Transportation Environmental Study Report

Talbotville Bypass and Highway 4 Widening (GWP 3042-22-00)

February 2024

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SIGN OFF SHEET

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1.0 Overview of the Undertaking

1.1 Introduction

The Ontario Ministry of Transportation (MTO) retained Stantec Consulting Ltd. (Stantec) to complete the Preliminary Design, Detail Design, and Class Environmental Assessment (Class EA) Study to address the future needs of the Highway 3 corridor from Highway 4 near Talbotville in the Township of Southwold to Centennial Road in the City of St. Thomas.

The study has been divided into two Group Work Projects (GWPs):

- Highway 3 Twinning in the City of St. Thomas, Municipality of Central Elgin, and Township of Southwold (GWP 3041-22-00).
- Talbotville Bypass and Highway 4 Widening in the Township of Southwold (GWP 3042-22-00).

This *Transportation Environmental Study Report* (TESR) has been prepared to document the Preliminary Design and Class EA for the Talbotville Bypass and Highway 4 Widening project (GWP 3042-22-00). A TESR has also been prepared to document the Preliminary Design and Class EA for the Highway 3 Twinning project (GWP 3041-22-00) and is available under separate cover.

1.2 General Description of Project

The purpose of this project is to identify a Recommended Plan for improvements as part of the Ministry's ongoing review of safety and operational needs for the provincial highway network.

This project is a Group 'A' project under the *Class Environmental Assessment for Provincial Transportation Facilities* (2000) and includes undertaking environmental and engineering field investigations and seeking input from stakeholders, external agencies, Indigenous communities, and the public.

1.2.1 Study Area

The study area for the Talbotville Bypass and Highway 4 Widening project (GWP 3042-22-00) includes Highway 4 from Clinton Line to the new Talbotville Bypass, the route for the Talbotville Bypass from Highway 4 to Highway 3 near the area of Ron McNeil Line, and the existing Highway 3 from Ron McNeil Line to west of Wellington Road, in the Township of Southwold, Elgin County, as shown in **Figure 1**.

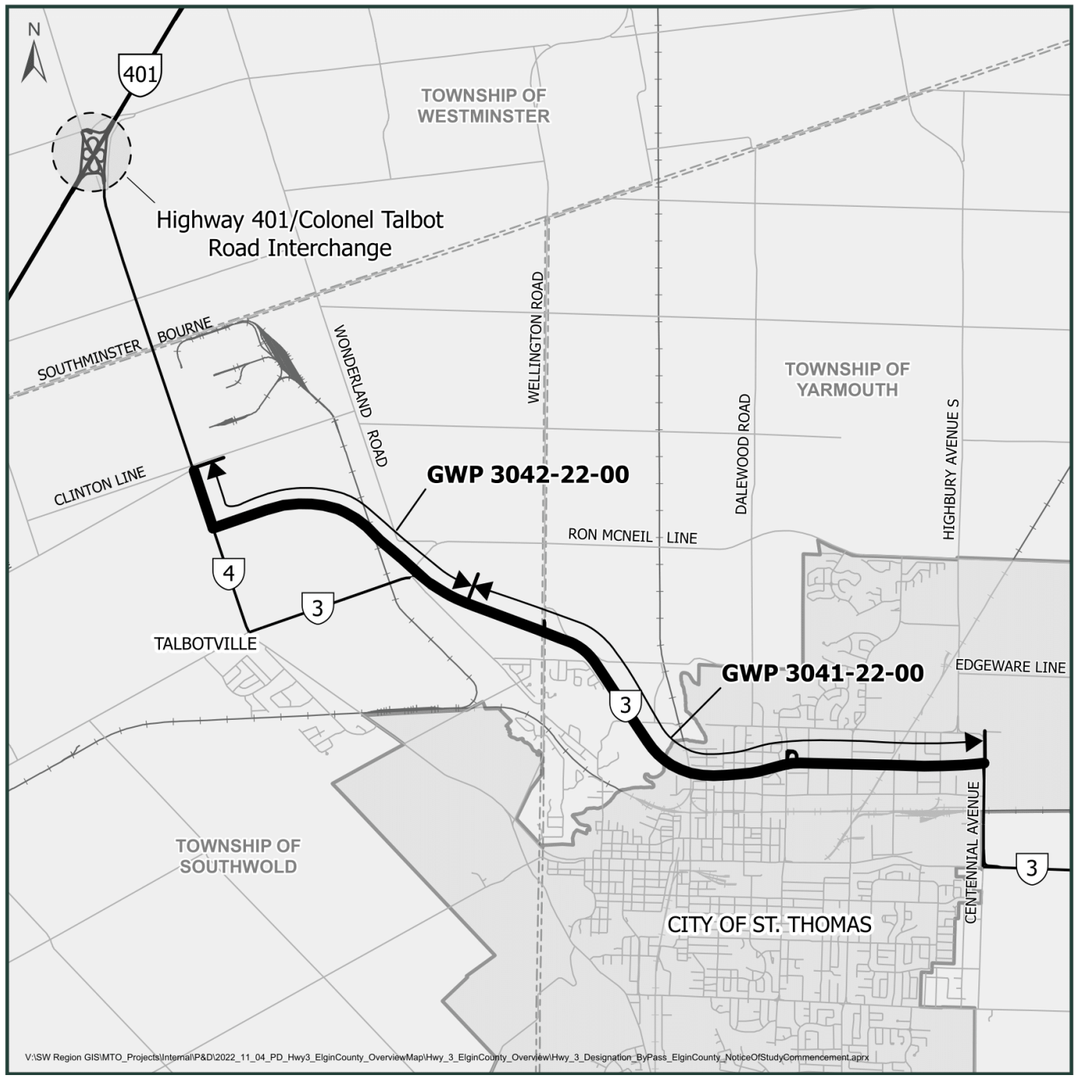

Figure 1: Study Area

1.3 Project Background

1.3.1 Function of Provincial Highways in the Study Area

Highway 3 is a King's Highway that provides a strategic connection to the City of St. Thomas and Highway 401 using Highway 4. Highway 3 allows for efficient movement of people and goods, with accommodation of heavy truck traffic along the highway. Access to Highway 3 is provided via existing intersections at Highway 4, Ron McNeil Line/Ford Road, Wellington Road, the existing First Avenue interchange, and Centennial Avenue. The intersection at Highway 3 and Highway 4 is signalized within Talbotville. Highway 3 provides a critical transportation link between Highway 401 and the growing industrial area within the City of St. Thomas.

The existing Highway 3 in the study area is an undivided two-lane highway that was constructed between 1974 and 1981. Generally, Highway 3 is at-grade west of Kettle Creek and in a cut east of Kettle Creek. There is an at-grade intersection with Ron McNeil Line in the study area.

Prior to construction of Highway 3, it was anticipated that the highway would be expanded from two to four lanes in the future. As such, the Highway 3 right-of-way in the study area was designed to accommodate a divided four-lane highway.

The existing Highway 4 within the study area is classified as an undivided four-lane road with centre turning lanes from Highway 401 southerly to approximately 75 m south of Longhurst Line. Highway 4 then transitions to an undivided two-lane road from 75 m south of Longhurst Line to Highway 3. Highway 4 acts as a primary transportation link between Highway 401 and Highway 3.

1.3.2 Previous and Adjacent Studies

In 1971, the Technical Advisory Committee for the City of St. Thomas and the Ontario Department of Highways completed a functional planning study for the St. Thomas Expressway from Highway 401 easterly to Highway 3 at New Sarum. This study recommended that the construction of both the St. Thomas Expressway and a new Highway 126 extension should consist of four-lanes of divided, controlled access highway, with the western extremity of the expressway interchanging at Highway 401 (approximately 4.5 km west of the existing Highway 4 interchange). In consideration of operating deficiencies that were estimated to occur over a 20-year planning period, four construction stages were recommended. The first stage would include the construction of a 10 km long, four-lane wide expressway between Highway 4 (north of Talbotville) and Centennial Avenue. This would complete the 'in-City' portion of the project and connect the expressway to the major existing highways. The recommended alignment was designated on January 20, 1976, and is the alignment followed for the current study. The second stage consisted of continuing the four lanes of expressway easterly for 6.0 km from Centennial Avenue to New Saum, to provide a direct connection to Highway 3. The third stage would provide a 5.0 km long connection from Highway 401 to Highway 4 with only two lanes of vehicular traffic. The fourth and final stage would consist of widening these two lanes to an eventual four lanes, once required.

In 2021, MTO retained WSP to undertake a feasibility study to confirm the need for a future conversion of Highway 3 designations to a controlled access highway, and to identify alternative connection locations and types for the future Talbotville Bypass extensions between Highway 4 and Elgin County Road 35. Following the evaluation of alternatives and a traffic analysis of the preferred alternatives, recommended designs for the Highway 3 Talbotville Bypass and Highway 3 East Bypass extensions were confirmed. The recommended alignment for the Talbotville Bypass followed the designation from the 1970s and included an extension northwest from the existing Highway 3/Ron McNeil Line intersection, with a connection to Highway 4, south of Clinton Line. The recommended design of the Talbotville Bypass did not include a connection from Ford Road to Highway 3/Talbot Line, but rather converted the existing Ford Road into a cul-de-sac to maintain access to private properties, and limited access to Ford Road and the surrounding residential development to Wellington Road and McBain Line. The recommended design for the East Bypass consisted of a 6.0 km long extension with a continuous connection to Highway 3 at the existing curve west of Belmont Road, 5.0 km east of the Highway 3/Centennial Avenue intersection. In addition, the existing Highway 3 was recommended to be realigned to meet the future bypass at a T-intersection west of the connection location. The existing cross-section for Highway 3 was recommended to be maintained for both the Talbotville Bypass and East Bypass, consisting of a two-lane undivided highway, with one 3.75 m wide vehicular lane in either direction and 2.5 m wide uncurbed shoulders; however, a right-of-way (ROW) width of 50 m was assumed for the East Bypass extension to accommodate future widening and the possible conversion to a divided freeway, if required.

MTO retained Stantec in 2022 to prepare a Conceptual Design of the Highway 3 Talbotville Bypass. The purpose of the assignment was to generate conceptual cross-section and intersection Design Alternatives to provide guidance to the subsequent Preliminary Design and Class EA Study. Design Alternatives related to the twinning of Highway 3 through the City of St. Thomas were beyond the scope of the assignment.

Presently, the City of St. Thomas is undertaking a Municipal Class EA Study for improvements to Highbury Avenue from Edgeware Road to Ron McNeil Line, and South Edgeware Road from Burwell Road to Highbury Avenue. The study includes improvements to the Highway 3 and Highbury Avenue intersection to improve connectivity with Highway 3. The Recommended Design includes the construction of a multi-lane roundabout (i.e., two approach lanes per direction) to the southwest of the existing intersection. An *Environmental Study Report* (ESR) was prepared documenting the Municipal Class EA planning and decision-making process. The 30-day public review period ended December 7, 2023. Detail Design and Construction are to follow, subject to funding and approvals.

The City of St. Thomas is also undertaking a Municipal Class EA Study for the construction of a Major Arterial Roadway Connection from the existing Highway 3 and Centennial Avenue intersection, easterly to Yarmouth Centre Road. The new roadway is being proposed to support the construction of a new industrial park located within the north-eastern city limits. The Recommended Design includes the construction of a new semi-rural road (with a 15 m median) between Centennial Avenue and Yarmouth Centre with associated infrastructure and intersection

improvements. The Recommended Design was presented as part of the study's second Public Information Centre, which was available on the City's website from October 18 to November 8, 2023. It is anticipated that the City's Municipal Class EA Study will be completed in 2024, with Detail Design and Construction to follow, subject to funding and approvals.

In July 2020, MTO and the County of Elgin initiated a Municipal Class EA Study to determine the need for road network improvements in the vicinity of Wonderland Road, Ron McNeil Line, Ford Road, and Highway 3 in the Township of Southwold. One Public Information Centre took place in April 2021. The Municipal Class EA Study was replaced in 2022 with the Highway 3 Twinning, and Talbotville Bypass and Highway 4 Widening studies.

2.0 Class Environmental Assessment Process

The purpose of Ontario's *Environmental Assessment Act* (EA Act) is to help protect and conserve Ontario's environment by requiring that projects subject to the EA Act follow a planning process leading to environmentally sound decision-making. For projects subject to the EA Act, an environmental assessment involves identifying and planning for environmental issues and effects prior to implementing a project. The process allows reasonable opportunities for public involvement in the decision-making process of the project.

The Class Environmental Assessment process is a planning process approved under the EA Act that provides a streamlined process that must be followed for projects or activities within a defined "class". When the Class EA planning process is adhered to for a project, the requirements of the EA Act are also fulfilled and formal approval under the EA Act is not required. The Class EA requirements must be met before a project can be implemented. Projects and activities that are defined with in a "class" are generally one that are recurring, carried out routinely and have predictable environmental effects that can usually be mitigated.

On December 15, 2023, the Ministry of the Environment, Conservation and Parks (MECP) granted approval for amendments to the MTO Class EA for Provincial Transportation Facilities, encompassing significant and minor revisions endorsed by both MTO and MECP. During the transitional phase of the 2023 Class EA, the Preliminary Design of this project will advance under the framework of the 2000 Class EA. Subsequent design phases will consider a transition to the 2023 Class EA, if eligible.

The word "environment" within the EA Act is broadly defined and can include aspects of the natural, social, economic, and cultural environments depending on the project in question. The *Class EA for Provincial Transportation Facilities* (2000) outlines the EA process to be followed for specific groups of provincial transportation projects. The groups of projects are as follows:

- Group "A" – Projects involving new facilities.
- Group "B" – Projects involving major improvements to existing provincial transportation facilities.
- Group "C" - Projects involving minor improvements to existing provincial transportation facilities.
- Group "D" – Activities that involve operation, routine maintenance, administration, and miscellaneous work for provincial transportation facilities. These activities are approved under the EA Act subject to compliance with applicable environmental legislation other than the EA Act.

This project is following the Class EA process for a Group 'A' project under the MTO Class EA, which is required for the construction of a new transportation facility and bypass. Group 'A' projects are considered approved under Ontario's EA Act subject to compliance with the Class EA.

The Class EA study process is based on an assessment of alternatives, starting with a broad perspective, and narrowing to a more focused perspective as the study progresses. The process of collecting additional environmental data as the project becomes more focused ensures that current information is sought and used throughout the study process. The public, stakeholders, and Indigenous communities were consulted/engaged during the assessment and evaluation of alternatives, and to refine issues/concerns in an attempt to develop measures for resolving them.

2.1 Purpose of the Transportation Environmental Study Report

This TESR documents the decision-making process and includes:

- A description of the project purpose.
- The existing technical, natural, socio-economic, and cultural environmental factors.
- Identification and evaluation of alternatives that were considered.
- Consultation activities, including a record of the comments received and how they were considered.
- The Recommended Plan.
- Anticipated environmental effects and proposed mitigation measures.
- Commitments to future work and monitoring.

The TESR fulfills the documentation requirements of the Class EA process for a Group 'A' project. The TESR is filed for a 30-day public comment period. If you have any questions and/or concerns regarding this study, please contact either one of the following individuals:

Kevin Welker, P.Eng.
Project Manager
Stantec Consulting Ltd.
400-1305 Riverbend Road
London, ON N6K 0J5
Phone: 519-675-6652
Email: comments@highway3elgin.ca

Deanna Pizycki, P.Eng.
Senior Project Engineer
Ministry of Transportation
659 Exeter Road, 3rd Floor
London, ON N6E 1L3
Phone: 519-859-7492
Email: comments@highway3elgin.ca

Interested persons may provide written comments to the study team by Tuesday, March 5, 2024.

In addition, a request may be made to MECP for an order requiring a higher level of study (i.e., requiring an individual/comprehensive environmental assessment approval before being able to proceed), or that conditions be imposed (i.e., requiring further studies), only on the grounds that the requested order may prevent, mitigation, or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights. Requests on other grounds will not be considered by MECP.

Requests should include the requester's contact information, full name, and specify what kind of order is being requested (i.e., request for conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy potential adverse impacts on Aboriginal treaty rights, and any information in support of the statements in the request. This will ensure that MECP is able to efficiently being reviewing the request.

The request should be sent in writing or by email to the MECP contacts listed below, as well as copied to MTO.

Minister of the Environment, Conservation and Parks
Ministry of the Environment, Conservation and Parks
777 Bay Street, 5th Floor
Toronto, ON M7A 2J3
Email: minister.mecp@ontario.ca

Director, Environmental Assessment Branch
Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, ON M4V 1P5
Email: enviropermissions@ontario.ca

Upon reviewing comments received from the public, the Minister of the Environment, Conservation and Parks may make a Section 16 Order on their own initiative within 30 days from the end of the public review period set out in the Notice of Completion. If no concerns or issues are outstanding within 60 days from the end of the comment period set out in the Notice of Completion, the project is considered to have met the requirements of the Class EA, and MTO may proceed to the design stage, subject to the commitments documented in the TESR, and obtain any outstanding environmental approvals.

The potential exists for final design plans completed during the next stage of planning and design to identify design modifications or refinements that may result in environmental benefits or impacts that were not anticipated or identified in this TESR. Under the 2000 Class EA, any changes that result in design modifications is to be discussed with affected external agencies, interested stakeholders, and property owners during the next study phase, and is to be documented in a *Design and Construction Report* (DCR). If significant changes are made to the project following completion of the TESR and eligibility for Environmental Clearance, a TESR Addendum may be required to document the project changes.

2.2 Environmental Clearance

If there are no significant concerns following the public comment period, or once the Minister of the Environment, Conservation and Parks has reviewed and considered any Order Requests, the project may be eligible for Environmental Clearance and continue to move forward. This will permit MTO to:

- Negotiate temporary and permanent property acquisitions, consistent with the project needs (including right-of-way designation).
- Relocate utilities.
- Initiate subsequent study stages (i.e., design and contract preparation) for the Recommended Plan.

The implementation of the identified improvements is dependent on funding and approvals.

3.0 Consultation

The main objective of consultation in the Class EA process is to ensure that project information is shared in a meaningful way, and that consideration is given to all aspects of the environment from the earliest stages of planning. Communication with potentially impacted and/or interested parties is key in the planning process and provides a mechanism for the proponent to define and respond to issues prior to key decisions being made. Recognizing this, the study team initiated a comprehensive consultation program from the onset of the study, as described herein.

All interested parties were offered early and ongoing opportunities to review study information and provide input to the decision-making process. To achieve this, a variety of communication strategies were used to engage the public, agencies, interest groups, property owners, and community members. As a first step, a Consultation Plan was developed and described the following elements:

- Study notifications (Notice of Study Commencement, Public Information Centre (PIC) 1 and *Study Design Repor*t Public Review, PIC 2, and Study Completion).
- Communication with external agencies in order to obtain pertinent technical information and identify the requirement for legislative or regulatory approvals related to the undertaking.
- Meetings with municipal staff (City of St. Thomas, Municipality of Central Elgin, County of Elgin, Township of Southwold).
- Communication with local residents, businesses, and local highway users.
- Two PICs (August 17, 2023, and November 22, 2023).
- 30-day comment period for the *Study Design Report* (August 17 to September 15, 2023).
- Notice of Study Completion/*Transportation Environmental Study Report* 30-day Comment Period (February 5, 2024).

Copies of the study notifications are provided in **Appendix A.** Copies of all public consultation materials are provided in **Appendix B** and are available on the project website (www.highway3elgin.ca under “Documentation”).

The input received from the public was incorporated into the project findings and recommendations, as appropriate, and responses were provided to all input received, a summary of which is provided in **Table 1**.

All project correspondence to/from the public was collected in accordance with the *Freedom of Information and Protection of Privacy Act*. Accordingly, with the exception of personal information, all public comments form part of the public record.

3.1 Public Consultation

As noted, four study notifications have been prepared and issued as part of this study, including Ontario Government Notifications (OGNs), to notify the public, federal, provincial, and municipal agencies, Indigenous communities, local community members, and other interested persons of the study at key points in the Class EA process. Notices were published in the *Dorchester Signpost*, *Aylmer Express*, *The Londoner*, and the *St. Thomas Times Journal* newspapers. The OGNs were also posted on municipal websites, specifically the City of St. Thomas, Municipality of Central Elgin, County of Elgin, and Township of Southwold. The OGNs were provided to agencies, key stakeholders, and Indigenous communities, as described in the subsequent sections. Copies of the OGNs are provided in **Appendix A**.

3.1.1 Project Website

A project website (www.highway3elgin.ca) was developed at the onset of the study to provide the public with easy access to project information, which was maintained throughout the study process, including background information, project team member contact information, PIC materials, links to project-specific documentation (i.e., study notifications, MTO Class EA Document, MTO Property Brochure) and supplementary information.

3.1.2 Project Email Address

A project email address was established for this study (comments@highway3elgin.ca) and was provided on all public consultation materials (i.e., notifications, PIC displays, and the project website). In addition, the project website allowed interested parties to contact the project team directly through the dedicated project email address, or by using the online comment form (secured with certified encryption).

3.1.3 Notice of Study Commencement

The purpose of the Notice of Study Commencement was to introduce the study to the public, agencies, stakeholders, and Indigenous communities to gather initial feedback.

The notice provided the purpose of the study, a brief overview of the Class EA process, a map of the study area, and offered project team contact information for members of the public to provide comments and/or questions about the study. The OGN was emailed (and mailed as required) to the public, agencies, stakeholders on June 1, 2023. The Notice of Study Commencement was communicated via newspaper advertisements in *The Londoner* and the *St. Thomas Times Journal* on Thursday, June 1, 2023. It was also posted on the project website.

A Canada Post marketing mailing (AdMail) was used to deliver a hard copy of the notice in flyer format to approximately 8,030 properties within Canada Post's delivery routes in the vicinity of the study area during the week of May 29, 2023.

A total of 44 comments were received by comment form, letters, emails, and phone calls following the Notice of Study Commencement up to, and beyond the requested submission date of July 7, 2023. A copy of the comments received from agencies and public and associated responses are provided in **Appendix B**.

3.1.4 Public Information Centre 1

The first PIC was held in person on August 17, 2023, at the Talbotville United Church located at 10734 Sunset Drive in the City of St. Thomas, Ontario. The PIC was held from 5:00 PM to 8:00 PM and was open to the public. External agencies, utility providers, and councillors were invited to attend a drop-in meeting at the same location from 2:00 PM to 3:00 PM, prior to the public meeting. PIC materials were provided on the study website (www.highway3elgin.ca) beginning on August 17, 2023, and comments were requested by September 15, 2023. Hardcopies of the PIC 1 materials were available on request. The purpose of PIC 1 was to provide the public and stakeholders with an opportunity to review the Transportation Needs Assessment, Existing Conditions, and Alternatives to the Undertaking, and to comment on the project activities to date. The purpose of the PIC was to also present and gather input on the existing study area conditions.

The PIC was advertised in *The Londoner* and the *St. Thomas Times Journal* on July 27, 2023. The Notice was also posted on the study website (www.highway3elgin.ca). In addition, the OGN was emailed (and mailed as required) to external agencies, businesses, stakeholders, property owners, and the general public on July 24, 2023. A Canada Post AdMail was used to deliver a hard copy of the notice in flyer format to approximately 8,015 properties within Canada Post's delivery routes in the vicinity of the study area during the week of July 24, 2023.

A total of 14 representatives from four external agencies attended the drop-in session from 2:00 PM to 3:00 PM, and 121 people attended the public drop-in session from 5:00 PM to 8:00 PM.

In total, 33 comments were received by the September 15, 2023, submission deadline.

A copy of the information presented at PIC 1, as well as the feedback received at, and following PIC 1 is provided in **Appendix B**.

3.1.4.1 Study Design Report Review Period

A *Study Design Repo*rt (SDR) is a requirement for Group 'A' projects following the Class EA process. The purpose of the SDR is to summarize the study process followed, document the planning decision made with respect to the assessment, and select the Preferred Alternative to the Undertaking. The report provides the basis for moving the study forward with confidence. The SDR included the Highway 3 Twinning (GWP 3041-22-00) project, despite it being a Group 'B' Class EA. Due to the proximity and interconnectedness of the Highway 3 Twinning, and Talbotville Bypass and Highway 4 Widening projects, the project team documented both Class EAs in the SDR.

A SDR was prepared and made available for 30-day public comment from August 17 to September 15, 2023, on the study website (www.highway3elgin.ca). Comments on the SDR were requested by September 15, 2023. A hardcopy of the SDR was available in person at PIC 1.

The Notice of SDR Review Period was a combined OGN with the Notice of PIC 1. The distribution of the OGN is detailed in Section 3.1.4. No specific comments were received related to the SDR.

3.1.5 Public Information Centre 2

The second PIC was held on November 22, 2023, at the St. Anne's Centre located at 20 Morrison Drive in the City of St. Thomas, Ontario. The PIC was held from 5:00 PM to 8:00 PM and was open to the public. External agencies, utility providers, and councillors were invited to attend a drop-in meeting at the same location from 2:00 PM to 3:00 PM, prior to the public meeting. PIC materials were provided on the study website (www.highway3elgin.ca) beginning on November 22, 2023, and comments were requested from the public by December 7, 2023, and from agencies by December 22, 2023. Hardcopies of the PIC 2 materials were available on request. The purpose of PIC 2 was to present the Evaluation of Alternatives, the Preferred Plan, and next steps in the Class EA process.

The PIC was advertised in in the *Dorchester Signpost* and *Aylmer Express* on November 8, 2023, and *The Londoner* and the *St. Thomas Times Journal* on November 9, 2023. The Notice was also posted on the study website (www.highway3elgin.ca). In addition, the OGN was emailed (and mailed as required) to external agencies, businesses, stakeholders, property owners, and the general public on November 6, 2023. A Canada Post AdMail was used to deliver a hard copy of the notice in flyer format to approximately 8,014 properties within Canada Post's delivery routes in the vicinity of the study area during the week of November 6, 2023.

A total of five representatives from three external agencies attended the drop-in session from 2:00 PM to 3:00 PM, and 135 people attended the public drop-in session from 5:00 PM to 8:00 PM.

In total, 28 comments were received by the December 7, 2023, submission deadline.

A copy of the information presented at PIC 2, as well as the feedback received at, and following PIC 2 is provided in **Appendix B**.

3.1.6 Summary of Public Comments

Over the duration of the study, many comments were received from the public, some of which could be categorized into common themes, including highway/interchange improvements, safety, agricultural equipment, noise, property impacts, active transportation, and the Preferred Plan.

Table 1 provides a summary of the main comments and themes and the associated response provided by the project team.

