Functional Design Study of PTH 1 and PTH 5 Intersection Improvements

ROUND 2B
RIGHTS HOLDER & STAKEHOLDER MEETINGS

SPRING 2025

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Welcome

- Welcome to engagement round 2B for the functional design study of PTH 1 and PTH 5 intersection improvements.
- The project team previously engaged with the community in July and November 2024.
- The image at the right illustrates the general study area.
- The following slides provide an overview of the study process and objectives.
- The intent of this engagement is to:
  - Provide project updates;
  - Share shortlisted alternatives, how they work, and how they improve safety;
  - Share further evaluation of intersection alternatives; and
  - Share important details regarding the next steps for this project.

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Project Team

Manitoba Transportation and Infrastructure (MTI)
Project Owner

WSP
Engineering Consultant
Larry Halayko, WSP Project Manager

Landmark Planning & Design
Public and Stakeholder Engagement Consultant
Donovan Toews, Engagement Lead

Project Intent

- The goal of this functional design study is to identify a design that will improve intersection safety at PTH 1 and PTH 5.
- In June of 2023 this intersection was the site of a significant collision that resulted in the loss of 17 lives and impacts to many others. There have been subsequent collisions since this time.
- The Manitoba government is focused on supporting those affected by the collision and identifying preventative measures to avoid reoccurrences.

PTH 1 and PTH 5 intersection looking north.

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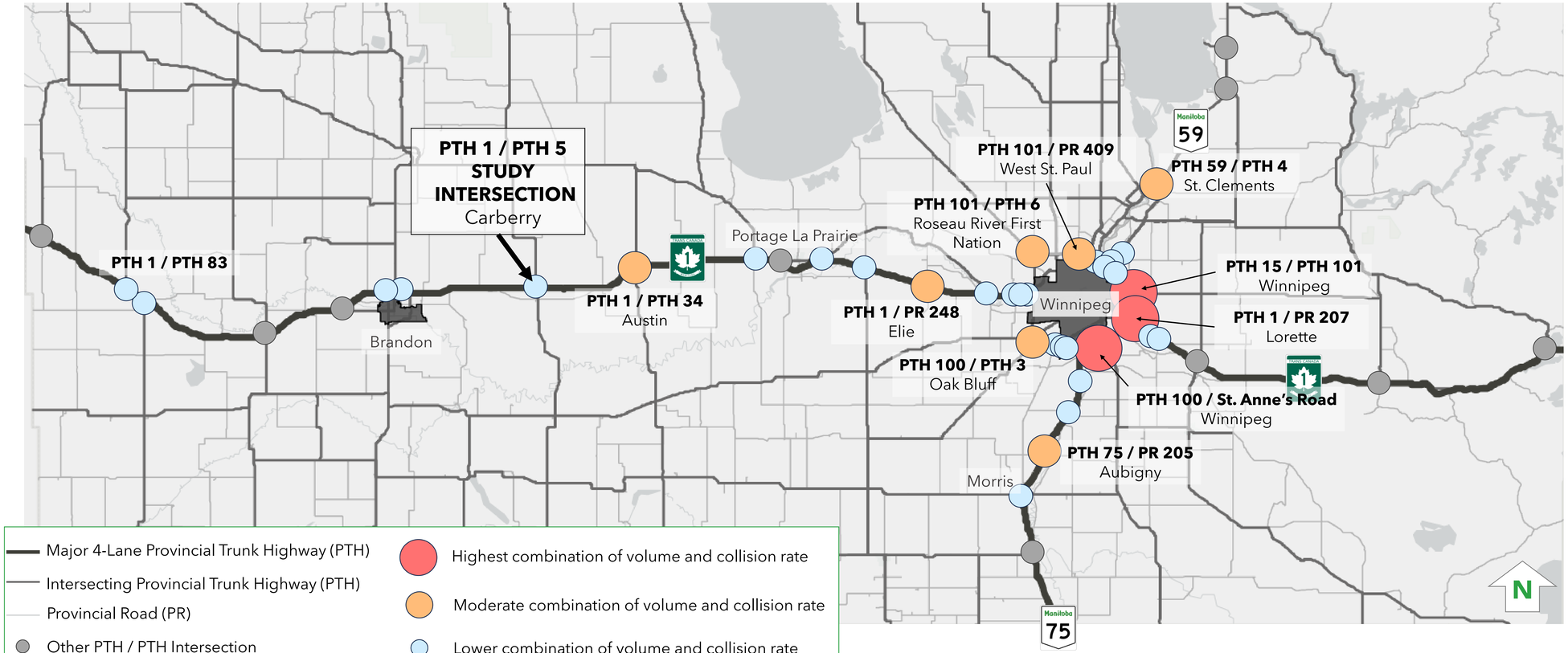
Regional Highway Context

The map below illustrates the regional highway context surrounding the PTH 1 and PTH 5 study intersection.

- This map illustrates intersections along PTH 1, PTH 75 and PTH 59
- Intersections are categorized based on collision rate relative to the traffic volumes
- Intersections that have a high combination of volume and collision rate are shown in red and orange
- MTI uses this information to help inform decisions about intersection improvements in each location



