected load growth for natural gas in Neepawa, excluding the expansion of communal agricultural operations, is projected to be 47% higher than the 2024 Design Winter Peak Load, when a business-as-usual scenario is considered.

Manitoba Hydro considered several options to meet this demand using natural gas or electricity. In addition to load growth within the community, some of the projected and potential load growth is related to agricultural applications, such as grain drying, and to

serve these applications with electric options using current technology would be economically infeasible. In addition to meeting future energy demand, parts of the system are already operating near maximum capacity, which could lead to pipeline integrity concerns. Proactive intervention is necessary, regardless of future load growth in the area.

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 Baseline Candidate Alternatives

As proactive intervention on the natural gas system is required whether future incremental energy demand is met with electricity or natural gas, the incremental costs to increase natural gas capacity in the Neepawa system has a strong business case, compared to meeting projected load growth via electrification and only upgrading the

natural gas system to serve current load reliably. The costs to electrify the projected capacity needs were estimated to be 20 times the most expensive natural gas pipeline expansion option identified and therefore was not considered to be economically feasible.

While several alternative natural gas capacity upgrades were assessed in addition to a high-level economic assessment of serving growing demand with electricity, the Project was selected as it can serve existing demand, known near-term energy demand growth, and can serve potential long-term growth as well. However, if each capacity upgrade project can serve these existing and incremental natural gas loads, all these options would result in the same market responses. The only difference in GHG effects would then be in project infrastructure (i.e., the pipeline), and comparing the infrastructure of these alternate projects was not within the scope of this GHG Assessment. Therefore, the Baseline Scenario for the Project was assumed to be identical to the Project Scenario and no incremental market responses are assumed.

3.4 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 [18], 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 [19], 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 [20] 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 last GHG assessment Manitoba Hydro performed on a natural gas distribution project [3], the Province of Manitoba released Manitoba's Path to Net-Zero [21] 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 [22], 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.

3.5 Alternative Fuels to Natural Gas

While Manitoba Hydro has determined that the project case is the same as the baseline for this GHG Assessment, and that no GHG effects are considered additional, a comparison of different fuel types is provided below for information only. Similar information was presented in previous GHG assessments performed by Manitoba Hydro for natural gas pipeline projects. Tables are provided below for references, however, refer to GHG assessment for the South Loop Phase 1 [3], for further details on the analysis and its applicability to this GHG Assessment as well.

Table 11: Direct Emission Factors – Space Heating Fossil Fuels[17]

Heating Fuel	Emission Factor	Unit	Emission Factor	Unit	Source
Propane	1.54	kg/L	61.02	kg/GJ	ECCC
Natural Gas	1.97	kg/m^3	50.77	kg/GJ	MH
Diesel/Fuel Oil	2.76	kg/L	71.12	kg/GJ	ECCC

Table 12: Annual Space Heating Requirements – Avg Single Family Customer [18]

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

[17] These emission factors do not include upstream GHG effects. Only fuel combustion is represented.

Table 13: Annual Space Heating Emissions (t CO_2e) – Average Single Family Residential Customers [18]

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

The above tables demonstrate that for heating processes using fossil fuels, natural gas is likely the lowest emitting option. In the short term, natural gas as a space heating fuel is likely lower emitting that electrification of heating as well. However, this is not necessarily true over the long term.

The above tables are for information only and any realized emission reductions by fuel switching away from more emissions-intense fossil fuels as a result of the Project are not considered additional relative to the baseline scenario.[18]

[18] As the baseline and project scenario are the same.

3.6 Market Response Conclusion

On an absolute basis (i.e., compared with a do-nothing scenario), additional natural gas usage can be expected in the Neepawa region. On an absolute basis, by providing additional natural gas capacity to Neepawa, the project will likely increase local natural gas emissions (both direct and indirect), potentially reduce diesel and propane emissions from surrounding agricultural and industrial operations, and decrease regional electricity generation emissions – potentially resulting in a net decrease in global emissions; however, these potential GHG effects are not considered additional.