Table 1: Summary of Public Comments and Responses

Comment	Response Provided and/or Action Taken
Highway/Interchange Improvements	
Why is Highway 3 being widened to the north of the existing lanes, rather than the south?	The new Highway 3 lanes are proposed to be constructed to the north of the existing lanes to minimize impacts to private property and the natural environment.
Is Wonderland Road being widening as part of this study?	The widening of Wonderland Road is beyond the scope of this assignment; however, a new Parclo A interchange is recommended at Ron McNeil Line/Wonderland Road.
Is Highway 3 extending east of Centennial Avenue?	The Ministry is undertaking a Preliminary Design and Environmental Assessment Study for the existing Highway 3 from Highway 4 easterly to just west of Centennial Avenue. Our project will tie into the planned roundabout at Highbury Avenue which is being completed as part of a separate study being undertaken by the City of St. Thomas (link: Highbury Widening Class EA - City of St. Thomas (stthomas.ca)). St. Thomas is also undertaking a study for a major arterial roadway connection east of Highway 3/Centennial (Major Arterial Roadway Connection MCEA). The Ministry is looking to undertake a Planning, Preliminary Design and Environmental Assessment Study for Highway 3 east of St. Thomas. The timing of this study will be subject to funding and approvals. No information on the timing or extent of the study is available at this time.
Why weren't roundabouts at ramp terminals considered?	Based on existing and future traffic projections, it was determined that interchanges in the locations selected support the anticipated traffic volumes, connections to the existing sideroads, the proposed twinned portion of Highway 3, and the proposed Talbotville bypass. Some of the ramp terminals at the interchanges are recommended to have signalized intersections but were assessed for potential roundabouts. While roundabouts provide safety, the approach grades to the bridge over Highway 3 make the installation of roundabouts less desirable. In addition, roundabouts at the ramp terminals would present challenges for large agricultural equipment/vehicles and would require a larger footprint to accommodate the equipment. The signalized intersections reduce the overall footprint when compared to roundabouts, which also reduces impacts to private properties.
Traffic increases will make turning movements from Clinton Line, and Southminster Bourne onto Highway 4 more difficult. Are improvements to these intersections being considered?	Based on current and project travel demands, traffic signals at the intersection of Clinton Line/Longhurst Line and Highway 4 are not warranted, but a Gap Analysis will be completed in order to assess the movements of farm and commercial vehicles crossing/accessing Highway 4 from Clinton Line and Southminster Bourne.
Safety	
There are a lot of accidents at the Ron McNeil/Wonderland Road intersection. The detours will divert more traffic to this area. Has this been considered?	Please note that Public Information Centre (PIC) 2 presented a Preliminary Construction Staging Sequence to provide the anticipated construction timeline for each section of the corridor. It is anticipated that the Ron McNeil Line Interchange will be constructed in advance of the Wellington Road Interchange. We will review the need for temporary traffic signals for use during construction during the Detail Design phase. This will allow the new Ron McNeil Line/Wonderland Road Interchange to be available for vehicular traffic during the construction staging and potential detours of the Wellington Road Interchange.
Agricultural Equipment	
Will we be able to drive our large farming equipment on the interchanges?	The Preferred Plan at Ron McNeil Line/Wonderland Road and Wellington Road include bridges that will allow traffic (including farm vehicles) to cross over Highway 3. The current bridge design, as an example, will consist of a single through lane as well as a speed change lane and wide shoulders in each direction. Generally, the minimum dimensions from the centreline of the bridge

Comment	Response Provided and/or Action Taken
	include a 3.75 m through lane, 3.5 m speed change lane and a 1.75 m shoulder. This will accommodate agricultural equipment 22 ft (6.7 m) wide to cross the bridge in either direction and not occupy lanes in the opposing direction. Please note that farm equipment is not permitted to use Highway 3.
Will farm vehicles be able to use the roundabout at Highway 4?	Traffic speeds within the proposed roundabout at Highway 4 and the Talbotville Bypass will be significantly lower than mainline speeds, and sightlines will be designed to allow for road users to identify slower-moving farm equipment and adjust their speed accordingly.
Noise	
Are there noise mitigation measures being considered?	Please note, a Noise Assessment is being undertaken as part of the study. This work is ongoing, and findings will be presented as the study progresses, including the need for noise barrier walls along the highway corridor. The Noise Assessment will use current and future traffic data to model the sound levels caused by road traffic with and without the proposed improvements. The Noise Assessment work is being undertaken in accordance with the Ministry of the Environment, Conservation and Parks' (MECP) draft document titled *NPC-306, Methods to Determine Sound Levels Due to Road and Rail Traffic*, published in December 2021. If a noise barrier is required in the area of your property, it will be constructed within the Ministry's right-of-way.
Property Impacts	
How will our household and business be affected?	If an impact is confirmed, you will be contacted by the Ministry of Transportation Ontario at a later date with more information specific to your property. You can find more property information available online on the project website under "Documentation – Property Brochure" www.highway3elgin.ca. The property representative listed in the brochure would be able to answer general questions related to acquisition/costs/legal counsel, in advance of knowing exact impacts (Susan McKay, Property Supervisor, Tel: 519-319-0527 Email: Susan.McKay2@ontario.ca). Please note that future design phases could result in refinements to the preferred plan and/or adjust property requirements.
Active Transportation	
Will the improvements include bike lanes, walking paths, or pedestrian bridges?	New bridges constructed over Highway 3 will provide shoulder widths for future bike lanes.
Is there a way to accommodate a cyclist crossing at the Ford Road cul-de-sac?	The project team is considering opportunities for a safe active transportation connection within this area. Cycling will not be permitted on Highway 3.
Preferred Plan	
What are the estimated project start and completion dates?	Construction will follow the environmental assessment and design phase. It is anticipated that the project will be completed in phases. Construction could start as early as 2025, subject to funding and approvals. Details on the schedule will be provided as the study progresses.

3.2 Property Owners

Property owner dialogue has been ongoing throughout the project. Letters were mailed or hand delivered on September 29, 2023, October 24, 2023, and October 25, 2023, to the residents that are expected to be impacted by construction of the Recommended Plan and where the project team requires permission to enter property prior to completing field work.

In addition, MTO Property has been in direct contact with potentially impacted property owners to discuss the project and potential impacts.

3.3 Agency Consultation

As part of the study, the following external agencies were engaged:

Federal Agencies

- Transport Canada

Provincial Agencies

- Infrastructure Ontario
- Ministry of Natural Resources and Forestry (MNRF)
- Ministry of Citizenship and Multiculturalism (MCM)
- Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
- Ministry of the Environment, Conservation and Parks (MECP)

Municipalities

- Township of Southwold
- Municipality of Central Elgin
- City of St. Thomas
- County of Elgin

Local Elected Representatives

- MPP – Elgin-Middlesex-London
- City of St. Thomas – Mayor
- Township of Southwold – Mayor, Deputy Mayor
- Municipality of Central Elgin – Mayor

Emergency Services

- Ontario Provincial Police – West Region Headquarters
- Ontario Provincial Police – London OPP Satellite Detachment
- St. Thomas Police
- St. Thomas Fire Department
- Medavie EMS – Elgin (MEMSEO)
- Municipality of Central Elgin Fire Department
- Township of Southwold Fire Department

School Boards / Bus Service

- Southwestern Ontario Student Transportation Services
- London District Catholic School Board
- Conseil scolaire catholique providence
- Thames Valley District School Board
- Conseil scolaire Viamonde
- Service de transport Francobus

Other Stakeholders

- Kettle Creek Conservation Authority
- Railway City Cycling Club
- Elgin/St. Thomas Small Business Centre
- Elgin County Tourism
- Ontario Federation of Snowmobile Clubs
- Southwestern Ontario Snowmobile Region
- Ontario Trucking Association
- Elgin Federation of Agriculture
- Elgin Business Resource Centre
- St. Thomas Chamber of Commerce
- CN Rail

A copy of the agency mailing list is provided within **Appendix A**.

3.3.1 Agency Meetings

To date, two meetings were held with municipalities. The first meeting was held on October 5, 2023, to provide an update on the study progress, and to discuss construction staging and detours, active transportation, and traffic signals. The meeting was held via videoconference (i.e., Microsoft Teams).

The second meeting was held on December 13, 2023, to discuss the Recommended Plan, the closure of Ford Road, and the intersections of Clinton Line and Highway 4, and Southminster Borne and Highway 4. The meeting was held via videoconference (i.e., Microsoft Teams).

Monthly meetings will be established with municipalities as the project moves forward into Detail Design and implementation.

3.3.2 Agency Correspondence

Agencies provided comments throughout the duration of the study. A copy of all agency correspondence is provided in **Appendix B**.

3.4 Indigenous Community and First Nation Engagement

Indigenous communities and First Nations contacted with respect to this study were identified during the initial stages of the planning process. Through this review, the following Indigenous communities were identified as having interests within the study area, and were provided formal letter notification about this study in coordination with a Notice of Upcoming Study to gauge interest, the Notices of Study Commencement, PIC 1 and SDR, PIC 2, and Notice of Completion:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Chippewas of Kettle and Stony Point First Nation
- Chippewas of the Thames First Nation
- Delaware Nation at Moraviantown
- Munsee-Delaware Nation
- Oneida of the Thames
- Walpole Island First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council

A copy of all correspondence with Indigenous communities is provided in **Appendix B**.

3.4.1 Notice of Study Commencement

The Notice of Study Commencement and Request to Consult was sent via mail and email to the communities noted above on May 24, 2023. The purpose of this correspondence was to provide information related to the purpose, the Class EA process, and to invite each Indigenous community to participate in the consultation process.

3.4.2 Field Work Monitors

In May 2023, Stantec and MTO extended invitations to the Indigenous communities to join the archaeological crew during the Archaeological Assessment field work. Aamjiwnaang First Nation, Caldwell First Nation, Chippewas of the Thames First Nation, and Haudenosaunee Confederacy Chiefs Council signed participation agreements to participate in Stage 2 and Stage 3 Archaeological Assessments.

3.4.3 Public Information Centre 1

The Notice of PIC 1 and Notice of SDR Review Period and cover letter was sent via mail and email to the communities noted above on July 20, 2023. The purpose of the letter was to provide an update regarding the study, including PIC 1 and the SDR, which would present the Study Background, Existing Study Area Conditions, Alternatives to the Undertaking, and next steps in the Class EA process. The letter offered an opportunity to meet with ministry staff to discuss the study in more detail.

3.4.4 Public Information Centre 2

The Notice of PIC 2 and cover letter was sent via mail and email to the communities noted above on November 6, 2023. The purpose of the letter was to notify them of PIC 2, which would present and gather feedback on the Evaluation of Alternatives, the Preferred Plan, and next steps in the Class EA process. The letter offered an opportunity to meet with ministry staff to discuss the study in more detail.

3.4.5 Indigenous Community and First Nation Meetings

The Haudenosaunee Confederacy Chiefs Council and Haudenosaunee Development Institute (HDI) requested to meet with MTO to discuss the study. A virtual meeting was held on November 27, 2023. At the meeting, it was acknowledged that not all required personnel from HDI were in attendance. The meeting is planned to be rescheduled to accommodate HDI's availability and consultation with HDI will be ongoing as the design progresses.

4.0 Transportation Needs Assessment

The Transportation Needs Assessment was presented in Section 3 of the SDR and is available under separate cover. In summary, the assignment has been initiated to address the following problems and opportunities:

Problems

- Traffic on Highway 3 and Highway 4 through Talbotville will continue to increase as recent and future industrial, commercial, and residential growth occurs, which will impact safety in the community.
- Highway 3 is a two-lane undivided highway with at-grade intersections, which is not suitable for the anticipated increase in traffic generated by the recent and future industrial, commercial, and residential growth.

Opportunities

- Highway 3 improvements and the Talbotville Bypass are being planned as a provincial project to support future industrial, commercial, and residential growth in the County of Elgin and City of St. Thomas areas. The project aims to address projected travel demand and aid in network connectivity in the area.
- Widen Highway 4 to a four-lane undivided facility from the Talbotville Bypass to the existing four-lane section south of Clinton Line.
- Provide a four-lane divided Highway 3 between Centennial Avenue and Highway 4 to enhance safety and operations.
- Replace existing at-grade intersections with interchanges to promote free-flow movement along Highway 3 through the majority of the study area.

4.1 Alternatives to the Undertaking

The Class EA requires that ‘reasonable alternatives’ be considered in addressing identified problems and/or opportunities. This involves two levels of analysis. The Alternatives to the Undertaking considers a broad range of alternatives that could address the project needs. Once the best alternative is selected, the Alternative Methods of Carrying out the Undertaking are studied in greater detail. The Alternatives to the Undertaking considered as part of this assignment (i.e., for both the Talbotville Bypass and Highway 4 Widening project, GWP 3042-22-00, and the Highway 3 Twinning project, GWP 3041-22-00) consisted of the following.

4.1.1 Do Nothing

The “Do Nothing” alternative is used as the baseline for comparative evaluation of alternatives and is considered the status quo, where the area transportation system would be limited to maintenance of current transportation infrastructure and the implementation of approved provincial and municipal initiatives.

4.1.2 Optimize the Existing Area Transportation System

Considerations for the optimization of the existing area transportation system include Travel Demand Management (TDM) and Transportation Systems Management (TSM). The objective of TDM strategies is to improve the operation of the current area transportation system by managing travel demand independent of expanding or constructing new infrastructure. The objective of TSM is to improve the efficiency and safety of the current area transportation system and to optimize the use of existing and planned infrastructure through a wide range of strategies and technology policies and initiatives on existing municipal roads and existing provincial highways.

4.1.3 Expanded/New Non-Road Infrastructure

Expanded/new non-road initiatives include:

- New or improved transit service to potentially divert use of private cars and relieve congestion on existing municipal roadways.
- Increased freight rail services for goods movement within existing rail corridors and/or along new rail corridors could encourage the diversion of freight from trucks. The ability to expand rail service and divert longer haul goods to rail may provide some relief to network congestion both on regional arterial roads and the provincial highway network.
- Providing interregional transit and passenger rail and/or provincial transitways through new/increased services within the existing area transportation system and/or through new services in new corridors could relieve congestion and increase the performance of the area transportation system.

4.1.4 Widen/Enhance Existing Road Network

This alternative includes the widening/enhancing municipal arterial roads to improve capacity and operations and to provide congestion relief on existing facilities through additional lanes, thereby increasing the performance of the area transportation system.

4.1.5 Improve Highway 3 and Highway 4

This alternative includes the twinning and extension of Highway 3 (via the proposed Talbotville Bypass) and widening of Highway 4 to provide improved capacity and operations, and to increase the performance of the area transportation system.

4.1.6 Preliminary Assessment of Alternatives to the Undertaking

A process has been developed to evaluate the Alternatives to the Undertaking and to select only the most reasonable alternative(s) for more detailed study. This process allows unreasonable alternatives or alternatives that do not meet provincial policy requirements to be eliminated from consideration in advance of further developing the alternatives and undertaking the detailed evaluation stage.

The *Preliminary Assessment of the Alternatives to the Undertaking* uses the following screening criteria:

- Does the alternative realistically address all of the problems and opportunities?
- Does the alternative make a significant contribution towards realistically addressing all of the problems and opportunities?

Only those alternatives that satisfy at least one of the above criteria were carried forward.

The *Preliminary Assessment of the Alternatives to the Undertaking* is summarized in **Table 2**.

Table 2: Preliminary Assessment of Alternatives to the Undertaking

Alternatives to the Undertaking	Advantages/Disadvantages of the Alternative	Carried Forward?
Do Nothing The area transportation system would be limited to maintenance of current transportation infrastructure and the implementation of approved provincial and municipal initiatives.	× Increased costs for the delivery of goods and services. × Negative economic impact on industry and community quality of life. × Negative environmental impacts through increased fuel consumption and emissions. × Increased driver delay and stress. × Constrained employment and economic growth in the study area. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Optimize the Existing Area Transportation System Optimize the existing area transportation system via TDM and TSM.	× TDM and TSM are more applicable to commuter traffic than the predominant local, recreational, and commercial traffic on Highway 3. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Expanded/New Non-Road Infrastructure New or improved local transit service, increased freight rail services for goods movement, and/or providing interregional transit and passenger rail and/or provincial transitways through new/increased services	× The scattered origin/destination patterns of travel within and beyond the study area are not conducive to supporting the use of non-road alternatives. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Widen/Enhance Existing Road Network Widening/enhancing municipal arterial roads to improve capacity and operations and to provide congestion relief on existing facilities through additional lanes	✓ Provides congestion relief on existing facilities through additional lanes. × Municipal roads are not generally designed and maintained to the standards required for higher speed, long distance, interregional travel that is required through this study area. × Mixing long-distance and local traffic creates other transportation network concerns. × Constrained employment and economic growth in the study area. × Increased costs for the delivery of goods and services. × Loss of opportunity to improve highway safety, provide adequate future highway capacity, and address operational needs.	No. The alternative does not address the needs and opportunities for the study area, so it is not recommended to be carried forward.
Improve Highway 3 and Highway 4 Twinning and extension of Highway 3 (via the proposed Talbotville Bypass) and widening of Highway 4 to provide improved capacity and operations	✓ Provides an opportunity to improve highway safety. ✓ Provides future highway capacity and addresses operational needs. ✓ Maximizes the use of the existing highway corridor. ✓ Improves the existing highway to meet current MTO design standards. ✓ Bypasses areas of the existing highway constrained by adjacent development/facilities and protects the village of Talbotville from commercial/truck traffic.	**Yes. The alternative addresses the needs and opportunities for the study area, and it is recommended to be carried forward.**

5.0 Overview of Existing Conditions

Background studies and site-specific field investigations were carried out to support the examination of a reasonable range of alternatives and to assess existing environmental conditions in the study area. All significant features were identified to determine their sensitivity and potential for impacts associated with the project. All work was carried out in accordance with the requirements of the *Environmental Reference for Highway Design* (2006), which provides standards for the scope of work, evaluation of potential impacts, and proposed mitigation measures for MTO undertakings.

The background reviews to identify existing conditions were carried out between spring, summer and fall 2023. Significant environmental features and/or constraints identified as a result of the background studies were documented and considered during the development and evaluation of alternatives.

5.1 Natural Environment

An inventory of natural environment features within the study area was undertaken through a review of previous and relevant studies, field investigations, and information received from external agencies and the public during the course of this study.

5.1.1 Physiography, Geology, and Soils

Background information pertaining to physiography, geology, and soils was reviewed as part of the overall assignment and is documented in a *Groundwater Review Report*. As the review was undertaken for the overall assignment (i.e., both GWP 3041-22-00 and GWP 3042-22-00), the study area referenced in this section includes the study area for both GWPs.

The study area traverses three physiographic regions. The western portion of the study area is situated within the Ekfrid Clay Plain, the eastern portion of the study area is generally situated within the Mount Elgin Ridges, and the eastern limits of the study area crosses the St. Thomas Moraine. A review of the surficial geological mapping by the Ontario Geological Survey (2010) indicated that overburden in the study area is predominantly composed of silty to clayey till of glaciolacustrine origin, interpreted as Port Stanley Till, with extensive pockets of fine textured, massive to well laminated glaciolacustrine deposits of silt and clay with minor sand and gravel lying within the eastern portion of the study area. The study area also crosses minor occurrences of coarse textured glaciolacustrine deposits to the east of First Avenue and modern alluvial deposits of silt, sand, and gravel associated with watercourses. The overburden is underlain by limestone and shale, mapped by Armstrong and Dodge (2007) as the Dundee Formation. Overall, the study area is relatively flat, apart from the Kettle Creek valley.

Based on a review of MECP water well records (WWRs), limestone bedrock occurs at depths of about 62 m to 80 m below ground surface in the study area. WWRs indicated that overburden predominantly consists of clay and clay with stones/gravel in minor layers of sand and/or gravel that range in thickness from less than 1.0 m to 9.0 m.

5.1.2 Drainage, Surface Water, Groundwater, and Source Water

The overall study area for the assignment is located within the Kettle Creek Watershed and crosses Kettle Creek and several tributaries. Kettle Creek is predominantly a surface water driven system and has a warm water thermal regime. Kettle Creek flows southwesterly to southerly before discharging into Lake Erie at the Town of Port Stanley, located approximately 15 km south of the study area.

The Lake Erie Region Source Protection Committee (LERSPC) indicated that groundwater levels within the Shallow Overburden Aquifer typically follow the contour of the surficial topography, with groundwater flow predominantly flowing south towards Lake Erie. Groundwater flow is influenced by Kettle Creek, with local shallow flow directed to the main branch of the creek. Groundwater flow within the Deeper Overburden Aquifer follows a similar southerly flow towards Lake Erie. Groundwater flow within the Bedrock Aquifer is from the northeast towards Lake Erie and surface water features do not appear to have a significant impact on the bedrock groundwater flow direction.

The study area is located in the Kettle Creek Source Protection Area and Catfish Creek Source Protection Area. Most communities in/adjacent to the study area, including St. Thomas and smaller communities, obtain their municipal water supply from surface water sourced from Lake Erie. The water supply for nearby rural residences and businesses could not be confirmed.

Based on a review of the MECP WWRs, there are 102 WWRs within 250 m of the study area, with 14 water supply wells reported for domestic/livestock use, one for irrigation, one for industrial use, and two for cooling/air conditioning use. The remaining WWRs were reported as monitoring, observation, or test wells, abandoned, or provided no information on use. Additionally, local private water wells were installed between 1955 and 2012, with four wells completed within shallow overburden, 10 wells completed within intermediate/deep overburden, and three wells completed within bedrock.

Results of a door-to-door survey conducted in May 2015 by Golder (2015) within 250 m of Highway 3 from Highway 4 to Centennial Avenue, indicated a piped municipal water supply is generally available to properties within the area, apart from properties along Wellington Road, Water Tower Road, and Beck Line, which rely on private groundwater wells as the primary water supply. Golder identified 12 inactive and 10 active private water supply wells within the area surveyed. Of the 10 active wells identified, five were reported as shallow overburden installations

and the remaining five were reported as deep installations. The active shallow private wells are situated outside of the study area and 250 m buffer. The active deep private wells are reported to be associated with properties near the Wellington Road/Highway 3 intersection, on Beck Line, and Water Tower Line within the study area and/or 250 m buffer. There are also properties along Highway 4, Longhurst Line, Clinton Road, Wonderland Road, Ron McNeil Line, Wellington Road, and Water Tower Line that may be supplied by private groundwater wells that are not associated with mapped WWRs. The use of private groundwater wells at these properties was not confirmed.

The study area does not cross/intercept any Wellhead Protection Areas, Highly Vulnerable Aquifers, Significant Groundwater Recharge Areas, Intake Protection Zones, or Issue Contributing Areas.

5.1.3 Designated Areas

Designated Areas have special or unique value and are defined by government authorities and/or the public, and through legislation, policies, or approved management plans. These areas may have a variety of ecological, recreational, or aesthetic features and functions that are highly valued. Designated Areas include but are not limited to Provincially Significant Wetlands (PSWs), Areas of Natural and Scientific Interest (ANSIs), heritage rivers, and national and provincial parks. There are no Designated Areas in the study area.

Significant woodlands are present in the study area and occur within the jurisdiction of the Township of Southwold. The Township of Southwold Official Plan (2021) considers any woodland equal to or greater than 4.0 ha to be significant.

There are no other designated natural heritage features, such as wetlands, ANSIs, or significant valleylands present within the study area.

5.1.4 Terrestrial Ecosystems

The terrestrial ecosystem is defined as the interaction of land, air, water, and biotic components functioning as an ecological unit over space and time, and includes vegetation, wetlands, wildlife, and wildlife habitat. The primary terrestrial concerns related to transportation projects include loss of habitat or habitat function, and habitat fragmentation.

The study area is situated in Ecoregion 7E (Carolinian Forest Ecoregion), and more specifically, the Ecodistrict of 7E-2 (St. Thomas). This Ecodistrict consists of sand plains and kame moraines. The land use is predominantly agricultural, with the remaining areas devoted to settlement. Approximately 17% of this Ecodistrict remains as natural cover and is predominantly forest (Henson and Brodribb, 2005).

The study area was comprised mainly of agricultural areas with pockets of large mature deciduous forests, including significant woodlots. Thicket and meadow communities were also present along with rural residential areas with maintained grass and planted mature trees.

Field investigations were completed from May 10 to September 1, 2023. Surveys included documenting vegetation communities and vegetation species, wildlife habitat assessments, species at risk habitat assessments, incidental wildlife observations, and migratory bird nest surveys.

5.1.4.1 Species of Conservation Concern

Significant species are considered at a number of levels, including globally, nationally, and provincially. In Ontario, significant species include species that are provincially rare (with a Provincial S rank of S1 to S3) or listed as Endangered, Threatened, or Special Concern on the Species at Risk in Ontario List (SARO) and/or Schedule 1 of the federal *Species at Risk Act* (2002).

The Ontario *Endangered Species Act* (2007) prohibits harm or harassment to Threatened or Endangered species, and damage or disturbance to their habitat. The *Endangered Species Act* applies on all private and Crown owned lands in Ontario. Habitat protection under the *Endangered Species Act* typically includes all habitats that directly or indirectly support species at risk.

Federally protected Endangered, Threatened, and Special Concern species are listed in Schedule 1 of the *Species at Risk Act* and apply only to federally owned lands. Migratory bird species are protected under the *Migratory Birds Convention Act* (MBCA) *and* are afforded protection on all lands.

Provincial ranks (S-ranks) are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and vegetation communities. They are based on the number of occurrences in Ontario and are not legal designations. By comparing the global and provincial ranks, the status, rarity, and the urgency of conservation needs can be determined. Species with provincial ranks of S1 to S3, and those tracked by the MNRF, are considered species of conservation concern (SOCC). Provincial S-ranks are defined as follows:

- S1: Critically imperiled – usually fewer than five occurrences.
- S2: Imperiled – usually fewer than 20 occurrences.
- S3: Vulnerable – usually fewer than 100 occurrences.
- S4: Apparently secure – uncommon but not rare, usually more than 100 occurrences.
- S5: Secure – common, widespread, and abundant.
- S-rank followed by a “?” indicates that a rank is uncertain.

The potential for species at risk and SOCC to be present in the study area was evaluated based on the review of background information and field investigations. There were 10 species at risk and 12 SOCC identified in the background review that have been previously documented or have

the potential to occur within the study area. The detailed findings of the background review and field investigations are documented within the *Terrestrial Ecosystems Existing Conditions and Impact Assessment Report*. A copy of the report is on file with MTO.

5.1.4.2 Vegetation Communities

The study area was comprised mainly of agricultural areas with pockets of large mature deciduous forests, including significant woodlands in the study area. Thicket and meadow communities were also present along with rural residential areas with maintained grass and planted mature trees.

One provincially rare (i.e., S1 to S3) vegetation community was present in the study area; Fresh-Moist Shagbark Hickory Deciduous Forest Type (S3). There is also a Fresh-Moise Mixed Tallgrass Prairie community, which is ranked as S1, however, this community is a result of human activity of over seeding from adjacent agricultural fields and not naturally occurring. All other vegetation communities observed are common and widespread throughout Ontario.

Highly invasive European common reed, also known as Phragmites, was observed in several roadside locations throughout the study area.

5.1.4.3 Rare Vegetation

Botanical assessments were carried out in May, June, August, and September 2023. A total of 259 species of vascular plants were recorded, including:

- 168 species native to Ontario, and 91 exotic species not native to Ontario.
- 140 native species that have a provincial rank of S5, which indicates that they are common with a secure population in Ontario.
- 28 native species that have a provincial rank of S4, which indicates that they are uncommon to common, but not rare in the province and populations are apparently secure.
- No provincially rare (i.e., S1 to S3) vascular plants.
- One species at risk that was observed: Black Ash (*Fraxinus nigra*) (Endangered).
- Four highly sensitive native plant species with a high coefficient of conservatism value of 8, 9, or 10 that were observed, including: bluntleaf waterleaf (*Hydrophyllum canadense*; CC 8), Gray's sedge (*Carex grayi*; CC 8), grey sedge (*Carex grisea*; CC 8), and James' sedge (*Carex Jamesii*; CC 8).

5.1.4.4 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) is defined as habitat that is ecologically important in terms of features, functions, representation, or amount of contribution to the quality and diversity of an identifiable geographic area or Natural Heritage System and is protected under the *Provincial Policy Statement* (2020).

SWH includes species at risk habitat, seasonal concentration areas, rare vegetation communities or specialized habitat for wildlife, habitat for SOCC, and wildlife movement corridors.

Habitat for Species at Risk

A list of species at risk with the potential to occur in the study area was created using the results of the review of available background information. Habitat Assessments undertaken for the project determined that three bat species at risk have the potential to occur in the study area, including Northern Myotis, Little Brown Myotis, and Eastern Small-footed Myotis. Bat acoustic monitoring confirmed the presence of bat species at risk in the study area, and there is suitable habitat for bat species at risk within wooded areas in the study area. Black Ash was also documented within the study area. Construction of the proposed Talbotville Bypass may impact this habitat; therefore, authorization under the *Endangered Species Act* is anticipated to be required. Consultation with MECP will be initiated through submission of an Information Gathering Form during the next phases of the project.