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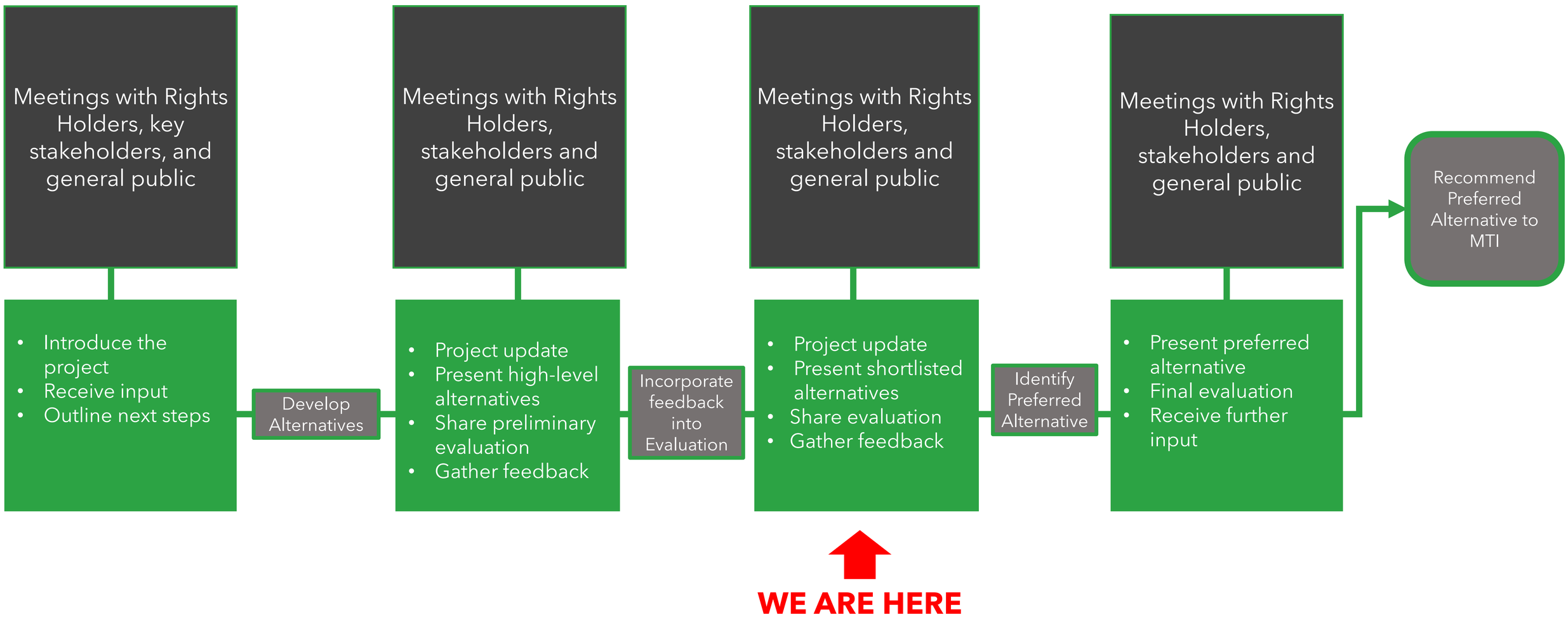
Engagement Process

The following diagram illustrates the engagement process:



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Identified Rights Holders & Stakeholders

There are many people and groups who may be interested in or affected by this project:

- Impacted families and communities;
- Local residents and landowners;
- Emergency service providers;
- Agricultural operations;
- Potato industry groups;
- Manitoba Trucking Association;
- Rights Holders including Swan Lake First Nation and Manitoba Métis Federation;
- Local municipalities including the RM of North Cypress-Langford and Town of Carberry;
- Business owners;
- Local school divisions;
- Utilities in the vicinity;
- Local Trail or Recreation Groups; and
- Others as identified throughout the engagement process.

Rights Holder & Stakeholder Interests

The study team needs to consider a number of factors in the design process, including;

- Safety and collision history;
- Traffic operations, including traffic flow;
- Local land use and access patterns;
- Impact to surrounding lands and residences;
- Existing infrastructure;
- Utilities;
- Environmental impacts;
- Cultural or heritage considerations;
- Emergency access and services;
- Capital and maintenance costs; and
- Other factors that may be identified through the engagement process, including Rights Holder and stakeholder perspectives on these and other topics.

PTH 1 and PTH 5 intersection looking east.

What We Heard

At the first and second round of Stakeholder Engagement meetings in July and November 2024, comments were offered by participants. The following comment themes are considered important perspectives for the study team to carefully consider:

- Concerns about safety for all types of road users
- Suggestions to reduce speed limit at the intersection
- Concerns about road visibility and driving conditions in all seasons
- Concerns about slowing down traffic on major highways
- Suggestions that median and turning lanes should accommodate semis
- Suggestions to accommodate rest stops and truck parking
- Concerns that drivers would need education to use some intersection types
- Suggestions that the intersection should be easy for drivers to understand
- Suggestions to create consistent intersection approaches across Manitoba
- Desire to maintain access to residences and agricultural land during and after construction
- Concerns about service road realignment impacts to surrounding properties and irrigation systems
- Concerns about adjacent PTH 1 access closures one mile east and one mile west of the study intersection
- Concerns about the difficulty of snow clearing and maintenance for some intersection types

Safe System Approach

- The Safe System Approach is a framework adopted by the Transportation Association of Canada (TAC) to help improve road safety.
- Design alternatives for this intersection will follow the Safe System Approach to ensure best practice.
- The Safe System Approach recognizes people make mistakes and the roadway should be designed to help reduce the impact of those mistakes.

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Safe System Approach

This slide provides information on key Safe System Approach elements related to highway design that will guide this functional study:

SAFE SYSTEM APPROACH

Safe Road Design

Designs should provide road users with a chance to:

- Make decisions
- React and recover from mistakes
- Survive collisions in the event of mistake

GOAL: Designs that protect for mistakes

Safe Speeds

Speed is selected by drivers based on visual cues:

- Roadway cross section
- Presence of driveways and intersections
- Surrounding land use
- Speed limit signage

GOAL: Not too fast and not too variable

Safe Land Use Planning

Support development adjacent to highways while promoting safety through:

- Provincial land use planning
- Driveway and intersection management standards
- Traffic impact studies

GOAL: Reduce conflicts and control movements

Intersection Alternatives

The evaluation process suggests three shortlisted alternatives for this location.

- Each intersection alternative has advantages and disadvantages.
- Rights Holder and stakeholder input supplements technical considerations in the evaluation.
- The next slides illustrate the following intersection alternatives being considered for further review:

1. **Widened Median Intersection**
2. Split Intersection
3. RCUT – Reduced Conflict U-Turn

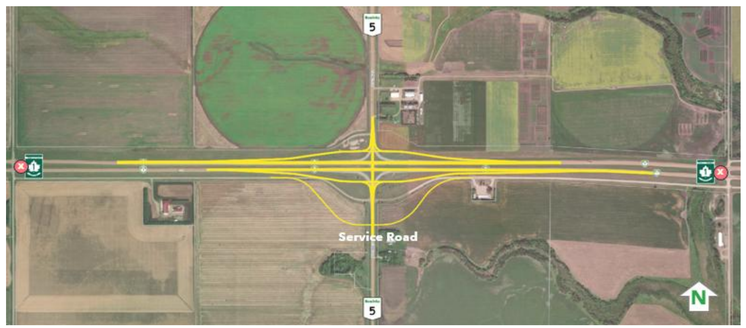
Intersection Concepts That Have Been Reviewed

Widened Intersection

Split Intersection

RCUT – Reduced Conflict U-Turn

Grade Separated Interchange



Signalized Intersection

Roundabout

Median U-Turn (MUT)

Restricted Left/Jug Handle

Offset-T Intersection

Evaluation Criteria

- This chart illustrates a preliminary evaluation that was shared during the previous round of engagement.
- The use of signals as a short- or medium-term solution will not be recommended as it would not improve safety.
- A grade separated interchange will be considered as a long-term option at this location, however, will not be recommended in the short term.
- An updated evaluation will be shared later in this presentation for the shortlisted alternatives.