REFERENCES

[1] Manitoba Hydro-Electric Board, "Manitoba Hydro-Electric Board 73rd Annual Report (For the year ended March 31, 2024) - Energy for Life: Planning for a strong energy future," Manitoba Hydro, Winnipeg, 2024.

[2] Manitoba Hydro, "BP6/BP7 Transmission Project Environmental Assessment Report," Manitoba Hydro, Winnipeg, 2021.

[3] Manitoba Hydro, "Dominion City to Altona (DC to Altona) Gas Transmission project - Greenhouse Gas Assessment Report," Winnipeg, 2024.

[4] Manitoba Hydro, "Portage Area Capacity Enhancment Project - Greenhouse Gas Mitigation Assessment," Manitoba Hydro, Winnipeg, 2021.

[5] Manitoba Hydro, "Radisson to Henday (R44H) Transmission Project - Environmental Assessment Report," Winnipeg, 2024.

[6] Manitoba Hydro, "Silver to Rosser Tap (S65R Tap) Transmission Project," Manitoba Hydro, Winnipeg, 2024.

[7] World Resources Institute and World Buisness Council for Sustainable Development, "A Corporate Accounting and Reporting Standard (Revised Edition)," 2004.

[8] Manitoba Hydro, "Greenhouse gas emissions," 2023. [Online]. Available: https://www.hydro.mb.ca/environment/greenhouse-gas/.

[9] Environment and Climate Change Canada, "National Inventory Report 1990 - 2023," Gatineau, 2023.

[10] WorleyParsons Resources & Energy, "Katherine to Gove Gas Pipeline - Pipeline Greenhouse Gas Assessment," WorleyParsons, Brisbane, 2013.

[11] World Resources Institute, *The GHG Protocol for Project Accounting,* World Resources Institute, 2005.

[12] K. R. Jeyakumar B, "Greenhouse Gas LIfe Cycle Assessment of the Manitoba-Minnesota Transmission Project," The Pembina Insititue for Manitoba Hydro, 2015.

[13] Government of Canada, "Global Warming Potentials," 2024. [Online]. Available: https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/quantification-guidance/global-warming-potentials.html.

[14] National Renewable Energy Labratory, "U.S. Life Cycle Inventory Database," 2012. [Online]. Available: www.nrel.gov/lci.

[15] H. Berg and S. Haggstrom, "LCA Based Solution Selection," Chalmers University of Technology , Göteborg, 2002.

[16] Environment and Climate Chanage Canada, "Emission Factors and Reference Values - Version 2.0," Environmental and Climate Change Canada, Gatineau, 2024.

[17] Manitoba Hydro, "Pointe du Bois Unit Replacement Project - Greenhouse Gas Mitigation Assessment," Winnipeg, 2021.

[18] Manitoba Hydro, "Space Heating Costs," 2024. [Online]. Available: https://www.hydro.mb.ca/docs/resources/home-space-heating-costs-nov-2024-v1-acc.pdf.

[19] Province of Manitoba, "The Manitoba Affordable Energy Plan," 2024. [Online]. Available: https://www.gov.mb.ca/energyplan/index.html.

[20] Manitoba Hydro, "2025 Integrated Resource Plan," [Online]. Available: https://www.hydro.mb.ca/corporate/planning/.

[21] Province of Manitoba, "Manitoba's Path to Net Zero," 2025. [Online]. Available: https://www.gov.mb.ca/asset_library/en/netzero/mb-path-to-net-zero.pdf.

[22] Canada Energy Regulator, "Canada's Energy Future 2023: Energy Supply and Demand Projections to 2050," 2023. [Online]. Available: https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/. [Accessed 27 November 2025].

[23] Circular Ecology, "Embodied Carbon - ICE Database," 2019. [Online]. Available: https://circularecology.com/embodied-carbon-footprint-database.html.

[24] Infrastructure Canada, "The Climate Lens," Infrastructure Canada, Ottawa, 2023.