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. The following candidate habitat for seasonal concentration areas were identified within the study area through the background review and during field investigations:

- Raptor Wintering Areas: Present in large woodlots in the study area. The woodlot contains a combination of forest and meadow communities that may support raptor wintering areas.
- Bat Maternity Colonies: Present in forested communities in the study area that contain suitable bat maternity trees and bats (including species at risk), which were recorded using automatic recording units.
- Reptile Hibernacula: A reptile hibernacula feature of fallen logs and debris was observed in the study area.
- Turtle Wintering Area: Potential for wetlands within the study area to support overwintering turtles.

Rare or Specialized Habitat

Rare or specialized habitats are two separate components of SWH. Rare habitats are habitats with vegetation communities that are considered rare in the province. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

Specialized habitats are microhabitats that are critical to some wildlife species. The following rare or specialized habitats were identified within the study area through the background review and during field investigations:

- Other Rare Vegetation Communities: A provincially rare Fresh-Moist Shagbark Hickory Deciduous Forest vegetation community is present within the study area.
- Bald Eagle and Osprey Nesting, Foraging, and Perching Habitat: Suitable habitat of treed communities is present adjacent to watercourses.
- Woodland Raptor Nesting Habitat: Suitable woodlot habitat present to support woodland raptor nesting habitat.
- Amphibian Breeding Habitat (woodland and wetland): Forest communities in the study area have the potential to support breeding amphibians. Two large vernal pools were documented in the Fresh-Moist Shagbark Hickory Deciduous Forest vegetation community in the study area.
- Woodland Area Sensitive Breeding Bird Habitat: Forest communities in the study area contain potentially suitable woodland areas sensitive breeding bird habitat.

Habitats for Species of Conservation Concern

Habitat for SOCC includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

Crayfish chimneys were observed in the study area, indicating the presence of suitable habitat and Terrestrial Crayfish individuals in the study area.

Potentially suitable habitat for the following Special Concern and provincially rare wildlife was also identified within the study area: Barn Swallow, Midland Painted Turtle, Snapping Turtle, and Eastern Milkshake. In addition, the presence of Monarch, Eastern Wood-pewee, Tufted Titmouse, and Wood Thrush, all Special Concern and/or provincially rare species, were confirmed during field investigations.

Animal Movement Corridors

Animal movement corridors are distinct passageways or defined natural features that are used by wildlife to move between habitats. Movement is usually in response to different seasonal habitat requirements. Amphibian movement corridors are the only type of animal movement corridor in Ecoregion 7E. These corridors are identified after amphibian breeding habitat (woodlands) is confirmed. Amphibian breeding habitat is potentially present where candidate SWH for amphibian breeding habitat (woodland and wetland) was identified.

5.1.4.5 Avian Species and Migratory Birds Nest Surveys

A breeding bird survey was completed on May 29 and June 30, 2023, following guidelines outlined in the 3rd Ontario Breeding Bird Atlas (OBBA 2023). Structures in the study area were also searched for the presence of migratory bird nests.

A total of 33 species of birds were recorded during the breeding bird surveys. The majority of species observed are ranked as S5 (common and secure in the province) or S4 (apparently secure in the province; uncommon but not rare). A Tufted Titmouse was observed within the Fresh-Moist Shagbark Hickory Deciduous Forest vegetation community and is ranked as an S3 (vulnerable) species, making it a SOCC. Two species listed as Special Concern under the provincial *Endangered Species Act* were also observed within the study area: Eastern Wood-Pewee and Wood Thrush.

None of the structures examined in the study area proposed work zone provided suitable habitat for Barn Swallow or other species protected under the *Migratory Birds Convention Act*. Under the 2022 updates to the *Migratory Bird Regulations* (MBR) within the *Migratory Birds Convention Act*, nests for 18 bird species receive year-round protection for a prescribed length of time ranging from 24 to 26 months.

Pileated Woodpecker was the only one of those 18 species that was identified as being potentially present in the study area. There were 17 trees within the study area that were assessed as potential Pileated Woodpecker nest cavities. Seven of these trees will be impacted by the proposed works and an additional three trees are within 30 m of the proposed alignment. A Pileated Woodpecker was observed within the Fresh-Moist Shagbark Hickory Deciduous Forest vegetation community to the northwest of the existing Highway 3 and Ron McNeil Line/Ford Road intersection. One individual was observed foraging throughout the forest. A roosting cavity was also observed in the American Beech/Ironwood Deciduous Forest located to the southeast of the existing Highway 3 and Ron McNeil Line/Ford Road intersection. The cavity was observed from Highway 3 right-of-way and a nest was not detected at the time of the survey.

5.1.4.6 Bat Species and Habitat

Trees within the MTO right-of-way and portions of the study area were assessed on May 10, 2023, to identify trees that meet the criteria to support potential maternal roosts of species at risk bats (i.e., cavities and peeling bark). Due to the size of the study area and restrictions on property access, it was not possible to assess all trees in the study area. As such, field investigations were focused on areas with trees that were likely to support the highest quality habitat and areas with the best candidate roost trees were identified.

An acoustic survey was also completed to identify the bat species, including bat species at risk, which were present in the study area. Nine Wildlife Acoustics SM4 bat detectors were deployed within areas where suitable bat habitat was identified during the Bat Habitat Assessment described above. These devices passively record the ultrasonic echolocation calls of passing bats. Detectors recorded for 26 or 33 nights and were retrieved between June 23 and June 30, 2023. Recordings were taken from 30 minutes prior to sunset until 30 minutes after sunrise.

Seventeen suitable bat maternity roost trees were identified within the study area on May 10, 2023, during the leaf-off period; however, the entire study area was not able to be searched, so this is considered to be an underestimate of the number of suitable bat trees.

Six bat species were recorded during the acoustic surveys, including Northern Myotis, a species at risk. Four Northern Myotis calls were recorded in the Fresh-Moist Shagbark Hickory Deciduous Forest intersection. Additional calls were made by bat species at risk (i.e., *Myotis* species); however, the species that made these calls could not be identified. These calls could have been made by Little Brown Myotis, Northern Myotis, or Eastern Small-footed Myotis, all species at risk. Although the species that made the calls could not be identified, the calls confirm that bat species at risk are present within the study area. Four additional bat species were recorded in the study area, including Big Brown Bat, Hoary Bat, Silver-haired Bat, and Eastern Red Bat. These species of bats are not species at risk.

5.1.5 Fish and Fish Habitat

Lakes, rivers, streams, ponds, and wetlands provide fish habitat. Seasonally flooded areas and watercourses with intermittent flow can also provide important habitat for some fish species at certain times of year. In-water structures such as logs, stumps and other woody debris, pools and riffle areas, riparian and aquatic vegetation, and groundwater discharge areas provide habitat structure and diversity.

Fish communities and fish habitat were assessed as part of this study based on a review of existing/available information and field investigations. Background information was obtained from MNRF and published resources, and field investigations were carried out on May 30 and July 18, 2023. The findings of these investigations are documented within in the *Fish and Fish Habitat Existing Conditions Report*, a copy of which is on file with MTO. Field investigations were conducted according to MTO's *Environmental Reference for Highway Design* (MTO 2013) and the *Interim Environmental Guide for Fisheries* (MTO 2020).

Within the study area, two watercourses support warmwater fish communities and provide direct fish habitat. The Unnamed Tributary to Dodd Creek (Lindsay Drain/Lindsay Drain Extension) and Auckland Drain support small-bodied fish species (cyprinids). The Unnamed Tributary to Dodd Creek (East) (Henderson Drain) is a mapped watercourse within the study area but it is not a surface water drainage feature and does not provide fish habitat.

There are no records of federally or provincially regulated aquatic species at risk in watercourses within the study area.

5.1.6 Summary of Key Terrestrial Ecosystems and Fish and Fish Habitat Features

Detailed terrestrial and aquatic studies have been conducted as part of this study to confirm information gathered from secondary sources. Key ecological characteristics of the region include:

- Migratory bird nests may be present in vegetation throughout the study area. No nest were observed on structures, but new nests could be established in subsequent years.
- Seven Pileated Woodpecker cavity trees were documented within the proposed work zone and an additional three nests within 30 m of the work zone. Nests of Pileated Woodpecker are protected under the *Migratory Bird Regulations Act* (2022).
- Deciduous swamps, deciduous swamps, and meadow marshes are present in the study area.
- Four significant woodlands identified within the Township of Southwold Official Plan are present within the work zone.
- SWH within the study area includes the following: Raptor Wintering Area, Bat Maternity Colonies, Turtle Wintering Area, Reptile Hibernaculum, Amphibian Breeding Habitat, Rare Vegetation Communities, Woodland Raptor Nesting Habitat, Woodland Area-Sensitive Bird Breeding Habitat, and Terrestrial Crayfish.
- Northern Myotis and possibly other bat species at risk (i.e., Little Brown Myotis and/or Eastern Small-footed Myotis) are present in forest communities in the study area.
- One plant species at risk, Black Ash (Endangered), was identified in the study area.
- Potentially suitable habitat for the following Special Concern and provincially rare wildlife was identified within the study area: Barn Swallow, Midland Painted Turtle, Snapping Turtle, and Eastern Milksnake.

- Monarch, Eastern Wood-pewee, Tufted Titmouse, and Wood Thrush, all SOCC, were observed during field investigations. These species and their habitat are not afforded protection under the *Endangered Species Act.*
- Two provincially rare vegetation communities were present in the study area: Fresh-Moist Shagbark Hickory Deciduous Forest and Fresh-Moist Mixed Tallgrass Prairie Ecosite.
- The Unnamed Tributary to Dodd Creek (Lindsay Drain/Lindsay Drain Extension) and Auckland Drain support warmwater fish communities and provide direct fish habitat within the study area.

5.2 Tree Inventory

A Tree Inventory was completed in 2023 to assess trees located within the study area. Trees 10 cm diameter at breast height (DBH) and greater located within the study area were tagged and recorded in a Detailed Tree Inventory (DTI), and large groupings or stands of trees were recorded in a General Tree Inventory (GTI). The data collected for each tree took into consideration the condition of the tree, and specific details about the species and health.

A total of 6587 trees were observed within the study area as part of the DTI, and 2341 stems were observed as part of the GTI.

Additional details regarding trees to be preserved and trees to be removed, along with construction mitigation and management, are provided in Section 8.0.

5.3 Socio-Economic Environment

5.3.1 Land Uses

The study area is located in the Township of Southwold in Elgin County. The Township of Southwold Official Plan (2021) provides guidance for land use and development in the study area. The Talbotville bypass route is primarily designated as Industrial land, with areas designated as Agricultural near Highway 4 and near the existing Highway 3 and Ron McNeil Line/Ford Road intersection. To the east of the intersection, lands are designated as agricultural to the north of Highway 3, and residential and agricultural to the south of Highway 3 out to the eastern extent of the study area. Additionally, the majority of the study area is within the proposed Talbotville Settlement Area Boundary, except for the area east of Wonderland Road and north of Highway 3.

Additionally, there are no records of petroleum wells in or adjacent to the study area. Likewise, there are no aggregate operations (i.e., pits or quarries) in proximity to the study area.

5.3.2 Potentially Contaminated Property

A Contamination Overview Study (COS) was completed to determine the potential for the presence of subsurface contamination in the study area associated with current or historical land uses in and adjacent to the study area. The COS included a review of available background information and datasets and completion of a site reconnaissance in the study area.

The COS identified several potential sources of contaminating activities, including records of historical spills, railway operations, pesticides manufacturing and storage, hazardous waste generation, wood treatment/preservation operations, storage of treated/preserved wood products, and fuel storage. In total, six Areas of Potential Environmental Concern were identified within and/or adjacent to the study area. More detailed information is documented within the *Contamination Overview Study Report*, a copy of which is on file with MTO.

5.3.3 Student Transportation Services

Southwestern Ontario Student Transportation Services and Service de transport Francobus provide students with transportation services to and from schools in the City of St. Thomas. These companies will continue to be consulted during future phases of the project and will be advised of potential impacts to their operations.

5.3.4 Navigable Waters

Navigable waters include bodies of water that are used by vessels for any part of the year as a means of transport or travel for commercial or recreational purposes, or as a means of transport or travel for Indigenous peoples of Canada exercising rights recognized and affirmed by section 35 of the *Constitution Act* (1982).

Upon review, it does not appear as if there are navigable bodies of water in the study area.

5.3.5 Recreational Trails

The Township of Southwold Official Plan (2021) and Elgin-St. Thomas Cycling and Hiking Trail Map (2018) do not identify any recreational trails or cycling routes that cross or utilize portions of the study area.

5.3.6 Emergency Services

Emergency services include police, fire, and medical service providers. The following is a summary of the emergency service providers in the study area:

- The Ontario Provincial Police, Elgin County Detachment, St. Thomas Police Services and West Region Headquarters provide policing to the area.

- Southwold Fire Department provides fire and emergency response to the area.
- Medavie EMS Elgin Ontario provides ambulance services to the area.

5.3.7 Agriculture

There are active agricultural land uses throughout the study area. These agricultural lands are predominantly used to grow row crops (i.e., corn, soybeans, etc.), and there are no designated specialty crop areas in the study area. The Elgin Federation of Agriculture is the affiliate of the Ontario Federation of Agriculture that represents farmers in and adjacent to the study area.

5.4 Cultural Environment

5.4.1 Archaeological Resources

A Stage 1 Archaeological Assessment (Project Information Form number P422-0029-2022) of the overall assignment's study area (i.e., the study areas for GWP 3041-22-00 and 3042-22-00) was carried out in accordance with the Ministry of Citizenship and Multiculturalism's (MCM) *Standards and Guidelines for Consultant Archaeologists* (2011) and the Office of History and Archaeology (OHA) to determine the potential for the presence of known and/or potential archaeological resources in the study area based on a review of relevant background information and a site visit conducted on February 21, 2023, and May 30, 2023. As the assessment was undertaken for the overall assignment, the study area referred to in this subsection includes the study areas for both GWP 3041-22-00 and GWP 3042-22-00.

Archaeological potential is established by determining the likelihood that archaeological resources may be present within the study area. Criteria to determine archaeological potential includes the proximity to registered archaeological sites, distance to various types of water sources, soil texture and drainage, glacial geomorphology, elevated topography, and the general topographic variability of the area; however, extensive land disturbance can eradicate archaeological potential. Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and considered alone, may result in a determination of archaeological potential; however, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential.

Kettle Creek and several of its tributaries, as well as tributaries of Dodd Creek, cross through the study area. Ancient and/or relic tributaries of other water sources may have existed but are not identifiable today and are not indicated on historical mapping. Soil texture can also be an important determinant of past settlement, usually in combination with other factors, such as topography. A review of soils in the study area indicates that soils would have been suitable for Indigenous agricultural purposes. A review of the MCM's *Ontario Archaeological Sites Database* has shown that there are 18 registered Indigenous archaeological sites within 1.0 km of the study area. Historical background information from Jesuit missionary accounts also suggests the presence of Indigenous villages and camps within the general vicinity of the study area.

Archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements, early transportation routes, and properties listed on the municipal register or designated under the OHA or property that local histories or informants have identified with possible historical events, activities, or occupations. Historical mapping demonstrates that the study area was occupied by Euro-Canadians as early as the mid-to-late 19th century. Much of the established road and rail networks and agricultural settlement from the 19th century is still visible today. Historical mapping illustrates many 19th century structures and homesteads within, or in proximity to, the study area. Adding to these observations is the presence of two registered Euro-Canadian archaeological sites within 1.0 km of the study area.

The Stage 1 Archaeological Assessment determined approximately 76.93% of the study area retains archaeological potential. The remaining portions of the study area (approximately 23.07%), retain low to no archaeological potential due to low and wet areas, areas of steep slope, areas subject to previous archaeological assessment, and areas subject to deep and extensive modern disturbances, such as existing gravel and asphalt laneways, driveways, draining ditching, sidewalks and parking lots, residential and commercial buildings, and buried utilities or other municipal infrastructure. A Stage 2 Archaeological Assessment will be undertaken for portions of the study area where construction activities are anticipated to impact areas of archaeological potential. Stage 2 Archaeological Assessment work is ongoing and will continue in 2024 when weather permits. A Stage 2 Archaeological Assessment is not required for areas determined to have low to no archaeological potential.

A *Stage 1 Archaeological Assessment Report* has been prepared to document the findings of the assessment and its recommendations. The report has been entered into the Ontario Public Register of Reports and is on file with MTO.

5.4.2 Built Heritage Resources

A *Cultural Heritage Report* (CHR) was undertaken in 2023 to identify any heritage resources, including built heritage and cultural heritage landscapes, present within, and adjacent to the study area. A land use history was completed to provide a cultural context for the study area, and to inform the evaluation of each property. In addition, the MCM, the Ontario Heritage Trust, and local municipalities were consulted.

A vehicular windshield survey was also undertaken to confirm existing study area conditions, identify potential heritage resources within, and adjacent to the study area, and to confirm the presence of previously identified heritage properties.

Potential heritage resources were identified, inventoried, and evaluated according to Ontario Regulation (O. Reg.) 9/06, the criteria for determining cultural heritage value or interest (CHVI) (Government of Ontario).

Based on the findings of the evaluation, four built heritage resources were identified within a 50 m buffer of the study area. The CHR is on file with MTO.

5.5 Indigenous Communities

The following Indigenous communities/organizations have interest in the study area:

- Aamjiwnaang First Nation
- Caldwell First Nation
- Chippewas of Kettle and Stony Point First Nation
- Chippewas of the Thames First Nation
- Delaware Nation at Moraviantown
- Munsee-Delaware Nation
- Oneida of the Thames
- Walpole Island First Nation
- Six Nations of the Grand River
- Haudenosaunee Confederacy Chiefs Council

5.5.1 Historical Occupation

It has been demonstrated that Indigenous people began occupying southern Ontario as the Laurentide glacier receded, as early as 11,000 years ago. Contact between Indigenous and European cultures in what is now the province of Ontario broadly occurred in the 16th century. The precise moment of contact is unknown.

The post-contact Indigenous occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking communities by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century.

In the winter of 1626-1627, Recollet Father Daillion travelled through the region of the study area along the north shore of Lake Erie and encountered numerous villages occupied by the Neutral, also called Attikadaron, Atiouandaronk, and Attiwondaronk, who cultivated fields of maize, tobacco, and squash, in addition to hunting and fishing. In 1641-1642, the Jesuit missionaries Brebeuf and Chaumonot passed through 28 Neutral villages and gave some of them Christian names, which appear on Sanson's 1656 map of New France. The village of St. Alexis appears to be located near what may be Kettle Creek, but the rivers and creeks are not named on the map and their depicted locations are not entirely accurate; therefore, the exact location of the village cannot be determined. Population estimates of the Neutral, compiled by the Jesuits, range from 12,000 to 30,000 people. In 1650, the Iroquois Confederacy declared war on the Neutral, and they were expelled from their villages and lands. Once the Iroquois moved further into southern Ontario, the Ojibway moved into the Bruce Peninsula and the surrounding area.

By the 1680s, Mississauga people had begun to re-enter the lower Great Lakes basin. In southern Ontario, members of the Three Fires Confederacy (Chippewa, Ottawa, and Potawatomi) were immigrating from Ohio and Michigan in the late 1700s.

5.5.2 Historic Treaties

Since European contact and, later, with the establishment of provincial and federal governments (i.e., the Crown), the lands within Ontario have been included in various treaties, land claims, and land cessions. Based on Morris (1943), the study area is part of Treaty Number 2, also known as the McKee Purchase, a parcel of land given to the Odawa, Chippewa, Pottawatomi, and Huron by the Crown on May 19, 1790.

5.6 Transportation Conditions

This section of the report documents the existing transportation conditions along Highway 3 and Highway 4 within the study area.

5.6.1 Highway Classification

Highway 3 within the project limits runs east-west and is classified as a two-lane rural arterial undivided Controlled-Access-Highway. Highway 4 within the project limits runs north-south and is classified as an undivided four-lane road with median turning lanes from Highway 401 southerly to approximately 75 m south of Longhurst Line. Highway 4 becomes a two-lane rural arterial undivided highway south of Longhurst Line to the Village of Talbotville.

5.6.2 Posted and Design Speed

The existing posted speed limit on Highway 3 is 80 km/h and the design speed is 100 km/h. The existing posted speed limit on Highway 4 is 80 km/h and the design speed is 100 km/h.

5.6.3 Cross-Section

The cross-section characteristics of Highway 3 within the study limits are summarized in **Table 3**.

Table 3: Summary of Existing Cross-Section Elements on Highway 3

Cross-Section Element	Width (m)
Lane Width	2 lanes x 3.75
Shoulder Width	3.0
Shoulder Rounding	0.5

The cross-section characteristics of Highway 4 within the study limits are summarized in **Table 4**.

Table 4: Summary of Existing Cross-Section Elements on Highway 4

Cross-Section Element	Width (m)
Lane Width	2 - 4 lanes x 3.75
Shoulder Width	2.5
Shoulder Rounding	0.5

5.6.4 Intersections

There are two at-grade intersections with Highway 4 and one at-grade intersection with Highway 3 in the study area that provides access to the local road network and existing communities. The intersections with Highway 4 are at Longhurst Line and Clinton Line and the intersection with Highway 3 is at Ron McNeil Line/Ford Road, as described herein.

5.6.4.1 Highway 4 and Clinton Line Intersection

The existing at-grade intersection at Highway 4 and Clinton Line is a four-leg, two-way stop-controlled intersection. Clinton Line is stop-controlled on both the east and west approaches. Highway 4 has an undivided four-lane cross-section with continuous left-turn lanes at the intersection.

5.6.4.2 Highway 4 and Longhurst Line Intersection

The existing at-grade intersection at Highway 4 and Longhurst Line is a three-leg, one-way stop-controlled intersection. Longhurst Line is stop-controlled on the west approach. Highway 4 has an undivided four-lane cross-section with continuous left-turn lanes at the intersection.

The intersection of Highway 4 and Longhurst Line is located approximately 45 m south of the intersection of Highway 4 and Clinton Line.

5.6.4.3 Highway 3 and Ron McNeil Line Intersection

The existing at-grade intersection at Highway 3 and Ron McNeil Line/Ford Road is a two-way stop-controlled intersection. Ron McNeil Line is stop-controlled on the north leg of the intersection and Ford Road is stop-controlled on the south leg of the intersection. Wonderland Road connects with Ron McNeil Line northeast of the Highway 3 intersection.

5.6.5 Crossing Roads

There are two municipal roads that cross Highway 4 within the study area: Clinton Line and Longhurst Line. There is one municipal road that crosses Highway 3 within the study area: Ron McNeil Line to the north of Highway 3 and Ford Road to the south of Highway 3.

5.6.5.1 Posted and Design Speed

The posted speed limit and design speed on the crossing roads are listed in **Table 5**. It has been assumed that the design speed is 20 km/h above the posted speed limit.

Table 5: Crossing Road Posted and Design Speed

Crossing Road	Structure Type	Posted Speed (km/h)	Design Speed (km/h)
Clinton Line	N/A (at-grade intersection)	80 (see Note 1)	80
Longhurst Line	N/A (at-grade intersection)	80 (see Note 1)	80
Ron McNeil Line	N/A (at-grade intersection)	80	100
Ford Road	N/A (at-grade intersection)	60	80

*Note 1: Speed limit is not posted; as such, an 80 km/h speed limit applies for a rural roadway.

5.6.5.2 Cross-Section

The cross-section characteristics of the crossing roads within the study limits are summarized in **Table 6**.

Table 6: Summary of Existing Cross Road Cross-Section Elements

Crossing Road	Approx. Lane Width	Approx. Shoulder Width
Clinton Line	2 x 2.75 m lanes (see Note 1)	N/A
Longhurst Line	2 x 3.5 m lanes	N/A
Ron McNeil Line	2 x 3.66 m	2.18 – 3.0 m
Ford Road	2 x 3.35 m	N/A

*Note 1: Clinton Line to the west of Highway 4 is a gravel road.

5.6.6 Railway Crossings

There is an existing CN Railway at-grade rail crossing at Highway 3 approximately 300 m west of the Ron McNeil Line/Ford Road intersection. Timing of reinstatement of operations on this track is unknown.

5.6.7 Existing Structures

There are no existing structures within the study area.

5.6.8 Traffic

A *Traffic Analysis Report and Safety Review of Existing Conditions Report* have been prepared as part of this study and are on file with MTO. The report details the existing traffic operations and collision statistics within the study area. The following sections have been extracted from those reports.

5.6.8.1 Traffic Operations

The operational efficiency of the Highway 3 and Highway 4 corridors within the study area is determined by the unsignalized intersections. For the sideroads operating under stop control, the availability of gaps on Highway 3 and Highway 4 traffic has a major influence on their operational performance.

The Level of Service (LOS) is a way to measure the free flow of traffic on a roadway and is used to determine how well a transportation facility is operating from a traveller's perspective. LOS is expressed in terms of traffic delays and is represented by letters A through F, whereby a LOS of A represents free-flow traffic conditions, and a LOS of F represents a breakdown in traffic flow with stop-and-go traffic conditions.

The intersection of Highway 4 and Clinton Line operates at an overall LOS A in both the AM and PM periods. The intersection of Highway 4 and Longhurst Line operates at an overall LOS A in both the AM and PM periods. The intersection of Highway 3 and Ron McNeil Line/Ford Road operates at an overall LOS B in the AM period and at an overall LOS F in the PM period.

A Traffic Signal Warrant Analysis was completed for the existing unsignalized intersections in the study area. A traffic signal is not warranted at the intersections of Highway 4 and Clinton Line and Highway 4 and Longhurst Line. A traffic signal is warranted at the intersection of Highway 3 and Ron McNeil Line/Ford Road.

5.6.8.2 Road Safety

Based on a review of collision history from the last seven years within the study area, there were seven collisions at the intersection of Highway 3 and Ron McNeil Line/Ford Road. Five were angle collisions and two were turning movement collisions. Two fatal collisions occurred in the vicinity of the intersection of Highway 3 and Ron McNeil Line/Ford Road; however, they were reported as non-intersection related.

Several collisions (10 total) occurred along Highway 4 in the vicinity of the proposed widening. The majority were rear end collisions in the southbound direction and involved inattentive drivers or occurred due to drivers following too closely.

5.6.8.3 Traffic Field Investigation

In addition to the collision review, field investigations were conducted in June and July 2023 to collect additional data, observe traffic behaviours, and further analyze road safety. General deficiencies such as missing advisory signage, sightline obstructions, deficient guiderail systems, and sources of traffic conflicts were identified.

5.6.9 Drainage

A *Drainage Report* has been completed as part of this study to assess existing drainage conditions and to develop a strategy for the Recommended Plan based on a desktop review of relevant information and field visit conducted during this study, as described herein.

5.6.9.1 Centreline Culverts

Within the study area, there is one centreline culvert on Highway 4 and two centreline culverts on Highway 3. The culvert on Highway 4 and one of the Highway 3 culverts are concrete culverts that are in good condition with approximately 30% sediment buildup near the inlets and outlets. The other culvert on Highway 3 is a corrugated steel pipe (CSP) arch culvert showing some erosion at the south end causing rocks to fall into the watercourse and minor rust discolouration shown on the pipe.

5.6.9.2 Ditch Drainage

Drainage along Highway 4 and Highway 3 is conveyed overland through open ditches and swales. Ditches are present on the east and west sides of Highway 4 within the study area and on either side of Highway 3. These ditches are generally in fair condition. Some areas of ditching are very flat and were found to have an excess build-up of sediment and vegetation.