PTH 1 / PTH 5 INTERSECTION IMPROVEMENTS [Preliminary - Round 2A]		Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Other Intersection Types			
		Grade Separated Interchange	Widened Intersection + Auxilliary Lanes	RCUT - Reduced Conflict U-Turn	Split Intersection (No Traffic Lights)	Signalized Intersection	Roundabout	Restricted Left / Jug Handle J-Turn	Median U-Turn MUT	Offset-T
SUMMARY EVALUATION										
Engineering	Safety									
	Addresses Severe Conflicts									
	Accommodates future interchange									
	Visibility (sightlines)									
	Visibility (environmental conditions)									
	Avoids shifting Problem to new location									
	Turning Movement Mobility									
	Traffic Flow / Through Movement (PTH1)									
	Traffic Flow / Through Movement (PTH5)									
	Local Access Disruption									
	Prioritizes PTH 1 (Accommodates offset volumes)									
	Operating Speed									
	Large Vehicle Navigation (trucks, semis, school bus, low bed trailers,etc.)									
	Large Vehicle Navigation (agricultural)									
	Geotechnical									
	Drainage									
	Maintenance									
	Construction Staging/Detours									
	Using Existing Road Infrastructure									
	Greenhouse Gas									
	Environmentally Sensitive Site Risks									
	Other ?									
Social	Impacts to Residences and Yards (views and noises)									
	Impacts to Agricultural Land and Irrigation systems									
	Property Acquisition Likelihood									
	Community Access (Carberry/Neepawa)									
	Need for Driver Education									
	Compliance / Enforcement									
	Driver Expectation									
	Driver Workload									
	Potential Risks to Heritage Resources									
	Snowmobile Trail									
	Emergency Services									
	Time to Implement									
	Other ?									
Cost	Capital Cost (Conceptual Comparison)	$80 - $100M	$12 - $15M	$12 - $15M	$12 - $15M	$2 - $3M	$12 - $15M	$12 - $15M	$12 - $15M	$45 - $55M
	Capital Cost (Class D)									
	Maintenance Cost									
	Life Cycle Cost									
	TOTAL COST									

- Much Better
- Better
- Comparable
- Not as Good
- Poor

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Shortlisted Alternatives

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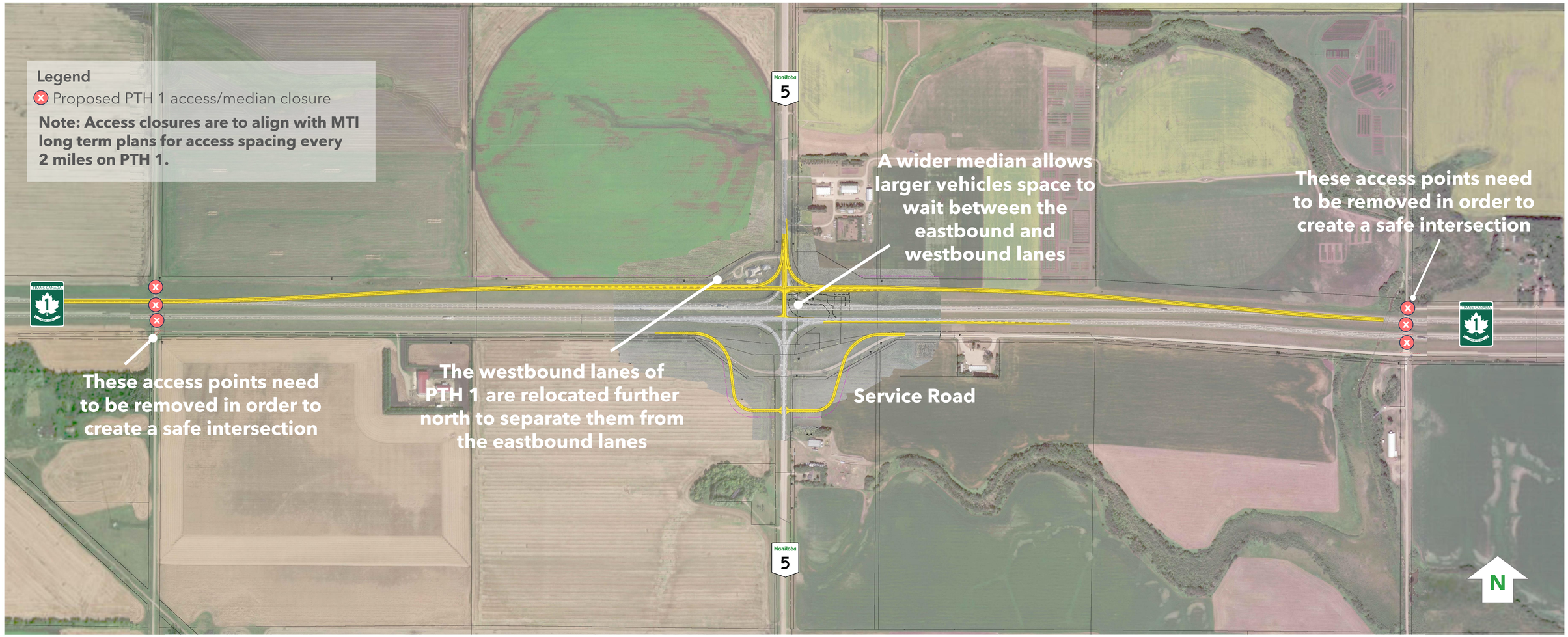
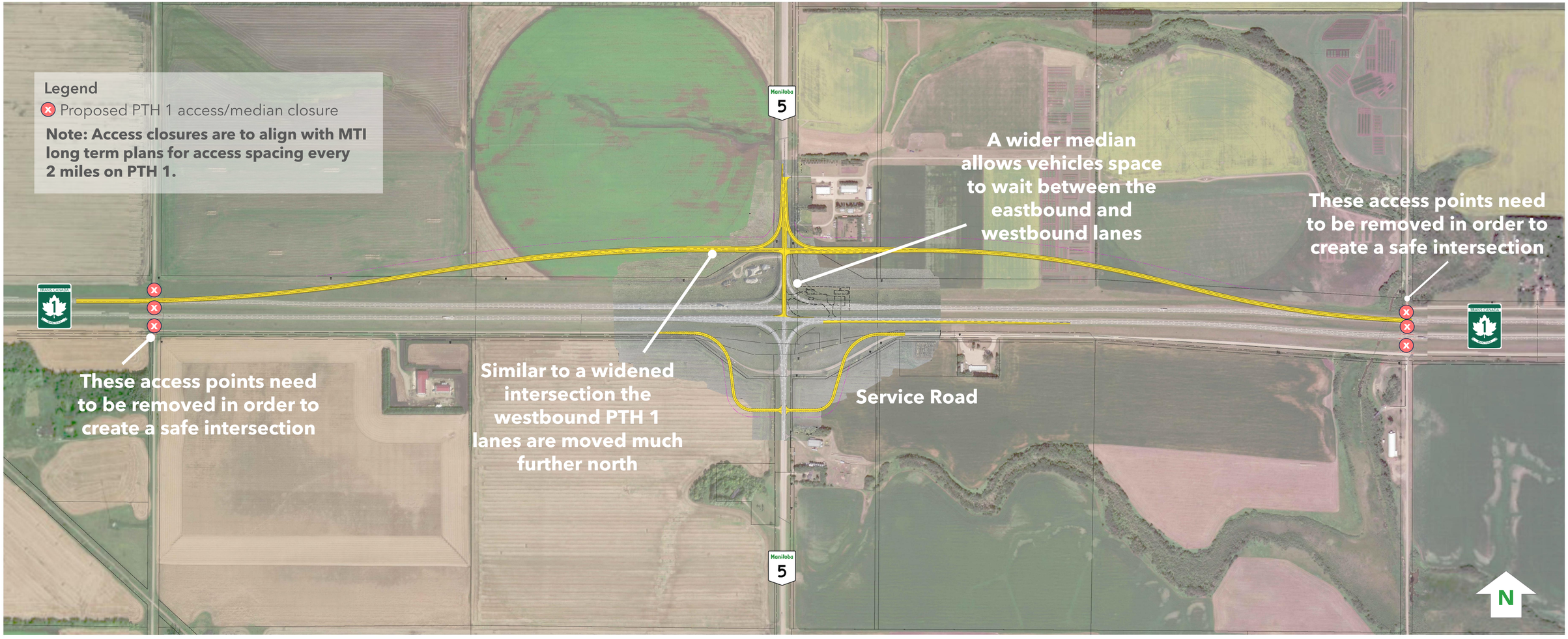
Widened Median Intersection