[25] Manitoba Hydro, "Transmission Project Environmental Assessment Report," Manitoba Hydro, Winnipeg, 2023.

[26] Manitoba Hydro, "Operations & exports," 2024. [Online]. Available: https://www.hydro.mb.ca/corporate/operations/.

[27] US Environmental Protection Agency, "Emission Factors for Greenhouse Gas Inventories," US EPA, Washington, D.C., 2014.

[28] United States Environmental Protection Agency, "Portfolio Manager Technical Reference: Greenhouse Gas Emissions," 2024. [Online]. Available: https://www.energystar.gov/buildings/tools-and-resources/portfolio-manager-technical-reference-greenhouse-gas-emissions.

[29] World Resources Institute, "Guidelines for Quantifying GHG Reductions from Grid-Connected Electricity Projects," World Resources Institute, 2007.

[30] Manitoba Hydro, "2023 Integrated Resource Plan," 2023. [Online]. Available: https://www.hydro.mb.ca/docs/corporate/irp/irp-2023-integrated-resource-plan.pdf.

[31] Soil Classification Working Group, The Canadian System of Soil Classification, Ottawa: Agriculture and Agri-Goods Canada, 1998.

APPENDIX E

Cultural and Heritage Resources Protection Plan

December 2025

Manitoba Hydro






STANDARD CULTURAL AND HERITAGE RESOURCES PROTECTION PLAN

Contacts:
Transmission & Distribution Environment and Engagement:
Megan Anger Phone: 204-391-7355 Email: manger@hydro.mb.ca

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 discoveries. 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 discovery 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 discovery of previously unrecorded cultural and heritage resources during work on the Neepawa gas transmission project (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 discovered 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 discovered 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 discovery of cultural or heritage resources or human remains. Manitoba Hydro will inform relevant employees and contractors working on the project of the contents of applicable regulatory specifications, guidelines, licenses, authorizations and permits, and of this plan, and copies will be available from the on-site lead office.

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 discovered during the construction, operation or maintenance of the project.

Manitoba Hydro expects workers to remain vigilant to watch for discoveries, 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 discoveries. 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 discovery. 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.

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

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 Project Description

The proposed Neepawa gas transmission project (the project) is an approximate 20 kilometre, 6-inch steel natural gas pipeline. The line will extend from a control point located approximately 22.5 kilometres south of Neepawa, running 19 kilometres north to another control point located 3.5 kilometres south of Neepawa.

3.0 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 discovered during the construction of the Project. Heritage resources may be discovered 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.