5.6.9.3 Other Drainage Infrastructure and Concerns

There are two notable watercourses within the study limits, Dodd's Creek and the Auckland Municipal Drain. The Dodd's Creek watercourse primarily runs from north to south through the greenfield Bypass area east of Highway 4. The Auckland Municipal Drain runs under Wonderland Road along the west side of Ron McNeil Line and under existing Highway 3. From discussions with the Municipal Drain Superintendent for Southwold Township it has also been determined that there are several tile drains adjacent to this project that are contributing flow to the Highway drainage system.

5.6.10 Utilities

Information on the location and types of existing utility plants was requested from utility companies with infrastructure in the study area. Enbridge Gas, Hydro One, Bell, and a municipal watermain are present within the study limits.

6.0 Generation and Evaluation of Design Alternatives

6.1 Generation of Design Alternatives

The purpose of the study was to identify a Recommended Plan for a free-flow, four-lane Highway 3 within the study limits with access restricted to interchange locations. Given the number of possible alternatives that could be reasonably considered, a staged evaluation approach was carried out. As a first step, a list of Design Alternatives was identified, which included the initial development of three Highway 3 cross-section alternatives, three Highway 4 intersection alternatives, and six Ron McNeil Line/Wonderland Road interchange alternatives for GWP 3042-22-00, as described and illustrated in the following subsections.

6.1.1 Highway 3 Cross-Section Alternatives

Three Highway 3 cross-section alternatives were considered, one with an 8.0 m median between lanes (see **Figure 2**), one with a 15.0 m median between lanes (see **Figure 3**), and one with a 22.5 m median between lanes (see **Figure 4**). Only the cross-section with a 15.0 m median is consistent with the historical intent for twinning Highway 3, as this alternative would centre the eastbound and westbound lanes within the highway right-of-way and would be accommodated by existing infrastructure.

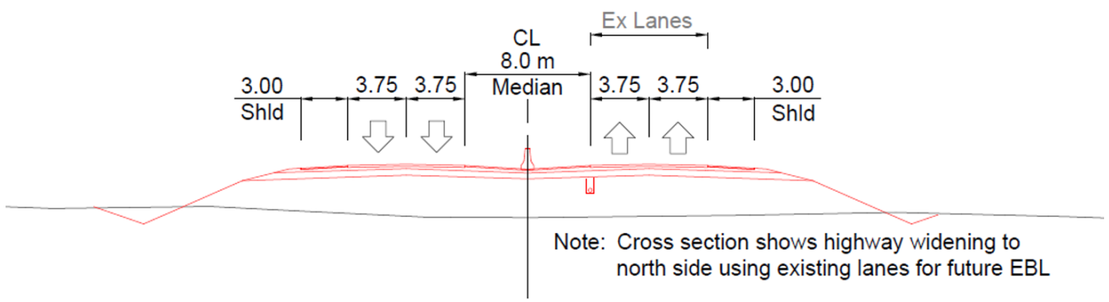

Figure 2: Highway 3 Cross Section Alternative 1 - 8.0 m Median

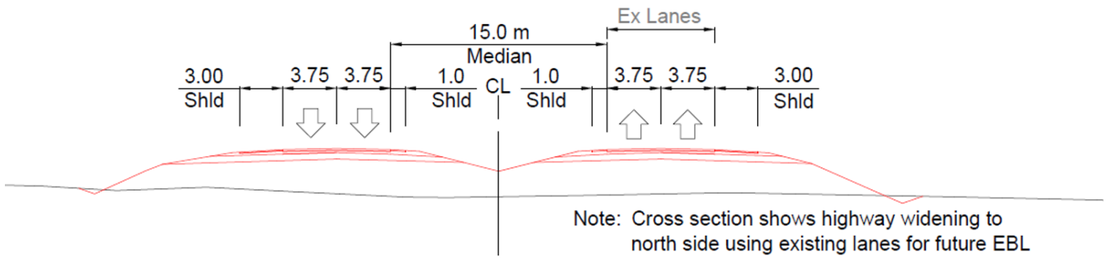

Figure 3: Highway 3 Cross Section Alternative 2 - 15.0 m Median

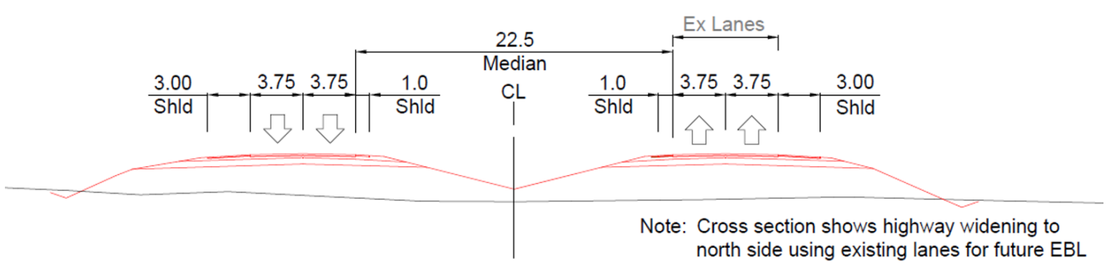

Figure 4: Highway 3 Cross Section Alternative 3 - 22.5 m Median

6.1.2 Highway 4 Intersection Alternatives

Three roundabout alternatives were considered at the intersection of Highway 4 and the new Talbotville Bypass, including a roundabout in-line with Highway 4 (see **Figure 5**), a roundabout offset of Highway 4 with an east-to-north bypass lane (see **Figure 6**), and a roundabout from the Talbotville Bypass to Highway 4 mainline without an east to north bypass lane (see **Figure 7**).

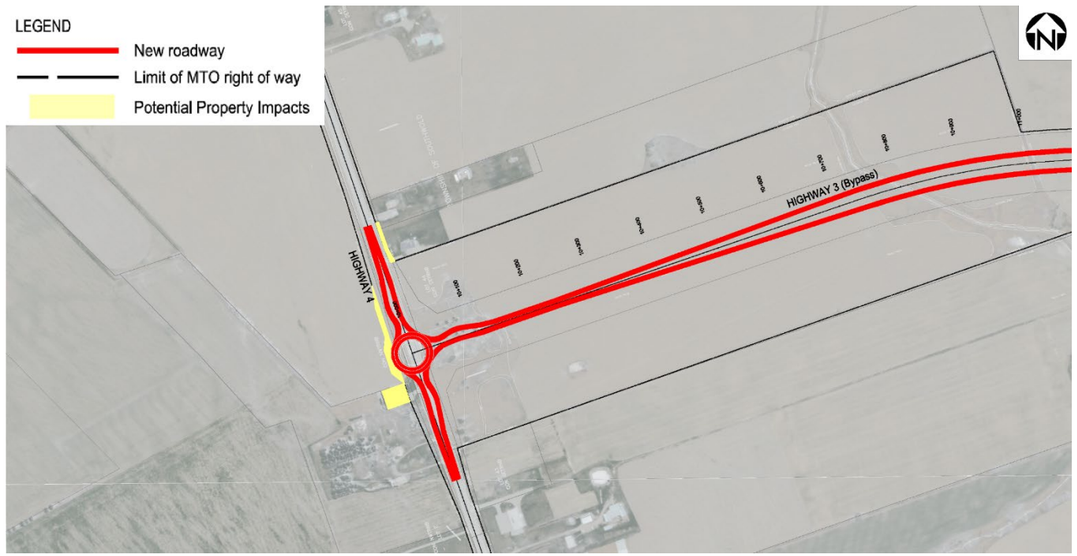

Figure 5: Highway 4 Intersection Alternative 1: Roundabout In-line with Highway 4

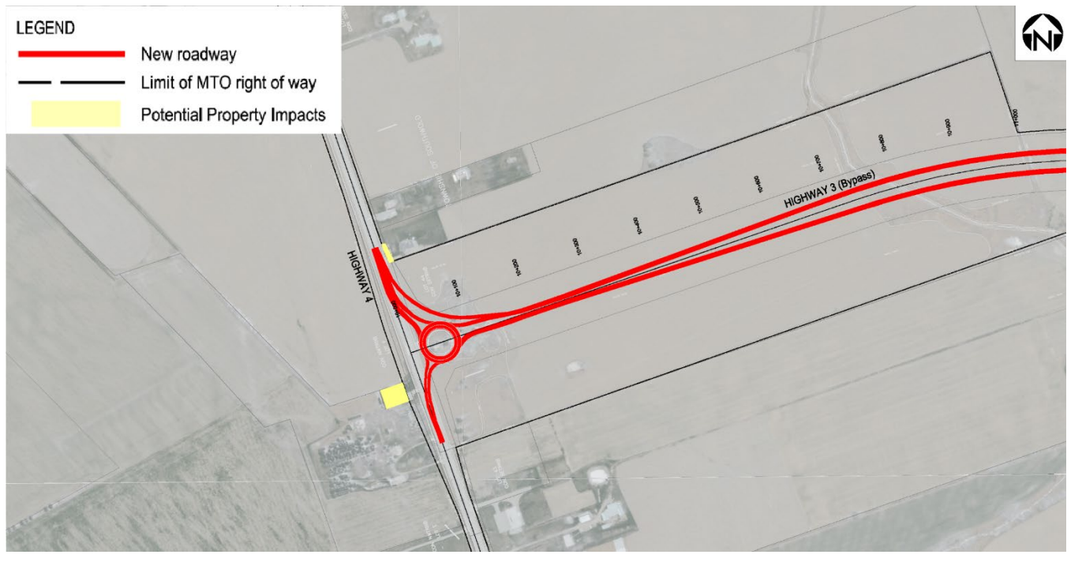

Figure 6: Highway 4 Intersection Alternative 2: Roundabout Offset East of Highway 4 (With East to North Bypass Lane)

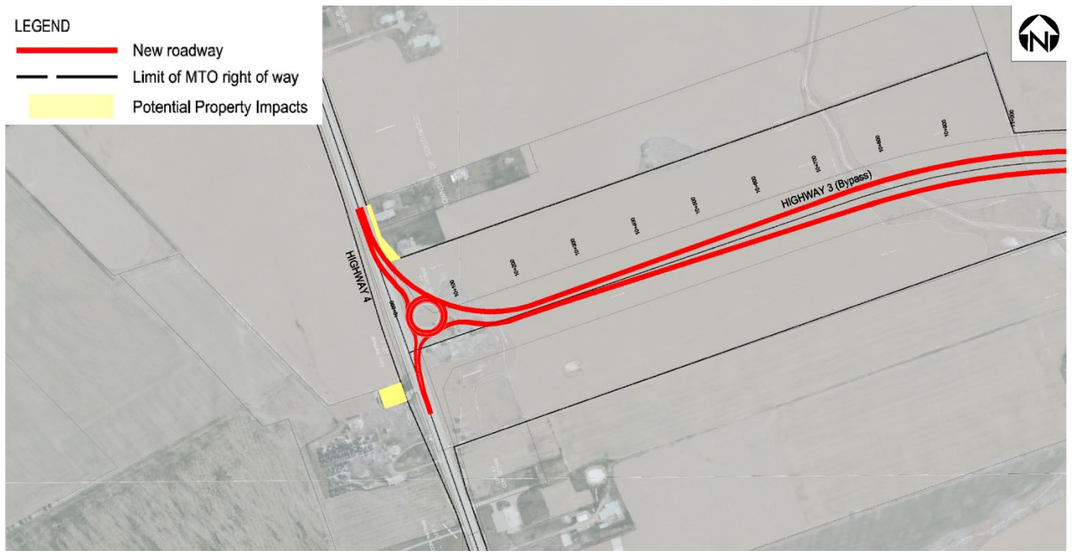

Figure 7: Highway 4 Intersection Alternative 3: Roundabout Talbotville Bypass to Highway 4 Mainline (Without East to North Bypass Lane)

6.1.3 Ron McNeil Line/Wonderland Road Interchange Alternatives

Six interchange alternatives were considered for the Ron McNeil Line/Wonderland Road Interchange, including two Parclo A2 interchange alternatives (see **Figure 8** and **Figure 9**), a Parclo A3 interchange alternative (see **Figure 10**), a Parclo AB interchange alternative (see **Figure 11**), a Diamond interchange alternative (see **Figure 12**), and a Parclo A/Diamond interchange alternative (see **Figure 13**).

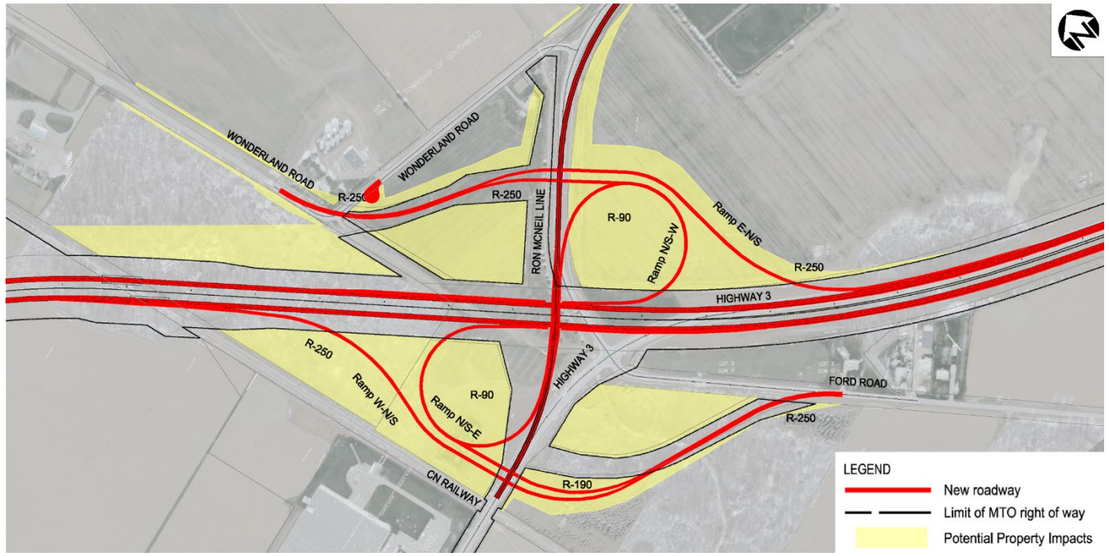

Figure 8: Ron McNeil Line/Wonderland Road Interchange Alternative 1: Parclo A2

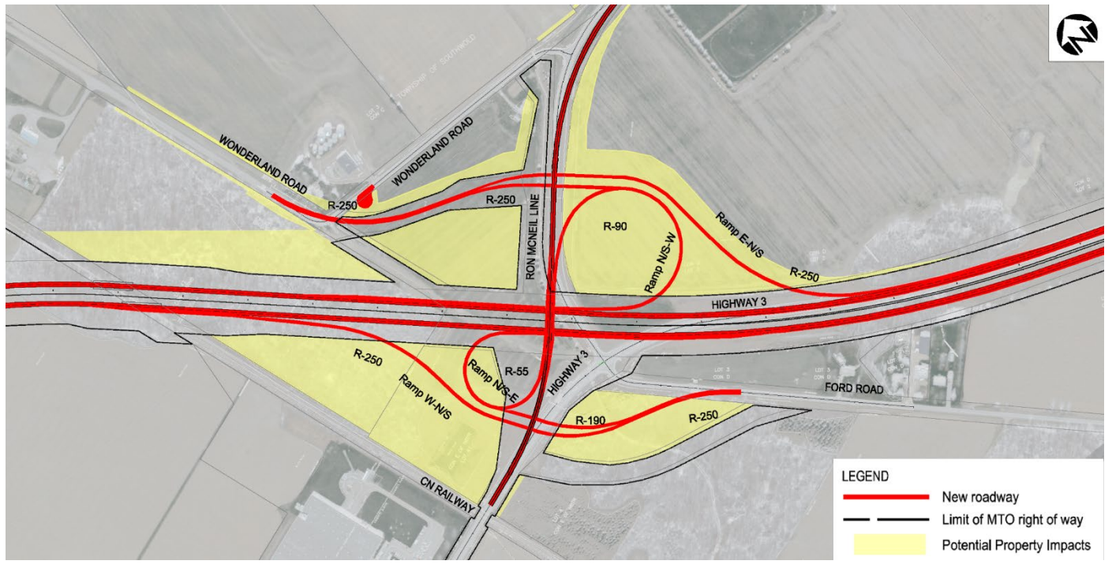

Figure 9: Ron McNeil Line/Wonderland Road Interchange Alternative 2: Parclo A2

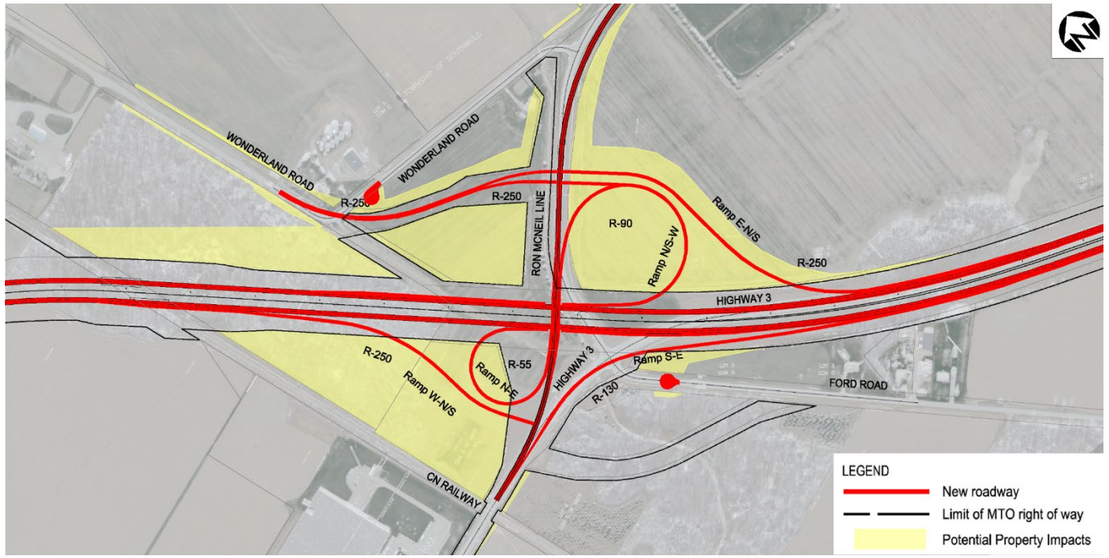

Figure 10: Ron McNeil Line/Wonderland Road Interchange Alternative 3: Parclo A3 (Ford Road closed with cul-de-sac)

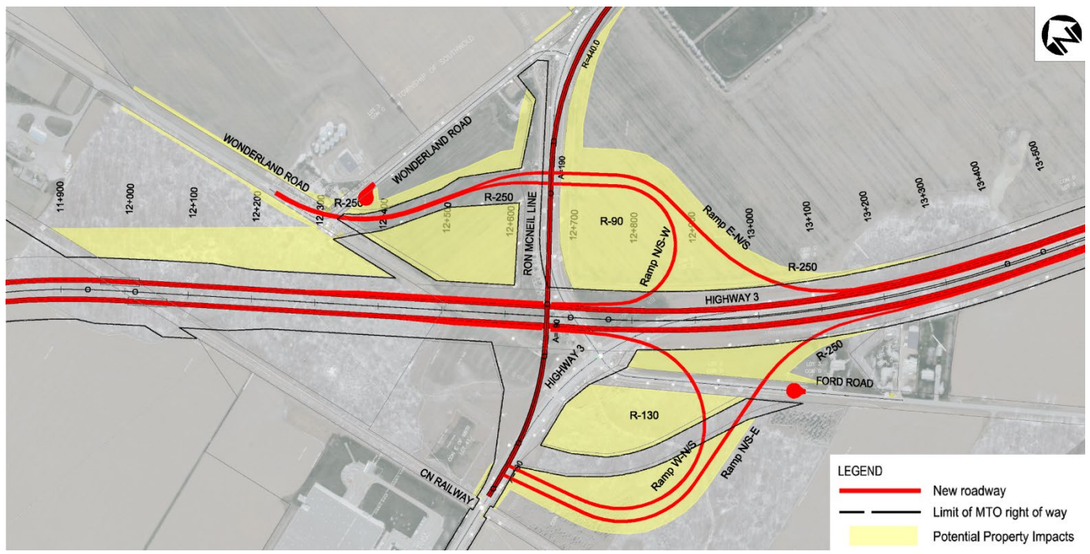

Figure 11: Ron McNeil Line/Wonderland Road Interchange Alternative 4: Parclo AB (Ford Road closed with cul-de-sac)

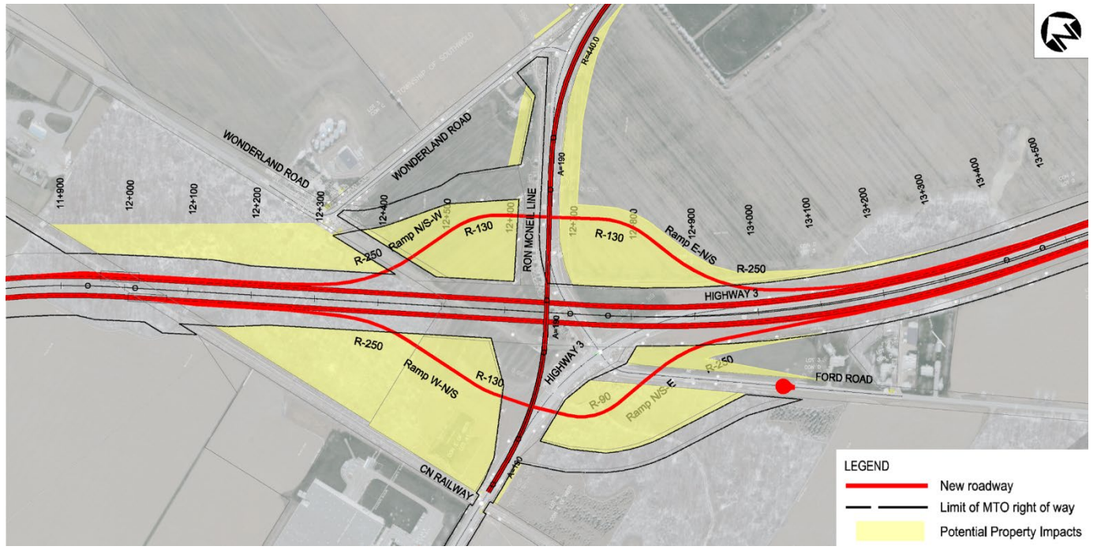

Figure 12: Ron McNeil Line/Wonderland Road Interchange Alternative 5: Diamond (Ford Road closed with cul-de-sac)

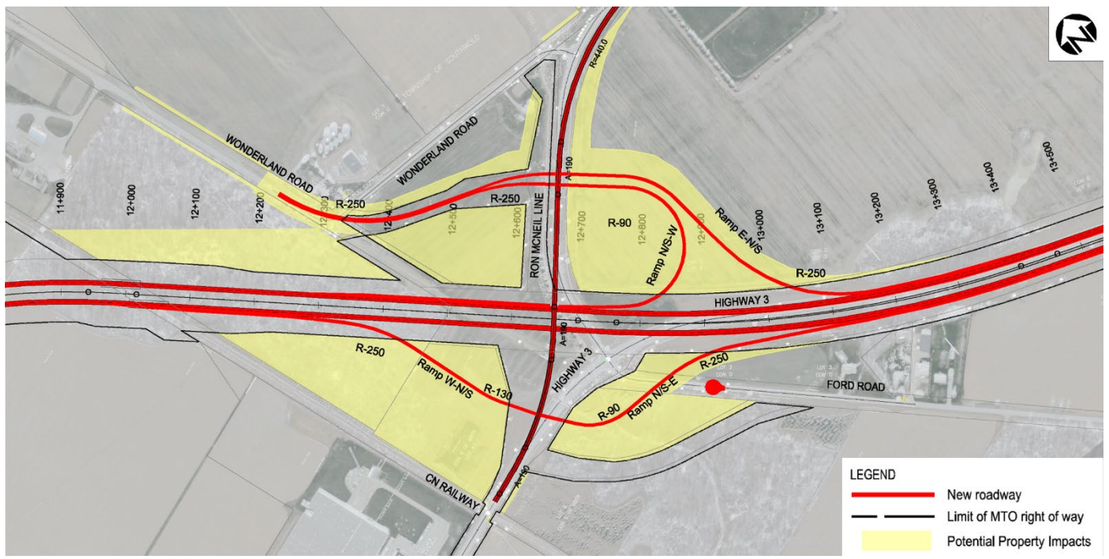

Figure 13: Ron McNeil Line/Wonderland Road Interchange Alternative 6: Parclo A/Diamond (Ford Road closed with cul-de-sac)

6.2 Screening of Long List of Design Alternatives

An initial screening of the Design Alternatives was completed to assess their feasibility. Those alternatives that were deficient from an engineering, environmental, or community perspective were screened out from further consideration. The remaining Design Alternatives (i.e., the short list of Design Alternatives) were carried forward for further detailed evaluation, as described in Section 6.3.

6.2.1 Highway 3 Cross-Section Alternatives

Alternative 1: 8.0 m Median

Alternative 1 was screened out because:

- Twinning would not be centered within the right-of-way.
- Does not align well with existing bridge piers in the future median.
- Would require concrete median tall wall and median storm sewer.

Alternative 2: 15.0 m Median

Alternative 2 was carried forward because:

- It is consistent with the historical intent for the twinning of this highway, as the eastbound and westbound lanes will be centered within the right-of-way.

Alternative 3: 22.5 m Median

Alternative 3 was carried forward because:

- No median protection is required.
- It provides the standard median width for a divided highway.

During the initial screening process, it was determined that the 15.0 m median cross-section will be carried forward for areas where the highway footprint has constraints (i.e., property impacts), and the 22.5 m median cross-section will be carried forward for other areas of Highway 3, where feasible.

6.2.2 Highway 4 Intersection Alternatives

Alternative 1: Roundabout In-line with Highway 4

Alternative 1 was screened out because:

- More property is required along the west side of Highway 4.
- There are greater impacts to existing traffic with extensive construction staging required on Highway 4.
- There are potential utility conflicts along the west side of Highway 4.

Alternative 2: Roundabout Offset of Highway 4

Alternative 2 was carried forward because:

- Off-line construction of the roundabout reduces impacts to traffic on Highway 4.
- There is an opportunity to provide a E-N bypass lane.

Alternative 3: Roundabout Talbotville Bypass to Highway 4 Mainline

Alternative 3 was carried forward because:

- Off-line construction of the roundabout reduces impacts to traffic on Highway 4.

6.2.3 Wonderland Road Interchange Alternatives

Alternative 1: Parclo A2

Alternative 1 was screened out because:

- The ramp terminal intersection with Ford Road is too close to railway crossing.
- It has a larger footprint than a Diamond interchange.
- It has a higher cost compared to a Diamond interchange.

Alternative 2: Parclo A2

Alternative 2 was carried forward because:

- The loop ramp radii (R-90) for ramp N/S-W meets the minimum standard for 100 km/h design speed.
- The ramp terminal intersection with Ford Road provides good separation from railway crossing.
- It has higher traffic capacity compared to a Diamond interchange.
- It provides a direct connection to Wonderland Road.

Alternative 3: Parclo A3 (Ford Road closed with cul-de-sac)

Alternative 3 was carried forward because:

- The loop ramp radii (R-90) for ramp N/S-W meets minimum standard for 100 km/h design speed.
- The direct S-E ramp eliminates left turn conflicts and potentially reduces collision severity.
- The ramp terminal intersection with Ford Road provides good separation from railway crossing.
- It has higher traffic capacity compared to a Diamond interchange.
- It provides a direct connection to Wonderland Road.

Alternative 4: Parclo AB (Ford Road closed with cul-de-sac)

Alternative 4 was screened out because:

- It has a larger footprint than a Diamond interchange.
- The loop ramp exit on freeways are less desirable than direct ramps.
- The ramp terminal intersection is close to the railway crossing.
- Requires closure of Ford Road with a cul-de-sac.
- It has a higher cost compared to a Diamond interchange.