- In this alternative, the westbound lanes of travel are relocated further north, which creates a wider median (approximately 66m) between the eastbound and westbound lanes.
- Wider medians provide drivers (including drivers of larger vehicles) space to stop safely in the middle, so they have time to assess gaps in traffic and proceed when safe. This reduces collision risk.

Split Intersection



- This intersection replaces a typical four-leg intersection with two separate at grade intersections along the minor road.
- This intersection is similar to the Widened Median Intersection alternative but has a wider median (approximately 166m).

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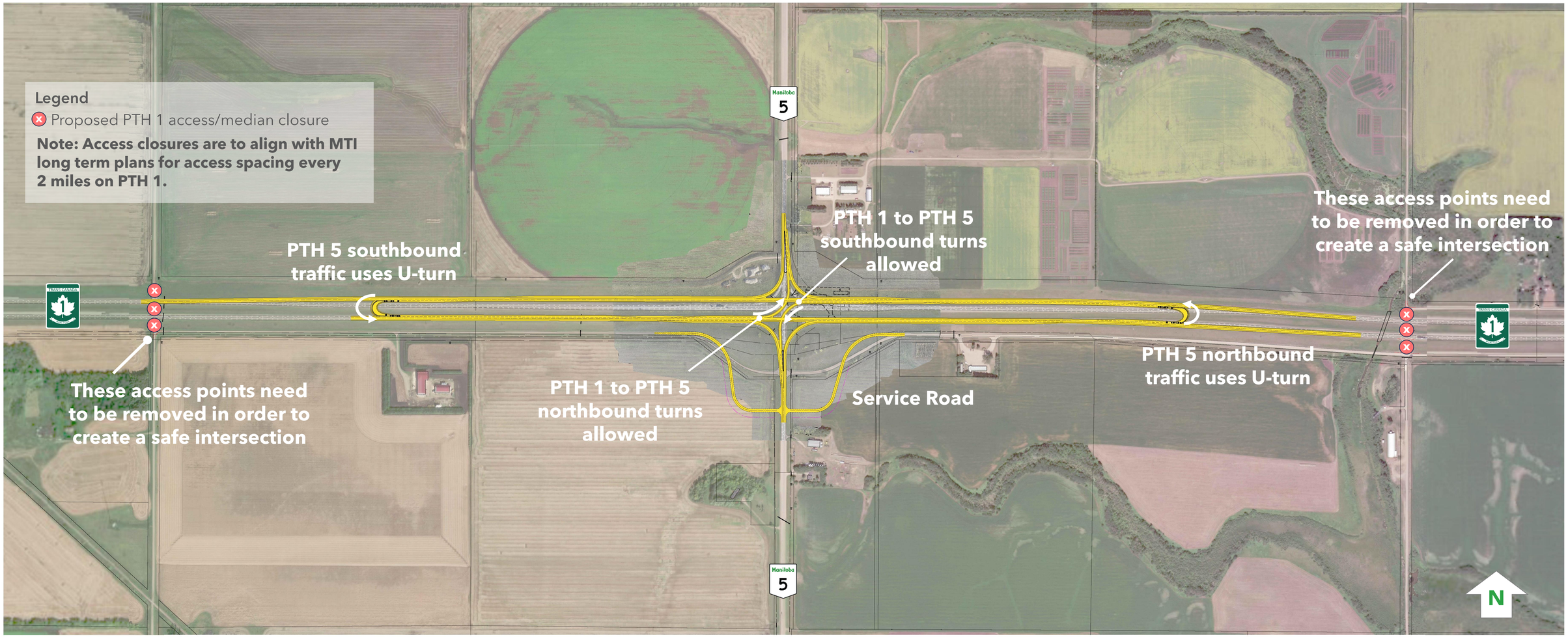
RCUT – Reduced Conflict U-Turn



- This alternative eliminates left-turn and through movements from the minor road (PTH 5), requiring drivers to U-turn at a safer location instead.
- Long acceleration and deceleration lanes are constructed to allow vehicles, including large vehicles, enough time to safely merge with vehicles on PTH 1.