3.1 General Protocol Requirements

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

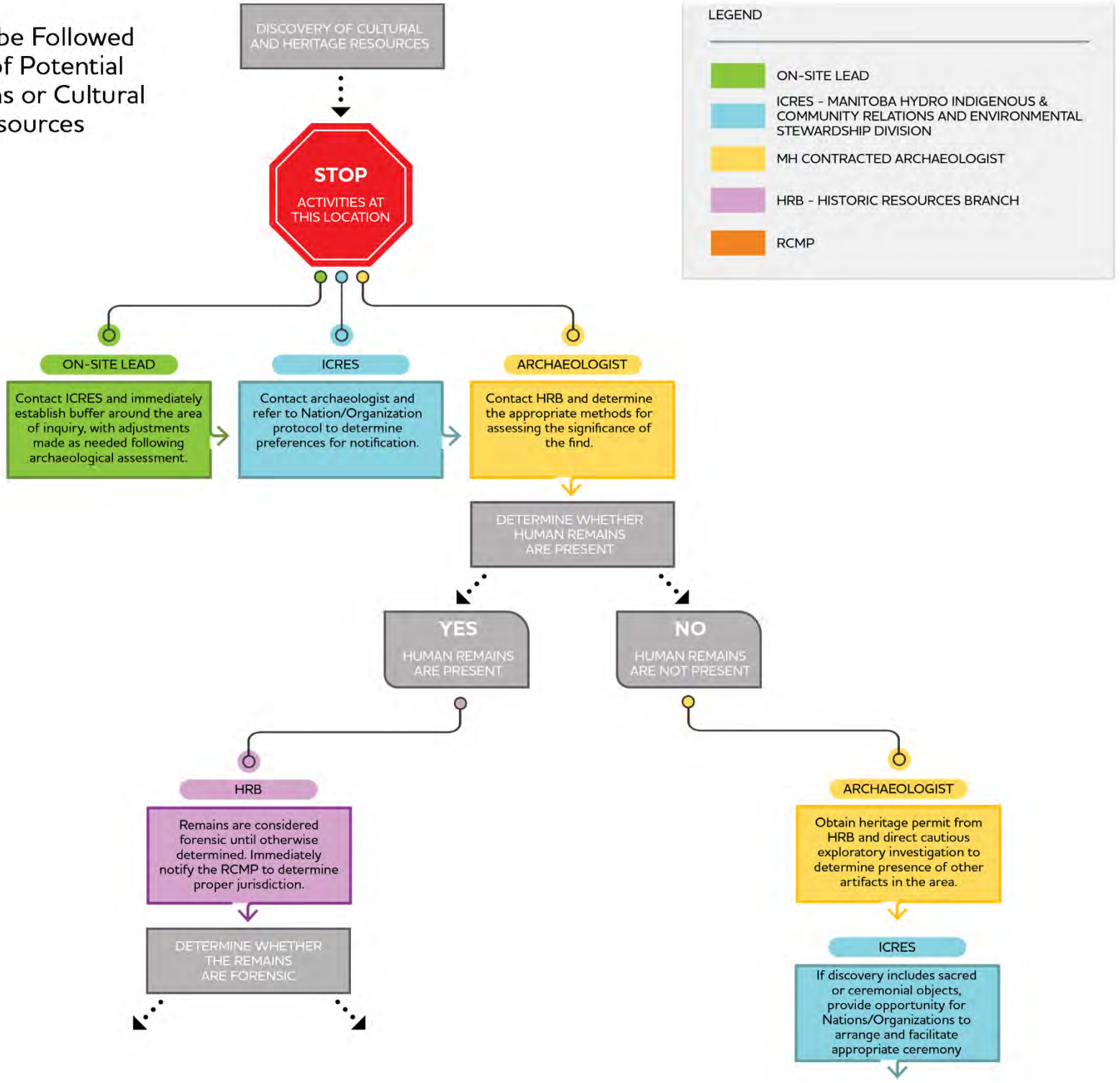
1. In all cases, construction activities will be stopped immediately at the location.
2. Immediately mark the discovery location with flagging tape. A buffer zone should be established around the area of discovery and cordon off with temporary fencing, on reasonable judgment, but to a minimum distance of 30 meters radius from the center of discovery. 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.