Alternative 5: Diamond (Ford Road closed with cul-de-sac)

Alternative 5 was screened out because:

- It has a lower traffic capacity than a Parclo configuration.
- It has the potential for left turn conflicts and potential for higher collision severity.
- It does not provide a direct connection to Wonderland Road.

Alternative 6: Parclo A/Diamond (Ford Road closed with cul-de-sac)

Alternative 6 was carried forward because:

- The loop ramp radii (R-90) meets the minimum standard for 100 km/h design speed.
- It has a higher traffic capacity for westbound ramps compared to the full Diamond interchange.
- The ramp terminal intersection provides good separation from railway crossing.
- There is a direct connection to Wonderland Road.

6.3 Evaluation of Short List of Design Alternatives

6.3.1 Evaluation Process

A detailed evaluation of the short list of Design Alternatives was carried out to identify an improvement plan that is cost-effective, addresses structural needs, provides safe operations, and provides reasonable local access, while minimizing the effects on the natural, social, and cultural environments. This is accomplished by identifying evaluation criteria along with their relative importance, and then ranking the overall scores of the Design Alternatives.

This process includes identifying evaluation criteria through the input received through the consultation process, the project team's experience on similar projects, provincial guidelines, and existing study area conditions. Preliminary evaluation criteria were presented for public review and comment at PIC 1, following which the evaluation criteria were reviewed and confirmed. Engineering criteria included considerations for traffic operations, geometrics and safety, constructability, utility impacts, and total cost. Community-based criteria included considerations for property, business operations/viability, noise, air quality, contamination, stormwater management, cultural heritage resources, and archaeological resources. Natural environment criteria included considerations for terrestrial ecosystems, species of conservation concern, species at risk, and fish and fish habitat.

The next step in the process included evaluating the Design Alternatives that were carried forward. The evaluation process considered a range of engineering and environmental factors in the study area. Alternatives were evaluated using a comparative analysis based on the evaluation criteria and consideration of the advantages and disadvantages of each alternative.

A Preliminary Preferred Plan is selected as the aggregate of Design Alternatives that achieve the best overall balance of transportation engineering, individual environmental factor impacts, and overall environmental impact, taking into consideration the net environmental effects by applying conceptual mitigation measures.

In the final step of the evaluation process, each alternative is ranked to provide an overall recommendation (i.e., Most Preferred, Moderately Preferred, Least Preferred). This is the basis for identifying the Preferred Plan.

6.3.2 Evaluation Criteria

In accordance with the MTO *Class EA for Provincial Transportation Facilities* (2000), a wide range of potential impacts to the natural, social, and cultural environments in the study area are to be considered in the development and evaluation of Design Alternatives.

As noted in Section 6.3.1, the preliminary evaluation criteria were provided for public review and feedback as part of PIC 1, following which the evaluation criteria were reviewed and confirmed. The criteria are independent variables, each of which may contribute a positive or negative influence on the overall suitability of an alternative. To evaluate and determine the Preferred Alternative, each alternative was rated based on whether it was more or less preferred for each evaluation criterion. Ratings were based on engineering judgement, environmental significance, input received from external agencies, and input received from the public.

Table 7 identifies the evaluation criteria for this study, including the factors considered for each criterion, and the measurement for the rating of each factor. The short list of Design Alternatives that were subjected to the detailed evaluation process is provided in **Table 8**.

Table 7: Evaluation Criteria

Category	Criteria	Measures
Highway Engineering	**Traffic Operations**	Level of Service (LOS) – Highway 3.
		Level of Service (LOS) – Municipal Intersections.
	Geometrics and Safety	Collisions.
		Accommodates large agricultural vehicles.
		Accommodates active transportation.
		Intersection spacing.
		Ramp radii.
		Crossing road alignment.
		Crossing road grade at ramp terminal.
		CNR compatibility.
	Constructability	Complexity of staging and detours.
	Utilities	Length of impacts to utilities.
	Total Cost	Construction cost.
Socio-Economic Environment	**Property**	Approximate area of impact to existing and future land uses.
		Approximate number of private properties potentially impacted by construction activities.
	Business Operations/Viability	Number of businesses directly impacted (i.e., access to/from commercial property or landscaped areas) or displaced.
	Noise	Relative potential change in traffic noise levels on surrounding residential dwellings.
	Air Quality	Relative potential to affect air quality.
	Contamination	Potential to encounter contaminated soils/groundwater.
	Stormwater	Total additional impervious area requiring stormwater management strategies/facilities.
Cultural Environmental	**Cultural Heritage Resources**	Conserves built heritage resources and cultural heritage landscapes. Minimize potential impact on known (i.e., previously recognized) and potential built heritage resources and cultural heritage landscape.
	Archaeological Resources	Conserves archaeological resources. Minimize potential impact to archaeology sites and areas of archaeological potential.
Natural Environment	**Terrestrial Ecosystem**	Area of impact to wildlife habitat.
		Area of impacts to vegetated areas due to construction.
	Species of Conservation Concern, Species at Risk	Area impacts to potential species at risk habitat.
	Fish and Fish Habitat	Number of watercourse crossings. Impacts to fish habitat.

Table 8: Short List of Design Alternatives

Highway 3 Cross-Section Alternatives
Alternative 2: 15.0 m median
Alternative 3: 22.5 m median
Highway 4 Intersection
Alternative 2: Roundabout Offset of Highway 4
Alternative 3: Roundabout Talbotville Bypass to Highway 4 Mainline
Ron McNeil / Wonderland Road Interchange
Alternative 2: Parclo A2
Alternative 3: Parclo A3 (Ford Road closed with cul-de-sac)
Alternative 6: Parclo A/Diamond (Ford Road closed with cul-de-sac)

6.3.3 Evaluation

The Evaluation of Alternatives was completed based on the methodology outlined in outlined in Section 6.3.2. A detailed evaluation of the Highway 4 Intersection Alternatives and Ron McNeil Line/Wonderland Road Interchange Alternatives was undertaken.

Based on the evaluation of the Highway 4 Intersection Alternatives, Alternative 2 (Roundabout Offset of Highway 4 with east to north bypass lane) was carried forward as the Preferred Alternative because it:

- Provides the highest traffic capacity due to the bypass lane for traffic travelling from an east to north direction.
- Minimizes collision severity in comparison to an at-grade intersection.
- Easier to construct with reduced impacts to Highway 4 traffic.
- Has a slightly smaller footprint and reduces impacts to property.
- Free-flow east to north bypass lane reduces traffic noise (i.e., braking, accelerating).

Based on the evaluation of the Ron McNeil Line/Wonderland Road Interchange Alternatives, Alternative 3 (Parclo A3 with the closure of Ford Road with a cul-de-sac) was carried forward as the Preferred Alternative because it:

- Has the least number of conflict points between traffic movements and provides free-flow operations for most of the movements.
- Has a free-flow eastbound on-ramp that eliminates a northbound left turn movement which improves traffic operations and safety.
- Has the smallest footprint in the southeast quadrant and a similar footprint as the other alternatives in the other quadrants.
- Has bridge shoulder widths that will accommodate cyclists.

The detailed evaluation of the Highway 4 Intersection Alternatives is provided in **Table 9**.

The detailed evaluation of the Ron McNeil Line/Wonderland Road Interchange Alternatives is provided in **Table 10**.

As noted in Section 6.2.1, the 15.0 m median cross-section for Highway 3 was carried forward for areas where the highway footprint has constraints (i.e., property impacts) and the 22.5 m median cross-section of Highway 3 was carried forward for areas of the highway without constraints. As there are no constraints within the GWP 3042-22-00 study area, the 22.5 m median cross-section is considered to be the Preferred Alternative. A transition to the 15.0 m median cross-section, which will be implemented through the GWP 3041-22-00 study area, is proposed at the eastern end of the GWP 3042-22-00 study area. Additional information is provided in Section 7.0.

Table 9: Evaluation of Highway 4 Intersection Alternatives

Criteria	Measures	Alternatives	
		2 – Roundabout Offset East of Highway 4 (with E-N bypass lane)	**3 – Roundabout Talbotville Bypass to Highway 4 Mainline (without E-N bypass lane)**
Highway Engineering			
Traffic Operations	Level of Service (LOS) Highway 3	• Highest traffic capacity due to opportunity to provide a E-N bypass lane.	• High traffic capacity.
			
	Level of Service (LOS) Highway 4	• Highest traffic capacity due to opportunity to provide a E-N bypass lane.	• High traffic capacity.
Geometrics and Safety	Collisions	• Roundabouts eliminate left-turn conflicts and may reduce collision severity. • E-N bypass lane may further reduce collisions.	• Roundabouts eliminate left-turn conflicts and may reduce collision severity. • Potential for higher speed E-N movements may increase potential collision severity compared to Alternative 2.
	Accommodates Long Combination Vehicles (LCVs), Large Agricultural Vehicles	• Ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.
	Accommodates Active Transportation	• Roundabouts are less bicycle and pedestrian friendly than signals. • Highway 4 is not part of the Province Wide Cycling Network.	• Roundabouts are less bicycle and pedestrian friendly than signals. • Highway 4 is not part of the Province Wide Cycling Network. • Slightly better suited to accommodate active transportation compared to Alternative 1 as there is no bypass lane.
	Intersection Spacing	• No significant difference in intersection spacing between alternatives.	• No significant difference in intersection spacing between alternatives.

Criteria	Measures	Alternatives	
		2 – Roundabout Offset East of Highway 4 (with E-N bypass lane)	**3 – Roundabout Talbotville Bypass to Highway 4 Mainline (without E-N bypass lane)**
			
	Ramp Radii	• N/A	• N/A
	Crossing Road Alignment	• Less realignment of Highway 4 required on approach to roundabout. • Opportunity to provide a E-N bypass lane.	• More realignment of Highway 4 required on approach to roundabout.
			
	Crossing Road Grade at Ramp Terminal	• No significant difference between alternatives.	• No significant difference between alternatives.
			
	CNR Compatibility	• N/A	• N/A
Constructability	Complexity of Staging and Detours	• Off-line construction of the roundabout reduces impacts to traffic on Highway 4. • Slightly lower staging complexity than Alternative 3.	• Off-line construction of the roundabout reduces impacts to traffic on Highway 4. • Additional staging complexity than Alternative 2 due to the greater realignment of Highway 4 on the approach to roundabout.
			
Utilities	Number of Impacts to Utilities	• Bell: Two potential conflict locations; east on Highway 4 and 1 crossing south of roundabout. • Hydro: One potential conflict location; crossing south of roundabout. • Gas: Three potential conflict locations; east on Highway 4 and two crossings south of roundabout. • Most number of potential conflicts.	• Bell: Two potential conflict locations; east on Highway 4 and one crossing south of roundabout. • Hydro: One potential conflict location; crossing south of roundabout. • Gas: Two potential conflict locations; east on Highway 4 and one crossing south of roundabout. • Least number of potential conflicts.
			
Total Cost	Construction Cost	• Slightly lower anticipated cost.	• Slightly higher anticipated cost due to the larger footprint.
			

Criteria	Measures	Alternatives	
		2 – Roundabout Offset East of Highway 4 (with E-N bypass lane)	**3 – Roundabout Talbotville Bypass to Highway 4 Mainline (without E-N bypass lane)**
Socio-Economic Environment			
Property	Approximate Area of impact to Designated Land Uses.	• Slightly smaller footprint of potential impacts to designated land uses.	• Slightly larger footprint of potential impacts to designated land uses.
			
	Approximate Number of Private Properties Potentially Impacted by Construction Activities.	• Two private properties anticipated to be impacted in the N-E quadrant to accommodate the four-lane widening of Highway 4 on the roundabout approach.	• Two private properties anticipated to be impacted in the N-E quadrant to accommodate the four-lane widening of Highway 4 on the roundabout approach.
Business Operations/Viability	Number of Businesses Directly Impacted (i.e., access to/from commercial property or landscaped areas) or Displaced.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.
			
Noise	Relative Potential Change in Traffic Noise Levels on Surrounding Residential Dwellings.	• Similar distance to nearby sensitive receptors. • Higher speeds due to the E-N bypass lane and more direct entry into roundabout.	• Similar distance to nearby sensitive receptors. • Lower speeds.
			
Air Quality	Relative Potential to affect Air Quality.	• Lower potential to impact local air quality due to idling vehicles at roundabout when compared to Alternative 3, due to the E-N bypass lane. • Impacts may be mitigated by landscape design (additional tree plantings).	• Higher potential to impact local air quality due to idling vehicles at roundabout when compared to Alternative 2 with the E-N bypass lane. • Impacts may be mitigated by landscape design (additional tree plantings).
Contamination	Potential to Encounter Contaminated Soils/Groundwater.	• Slightly smaller footprint of potential to encounter contaminated soils/groundwater, as roundabout is in closer proximity to the previously disturbed area for Highway 4.	• Slightly larger footprint of potential to encounter contaminated soils/groundwater, as roundabout is in further proximity to the previously disturbed area for Highway 4.

Criteria	Measures	Alternatives	
		2 – Roundabout Offset East of Highway 4 (with E-N bypass lane)	**3 – Roundabout Talbotville Bypass to Highway 4 Mainline (without E-N bypass lane)**
		• Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.	• Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any. • All excess materials generated during construction will be managed in accordance with MECP regulations.
			
Stormwater	Total Additional Impervious Area requiring Stormwater Management Strategies/Facilities.	• Slightly larger additional impervious area requiring stormwater management strategies/facilities due to E-N bypass lane.	• Slightly smaller additional impervious area requiring stormwater management strategies/facilities.
			
Cultural Environment			
Cultural Heritage Resources	Conserves Built Heritage Resources and Cultural heritage Landscapes. Minimize potential impact on known (i.e., previously recognized) and potential built heritage resources and cultural heritage landscape.	• Slightly smaller footprint of potential impacts, as roundabout is in closer proximity to the previously disturbed area for Highway 4. • Additional Cultural Heritage Assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Slightly larger footprint of potential impacts, as roundabout is in further proximity to the previously disturbed area for Highway 4. • Additional Cultural Heritage Assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.
			
Archaeological Resources	Conserves Archaeological Resources. Minimize potential impact to archaeology sites and areas of archaeological potential.	• Slightly smaller footprint of potential impacts, as roundabout is in closer proximity to the previously disturbed area for Highway 4. • Additional Archaeological Assessment (AA) activities required to confirm impacts, if any.	• Slightly larger footprint of potential impacts, as roundabout is in further proximity to the previously disturbed area for Highway 4. • Additional Archaeological a=Assessment (AA) activities required to confirm impacts, if any.
			
Natural Environment			
Terrestrial Ecosystems	Area of Impact to Wildlife Habitat.	• Slightly smaller footprint of potential impacts, as roundabout is in closer proximity to the previously disturbed area for Highway 4.	• Slightly larger footprint of potential impacts, as roundabout is in further proximity to the previously disturbed area for Highway 4.
			

Criteria	Measures	Alternatives	
		2 – Roundabout Offset East of Highway 4 (with E-N bypass lane)	**3 – Roundabout Talbotville Bypass to Highway 4 Mainline (without E-N bypass lane)**
	Area of Impacts to Vegetated Areas due to Construction.	• Slightly smaller footprint of potential impacts, as roundabout is in closer proximity to the previously disturbed area for Highway 4.	• Slightly larger footprint of potential impacts, as roundabout is in further proximity to the previously disturbed area for Highway 4.
			
Species of Conservation Concern, Species at Risk	Area Impacts to potential Species at Risk Habitat.	• Slightly smaller footprint of potential impacts, as roundabout is in closer proximity to the previously disturbed area for Highway 4.	• Slightly larger footprint of potential impacts, as roundabout is in further proximity to the previously disturbed area for Highway 4.
			
Fish and Fish Habitat	Number of Watercourse Crossings, Impacts to Fish Habitat.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.
			
Overall Assessment			

Legend

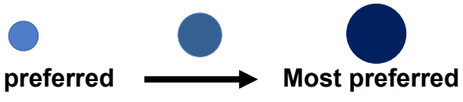

Table 10: Evaluation of Ron McNeil Line/Wonderland Road Interchange Alternatives

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
Highway Engineering				
Traffic Operations	Level of Service (LOS) Highway 3	• High traffic capacity.	• Highest traffic capacity with the S-E direct ramp.	• Lowest traffic capacity.
				
	Level of Service (LOS) Highway 4	• High traffic capacity.	• Highest traffic capacity with the S-E direct ramp.	• Lowest traffic capacity • Back-to-back left turn lanes over the structure (to Wonderland and to N/S-E ramp).
Geometrics and Safety	Collisions	• Interchange design has a fewer number of conflict points between traffic movements than Alternative 6 but does not provide as much free-flow operation as Alternative 3.	• Interchange design has the least number of conflict points between traffic movements and provides free-flow operations for most of the movements. • S-E direct ramp reduces potential for left-turn conflicts at the south ramp terminal intersection.	• Interchange design has the highest number of conflict points between traffic movements. • Potential for wrong-way movements for the diamond side
				
	Accommodates Long Combination Vehicles (LCVs), Large Agricultural Vehicles	• Ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.	• Ability to accommodate LCVs with modifications. • Ability to accommodate large agricultural vehicles.
				

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
	Accommodates Active Transportation	• Wonderland Road and Ron McNeil Line at this intersection are identified in the Province Wide Cycling Network. • Moderately suited to accommodate active transportation on Ron McNeil Line due to the number of direct ramps. • Ford Road remaining open with connectivity to the interchange accommodates active transportation.	• Wonderland Road and Ron McNeil Line at this intersection are identified in the Province Wide Cycling Network. • Less suited to accommodate active transportation on Ron McNeil Line due to the greatest number of direct ramps. • Ford Road closure does not accommodate active transportation, but design could be refined to provide a separate cycling route from Ron McNeil Line to Ford Road.	• Wonderland Road and Ron McNeil Line at this intersection are identified in the Province Wide Cycling Network. • Better suited to accommodate active transportation on Ron McNeil Line than the other two alternatives as there are no direct ramps. • Ford Road closure does not accommodate active transportation, but design could be refined to provide a separate cycling route from Ron McNeil Line to Ford Road.
				
	Intersection Spacing	• No significant difference in intersection spacing between interchange alternatives. • Ford Road remains open.	• No significant difference in intersection spacing between interchange alternatives. • Ford Road closed with cul-de-sac. • S-E direct ramp eliminates the need for an east intersection leg at the south ramp terminal intersection in the SE quadrant.	• No significant difference in intersection spacing between interchange alternatives. • Ford Road closed with cul-de-sac.
				
	Ramp Radii	• Loop ramp radius (R-90) for N/S-W ramp meets minimum standard for 100 km/h design speed. • Loop ramp radius (R-55) for N/S-E ramp does not meet minimum standard for 100 km/h design speed.	• Loop ramp radius (R-90) for N/S-W ramp meets minimum standard for 100 km/h design speed. • Loop ramp radius (R-55) for N-E ramp does not meet minimum standard for 100 km/h design speed. • Direct ramp radius (R-130) for S-E ramp does not meet minimum standard for 100 km/h design speed.	• Loop ramp radius (R-90) for N/S-W ramp meets minimum standard for 100 km/h design speed.
				
	Crossing Road Alignment	• No significant difference between interchange alternatives. • Provides opportunity to correct the existing substandard horizontal alignment of Ron McNeil Line.	• No significant difference between interchange alternatives. • Provides opportunity to correct the existing substandard horizontal alignment of Ron McNeil Line.	• No significant difference between interchange alternatives. • Provides opportunity to correct the existing substandard horizontal alignment of Ron McNeil Line.

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
				
	Crossing Road Grade at Ramp Terminal	• No significant difference between interchange alternatives.	• No significant difference between interchange alternatives.	• No significant difference between interchange alternatives.
				
	CNR Compatibility	• Ramp terminal intersection with Ford Road provides good separation from railway crossing. • Left turn lane for the S-E movement crosses CNR tracks and is not compatible as queuing over the railway tracks is not permitted.	• Ramp terminal intersection provides good separation from railway crossing. • More compatible than Alternative 2 as there are no left turn lanes crossing CNR tracks.	• Ramp terminal intersection provides good separation from railway crossing. • More compatible than Alternative 2 as there are no left turn lanes crossing CNR tracks.
				
Constructability	Complexity of Staging and Detours	• Higher complexity of staging than Alternative 3 due to the number of ramps.	• Higher complexity of staging than Alternative 3 due to the number of ramps.	• Lower complexity of staging than Alternatives 1 and 2 due to the number of ramps.
				
Utilities	Number of Impacts to Utilities	• Bell: One potential conflict location at N/S-E ramp. • Hydro: Five potential conflict locations; including two west of interchange, two at interchange and one) on the south side of Ford Road. • Gas: Three potential conflict locations; south side of Ford Road, east of interchange on new bypass, and south on Wonderland. • Water: Southwold watermain located on the east side of Ford Road and crossed Highway 3 west of the intersection.	• Bell: Two potential conflict locations; N/S-E ramp and W-N/S ramp. • Hydro: Four potential conflict locations; including one on S-E ramp, one on south side of Ford Road, and two at the interchange. • Gas: Three potential conflict locations; south side on Ford Road, east of interchange on new bypass, and south on Wonderland. • Water: Southwold watermain located on the east side of Ford Road and crossed Highway 3 west of the intersection.	• Bell: One potential conflict location; W-N/S ramp. • Hydro: Seven potential conflict locations; two on the south side of Ford Road, two west of the bypass, one at the bypass, one at N/S-E ramp, and one on the south side of Highway 3 east of Ford Road. • Gas: Five potential conflict locations; at new bypass west of the interchange, south on Wonderland, at new Ron McNeil, and two on Ford Road. • Water: Southwold watermain located on the east side of Ford Road and crossed Highway 3 west of the intersection.

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
		• Least number of potential conflicts, same as Alternative 3.	• Least number of potential conflicts, same as Alternative 2.	• Most number of potential conflicts.
				
Total Cost	Construction Cost	• Lower estimated cost than Alternative 2; greater estimated cost than Alternative 6.	• Greatest estimated cost.	• Lowest estimated cost.
				
Socio-Economic Environment				
Property	Approximate Area of Impact to Designated Land Uses.	• Same large footprint of potential impacts to S-W quadrant as Alternative 3.	• Same large footprint of potential impacts to S-W quadrant as Alternative 2.	• Smaller footprint of potential impacts to S-W quadrant.
				
	Approximate Number of Private Properties Potentially Impacted by Construction Activities	• Two private farm properties are anticipated to be impacted in the N-W quadrant, same area as other Alternatives. • One private farm property is anticipated to be impacted in the N-E quadrant, same area as other Alternatives. • One private industrial property is anticipated to be impacted in the S-W quadrant, same area as other Alternatives. • One private farm property is anticipated to be impacted in the S-E quadrant, larger area than Alternative 6. • Ford Road remaining open does not impact the residents as they can maintain their current travel routes.	• Two private farm properties are anticipated to be impacted in the N-W quadrant, same area as other Alternatives. • One private farm property is anticipated to be impacted in the N-E quadrant, same area as other Alternatives. • One private industrial property is anticipated to be impacted in the S-W quadrant, same area as other Alternatives. • One private residential property anticipated to be impacted in the S-E quadrant, smaller area than Alternative 6. • Closure of Ford Road impacts the residents as they have to choose an alternate travel route.	• Two private farm properties are anticipated to be impacted in the N-W quadrant, same area as other Alternatives. • One private farm property is anticipated to be impacted in the N-E quadrant, same area as other Alternatives. • One private industrial property is anticipated to be impacted in the S-W quadrant, same area as other Alternatives. • One private residential property anticipated to be impacted in the S-E quadrant, larger area than Alternative 3. • One private farm property is anticipated to be impacted in the S-E quadrant, smaller area than Alternative 2. • Closure of Ford Road impacts the residents as they have to choose an alternate travel route.
				

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
Business Operations/Viability	Number of Businesses directly Impacted (i.e., access to/from commercial property or landscaped areas) or Displaced.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.	• No significant changes between alternatives. • No businesses anticipated to be directly impacted.
Noise	Relative Potential Change in Traffic Noise Levels on Surrounding Residential Dwellings.	• Greatest distance to nearby sensitive receptors, as there are no ramps in the S-E quadrant. • High number (2) of free-flowing ramps (S-W and N-E) that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.	• Moderate distance to nearby sensitive receptors and the S-E direct ramp. • Highest number (3) of free-flowing ramps (S-W, N-E and S-E) that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.	• Smallest distance to nearby sensitive receptors and the N/S-E ramp. • No free-flowing ramps that can produce greater traffic noise level. • Some impacts may be mitigated by noise barrier design, if warranted and feasible.
Air Quality	Relative Potential to affect Air Quality.	• Moderate potential to impact local air quality due to idling vehicles at interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).	• Lowest potential to impact local air quality due to idling vehicles at interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).	• Highest potential to impact local air quality due to idling vehicles at interchange when compared to the other alternatives. • Impacts may be mitigated by landscape design (additional tree plantings at interchange).
Contamination	Potential to Encounter Contaminated Soils/Groundwater.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 3. • Large footprint of potential impacts to S-E quadrant. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative. 2 • Smallest footprint of potential impacts to S-E quadrant. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Smallest footprint of potential impacts to S-W quadrant. • Largest footprint of potential impacts to S-E quadrant. • Additional environmental site assessment activities required to confirm presences of subsurface contamination, if any.

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
		• All excess materials generated during construction will be managed in accordance with MECP regulations.	• All excess materials generated during construction will be managed in accordance with MECP regulations.	• All excess materials generated during construction will be managed in accordance with MECP regulations.
				
Stormwater	Total Additional Impervious Area requiring Stormwater Management Strategies/Facilities.	• Large additional impervious area requiring stormwater management strategies/facilities.	• Largest additional impervious area requiring stormwater management strategies/facilities.	• Smallest additional impervious area requiring stormwater management strategies/facilities.
				
Cultural Environment				
Cultural Heritage Resources	Conserves Built Heritage Resources and Cultural Heritage Landscapes. Minimize potential impact on known (i.e., previously recognized) and potential built heritage resources and cultural heritage landscape.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 3. • Large footprint of potential impacts to S-E quadrant. • Additional Cultural Heritage Assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 2. • Smallest footprint of potential impacts to S-E quadrant. • Additional Cultural Heritage Assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Smallest footprint of potential impacts to S-W quadrant. • Largest footprint of potential impacts to S-E quadrant. • Additional Cultural Heritage Assessment activities required to confirm cultural heritage value/interest, as well as impacts, if any.
				
Archaeological Resources	Conserves Archaeological Resources. Minimize potential impact to archaeology sites and areas of archaeological potential.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 3. • Large footprint of potential impacts to S-E quadrant. • Additional Archaeological Assessment (AA) activities required to confirm impacts, if any.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 2. • Smallest footprint of potential impacts to S-E quadrant. • Additional Archaeological Assessment (AA) activities required to confirm impacts, if any.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Smallest footprint of potential impacts to S-W quadrant. • Largest footprint of potential impacts to S-E quadrant. • Additional Archaeological Assessment (AA) activities required to confirm impacts, if any.
				

Criteria	Measures	Alternative		
		2 – Parclo A2	**3 – Parclo A3**	**6 – Parclo A/Diamond**
Natural Environment				
Terrestrial Ecosystems	Area of Impact to Wildlife Habitat	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 3. • Moderate footprint of potential impacts to S-E quadrant.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 2. • Smallest footprint of potential impacts to S-E quadrant.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Smallest footprint of potential impacts to S-W quadrant. • Largest footprint of potential impacts to S-E quadrant.
				