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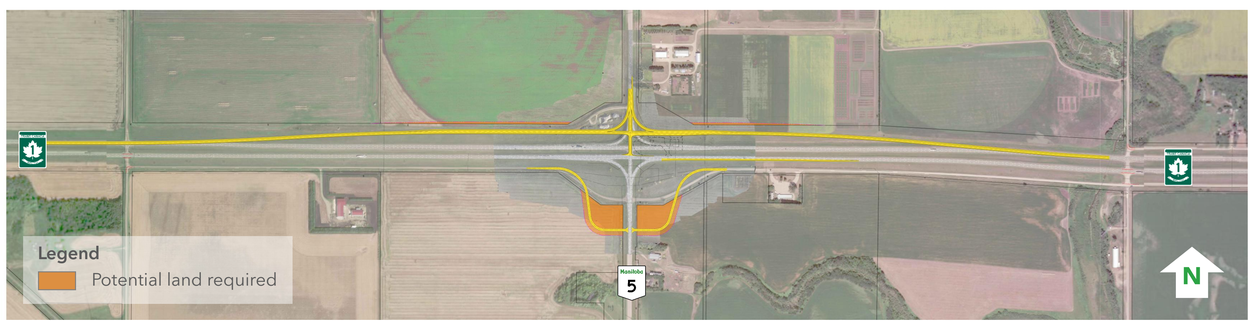
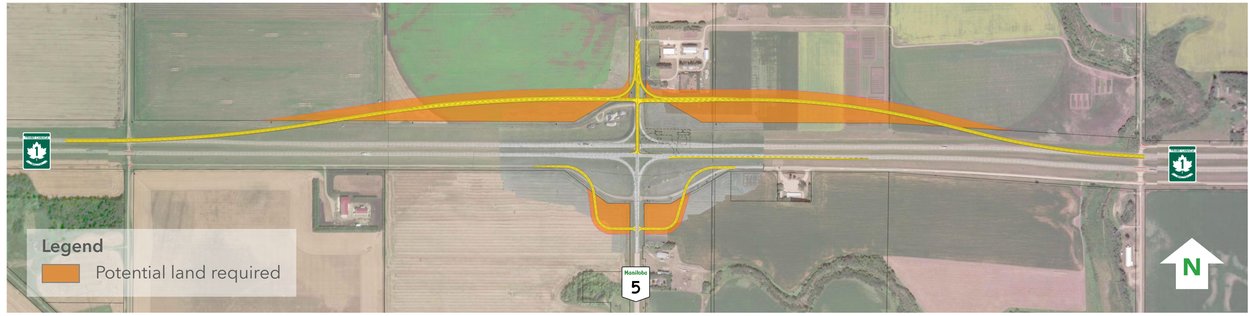
Potential Property Acquisition

Each option will include land acquisition to varying extents.

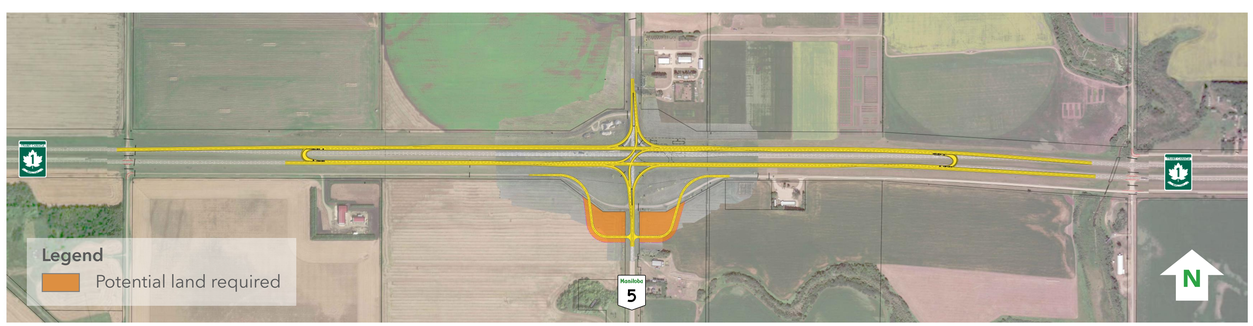
Widened Intersection



Split Intersection



RCUT – Reduced Conflict U-Turn



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Safety Analysis

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Safety Analysis

A safety analysis was completed to compare the performance of the Widened Median Intersection, Split Intersection, and RCUT alternatives.

- The study reviews numerous kinds of conflicts, these include merging conflicts, diverging conflicts, crossing conflicts, and predicted injury rates.

What are conflict points?

- A conflict point is defined as the intersecting point between two traffic movement paths.
- Crossing conflicts are more likely to result in severe collisions associated with right-angle collisions. Crossing conflicts are generally considered high-risk.
- Merging and diverging conflicts may be low-, medium-, or high-risk depending on speed and angle.

What about conflict severity?

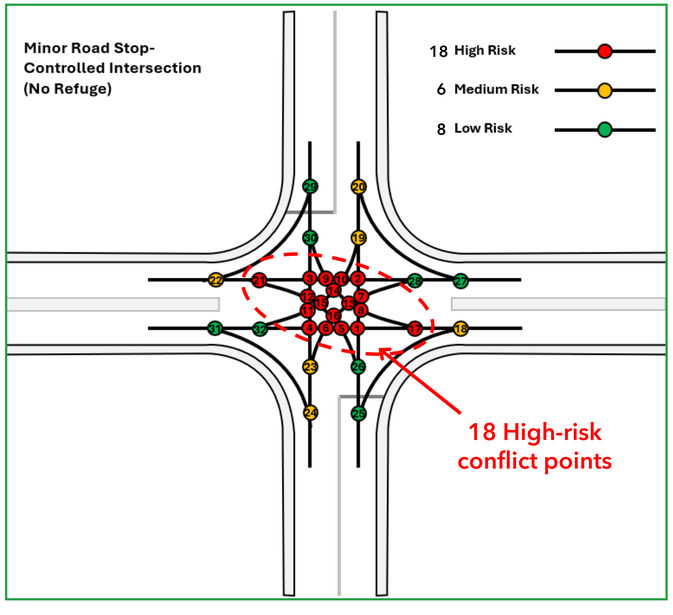
- The potential for a severe conflict outcome depends on two variables: speed and angle of impact as described on the chart to the right.