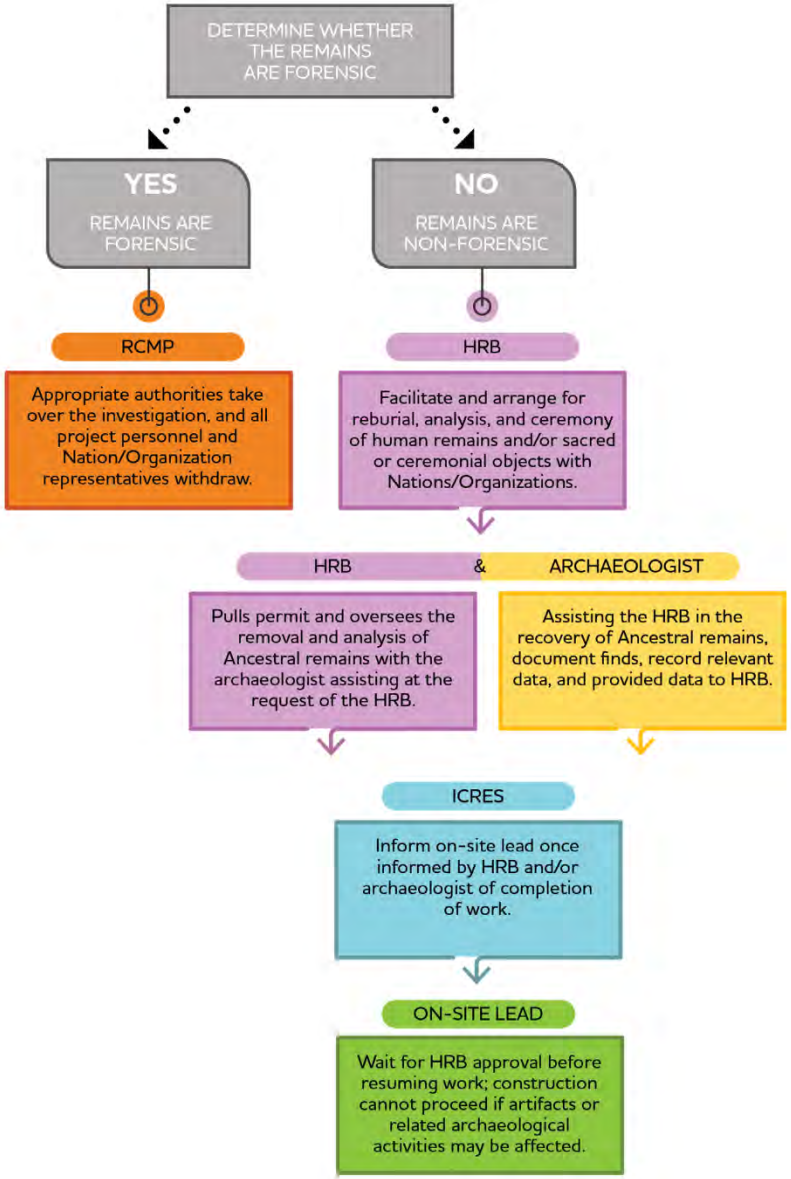
Permits will set the conditions and/or requirements of the necessary work, based on consultation with the Project Archaeologist and the Contract Administrator and Nation/Organization Representative, and will be made known to site staff and affected contractors.

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 discovered 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).

3.2 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.

3.3 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.

3.4 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.

3.5 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.

4.0 Reporting and follow-up

The Project Archaeologist will establish and maintain a record of report for each discovered 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 Nation/Organization representatives, and appropriate cultural measures, will be the responsibility of Nation/Organization representatives.

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 Nation/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.

5.0 Glossary of terms

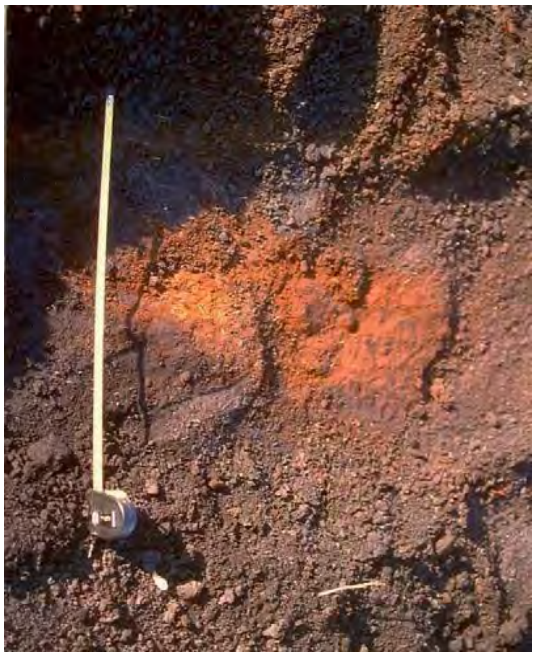
Artifacts	Any object of a historic nature that has been made or modified by a human being.
Caches	Rock features in which supplies were stored.
Cultural Resource	An object, site or location of a traditional or cultural practice that is the focus of traditional or contemporary use and is of continuing 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.