	Area of Impacts to Vegetated Areas due to Construction	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 3. • Large footprint of potential impacts to S-E quadrant.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 2. • Smallest footprint of potential impacts to S-E quadrant.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Smallest footprint of potential impacts to S-W quadrant. • Largest footprint of potential impacts to S-E quadrant.
				
Species of Conservation Concern, Species at Risk	Area Impacts to potential Species at Risk Habitat.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives • Same large footprint of potential impacts to S-W quadrant as Alternative 3 • Large footprint of potential impacts to S-E quadrant	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Same large footprint of potential impacts to S-W quadrant as Alternative 2. • Smallest footprint of potential impacts to S-E quadrant.	• Similar footprint of potential impacts to N-W and N-E quadrants as other alternatives. • Smallest footprint of potential impacts to S-W quadrant. • Largest footprint of potential impacts to S-E quadrant.
				
Fish and Fish Habitat	Number of Watercourse Crossings, Impacts to Fish Habitat	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.	• No significant difference between alternatives. • Same anticipated number of watercourse crossings as other alternatives. • Similar potential impacts to fish habitat between alternatives.
				

Criteria	Measures	Alternative		
		2 – Parclo A2	3 – Parclo A3	6 – Parclo A/Diamond
Overall Assessment				

Legend

7.0 Recommended Plan

The Recommended Plan in the GWP 3042-22-00 study area, as shown in **Figure 14**, **Figure 15**, and **Figure 16** includes the following:

- Widening of Highway 4 to a four-lane undivided cross-section from Clinton Line to the Talbotville Bypass.
- A 22.5 m median Highway 3 cross-section from Highway 4 to just west of Wellington Road with a transition to the 15.0 m median cross-section at the eastern end of the study area.
- A roundabout offset to the east of Highway 4 with an east to north bypass lane at the intersection of Highway 4 and the Talbotville Bypass.
- A Parclo A3 interchange at Ron McNeil Line/Wonderland Road with closure of Ford Road with a cul-de-sac.

An 11x17 copy of the Recommended Plan is provided in **Appendix C**.

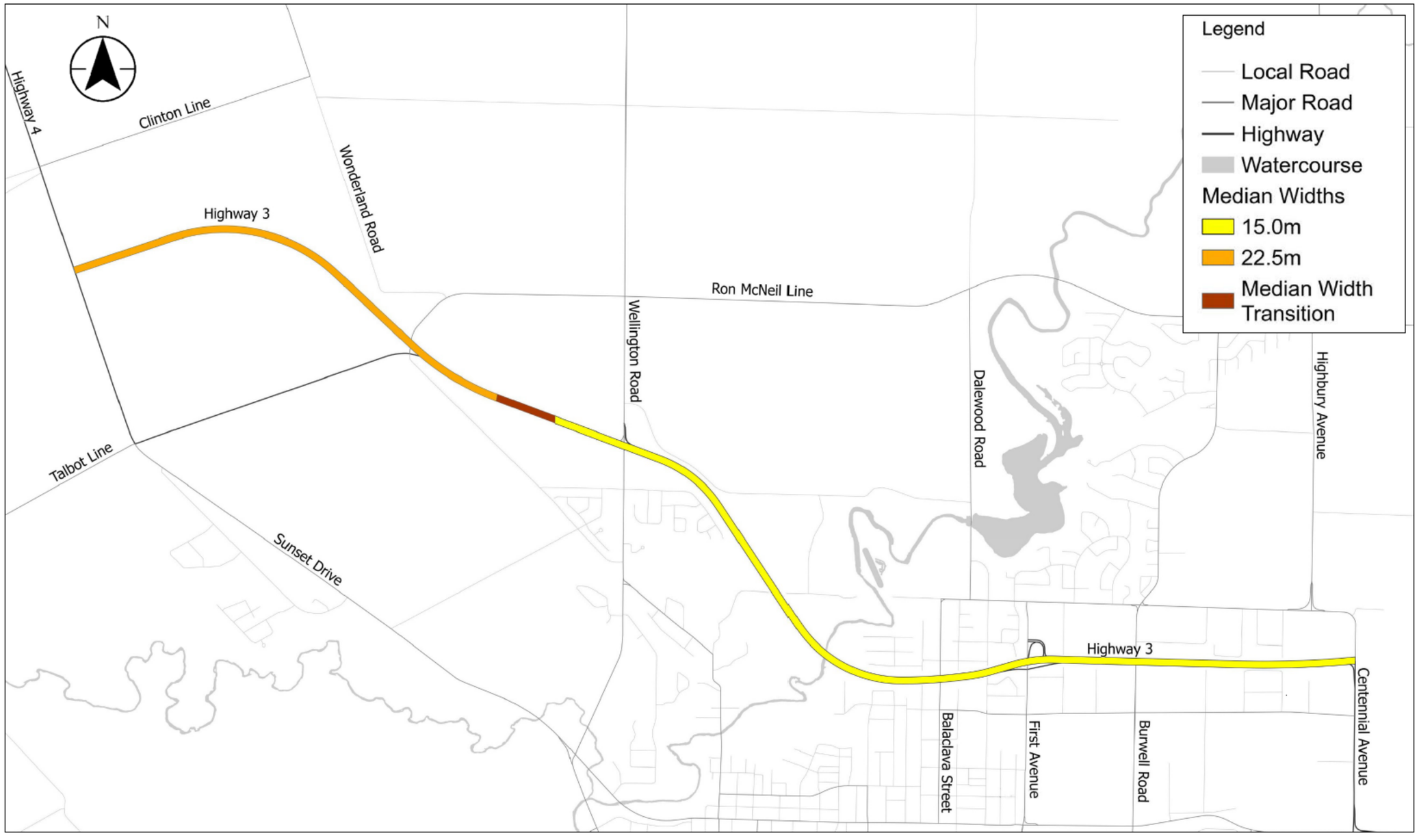

Figure 14: Recommended Plan for Highway 3 Cross-Section

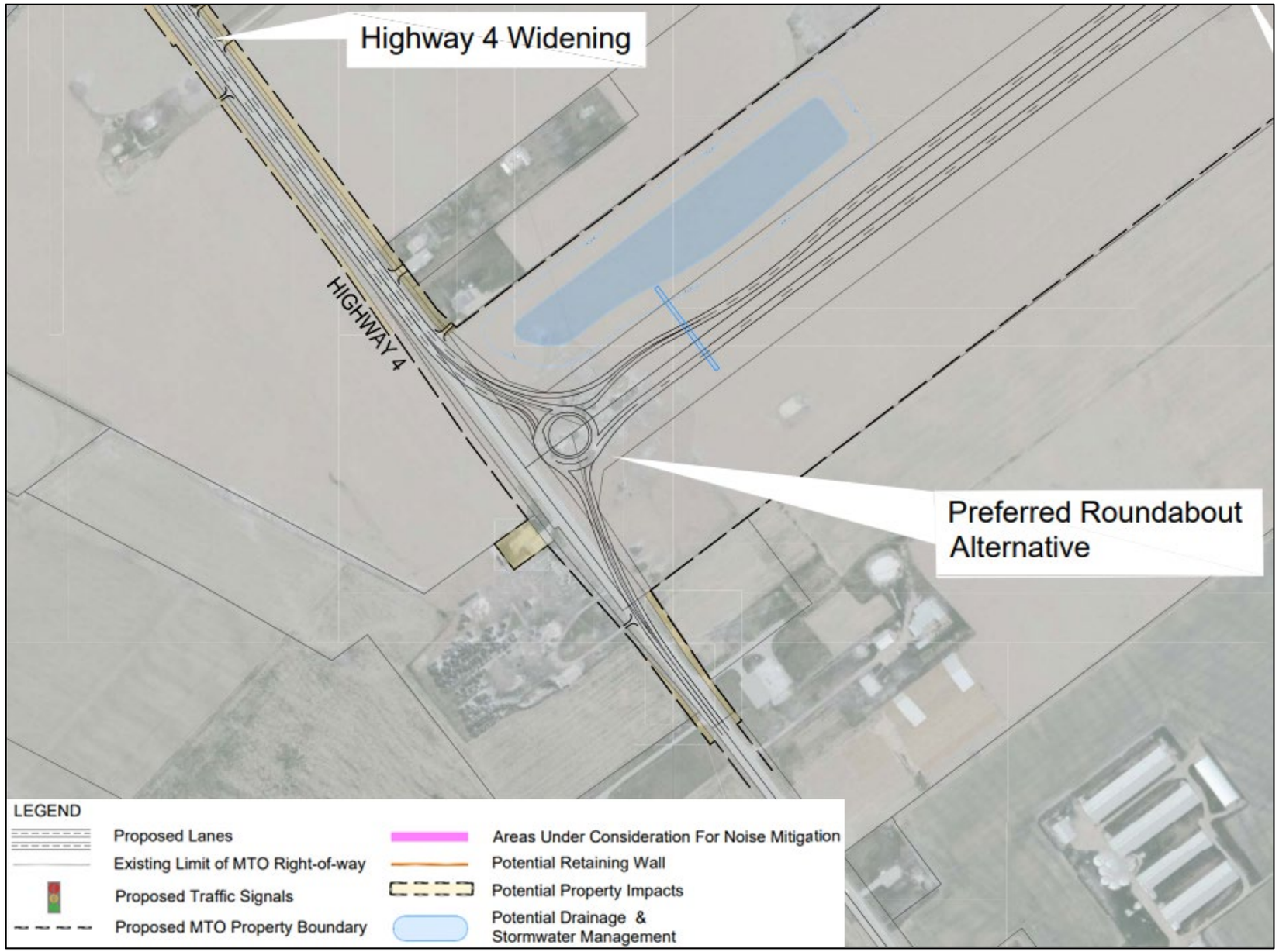

Figure 15: Recommended Plan at the Highway 4 Intersection with Talbotville Bypass

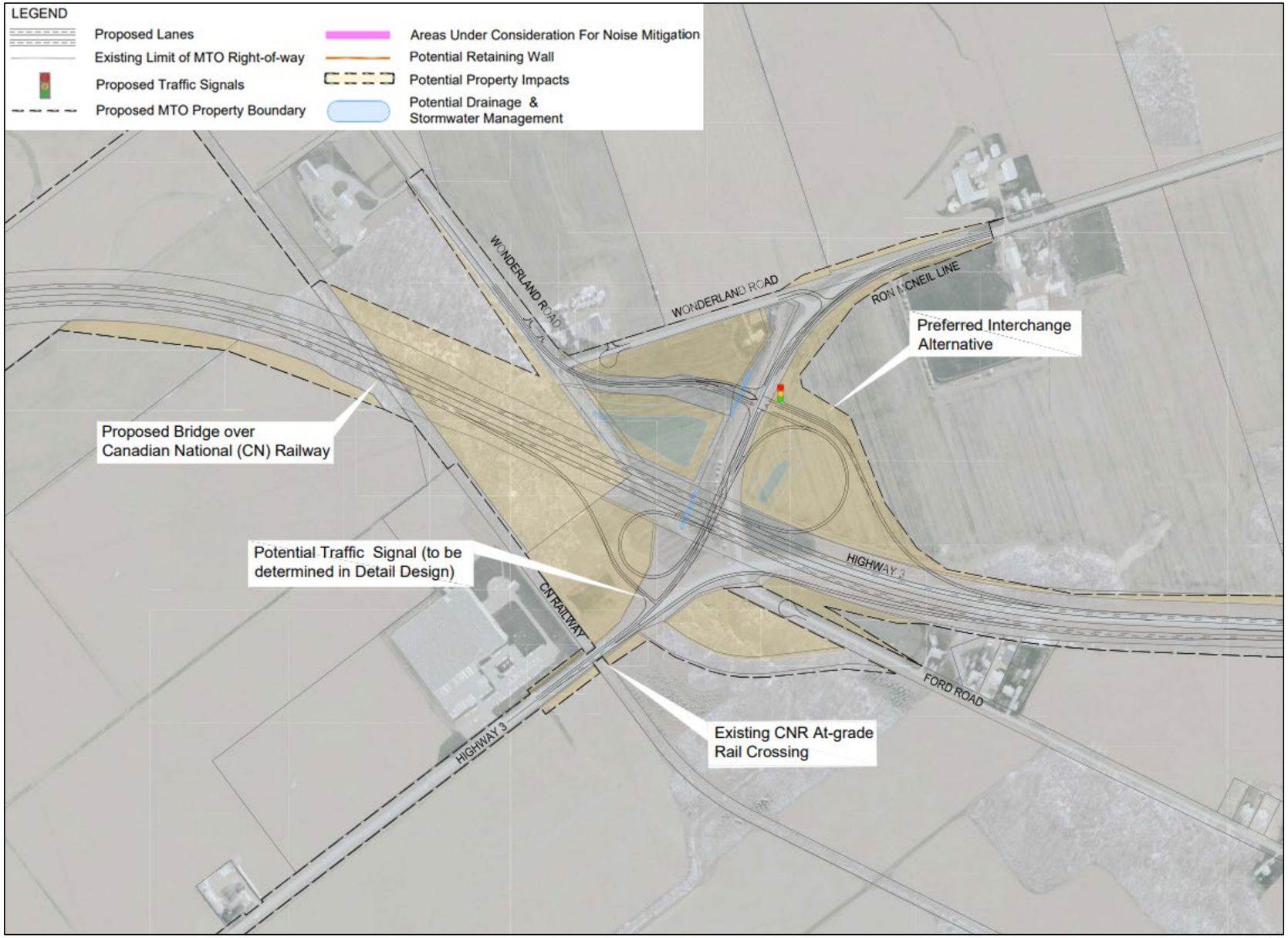

Figure 16: Recommended Plan at Ron McNeil Line/Wonderland Road Interchange

7.1 Design Criteria

Highway 3 within the study area is classified as a four-lane Rural Freeway Divided highway. The new posted speed limit on Highway 3 is 100 km/h and the design speed is 120 km/h.

Highway 4 within the study area is classified as an undivided four-lane road with centre turning lanes from Highway 401 southerly to approximately 75 m south of Longhurst Line. Highway 4 will be widened from two to four lanes from 75 m south of Longhurst Line to the new intersection with the Talbotville Bypass and will be a four-lane rural arterial undivided highway. The posted speed limit of 80 km/h on Highway 4 will be maintained and the design speed is 100 km/h.

There is one crossing road with Highway 4 and one crossing road with Highway 3. The functional classification of each crossing road along with its posted speed and design speed is outlined in **Table 11**.

Table 11: Crossing Road Posted and Design Speed

Crossing Road	Structure Type	Functional Highway Classification	Posted Speed (km/h)	Design Speed (km/h)
Longhurst Line	N/A (intersection)	RLU80	80 (see Note 1)	80
Ron McNeil Line	Underpass (interchange)	RAU100	80	100

*Note 1: During the Detail Design phase, discussions will occur with the municipality about the posted speed approaching the intersection in determining the final alignment.

7.2 Highway 3

The Recommended Plan includes a new Talbotville Bypass that will connect the existing Highway 3 near Ron McNeil Line to Highway 4.

7.2.1 Cross-Section

The new Talbotville Bypass includes a 4-lane cross-section with an open median. The existing Highway 3 cross-section within the study limits will be widened from a two-lane cross-section to a four-lane cross-section with an open median. A 22.5 m median width is the standard for divided highways and will be implemented along Highway 3.

The cross-section elements of Highway 3 within the project limits are summarized in **Table 12**.

Table 12: Summary of Recommended Cross-Section Elements on Highway 3

Cross-Section Element	Width (m)
Pavement Width	4 lanes x 3.75 (2 EBL, 2 WBL)
Shoulder Width	3.0 outside shoulder (right) 1.0 inside shoulder (left)
Shoulder Rounding	1.5
Median Width	22.5

7.3 Highway 4

7.3.1 Cross-Section

The existing Highway 4 cross-section will be widened from a two-lane cross-section to a four-lane cross-section from approximately 75 m south of Longhurst Line to the new intersection with the Talbotville Bypass.

The cross-section elements of Highway 4 within the project limits are summarized in **Table 13**.

Table 13: Summary of Recommended Cross-Section Elements on Highway 4

Cross-Section Element	Width (m)
Pavement Width	4 lanes x 3.75 (2 NBL, 2 SBL)
Shoulder Width	3.0
Shoulder Rounding	1.0

7.4 Interchanges

To accommodate the future footprint of Highway 3 and the projected future traffic volumes, a new interchange at Ron McNeil Line/Wonderland Road has been identified as part of the Recommended Plan. This section of the report provides a description of the interchange improvements.

7.4.1 Ron McNeil Line/Wonderland Road Interchange

A Parclo A3 configuration interchange is recommended for the new interchange at Highway 3 and Ron McNeil Line/Wonderland Road. Ford Road will be closed with a cul-de-sac. The new interchange ramps include W-N/S, E-N/S, and N/S-W ramps, as well as direct S-E, N-E, and S-W ramps. The interchange includes a R-55 m loop ramp for the N-E ramp and a R-90 m loop ramp for the N/S-W ramp.

The intersection of Ron McNeil Line and Wonderland Road/Highway 3 E-N/S off-ramp (north ramp terminal) will be signalized. The need for traffic signals at the intersection of Ron McNeil Line and Highway 3 W-N/S ramp (south ramp terminal) will be reviewed and determined during Detail Design.

Wonderland Road will be realigned to connect with Ron McNeil Line at the Highway 3 E-N/S off-ramp (north ramp terminal). Entrance modifications on Wonderland Road will be required to accommodate the realignment. The existing section of Wonderland Road will be maintained to provide access to an existing property, a cul-de-sac will be implemented, and the connection to Ron McNeil Line will be shifted slightly to accommodate the realignment of Ron McNeil Line.

The cross-section of Ron McNeil Line includes two 3.75 m lanes and 2.5 m shoulders with 1.0 m rounding. A 3.5 m lane is provided across the bridge to the S-W ramp and a 3.5 m lane is provided across the bridge to the N-E ramp. The bridge shoulder widths will accommodate cyclists. The bridge vehicular lanes and shoulder widths will accommodate wider agricultural equipment.

The cross-section of Wonderland Road includes two 3.75 m lanes and 2.5 m shoulders with 1.0 m rounding.

All new interchange on-ramps are single lane ramps with a 4.75 m wide lane, a 1.0 m wide fully paved left shoulder, a 2.5 m wide fully paved right shoulders and a 1.0 m shoulder rounding.

All new interchange off-ramps are single lane exit ramps with a 4.75 m wide lane, a 1.0 m wide fully paved left shoulder, a 2.5 m wide fully paved right shoulders and a 1.0 m shoulder rounding. The exit ramps develop into multi-lane approaches to the ramp terminal intersections.

7.4.1.1 Traffic Operations

Based on the Traffic Analysis conducted as part of this study, and as documented in the *Traffic Analysis Report and Safety Review of Existing Conditions Report* that are on file with MTO, the following conclusions are noted:

- The intersection of Ron McNeil Line and Highway 3 W-N/S off-ramp (south ramp terminal) will operate at an overall LOS A in both the AM and PM periods in the 2032 future horizon year.
- The intersection of Ron McNeil Line and Wonderland Road/Highway 3 E-N/S off-ramp (north ramp terminal) will operate at an overall LOS B in both the AM and PM periods in the 2032 future horizon year.
- The intersection of Ron McNeil Line and Highway 3 W-N/S off-ramp (south ramp terminal) will operate at an overall LOS A in both the AM and PM periods in the 2047 future horizon year.
- The intersection of Ron McNeil Line and Wonderland Road/Highway 3 E-N/S off-ramp (north ramp terminal) will operate at an overall LOS B in both the AM and PM periods in the 2047 future horizon year.

7.5 Intersections

7.5.1 Highway 4 and Highway 3

A new multi-lane roundabout is recommended for the intersection of the Talbotville Bypass and Highway 4. The roundabout will be located at an offset to the east of existing Highway 4 and will include an east to north bypass lane. The roundabout layout will be confirmed during the Detail Design phase.

7.5.2 Highway 4 and Longhurst Line/Clinton Line

The realignment of Clinton Line and Longhurst line is proposed at the Highway 4 intersection. Longhurst Line will be realigned to intersect Highway 4 at the existing intersection of Clinton Line. The existing Longhurst Line approach at Highway 4 will be closed with a cul-de-sac. Clinton Line will intersect with Longhurst Line west of Highway 4. The intersection configuration will be confirmed during the Detail Design phase.

7.6 Railway Crossings

The existing CN Railway at-grade rail crossing with Highway 3 west of Ron McNeil Line will be maintained. The Highway 3 and Ron McNeil Line S-E ramp speed change lane will extend onto the rail crossing. MTO is consulting with CN Railway about the possibility of removal of the physical crossing (i.e., tracks and signals) until reinstatement of track operations. This will be determined during the Detail Design phase.

The Talbotville Bypass will intersect the CN railway just west of Ron McNeil Line. A new structure will be constructed where the new alignment of Highway 3 crosses the railway, as described in Section 7.7.

7.7 Structures

The Recommended Plan includes one new roadway structure, one railway overhead, and one new structural culvert, as described herein.

7.7.1 Dodd's Creek Culvert

The proposed Dodd's Creek Culvert is a 3.6 m x 2.4 m rigid frame box culvert that is proposed to be installed as part of the new Talbotville Bypass. The culvert length will be refined to accommodate embankment grading requirements but is expected to be about 120 m. The culvert will cross Highway 3 at an approximate 51° skew and the maximum fill height above the culvert will be almost 3.0 m.

7.7.2 CNR Talbotville Overhead

The CNR Talbotville Overhead will span over the CN right-of-way. The proposed bridge will consist of a 27 m long reinforced concrete rigid frame. Highway 3 crosses the CN right-of-way at a large skew (approximately 61º) resulting in the need to utilize a wide single bridge, as opposed to two bridges each carrying one direction of highway traffic.

7.7.3 Ron McNeil Line Underpass

The Ron McNeil Line Underpass will carry a single lane of Ron McNeil Line traffic and a ramp lane in each direction over Highway 3. The bridge will provide 2.5 m shoulders adjacent to the ramp lanes. The proposed bridge will consist of a two-span integral abutment bridge. The span lengths and superstructure type will be confirmed during Detail Design; however, it is expected that the bridge will consist of a slab-on-girder superstructure and that each span will be about 38 m long.

7.7.4 Overhead Sign Support Structures

Overhead Sign Support Structures (OHSS) are required at the Highway 3 and Ron McNeil Line/Wonderland Road interchange and at the Talbotville Bypass and Highway 4 roundabout. The design of the OHSS will be completed during Detail Design.

7.8 Drainage

7.8.1 Culvert Recommendations

The centreline culvert located on Highway 4 between Clinton Line and the proposed roundabout can be retained; however, it will need to be extended to accommodate the planned widening of Highway 4. The culverts on Highway 3 will be removed as part of this project due to the reconstruction of the Highway 3 and Ron McNeil Line/Ford Road intersection into an interchange.

No new culvert crossings are proposed on Highway 4. There are three new culverts proposed to cross Highway 3 and two that are proposed to drain the future median of Highway 3. One new culvert under Highway 3 is proposed east of the proposed roundabout at Highway 4 and the Talbotville Bypass intersection that will convey surface water into a new stormwater management pond on the north side of Highway 3. One new proposed culvert on Highway 3 will be at Dodd's Creek under the proposed Talbotville Bypass alignment, as noted in Section 7.7.1. The third culvert will allow the Auckland Municipal Drain to flow under the Talbotville Bypass alignment.

To convey flow at the new proposed interchange of Highway 3 and Ron McNeil Line/Wonderland Road, a total of 13 new culverts are proposed for the interchange and adjacent local road network realignments, as well as the realignment of the Auckland Municipal Drain through the interchange.

The new proposed culverts in the study area will consist of pre-cast concrete box culverts, as well as CSPs.

7.8.2 Stormwater Management Strategy

Three new stormwater management ponds are proposed within the project limits. One is proposed in the northeast quadrant of the Highway 4 and Highway 3 roundabout and the other two are proposed at the new Highway 3 and Ron McNeil Line/Wonderland Road Interchange.

The new greenfield construction of the Talbotville Bypass alignment east of Highway 4 will bisect current overland flow patterns and some tile drains in agricultural fields within the project limits. Surface water in these areas will be conveyed through open ditches along the outsides and median of the new highway.

7.9 Foundations

Foundations field investigations and testing will be undertaken for the Dodd's Creek Culvert, the CNR Talbotville Overhead, the Ron McNeil Line Underpass, the OHSS, and the stormwater management ponds during Detail Design.

7.10 Pavement

A Pavement Design and Analysis will be completed for the Highway 3 and Highway 4 mainlines, crossing roads, and interchange ramps during Detail Design.

7.11 Illumination

Illumination requirements will be reviewed and confirmed during Detail Design. It is anticipated that partial illumination will be installed at the new Highway 4 roundabout and Ron McNeil Line/Wonderland Road Interchange.

7.12 Utilities

Utility relocations will be required to accommodate the Recommended Plan. Potential utility conflicts have been identified and a Utility Conflict Plan is being completed. Relocation plans for utilities will be confirmed during Detail Design.

7.13 Construction Considerations and Staging

Construction of the Recommended Plan in the GWP 3042-22-00 study area is anticipated to take three years, and there is the potential for temporary road closures and detour routes to be implemented to facilitate construction.

Detour routes will be implemented during the temporary closures. Additional information regarding the anticipated temporary closures and proposed detour routes is provided below. Additional temporary closures may be required for construction and will be confirmed during Detail Design. Detours may be subject to change based on consultation with municipalities.

It is anticipated that Ron McNeil Line will be closed temporarily during construction of the Ron McNeil Line/Wonderland Road Interchange. Ron McNeil Line and Wonderland Road traffic accessing Highway 3 is proposed to be detoured via Wellington Road. The Recommended Plan also includes the permanent closure of Ford Road near Highway 3 with construction of a cul-de-sac. **Figure 17** details the proposed closures and detour route.

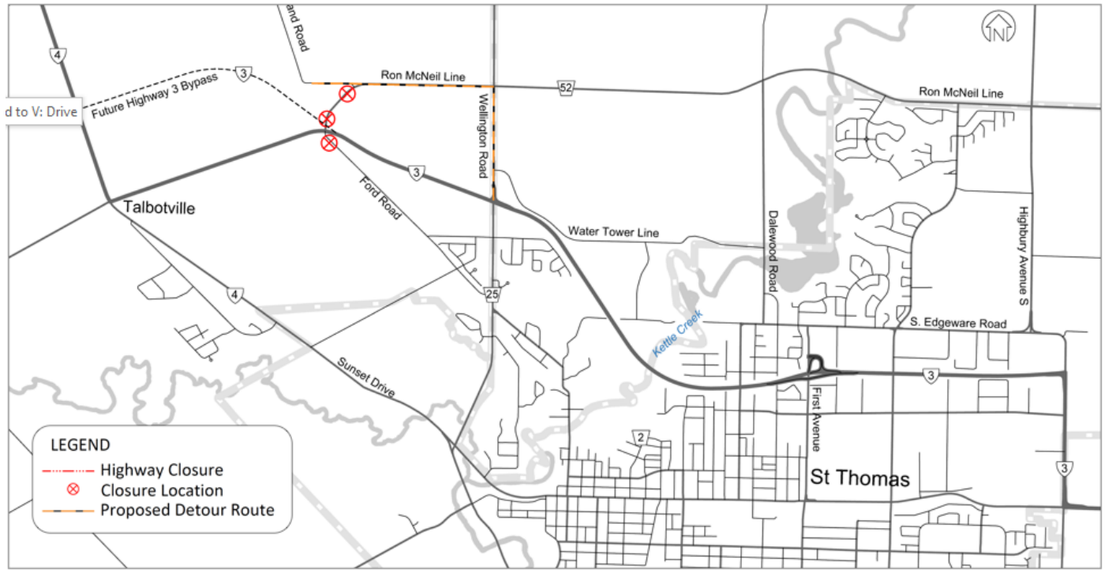

Figure 17: Proposed Temporary Closure of Ron McNeil Line and Associated Detour Route

8.0 Environmental Impacts and Mitigation

In accordance with the *Class EA for Provincial Transportation Facilities* (2000) and the *Environmental Reference for Highway Design* (2006), a description of the anticipated impacts associated with the Recommended Plan, and appropriate mitigation at a Preliminary Design level of detail is described herein. The details of the Recommended Plan will be refined and finalized during the next stage of the planning design process.