Risk	Angle	Speed Differential
High	90°	>50 km/h
Medium	45°	10-50 km/h
Low	10°	<10 km/h

Safety Analysis

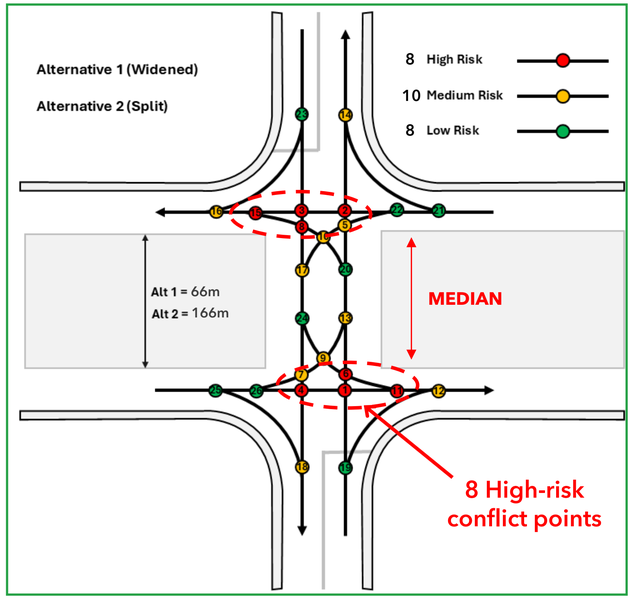
A safety analysis was completed to compare the performance of the three alternatives with respect to conflict points.

- The existing intersection has many high-risk conflict points clustered in a small area (each of the dots in this diagram represents a point where two vehicles can collide).



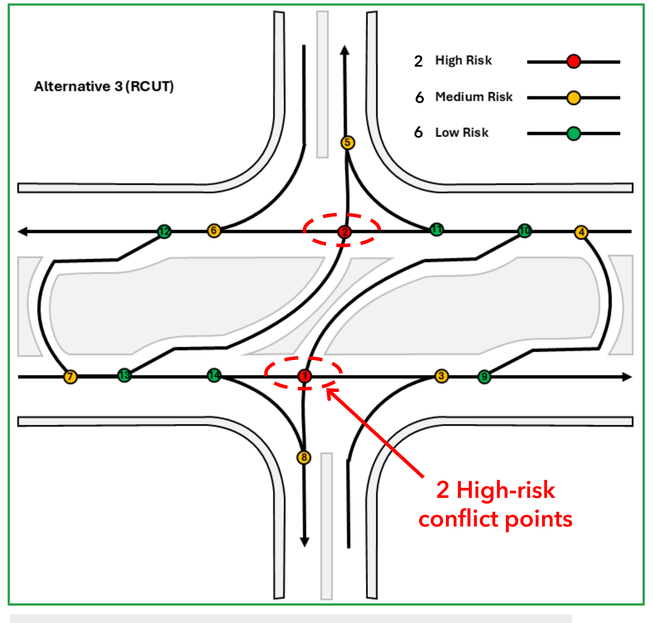
Existing Intersection

- The Widened Median Intersection and Split Intersection create a wider median, which reduces the number of high-risk conflict points and spreads them out between the PTH 1 eastbound and westbound lanes.



Widened Intersection and Split Intersection

- The RCUT dramatically reduces the number of high-risk conflict points and significantly spreads them out.



RCUT Intersection

Note: *Diagrams are not to scale.*

Safety Analysis

The safety analysis provided the following preliminary observations when comparing the performance of the three alternatives.

- Crossing conflicts are associated with more severe collisions. The existing intersection configuration has 16 crossing conflicts.
  - The Widened and Split reduce the number of crossing conflicts to **10 points**.
  - The RCUT reduces crossing conflict points down to **2 points**.

- In addition to the risk level, the study projects fatal and injury collision rates for each intersection type over a 28-year period (2026 to 2054).
  - The RCUT is expected to reduce fatal and injury collisions more significantly than the Widened and the Split.

	Total Conflict Points	Crossing Conflict Points
Existing	32	16
Widened	26	10
Split	26	10
RCUT	14	2

Traffic Operational Analysis

A traffic operational analysis was completed to compare intersection alternatives and the existing intersection configuration.

- The observations below were calculated for a future **2054** p.m. peak hour scenario. It is safe to assume that all times would be reduced when looking at the first day of implementation.
- The data indicates that all travel times are either reduced or similar with all three intersection types with only two exceptions.
- When travelling south on PTH 5 on average, it will take approximately 49 seconds longer than the existing intersection configuration to head eastbound towards Portage la Prairie and 67 seconds longer to continue south towards Carberry (see red box below).

	Travel Time (seconds)											
	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Current Conditions	166	140	81	106	73	71	87	90	71	83	89	71

	Travel Time Difference (seconds)											
Alternative 1: Widened Intersection	-57	-67	-15	-17	-15	-2	3	0	-1	2	0	-4
Alternative 2: Split Intersection	-58	-69	-15	-10	-6	-7	2	0	-1	13	0	-9
Alternative 3: RCUT Intersection	-9	0	-15	49	67	-1	4	0	0	2	0	0

Evaluation Criteria

- This slide illustrates the many considerations for evaluating options at a high level; all considerations are important.
- Other considerations can be added.

Social

- Impacts to residences and agricultural land
- Property acquisition likelihood
- Community access
- Driver education and expectation
- Driver workload
- Enforcement
- Heritage resources
- Snowmobile trail
- Emergency services
- Implementation timeline

Cost

- Capital Cost
- Maintenance Cost

Engineering

- Safety
- Addresses severe conflicts
- Visibility
- Turning movement mobility
- Traffic flow
- Local access disruption
- Operating speed
- Large vehicle navigation
- Geotechnical
- Drainage
- Maintenance
- Construction staging
- Use of existing road infrastructure
- Greenhouse gas
- Environmentally sensitive site risks

Evaluation Criteria

The chart on the next slide shows the three shortlisted intersection alternatives and relative advantages and disadvantages:

- Key topics raised as important by Rights Holders, stakeholders, the general public, and project team members are included.
- If a topic is missing, it can still be added to make sure it is properly considered.
- The alternatives that have the most green ratings are more preferred, while the alternatives that have more yellow and red ratings are less preferred.
- The selected alternative should be most effective for highway safety and efficiency, but also give consideration to the other topics.
- Once all perspectives are properly understood, and sufficient due diligence is undertaken, a preferred alternative can be selected and advanced to a detailed design stage.

Evaluation Criteria

- This chart illustrates the relative strengths and weaknesses of each intersection alternative.
- Alternatives that have fewer red ratings and more green ratings are more attractive than options that have more red ratings and fewer green ratings.
- The following are some notable differences among the options:
  - The RCUT performs better than the other alternatives when analyzing safety, including aspects such as **severe conflicts**. The Widened Median alternative performs the poorest of the three.
  - The Widened Median and Split alternatives perform better than the RCUT when looking at **large vehicle movements**.
  - The Split alternative performs the poorest of the three when looking at **using existing road infrastructure**.
  - The RCUT has minimal impacts to **residences**, **agricultural land**, and **land acquisition** when compared to the other two alternatives.
  - The RCUT performs better than the other alternatives when analyzing **driver workload**.