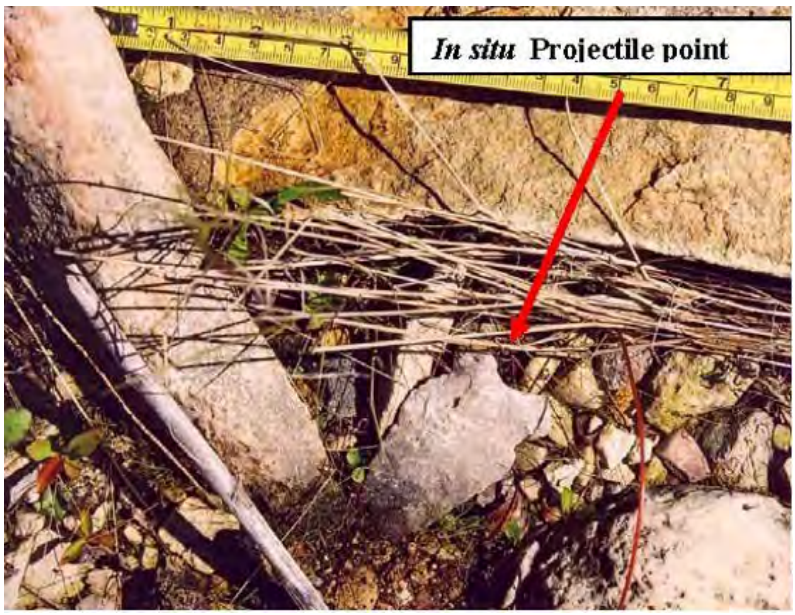
Stone Building Foundation

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 discoveries?

   Yes ☐ No ☐

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

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

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

Phone number: _____

Cell phone: _____

Email address: _____

Preference for contact _____

(i.e.: cell phone, email)

4. Should a previously unrecorded heritage or cultural resource be encountered, would your 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 discoveries of the following in the area near the project:

Human remains	Yes	☐	No	☐
Heritage/cultural resources	Yes	☐	No	☐

7. Have you received a copy of the Heritage Resources Protection Plan?

   Yes ☐ No ☐

Date: _____

Filled out by (Please print): _____

Signature _____

APPENDIX F

Contractor Environmental Responsibility Bulletins

December 2025

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.

President and Chief Executive Officer

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

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).

Manitoba Hydro
energy for life

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.

Version 4.0 // May 2025

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

Manitoba Hydro *energy for life*

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.

Version 4.0 // August, 2024

Available in accessible formats upon request.

Manitoba Hydro energy for life

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.

.

Version 4.0 // August, 2024

Available in accessible formats upon request.

Manitoba Hydro energy for life

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

Available in accessible formats upon request.

Manitoba Hydro

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.

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**
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.

Manitoba Hydro
energy for life

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.

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**
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.

Manitoba Hydro
energy for life

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.

Version 5.0 // May 2025

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

Manitoba Hydro energy for life

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>

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.

Version 2.0 // May 2025

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

Manitoba Hydro
energy for life

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.

Version 2.0 // May 2025

Manitoba Hydro
energy for life

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.

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

Version 5.0 // October 2025

Manitoba Hydro energy for life

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.

Version 3.0 // October 2025

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

Manitoba Hydro

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.

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**
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.

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.

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**
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.

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

Version 4.0 // May 2025

Manitoba Hydro
energy for life

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.

Version 4.0 // May 2025

Available in accessible formats upon request

Manitoba Hydro
energy for life

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.

Manitoba Hydro
energy for life

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.

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**
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.

Version 4.0 // May 2025

Manitoba Hydro
energy for life

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).*

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**
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.

Manitoba Hydro
energy for life

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.

Version 2.0 // May 2025

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

Manitoba Hydro
energy for life

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.

Manitoba Hydro
energy for life

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.

Version 3.0 // May 2025

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

Manitoba Hydro
energy for life

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.

Manitoba Hydro
energy for life

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

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

Manitoba Hydro energy for life

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

Manitoba Hydro
energy for life

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.

Version 5.0 // October 2025

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

Manitoba Hydro *energy for life*

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.