8.1 Natural Environment

Potential impacts to the natural environment were considered during the selection of the Recommended Plan. Alternatives that minimize potential impacts to the natural environment were more preferred during the Evaluation of Alternatives (see Section 6.3) than those with greater impacts. As the study progresses, the project team will minimize impacts through the design of the improvements and where impacts cannot be avoided, mitigation or compensation measures will be developed in consultation with applicable regulatory authorities.

8.1.1 Physiography, Geology, and Soils

An Erosion and Sediment Overview Risk Assessment (ESORA) was completed for the study area to evaluate the potential of erosion and sediment migration off-site during construction of the proposed improvements and to identify associated risks. To complete the assessment, the study area was divided into polygons based on the underlying soil type per Ontario Soil Survey Complex mapping (2023). The polygons were each assigned a Soil Erodibility Rating based on soil type, and an Erosion Potential Rating, which considered soil type as well as the proposed slope gradient and proposed slope length. An Environmental Consequence Rating was also assigned to each polygon based on the likelihood that sensitive environmental features in the polygon would be impacted during construction. The three ratings were all considered to assign the cumulative Erosion and Sediment Risk Rating to each polygon. The results of the assessment are provided in **Table 14**.

The study area had an overall medium to high Erosion and Sediment Risk Rating based on the erodibility of soils and sensitive environmental features. An Erosion and Sediment Control Plan (ESCP) will be developed in future design phases for all construction zones to mitigate erosion and sediment risk and limit impacts downstream. A memorandum was prepared to document the findings of the ESORA. A copy of the memorandum is on file with MTO.

Table 14: Erosion and Sediment Overview Risk Assessment Summary

Polygon Number	Soil Description (Texture)	Soil Erodibility Rating	Proposed Soil Gradient	Proposed Slope Length	Erosion Potential	Rational for Erosion Potential	Environmental Consequence Rating	Rational for Environmental Consequence Rating	Erosion and Sediment Risk Rating
1	Silt Loam/ Loam	High	Less than 10%	Greater than 100 m	Medium	High Soil Erodibility. Relatively flat. Imperfect to well drained soils.	Low	No connectivity to watercourse within 500 m.	Medium
2	Loam	High	Less than 10%	Greater than 100 m	Medium	High Soil Erodibility. Relatively flat. Imperfectly drained soils.	Medium	Indirect connectivity to Lindsay Drain.	Medium
3	Loam	High	Less than 10%	Less than 100 m	Medium	High Soil Erodibility. Very flat agricultural land with minor channel bisecting polygon. Imperfectly drained soils.	High	Direct connectivity to Lindsay Drain.	High
4	Clay Loam	Medium	Less than 10%	Less than 100 m	Medium	Medium Soil Erodibility. Relatively flat agricultural land. Imperfectly drained soils.	Medium	Direct connectivity to Lindsay Drain and Henderson Drain. Significant woodlot to the southeast.	High
5	Silt Loam/Loam	Medium	Less than 10%	Greater than 100 m	Medium	Medium Soil Erodibility. Uniform slope to the south. Imperfectly drained soils.	High	Indirect connectivity to Auckland Main Outlet. Significant woodlot along east side of polygon.	High
6	Loam/Clay Loam	High	Less than 10%	Greater than 100 m	High	High Soil Erodibility. Generally, slopes in a southerly direction with a flow split at the north end. Imperfectly drained soils.	High	Indirect connectivity to Auckland Main Outlet. Existing significant woodlot within most of the polygon area.	High
7	Clay Loam	Medium	Less than 10% (Channel side slopes are greater than 20%)	Less than 100 m	High	Moderate Soil Erodibility. Steeper slopes present along watercourse alignment and undulating topography adjacent to Highway 3 embankment. Relatively flat elsewhere. Poorly drained soils.	High	Direct connectivity to Auckland Main Outlet. Woodlot south of Intersection.	High
8	Loam/Clay Loam	High	Less than 10%	Greater than 100 m	Medium	High Soil Erodibility. Relatively flat. Imperfectly drained soils.	Low	Indirect connectivity to Auckland Main Outlet.	Medium
9	Silt Loam	High	Less than 10%	Greater than 100 m	Medium	High Soil Erodibility. Relatively flat elsewhere. Imperfectly drained soils.	High	Indirect connectivity to Auckland Main Outlet. Existing significant woodlot present.	High
10	Loam/Clay Loam	High	Less than 10%	Greater than 100 m	Medium	High Soil Erodibility. Relatively flat. Imperfectly drained soils.	Low	No connectivity to watercourse within 500 m.	Medium

8.1.2 Drainage, Surface Water, Groundwater, and Source Water

There is the potential for impacts to surface water and groundwater as a result of construction, and mitigation measures, including the following, will be confirmed during the subsequent phase of the project. Preliminary recommendations and proposed mitigation measures include:

- Refueling of equipment should be completed away from surface water features whenever possible to minimize potential impacts to surface water and groundwater quality in the event of a spill.
- To minimize the impact of potential contaminant spills, the Contractor should implement best management practices, such as containment of any temporary fuel storage, preparation of a spill response plan, and proper facility management during operation and maintenance.
- Materials for spill response, such as drip pans and spill contingency kits, must be maintained on site during construction.
- It is recommended that the locations of excavations and potential areas requiring groundwater dewatering be reviewed with respect to active groundwater supply wells to determine the need for and extent of private well monitoring. Based on the overburden clay and silt material across the study area, the extent of municipal water service, and the anticipated construction activities, minimal private well monitoring is anticipated to be required.

8.1.3 Designated Areas

Significant woodlands are present throughout the study area and occur within the jurisdiction of the Township of Southwold. The Township of Southwold Official Plan considers any woodland equal to or greater than 4.0 ha to be significant (Township of Southwold 2021). There is one significant woodland to the southwest of the intersection of Highway 3 and Ron McNeil Line/Ford Road and one significant woodland to the northwest of the same intersection. Impacts to the significant woodlands will be reviewed during the subsequent phase of the project. Measures to mitigate impacts to vegetation and wildlife and wildlife habitat will be implemented. Proposed mitigation measures are included in Section 8.1.4, which will be reviewed and confirmed during the subsequent phase of the project.

8.1.4 Terrestrial Ecosystems

8.1.4.1 Potential Impacts

Vegetation and Vegetation Communities

The Recommended Plan will require earth clearing and grading, including encroachment of meadow, thicket, woodland, and wetland communities. These communities support a variety of wildlife habitats which are discussed in the sections below. Potential impacts to vegetation communities include the following and will be reviewed and confirmed during the subsequent phase of the project:

- Direct loss of approximately 58.89 ha of vegetation, as summarized in **Table 15.**
- Removal of approximately 2,177 trees and 109 stems in the study area.
- Soil compaction which can affect growing conditions if replanting is proposed in those areas following construction.
- Injury to trees outside of the construction limits if the proposed works occur within the root zones.
- Edge tree effects within woodlands where tree removal occurs. This may cause stress or injury to trees that were otherwise sheltered but now form the new woodland edge.
- Mechanical damage to trees caused by construction equipment or felled trees striking trees to be retained.
- Root damage to trees caused by excavating soil within 1 m of a tree's dripline.
- Damage to vegetation due to dust suppression, salt spray effects, sedimentation, and accidental spills (i.e., fuel, oil, other hazardous materials).
- Changes to community structure due to the introduction and spread of invasive species, such as European common reed (Phragmites) which was documented in the study area.
- Exposure of soils from vegetation clearing, grubbing, and grading can result in sediment runoff discharging into nearby terrestrial habitats.

Table 15: Anticipated Impacts to Vegetation Communities

Vegetation Community Code	Description	Provincially Rare Community?	Approximate Area of Direct Loss (ha)
Agricultural Communities			
OAG	Open Agriculture	No	0.20
OAGM1	Annual Row Crops	No	37.29
OAGM2	Perennial Cover Crops	No	1.42
OAGM4	Open Pasture	No	0.27
Meadow Communities			
MEMM3	Dry - Fresh Mixed Meadow Ecosite	No	7.64
MEMM4	Fresh-Moist Mixed Meadow Ecosite	No	1.04
Thicket/Hedgerow Communities			
THD	Deciduous Thicket	No	1.19
THDM2-4	Gray Dogwood Deciduous Shrub Thicket Type	No	0.03
THDM2-6	Buckthorn Deciduous Shrub Thicket Type	No	0.03
THDM5	Fresh-Moist Deciduous Thicket Type	No	2.32
Plantation Communities			
TAGM1	Coniferous Plantation	No	0.03
Forested Communities			
FODM4-1	Dry-Fresh Beech Deciduous Forest Type	No	0.81
FODM5-11	Dry-Fresh Sugar Maple – Hardwood Deciduous Forest Type	No	0.55
FODM9-4	Fresh – Moist Shagbark Hickory Deciduous Forest Type	Yes	4.91
Wetland Communities			
MAMM1-3	Reed-canary Grass Graminoid Mineral Meadow Marsh	No	0.05
MAMM1-12	Common Reed Graminoid Mineral Meadow Marsh Type	No	0.58
SWDM3-3	Swamp Maple Mineral Deciduous Swamp Type	No	0.50
SWTM2-3	Gray Dogwood Mineral Deciduous Thicket Swamp Type	No	0.03

Significant woodlands are present within the work zone. The potential impacts identified for vegetation and vegetation communities also apply to the significant woodlands.

Wildlife and Wildlife Habitat

Encroachment of natural features may result in direct and indirect impacts to wildlife and wildlife habitat. This includes permanent and temporary loss of generalized wildlife habitat and candidate and confirmed SWH. Permanent habitat loss includes areas where there is permanent infrastructure and temporary habitat loss includes areas that can be restored following construction.

A summary of confirmed and candidate SWH in the study area and work zone is provided below:

- Confirmed SWH: Bat Maternity Colonies, Rare Vegetation Communities (FODM9-4), Terrestrial Crayfish Burrow, and Habitat for SOCC (Monarch, Eastern Wood-Pewee, and Wood Thrush).
- Candidate SWH: Raptor Wintering Area, Reptile Hibernaculum, Turtle Wintering Area, Bald Eagle, and Osprey Nesting, Foraging and Perching Habitat, Woodland Raptor Nesting Habitat, Amphibian Breeding Habitat/Amphibian Movement Corridors, Woodland Area-Sensitive Bird Breeding Habitat, and SOCC (Midland Painting Turtle, Snapping Turtle, and Eastern Milksnake).

Potential impacts to wildlife and wildlife habitat are provided below and are in addition to those identified for vegetation and vegetation communities. These impacts will be reviewed and confirmed during the subsequent phase of the project:

- Temporary loss of or access to existing wildlife corridors and passages during construction works. This may result in increased wildlife/vehicle collisions if wildlife is unable to safely cross the highway through existing crossing structures.
- Collisions with vehicles, machinery, or physical barriers may occur if wildlife are able to access the construction limits (i.e., improper design or installation of exclusionary measures).
- Light pollution, including temporary and permanent lighting may cause disorientation or attract birds and bats to the area due to increased foraging potential which may result in injury or incidental take of individuals through collisions with vehicles or physical barriers.
- Migratory birds' nests and eggs are susceptible to incidental take during construction activities, especially during vegetation removal and culvert works.
- Increased noise or the proximity of workers could cause nesting birds to temporarily vacate or completely abandon a nest in progress.
- Wildlife that uses road surfaces and shoulders as part of their habitat (i.e., snakes basking on the warm asphalt surface) or that cross the highway to access habitats, may be particularly susceptible to harm associated with road construction projects.
- Hibernacula may be discovered during construction, particularly in areas where there are rock piles, bedrock outcrops, housing foundations, waterbodies, and wetlands and require mitigation.

Migratory Birds

There were 17 trees within the study area assessed as potential Pileated Woodpecker nest cavities, which are protected year-round under the MBR, 2022. Seven of these trees will be impacted by the proposed works and an additional three trees are within 30 m of the proposed alignment. A "Nest Notification" is required using the Environmental Climate Change Canada (ECCC) Abandoned Nest Registry system.

Vegetation within the work zone also has the potential to support migratory bird nests. Any work near active bird nests has the potential to disturb nesting behaviour or damage/destroy the nests, particularly if vegetation clearing occurs during the active breeding bird window (i.e., April 1 to August 31).

Species at Risk

Species at risk bats were confirmed within the study area at six locations. The following potential impacts have been identified:

- Permanent and temporary loss of habitat resulting in encroachment of approximately 6.76 ha of habitat is anticipated.
- Habitat alteration, disruption and avoidance may also occur as a result of edge effects to habitats where vegetation that was previously sheltered is now exposed (i.e., trees in woodland that are part of the new edge may be susceptible to windthrow). Also, construction lighting, noise, vibration and increased human presence can result in disruption and avoidance of habitat.
- Injury and incidental take may occur as a result of collisions with vehicles, machinery, or physical barriers. Species at risk bats may be susceptible to injury and/or incidental take, particularly if habitat is removed while being occupied.

8.1.4.2 Preliminary Mitigation Measures

Mitigation will be implemented to reduce the likelihood of impacts to the natural environment. The standard measures described herein are recommended for the protection and reduction of impacts the natural features, general wildlife and wildlife habitat, and to reduce the risk of potential impacts to species at risk and SOCC.

Site-specific mitigation recommendations for natural features, SWH or habitat of species at risk/SOCC confirmed in the study area or assumed to be present, are discussed below.

Ontario Provincial Standard Specifications

The following Ontario Provincial Standard Specifications (OPSS) are applicable to the project:

- OPSS 180 – General Specification for the Management of Excess Materials
- OPSS 182 – Environmental Protection for Construction in Waterbodies and on Waterbody Banks
- OPSS 801 – Construction Specification for the Protection of Trees
- OPSS 803 – Construction Specification for Vegetative Cover
- OPSS 804 – Construction Specification for Temporary Erosion Control
- OPSS 805 – Construction Specification for Temporary Sediment Control

The OPSSs are applicable to the following general activities:

- Management of Excess Materials – Excess material shall be managed in accordance with OPSS 180 and O. Reg. 406/19.
- Equipment Use – Use of equipment shall be in accordance with OPSS 182.
- Erosion and Sediment Control – The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS 182, OPSS 801, OPSS 804, OPSS 805.
- Vegetation Removal and Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS 182, OPSS 801, OPSS 803 and OPSS 804. West Region Seed Mix will be used to reseed disturbed areas.

Protection of Vegetation and Vegetation Communities

To address the potential impacts, the following preliminary mitigation measures and recommendations have been proposed and will be reviewed and confirmed during the subsequent phase of the project:

- Time vegetation removal to occur outside of following periods for wildlife, where feasible and unless otherwise specified: birds (April 1 to August 31), bats (March 15 to September 30), reptiles/amphibians (April 1 to October 31), and monarch (May 1 to September 30). If in-water works/vegetation removals are required within wetlands that may also support turtle wintering habitat, those activities should occur between April and October.
- Demarcate work zones to ensure work remains within the construction limits.
- Staging areas are recommended to be sited in developed and disturbed areas to minimize impacts to natural features.
- Utilize appropriate vegetation clearing techniques and limit clearing, grubbing, and grading to only include areas necessary to complete the works (i.e., trees to be felled away from the retained natural areas).
- Install tree protection fencing along the dripline to protect the root zone of trees adjacent to the work zone in accordance with OPSS 801.
- Temporarily disturbed areas shall be restored and vegetated to pre-construction conditions or better. Vegetation plantings shall include seed mixes that are appropriate for the area, and include a mix of native species, including salt-tolerant varieties (as needed) that are appropriate to the site and conditions. Seed mixes should include fast-growing, short-lived perennial cover crop to stabilize soil and reduce competition from weedy exotics.
- Implement dust control measures.

Protection of Rare Plants and Vegetation Communities

Loss of rare vegetation communities (FODM9-4) is anticipated and cannot be avoided. It is recommended to demarcate the edge of disturbance to reduce the extent of encroachment.

Invasive Phragmites Management

European common reed (Phragmites) is a ‘restricted’ plant species regulated by the *Ontario Invasive Species Act* (2015). Phragmites was identified throughout the study area and is expected to be impacted during construction. A Phragmites Management Plan is on file with MTO, and includes the following mitigation measures:

- Develop a site-specific Invasive Species Management Plan that will outline procedures for the management, removal, and disposal of Invasive Phragmites.
- The Contractor will adhere to the requirements of special provision number ENVR0011 – Requirements for Herbicide Spraying and Mechanical Cutting of Invasive and Noxious Vegetation Species (MTO 2019).
- Herbicide spraying will not occur in areas with standing water. All locations will be inspected for standing water prior to spraying in accordance with section 7.02 of special provision number ENVR0011. Spraying will only commence when water is no longer present.
- Locations to be treated by cutting will be cut to a height of 30 cm or less unless otherwise specified or directed by the Contract Administrator per section 7.04 of special provision number ENVR0011.

- The Contractor will implement the Clean Equipment Protocol for Industry (Halloran et al. 2013) to minimize the introduction and spread of invasive species.
- Designated areas for equipment cleaning and invasive species stockpiles may be temporarily required during construction. If designated areas are required, they will be identified and demarcated in the field. The designated areas will not be located in or near watercourses, environmentally sensitive features, or areas where invasive species are not currently present.
- Soil contaminated with invasive species will not be re-used for restoration activities.

Black Ash

Black Ash receives species and habitat protection effective January 26, 2024, in accordance with the provisions of O. Reg. 6/24 and O. Reg. 7/24. Black Ash receives species and habitat protection if they are within a listed municipality and are healthy with a stem diameter at breast height of at least 8 cm. A qualified professional must assess the health of each tree and prepare a report containing the details required by the regulation and submit to the Ministry. The prescribed habitat for Black Ash is a 30 m buffer from the stem.

As the project is within a listed municipality, the following is required:

- Assess the health of Black Ash within 30 m of the project that may be impacted to determine if the prohibitions of O. Reg. 6/24 apply.
- The timing of the assessment will be completed during the leaf-on period to assess canopy condition and extent of dieback or regeneration of the canopy in accordance with the Regulation.
- A qualified professional must prepare a report in accordance with section 2(3) of O. Reg. 6/24 and submit to the Ministry.
- A 30 m setback shall be maintained from a healthy Black Ash in accordance with O. Reg. 7/24.
- Unhealthy trees may be removed if the conditions of clause 2(2) of O. Reg. 6/24 are satisfied:

1. The Black Ash is not located in a municipality or territorial district set out in Schedule 1 to this Regulation.

2. The Black Ash has:
   I. A stem height that is less than 1.37 m, or
   II. A diameter that is less than 8.0 cm at a stem height of 1.37 m.

3. The Black Ash is determined to be unhealthy in a report prepared in accordance with subsection (3) and submitted to the Ministry prior to the commencement of an activity that may impact the Black Ash.

Protection of Wildlife and Wildlife Habitat

To address the potential impacts, the following preliminary mitigation measures and recommendations have been proposed and will be reviewed and confirmed during the subsequent phase of the project:

- The design shall minimize encroachment of natural areas, including siting staging areas and other temporary construction activities appropriately to minimize disturbance of natural areas to the extent feasible.
- The design shall consider areas where vegetated buffers can be maintained to allow for cover and protection of wildlife, where appropriate and feasible.
- Time vegetation removal to occur outside of following periods for wildlife, where feasible: birds (April 1 to August 31), bats (March 15 to September 30), reptiles/amphibians (April 1 to October 31), and monarch (May 1 to September 30). In addition, vegetation removal in wetland, watercourse, or pond vegetation communities should occur outside of the reptile/amphibian overwintering season (November 1 to March 31).
- If in-water works or removals are required within watercourses or wetlands that may support turtle wintering habitat, activities should occur during the active period. Salvage of turtles and exclusion measures may be required.
- Restrict construction activities to work areas and demarcate sensitive features (i.e., wetlands, SWH, etc.) to prevent off-site encroachment (i.e., fencing).
- Stockpiles shall be covered, protected and/or stored in a way to prevent and discourage wildlife from accessing the materials for nesting (i.e., birds, reptiles), burrows or refuge and install exclusionary measures around the perimeter to prevent access from wildlife (i.e., mammals, reptiles/amphibians).
- Direct artificial light away from natural areas to reduce disturbance to wildlife habitat.
- Avoid idling and make sure construction vehicles and machinery are kept in good repair.
- Where feasible, limit the extent and duration of construction noise and lighting to daylight hours during the wildlife active season (i.e., April to October).

Protection of Migratory Birds

The MBCA protects nests of migratory birds from damage while they are active, including nests in vegetation and on structures. For all migratory birds, the core nesting period is identified as April 1 to August 31 (Government of Canada 2018). Vegetation clearing during nesting periods in migratory bird breeding habitat can destroy active nests and contravene the MBCA. The following mitigation measures shall be followed for migratory birds (including Pileated Woodpecker and SOCC, such as Eastern Wood-Pewee, Wood Thrush, and Tufted Titmouse):

- Time vegetation removal to occur outside of the migratory bird nesting period which extends from April 1 to August 31.
- Removal of Pileated Woodpecker nests shall not occur at any time unless authorized by the MBR, 2022.
- If work must take place during the core nesting period and the area is small enough to be effectively searched for nesting birds, then a breeding bird nest survey can be completed by a Qualified Biologist. The area where vegetation is to be removed must be searched within five days prior to the work commencing.
- If an active nest, or signs of an active nest are observed during construction, a designated buffer will be delineated within which no activity will be allowed to occur while the nest is active (i.e., with eggs or young). The radius of the buffer will be determined by a Qualified Biologist. Once the nest is determined to be inactive (i.e., the young have fledged the nest), clearing and other activities in the area may proceed.

In certain situations, a permit may be issued under Section 71 of the MBR, 2022 to relocate Pileated Woodpecker nest cavities to "mitigate or eliminate the impacts of birds nesting in locations that will cause the permit applicant undue demonstrable hardship by preventing access to, or use of, their land". A permit may be obtained if:

- The relocation of birds, eggs, and nests is necessary to prevent or reduce.
  - The danger that migratory birds are causing or are likely to cause to human health or to public safety in one or more areas, or
  - The damage that migratory birds are causing or are likely to cause to the use of the land or to agricultural interests; and
- Other means are not sufficient to prevent or reduce the danger or damage.

Protection of Monarch

The following mitigation measures are recommended to reduce impacts to Monarch:

- Avoid vegetation clearing in Monarch habitat to occur outside of the larval period which is approximately May 1 to September 30 (Mission Monarch 2020).
- If vegetation clearing will proceed when Monarch larvae may be present (May 1 to September 30), identification and inspection of milkweed plants shall be completed to locate Monarch larvae.
- If larvae are identified a trained Environmental Monitor may relocate the species to a suitable and safe location under the direction of a Qualified Biologist. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted.
- Milkweed and nectar producing plants are recommended to be included in seed mixes for areas restored to meadow to provide habitat for Monarch.

Protection of Bats (Non-species at risk and species at risk)

Bat acoustic surveys confirmed the presence of non-species at risk and species at risk bats within the study area. Non-species at risk bats were recorded at all nine locations, while species at risk bats were only recorded at six locations where acoustic surveys were conducted.

The following mitigation measures are recommended to lessen the likelihood of impacts to bats and will be updated following consultation with MECP on any permitting and compensation requirements for species at risk:

- Time tree removals to occur between October 1 to March 14 which is outside of the active period (March 15 to September 30).
- If potential roost trees are removed during the active period (March 15 to September 30), a Qualified Biologist shall complete a bat exit survey of each tree prior to removal. Trees occupied by bats shall not be removed until they have vacated the roost.
- Avoid installing light figures (permanent or temporary) near bat habitat to lessen the likelihood of effects of light pollution. If not feasible, efforts to reduce illumination and light spill shall consider the following: height of light, light shields, lighting intensity, direction, and spectral composition.
- Installation of artificial bat boxes (i.e., Rocket Boxes and BrandenBarkTM roosts) will be considered in areas with species at risk bats and adjacent to edges within retained vegetation. A recommended artificial roosting structure design is the two-chamber Rocket Boxes that can accommodate an average of 250 bats (specifications available at the following website www.batcon.org/files/RocketBoxPlans.pdf).
- Creation of compensation habitat (i.e., tree plantings) will be considered with locations determined through consultation with MECP and Kettle Creek Conservation Authority.
- Potential cavity trees to be retained shall be identified and their root zone protected by clearly demarcating vegetation clearing/construction limits within the dripline.
- Construction activities within 30 m of known cavity trees that will be retained, and surrounding bat habitat (woodland edge) shall be restricted to daylight hours when possible.

Wildlife Encounters, Safe Handling and Relocation

- If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. If slow moving wildlife (i.e., turtles, snakes) are observed on the road and are in danger, and if safe to do so, they should be moved off the road by gently guiding the individual in the direction it was travelling.
- Wildlife shall not be harmed or harassed.
- Construction equipment and vehicles are to yield to wildlife.
- All injured wildlife (species at risk or non-species at risk) shall be transported to an authorized wildlife rehabilitator by an Environmental Monitor or Qualified Biologist. Euthanasia of injured wildlife is not permitted unless conducted by an authorized wildlife rehabilitator.
- If a snake hibernacula is discovered, all work must cease, and a Qualified Biologist shall be contacted to discuss mitigation options. Overwintering snakes shall not be relocated. If species at risk are encountered, MECP shall be contacted.
- If overwintering turtles are disturbed by construction activities, work shall cease, and a Qualified Biologist shall be contacted to discuss mitigation measures. Overwintering turtles shall not be relocated. If species at risk are encountered, MECP shall be contacted.
- Immediately upon observation of an actively nesting female turtle, personnel and vehicles shall clear the area within the turtle's line of sight as much as possible to allow the female to finish laying. Startling a nesting female could lead to abandonment of the partially laid nest before the eggs are concealed.
- If potential turtle nest sites (i.e., areas of fresh digging in loose gravel or sandy material) are found within the work areas, all work in that area shall cease. The nests shall be left undisturbed, flagged and a setback applied to protect against construction activities. If avoidance is not possible, egg salvage may be completed by a Qualified Biologist which will be detailed in the Salvage and Relocation Plan.

Environmental Training and Monitoring

- Wildlife protocols should be developed to educate workers of potential wildlife occurrences, including species at risk, and measures to take in the event of potential encounters. Preventative measures to reduce the likelihood of encounters, injury, and incidental take should also be provided.
- Monitoring shall occur to confirm that mitigation and contingency measures are implemented, and performance objectives are being met. A construction monitoring log shall be maintained to identify any deficiencies and corrective actions are documented.
- Environmental monitoring during construction shall include, but not be limited to:
  - Daily visual inspections for wildlife prior to the start of construction during the active season (i.e., April to October). This shall include a thorough walk-through of the work area and searching any vegetation, brush piles, logs or rock piles, and equipment. If wildlife is observed, work shall be suspended until the species is out of harm's way.
  - Regular inspections of sensitive features to confirm that setbacks are adhered to and that damage/alteration to the demarcations of these features is addressed.
  - Required monitoring activities to confirm that spills and sediment releases are prevented or addressed quickly and effectively.
  - Visual inspections and wildlife monitoring shall be required where exclusionary measures have been installed and where wildlife activity has been noted.
  - Monitoring of environmental features during construction to confirm works are carried out in accordance with the design and specifications.
- Specialized environmental monitoring programs shall be developed and implemented as it relates to:
  - Establishment of restoration and landscaping.
  - Permit and approval requirements, which will be confirmed as part of the permitting processes (i.e., may include effectiveness monitoring of compensation habitat for species at risk).