PTH 1 / PTH 5 INTERSECTION IMPROVEMENTS [Preliminary - Round 2B]		Alternative 1	Alternative2	Alternative 3
		RCUT - Reduced Conflict U-Turn	Widened Median Intersection	Split Intersection
SUMMARY EVALUATION		41	38	29
Engineering	Safety			
	Traffic Flow / Through Movement (PTH1)			
	Geotechnical			
	Drainage			
	Prioritizes PTH 1 (Accommodates offset volumes)			
	Visibility (sightlines)			
	Turning Movement Mobility			
	Local Access Disruption			
	Operating Speed			
	Construction Staging/Detours			
	Greenhouse Gas			
	Environmentally Sensitive Site Risks			
	Accommodates future interchange			
	Addresses Severe Conflicts			
	Traffic Flow / Through Movement (PTH5)			
	Visibility (environmental conditions)			
	Maintenance			
	Large Vehicle Navigation			
	Using Existing Road Infrastructure			
	Other ?			
Social	Community Access (Carberry/Neepawa)			
	Compliance / Enforcement			
	Potential Risks to Heritage Resources			
	Snowmobile Trail			
	Time to Implement			
	Impacts to Residences and Yards (views and noises)			
	Impacts to Agricultural Land and Irrigation systems			
	Property Acquisition Extent			
	Driver Workload			
	Driver Expectation/Education			
	Emergency Services			
	Other ?			
Cost	Capital Cost (Conceptual Comparison)			
	Capital Cost (Class D)			
	Maintenance Cost			
	Life Cycle Cost			
	TOTAL COST			

Better
Comparable
Not as Good

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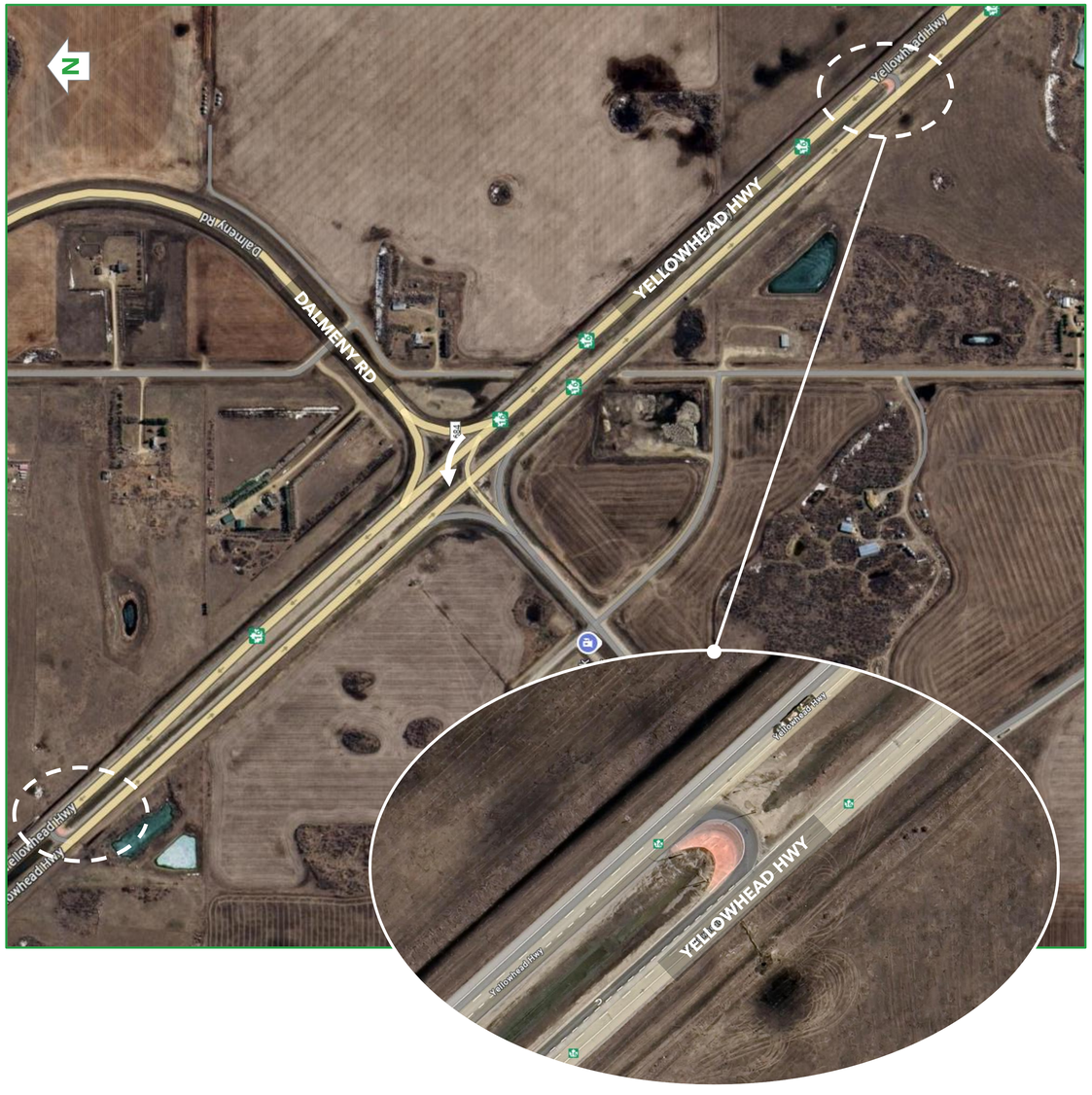
Additional Material

Since the RCUT alternative is a new idea for Manitoba, the following information is provided to help improve the understanding of this alternative. Please note a preferred alternative has not been selected.

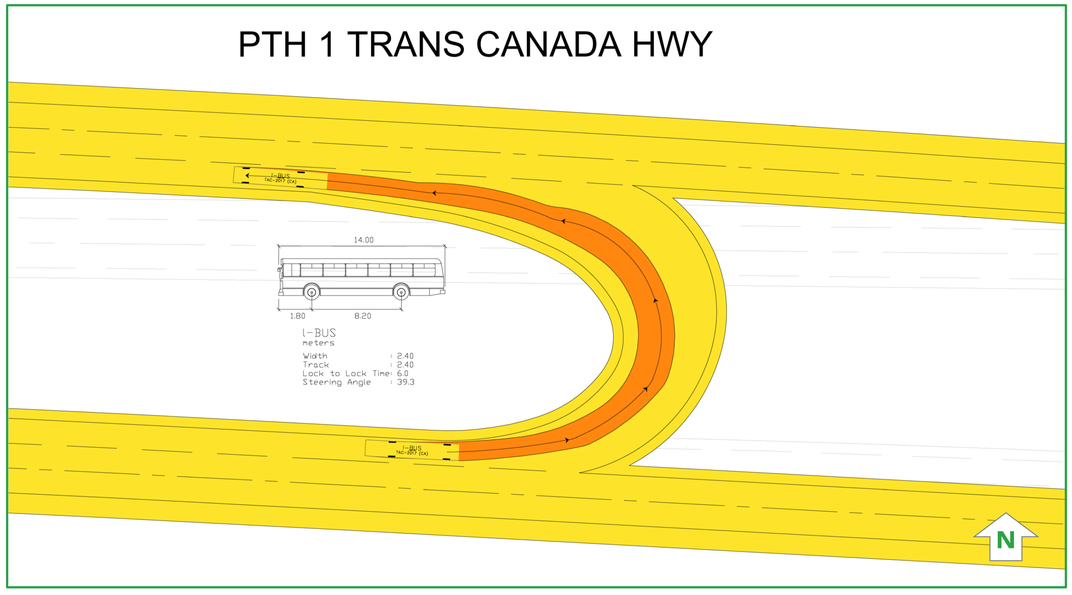
RCUT Reference

The RCUT intersection concept has been used successfully widely across the United States and adopted in Canada (Saskatoon, SK).

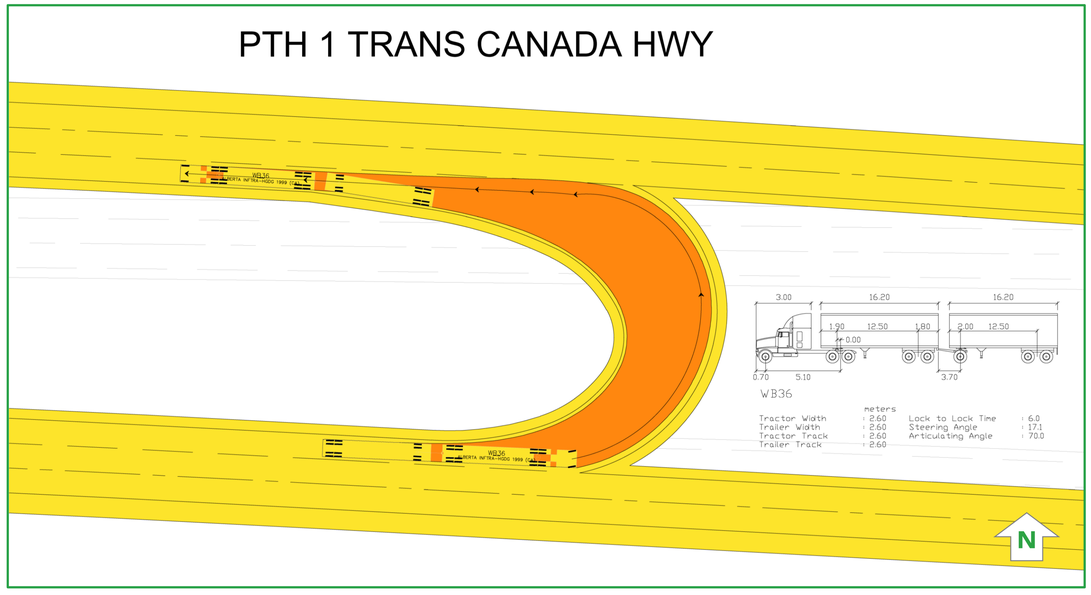


RCUT Turning Movements

These drawings illustrate the turning movements for a typical school bus and Long Combination Vehicle (LCV) when utilizing the RCUT. The orange filled area represents the wheel path of each vehicle as it moves through the U-turn.



School Bus Turning Movement



LCV Turning Movement

Decision Making Process

This slide outlines the decision-making process involved in the design study, illustrating the steps to select the preferred alternative for recommendation to MTI:

✓	1	Connect with Rights Holders, stakeholders, and the general public, share basic information about intersection types, and gather feedback.	Summer 2024
✓	2	Prepare a series of viable intersection alternatives and determine initial evaluation criteria.	
✓	3	Share intersection alternatives and preliminary evaluation and gather feedback.	Fall 2024
✓	4	Incorporate feedback into options evaluation.	
WE ARE HERE	5	Share more detailed alternatives and evaluation and gather feedback.	Winter/ Spring 2025
	6	Incorporate feedback into options evaluation and select a preferred alternative.	
	7	Share the preferred alternative and final evaluation.	

Project Milestones

This slide outlines illustrates project milestones to construction completion.

Detailed design
Fall 2025

Aggregate production
Winter 2025/Spring 2026

Traffic availability
Fall 2026
(Weather permitting)

01 02 03 04 05 06 07

Phase 3 Engagement Preferred alternative
Summer 2025

Construction tender advertised
Fall 2025

Commence onsite construction
Summer 2026
(Weather permitting)

Landscaping
Spring 2027

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Key Questions

- Does the evaluation process make sense to you? Would you add any considerations for the evaluation?
- What impacts or benefits do you see from your own perspective with these alternatives?

Your feedback will help the team identify topics of importance and specific information that can be incorporated into the evaluation of intersection alternatives.

PTH 1 and PTH 5 intersection looking southwest.

Next Steps

- Thank you for participating in this process.
- We will review the feedback from today's meeting and work to incorporate it into the study where possible.
- We will conduct a final round of engagement meetings in Summer 2025.
- In these meetings we will present a preferred alternative.

Thank You. Questions?

Thank you for attending today's meeting. Your feedback is important to us, so please fill out an online comment sheet at the following link:

https://www.surveymonkey.com/r/PTH1and5ImprovementsR2B

If you have any further questions, please contact:

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Donovan Toews
Landmark Planning & Design
Engagement Lead
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Reference Slides

Traffic Operational Analysis

A traffic operational analysis was completed to compare intersection alternatives and the existing intersection configuration.

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- The data indicates that all travel times are either reduced or similar with all three intersection types with only two exceptions.
- When travelling south on PTH 5 on average, it will take approximately 49 seconds longer than the existing intersection configuration to head eastbound towards Portage la Prairie and 67 seconds longer to continue south towards Carberry (see red box below).

	Travel Time (seconds)											
	Northbound			Southbound			Eastbound			Westbound		
	Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right
Current Conditions	166	140	81	106	73	71	87	90	71	83	89	71
Alternative 1: Widened Intersection	109	73	66	89	58	69	90	90	70	85	89	67
Alternative 2: Split Intersection	108	71	66	96	67	64	89	90	70	96	89	62
Alternative 3: RCUT Intersection	157	140	66	155	140	70	91	90	71	85	89	71