Erosion and Sedimentation Control

- Develop and implement an Erosion and Sediment Control Plan prior to construction to protect sensitive natural heritage features.
- Erosion and Sediment Control (ESC) shall be in accordance with OPSS 804 (Construction Specification for Temporary Erosion Control) and OPSS 805 (Construction Specification for Temporary Sediment Control).
- The Erosion and Sediment Control Plan shall capture measures related to vegetation communities, natural areas, and wildlife habitat.
- Maintain vegetative buffers and retain natural vegetation to the extent feasible, to help control erosion.
- Timing of vegetation removal shall consider rainfall and other weather conditions that could increase the likelihood of erosion and sedimentation.

- Reduce the extent and duration of exposed soil and cover areas to suppress dust and prevent sedimentation due to wind and rainfall erosion.
- Re-vegetate disturbed areas as soon as possible to help re-stabilize soils following OPSS 803 (Construction Specification for Vegetative Cover). Vegetation plantings shall include a seed mix that is appropriate to the area and similar to or better than pre-construction conditions.
- Selection of ESC measures shall be appropriate for the site and extent of disturbance, and potential impacts to wildlife, such as entanglement. For example, measures that contain plastic or wire mesh or netting shall not be used, and fully biodegradable options shall be implemented wherever feasible (i.e., erosion control blankets made from coconut fiber, fiber rolls, etc.). Placement of silt fencing shall not create a barrier to movement and wildlife should be redirected to areas where there is safe passage and access to habitat. Sediment control materials shall follow specifications outlined in OPSS 805.
- ESC measures shall be installed prior to vegetation removal and remain in place until vegetation has become established and soils re-stabilized.
- Remove non-biodegradable ESC materials, where approved once site is stabilized.
- ESC measures shall be inspected to confirm they are installed in accordance with manufacturer's instructions and maintained so that controls are working effectively and per design. A monitoring log shall be maintained and include any corrective actions taken and additional recommendations for compliance.

Excess Material and Deleterious Substances

- Surplus materials shall be managed in accordance with OPSS 180 (Management of Excess Materials).
- Excess soils shall be managed in accordance with O. Reg 406/19: On-Site and Excess Soil Management.
- Management and placement of earth, excess soil and stockpiles shall be planned so it does not result in the discharge of contaminants into the natural environment or promote use by wildlife (i.e., bird nesting).
- Fuels, oils, and other hazardous materials will likely be present on site through the operation of vehicles and on-site equipment. Accidental spills of these materials could result in potential negative impacts to the natural environment. The following mitigation measures have been identified to lessen the likelihood for accidental spills:
  - Properly store and locate on-site hazardous materials at least 30 m away from watercourses/wetlands and other sensitive natural features.
  - All on-site materials should be self-contained, maintained according to manufacturer's instructions and disposed of appropriately.
  - Develop and implement an emergency response management and monitoring plan that includes measures for preventing and addressing potential spills and monitoring activities.
  - Spill kits should always be kept on-site and accessible.
  - All waste resulting from construction should be removed from the site and disposed of at an appropriate facility. This includes packaging (bags, wraps, boxes, ties, etc.), waste materials (excess fill, cement, grout, asphalt, or other substances), and ESC structures (silt fencing, flow checks, etc.) once permanent vegetation has established and ESC measures are no longer required.

8.1.5 Fish and Fish Habitat

It was determined that watercourses in the study area do not provide significant habitat for fish; however, there are potential impacts to fish and fish habitat as a result of the Recommended Plan. The following potential impacts to fish and fish habitat have been identified based on the preliminary design information available at the time of publishing this TESR:

- Changes to direct fish habitat at the Unnamed Tributary to Dodd Creek (Lindsay Drain/Lindsay Drain Extension)
- Changes to direct fish habitat at Auckland Drain

During the subsequent design phase of the project, a Fisheries Assessment (i.e., Impact Assessment) will be undertaken to determine the potential for the death of fish or harmful alteration, disruption, or destruction (HADD) of fish habitat based on the final design of the project.

8.1.5.1 Potential Enhancement Measures and Design Recommendations

Opportunities for habitat enhancement were identified at the Unnamed Tributary to Dodd Creek (Lindsay Drain/Lindsay Drain Extension) and Auckland Drain and include increasing riparian vegetation and maintaining flow conveyance and fish habitat in the watercourses. Design recommendations were also provided as part of the preliminary assessment of fish and fish habitat in the study area. It was recommended that the crossing of the Unnamed Tributary to Dodd Creek (Lindsay Drain/Lindsay Drain Extension) be designed to provide passage for small-bodied fish species, and that passage for small-bodied fish species be provided at new culverts, extended culverts, and realigned channel sections in Auckland Drain, as applicable. It was also recommended that low flow channels be considered at crossings of these watercourses to provide fish habitat and/or passage during low flow conditions. These recommendations and opportunities will be reviewed during the subsequent design phase to determine how these measures may be incorporated into the final design of the project.

8.1.5.2 Authorizations

The Recommended Plan includes a new watercourse crossing of the Unnamed Tributary to Dodd Creek (Lindsay Drain/Lindsay Drain Extension) and the relocation of Auckland Drain at the proposed interchange at Highway 3 and the Talbotville Bypass. These aspects of the Recommended Plan will require review by Fisheries and Oceans Canada to determine the need for a *Fisheries Act* authorization during the subsequent phase of the project.

8.1.5.3 Preliminary Mitigation Measures

The following mitigation measures have been identified and will be reviewed and confirmed during the subsequent design phase of the project. Additional mitigation measures will also be identified following the completion of the fisheries assessment, which will be undertaken during the subsequent design phase of the project.

Timing Windows

The in-water construction window for watercourses in the study area is July 16 to March 14, inclusive (i.e., in-water work is not permitted from March 15 to July 15). The timing window does not apply to work above the high-water level.

Ontario Provincial Standard Specifications

The following OPSS.PROVs may be applicable to the project:

- OPSS.PROV 180 – General Specification for the Management of Excess Materials
- OPSS.PROV 182 – General Specification for Environmental Protection for Construction in and Around Waterbodies and on Waterbody Banks
- OPSS.PROV 517 – Construction Specification for Dewatering
- OPSS.PROV 803 – Construction Specification for Vegetative Cover
- OPSS.PROV 804 – Construction Specification for Temporary Erosion Control
- OPSS.PROV 805 – Construction Specification for Temporary Sediment Control
- OPSS.PROV 825 – Construction Specification for Placement of Aggregates in Waterbodies
- OPSS.PROV 1005 – Material Specification for Aggregates - Waterbody

The OPSS.PROVs are applicable to the following general activities:

- Equipment Use – Use of equipment shall be in accordance with OPSS.PROV 182.
- Dewatering and Temporary Flow Passage – Dewatering and/or temporary flow passage shall be implemented according to OPSS.PROV 517 and OPSS.PROV 182.
- Fish Salvage – Fish salvage operations shall be conducted in accordance with OPSS.PROV 182.
- Preservation of Riparian Vegetation – Removal of riparian vegetation shall be in accordance with OPSS.PROV 182.
- Erosion and Sediment Control – The installation, monitoring, maintenance, and removal of temporary erosion and sediment control measures shall be according to OPSS.PROV 182, OPSS.PROV 804 and OPSS.PROV 805.
- Placement of Aggregates in Waterbodies – The use of aggregate in waterbodies shall be according to OPSS.PROV 825 and OPSS.PROV 1005.
- Restoration of Disturbed Areas – Vegetation protection and rehabilitation shall be in accordance with OPSS.PROV 182, OPSS.PROV 803 (Vegetative Cover, Non-Standard Special Provision - Amendment to OPSS.PROV 803) and OPSS.PROV 804.
- Management of Excess Materials – Excess material shall be managed in accordance with OPSS.PROV 180.

8.2 Socio-Economic Environment

8.2.1 Land Use

8.2.1.1 Property

It is anticipated that the Recommended Plan will require the acquisition of property to facilitate construction. Property impacts and/or acquisitions will be confirmed during the subsequent phase of the project.

8.2.1.2 Communities

Direct impacts to community facilities in the study area are not anticipated as a result of the Recommended Plan.

8.2.1.3 Agriculture

It is anticipated that the Recommended Plan will result in impacts to portions of agricultural land in the study area. These impacts will be confirmed during the subsequent phase of the project.

8.2.2 Potentially Contaminated Property

In total, six Areas of Potential Environmental Concern were identified within and/or adjacent to the study area. The Recommended Plan may result in impacts to these areas and will be confirmed during the subsequent phase of the project. The following recommendations were provided in the COS Report, and will be reviewed during the subsequent phase of the project:

- O. Reg. 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O. Reg. 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction. This includes sampling soil that will be disturbed during construction, if required, according to a sampling and analysis plan and analyzing for the specific contaminants of concern, as described in the APEC summary table. Sampling programs should be developed and undertaken under the supervision of a qualified person, as defined in O. Reg. 406/19, and sample selection should take into consideration the presence of anthropogenic substances, such as debris/waste, and unusual odours or staining.
- Stockpiling and transport of excavated soil during construction should be done in accordance with the requirements specified in O. Reg. 406/19.
- Should suspected contaminated soil be encountered during future construction activities (i.e., staining, odours, debris/waste, petroleum hydrocarbon sheen), a qualified person should be retained to identify and collect representative soil samples for chemical analysis to determine management options and appropriate handling in accordance with O. Reg. 406/19.

8.2.3 Excess Materials Management

As noted in Section 8.2.2, O. Reg. 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O. Reg. 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction.

8.2.4 Student Transportation Services

Permanent impacts to student transportation routes are not anticipated as a result of the Recommended Plan. Students/school transportation services may experience minor delays while traveling through the study area and along detour routes during construction. Student transportation services will be consulted during the subsequent design stage and will be notified prior to construction commencing.

8.2.5 Navigable Waters

There are no navigable waters in the GWP 3042-22-00 study area; therefore, there are no impacts anticipated as a result of the Recommended Plan for GWP 3042-22-00.

8.2.6 Active Transportation

There are no impacts to active transportation routes anticipated as a result of the Recommended Plan. It is anticipated that the new shoulders on Ron McNeil Line and Wonderland Road will accommodate future bike lanes; however, bike lanes are not included in the Recommended Plan.

8.2.7 Recreational Features

There are no impacts to recreational features in the GWP 3042-22-00 study area as a result of the Recommended Plan.

8.2.8 Emergency Services

There are no permanent impacts to emergency service providers anticipated as a result of the Recommended Plan. Emergency service providers may, however, experience temporary delays during construction activities. All emergency service providers that service the study area will be consulted during the subsequent design phase and will be notified prior to construction commencing.

8.2.9 Municipal Services

Municipal services are expected to be impacted by the Recommended Plan and will be confirmed during Detail Design. As a result, temporary disruptions (i.e., water service) may be experienced by residents. All disruptions will be communicated to those affected prior to commencement of the activities impacting the service.

8.2.10 Air Quality

An Air Quality Assessment was completed to characterize baseline (2023) air pollutant emissions and predict air quality effects within the study area after implementation of the project in the Future Build (2032 and 2047) scenarios for the project alone and cumulatively with background air quality levels. The Future Build years of 2032 and 2047 represent five years and 20 years after completion of project construction. Predicted future emissions and potential effects with project implementation (Future Build) are compared to baseline emissions and effects (Baseline), and to predicted future emissions and effects without implementation of the project (Future No Build) for a total of five assessment scenarios:

- 2023 Baseline (existing conditions; two lanes)
- 2032 – Future No Build (future conditions without the project; two lanes)
- 2032 – Future Build (future conditions with the project; four lanes, bridge/interchange improvements, Talbotville Bypass)
- 2047 – Future No Build (future conditions without the project; two lanes)
- 2047 – Future Build (future conditions with the project; our lanes, bridge/interchange improvements, Talbotville Bypass)

This study was conducted following guidance from the MTO's *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects* (MTO Guide) (MTO 2020). Changes in greenhouse gas (GHG) emissions are assessed in this study. Additionally, potential air quality impacts during project construction are assessed qualitatively.

The air contaminants of potential concern (CoPC) selected for this study are based on the most relevant transportation-related contaminants listed in the MTO Guide and include nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter with diameter less than 10 micrometres (PM_{10}), particulate matter with diameter less than 2.5 micrometres ($PM_{2.5}$), acrolein, benzene, 1,3-butadiene, benzo(a)pyrene (B(a)P), acetaldehyde and formaldehyde. Greenhouse gas (GHG) emissions in the form of carbon dioxide equivalent (CO_2e) were also quantified.

Baseline ambient air quality conditions were characterized from historical data obtained from ECCC's National Air Pollution Surveillance (NAPS) Network and MECP for stations located near the study area. The United States Environmental Protection Agency's (US EPA's) Motor Vehicle Emission Simulator (MOVES) model version 3 (MOVES3) was used to estimate baseline and future emission rates from motor vehicles. The US EPA dispersion model, CAL3QHCR was used to predict the maximum 1-hour, 8-hour, 24-hour, and annual average ground level concentrations (GLCs) at special receptors for the five assessment scenarios.

The predicted ambient air quality results for each scenario were compared against relevant provincial Ambient Air Quality Criteria (AAQC) and Canadian Ambient Air Quality Standards (CAAQS) while GHG emissions were compared to National and Provincial totals for 2021 and 2030 emissions targets.

Based on the results of the assessment, the following was noted:

- While the project contributions to exceedances are expected to be small, it is expected that with ongoing advancements of on-road vehicles to newer, lower emission or electric vehicles, the quantities of air contaminants released to the atmosphere from transportation sources will be lower in the future.
- Implementation of the project will improve the future traffic flow and reduce congestion in the local road network, which is beneficial to local air quality. Other measures to minimize impacts of particulate and NOx emissions that could be considered include incorporating vegetative barriers in the landscaping design. The effectiveness of trees and plants as physical barriers for particulate or gaseous contaminant control depends on the density and height of the vegetation. In general, a vegetation barrier should be thick (approximately 6.0 m or more) and have full leaf and branch coverage from the ground to the top of the canopy with no gaps in-between or underneath the vegetation.
- Releases of GHGs from the project are expected to be insignificant (less than 0.1%) in comparison to the 2021 Canada and Ontario totals and the 2030 emissions targets.

8.2.10.1 Air Quality During Construction

During construction of the project, dust will be the primary CoPC. Other CoPC such as NO_2 and VOCs will also be emitted from equipment used during construction. As the construction activities will be short-term and intermittent, no significant adverse effects on local air quality are expected provided adequate mitigation measures are implemented. The ECCC guideline *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (ECCC 2005) provides recommendations for mitigation measures to reduce construction emissions. These measures include material wetting or use of chemical suppressants to reduce dust, use of wind barriers, covering or stabilizing exposed areas which may be a source of dust, and equipment washing. It is recommended that appropriate best management practices be followed during project construction.

8.2.11 Noise

8.2.11.1 Operational Noise

A Noise Impact Assessment was carried out in accordance with MTO's *Environmental Guide for Noise* (MTO 2008) to measure the anticipated change in traffic noise levels associated with the operation of the improved highway and to investigate the need for noise mitigation measures.

Road traffic noise impact is assessed with the applicable criteria published in MTO *Environmental Guide for Noise*. Future noise levels with (Future Build) and without the project (Future No-build) are predicted for the assessment. Where predicted Future Build noise levels increase by 5.0 dB or more over Future No-build, or the predicted Future Build noise levels equal or greater than 65 dBA, mitigation measures are investigated.

According to the MTO Guide requirements, mitigation measures should be restricted to within the MTO right-of-way. For the mitigation to be implemented, it must be technically, economically, and administratively feasible. For the noise mitigation measure(s) to be considered technically feasible, it (they) must provide a minimum 5.0 dB noise reduction averaged over the first row of receptors. Once a mitigation option is deemed technically feasible, it must then be evaluated for economic feasibility. For the noise mitigation measure(s) to be considered economically feasible, its cost-benefit ratio should be within the range of what the MTO typically spends per benefitted receptor (i.e., receptor with a minimum 5.0 dB noise reduction from the investigated mitigation). The current MTO cost-benefit ratio limit is $125,000 per residence for the noise mitigation measure to be economically feasible. The cost-benefit ratio is calculated as the estimated cost of the noise mitigation divided by the number of benefitted receptors. Administrative feasibility is assessed by determining the ability to locate the noise mitigation on lands within public ownership (i.e., provincial or municipal right-of-way).

Project road traffic noise impact was assessed at 55 representative receptors from eight noise sensitive areas (NSAs) within the study area (see attached figure for receptor locations), and the assessment was completed based on the criteria published in applicable MTO *Environmental Guide for Noise*. The assessment considered future traffic for horizon year 2047, as provided by the traffic team (CIMA+).

The increase in future sound levels with the project (Future Build) over without project (Future No-build) at all modelled receptors were below the MTO limit of 5.0 dB, except at receptor R45. However, the predicted Future Build sound levels at 16 receptors were equal or greater than 65 dBA limit (R03 within NSA01; R14 within NSA02; R17 thru R19 within NSA03; and R31, R33, R36, R38, R41, R42, R43, R45 thru R48 within NSA07) and noise mitigation was investigated for all receptors, except for the future developments. Mitigation for the proposed future developments (R14 and R43) was not investigated as the noise mitigation for the future developments is expected to be incorporated in the design and would fall under the responsibility of the developers.

Six noise barriers on MTO right-of-way were investigated and assessed for technical and economic feasibility. One of the barriers (NB1 – along Highway 4, just north of Talbotville roundabout) was ruled out for technical feasibility, as it did not provide the required 5 dB reduction with the investigated noise barrier. Other five noise barriers (NB2 thru NB6) were assessed for economic feasibility, and they all passed feasibility and recommended for the project. Noise barrier dimensions are provided in the feasibility assessment table below.

The locations of noise barriers are displayed in the Recommended Plan, provided in **Appendix C**.

8.2.11.2 Construction Noise

To minimize construction noise during construction, it is recommended that the following mitigation measures be carried forward for consideration during the subsequent phase of the project:

- All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order.
- There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and any applicable local by-laws.
- The Contract documents should contain a provision that any initial noise complaint will trigger verification of construction noise and typical noise control measures.
- In the presence of persistent noise complaints, all construction equipment should be verified to comply with MECP NPC-115 and NPC-118 limits.
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measures may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative, and economic feasibility of the various alternatives.

8.3 Cultural Heritage Environment

8.3.1 Archaeological Resources

Stage 2 work is ongoing as of the end of 2023 and will continue when weather permits in 2024.

Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and be subject to Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b). The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act.*

The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 (Government of Ontario 2002) requires any person discovering human remains notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

8.3.2 Built Heritage Resources and Cultural Heritage Landscapes

A Preliminary Impact Assessment was undertaken as part of the CHRA and is documented in the CHRA Report on file with MTO. It was determined that four built heritage resources located within the study area have the potential to be directly impacted through disruption, displacement, isolation, encroachment, and/or the introduction of non-sympathetic elements. Impacts to heritage resources will be confirmed during the subsequent phase of the project.

Mitigation measures may be required once impacts are determined. Depending on the final design, property-specific *Cultural Heritage Evaluation Report(s)* may be needed prior to the completion of a Heritage Impact Assessment. In general, the preferred approach to mitigate direct impacts is to avoid potential built heritage resources. In addition, the preferred approach to mitigate indirect impacts is to establish a buffer zone around built heritage resources to avoid construction activity within 50 m and to have staging and laydown areas be non-invasive and avoid built heritage resources. Where avoidance is not feasible, it is recommended that a Qualified Building Condition Specialist or Engineer develop a strategy to carry out condition surveys and vibration monitoring, where required. The pre-condition survey may include screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition. Vibration monitoring may consist of random confirmatory vibration monitoring during construction. A post-condition survey should be carried out on an as-needed basis to be determined by a Qualified Building Condition Specialist or Engineer. Mitigation measures and vibration monitoring, if required, will be confirmed during the subsequent phase of the project.

9.0 Summary of Environmental Effects, Proposed Mitigation and Commitments

A summary of environmental effects, proposed mitigation, and commitments to future work, as identified during the course of this study, is provided in **Table 16**. This summary forms a comprehensive ‘checklist’ of outstanding issues identified at the end of the Class EA and Preliminary Design phase of the project and will serve as a starting point for the subsequent design phase of the project.

Table 16: Summary of Environmental Effects, Proposed Mitigation, and Commitments for Future Work

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
Natural Environment		
1.0	**Physiography, Geology, and Soils (See Section 8.1.1 for further details)**	
	Potential for erosion and sedimentation during construction activities, which may impact watercourses and drainage ditches within the study area.	• An Erosion and Sediment Control Plan will be prepared during the subsequent design phase.
2.0	**Drainage, Surface Water, Groundwater, and Source Water (See Section 8.1.2 for further details)**	
	Potential impacts to surface water and groundwater from contaminant spills and soils, leaks, accidental spills, and dewatering activities.	• Refueling of equipment should be completed away from surface water features whenever possible to minimize potential impacts to surface water and groundwater quality in the event of a spill. • To minimize the impact of potential contaminant spills, the Contractor should implement best management practices, such as containment of any temporary fuel storage, preparation of a spill response plan, and proper facility management during operation and maintenance. • Materials for spill response, such as drip pans and spill contingency kits, must be maintained on site during construction. • To minimize the impact of potential contaminant spills, the Contractor should implement best management practices, such as containment of any temporary fuel storage, preparation of a spill response plan, and proper facility management during operation and maintenance. • Obtain a draft Permit to Take Water (PTTW), if required. • It is recommended that the locations of excavations and potential areas requiring groundwater dewatering be reviewed with respect to active groundwater supply wells to determine the need for and extent of private well monitoring. Based on the overburden clay and silt material across the study area, the extent of municipal water service, and the anticipated construction activities, minimal private well monitoring is anticipated to be required.
3.0	**Designated Areas (See Section 8.1.3 for further details)**	
	Potential for impacts to designated areas (i.e., significant woodland) within the study area.	• Measures to mitigate impacts to vegetation and wildlife and wildlife habitat, as outlined in the rows below, will be implemented.
4.0	**Vegetation and Vegetation Communities (See Section 8.1.4 for further details)**	
	Potential for localized impacts to vegetation due to disturbance of existing common and rare species.	• Time vegetation removal to occur outside of following periods for wildlife, where feasible: birds (April 1 to August 31), bats (March 15 to September 30), reptiles/amphibians (April 1 to October 31), and monarch (May 1 to September 30), where feasible and unless other specified. If in-water works/vegetation removals are required within wetlands that may also support turtle wintering habitat, those activities should occur between April and October. • Demarcate work zones to ensure work remains within the construction limits. • Staging areas are recommended to be sited in developed and disturbed areas to minimize impacts to natural features. • Utilize appropriate vegetation clearing techniques and limit clearing, grubbing, and grading to only include areas necessary to complete the work (i.e., trees to be felled away from the retained natural areas). • Install tree protection fencing along the dripline to protect the root zone of trees adjacent to the work zone in accordance with OPSS 801.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
		• Temporarily disturbed areas shall be restored and vegetated to pre-construction conditions or better. Vegetation plantings shall include seed mixes that are appropriate for the area, and include a mix of native species, including salt-tolerant varieties (as needed) that are appropriate to the site and conditions. Seed mixes should include fast-growing, short-lived perennial cover crop to stabilize soil and reduce competition from weedy exotics. • Implement dust control measures. • Assess the health of Black Ash within 30 m of the project that may be impacted to determine if the prohibitions of O. Reg. 6/24 apply. • The timing of the assessment will be completed during the leaf-on period to assess canopy condition and extent of dieback or regeneration of the canopy in accordance with the Regulation. • A qualified professional must prepare a report in accordance with section 2(3) of O. Reg. 6/24 and submit to the Ministry. • A 30 m setback shall be maintained from a healthy Black Ash in accordance with O. Reg. 7/24. • Unhealthy trees may be removed if the conditions of clause 2(2) of O. Reg. 6/24 are satisfied. • Avoid vegetation clearing in Monarch habitat to occur outside of the larval period which is approximately May 1 to September 30 (Mission Monarch 2020). • If vegetation clearing will proceed when Monarch larvae may be present (May 1 to September 30), identification and inspection of milkweed plants shall be completed to locate Monarch larvae. • If larvae are identified, a trained Environmental Monitor may relocate the species to a suitable and safe location under the direction of a Qualified Biologist. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted. • Milkweed and nectar producing plants are recommended to be included in seed mixes for areas restored to meadow to provide habitat for Monarch. • If potential roost trees are removed during the active period (March 15 to September 30), a Qualified Biologist shall complete a bat exit survey of each tree prior to removal. Trees occupied by bats shall not be removed until they have vacated the roost. • Creation of compensation habitat (i.e., tree plantings) will be considered with locations determined through consultation with MECP and Kettle Creek Conservation Authority. • Potential cavity trees to be retained shall be identified and their root zone protected by clearly demarcating vegetation clearing/construction limits within the dripline.
5.0	**Wildlife and Wildlife Habitat (See Section 8.1.4 for further details)**	
	Potential for species at risk habitat within or adjacent to the study area, and potential interactions with wildlife during construction.	• The design shall minimize encroachment of natural areas, including siting staging areas and other temporary construction activities appropriately so as to minimize disturbance of natural areas to the extent feasible. • The design shall consider areas where vegetated buffers can be maintained to allow for cover and protection of wildlife, where appropriate and feasible. • Time vegetation removal to occur outside of following periods for wildlife, where feasible: birds (April 1 to August 31), bats (March 15 to September 30), reptiles/amphibians (April 1 to October 31), and monarch (May 1 to September 30). In addition, vegetation removal in wetland, watercourse, or pond vegetation communities should occur outside of the reptile/amphibian overwintering season (November 1 to March 31). • If in-water works or removals are required within watercourses or wetlands that may support turtle wintering habitat, activities should occur during the active period. Salvage of turtles and exclusion measures may be required.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
		• Restrict construction activities to work areas and demarcate sensitive features (i.e., wetlands, SWH, etc.) to prevent off-site encroachment (i.e., fencing). • Stockpiles shall be covered, protected and/or stored in a way to prevent and discourage wildlife from accessing the materials for nesting (i.e., birds, reptiles), burrows or refuge and install exclusionary measures around the perimeter to prevent access from wildlife (i.e., mammals, reptiles/amphibians). • Direct artificial light away from natural areas to reduce disturbance to wildlife habitat. • Avoid idling and make sure construction vehicles and machinery are kept in good repair. • Where feasible, limit the extent and duration of construction noise and lighting to daylight hours during the wildlife active season (i.e., April to October). • Avoid installing light figures (permanent or temporary) near bat habitat to lessen the likelihood of effects of light pollution. If not feasible, efforts to reduce illumination and light spill shall consider the following: height of light, light shields, lighting intensity, direction, and spectral composition. • Installation of artificial bat boxes (i.e., Rocket Boxes and BrandenBark™ roosts) will be considered in areas with species at risk bats and adjacent to edges within retained vegetation. A recommended artificial roosting structure design is the two-chamber Rocket Boxes that can accommodate an average of 250 bats (specifications available at the following website www.batcon.org/files/RocketBoxPlans.pdf). • Construction activities within 30 m of known cavity trees that will be retained, and surrounding bat habitat (woodland edge) shall be restricted to daylight hours when possible. • If wildlife is encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. If slow moving wildlife (i.e., turtles, snakes) are observed on the road and are in danger, and if safe to do so, they should be moved off the road by gently guiding the individual in the direction it was traveling. • Wildlife shall not be harmed or harassed. • Construction equipment and vehicles are to yield to wildlife. • All injured wildlife (species at risk or non-species at risk) shall be transported to an authorized wildlife rehabilitator by an Environmental Monitor or Qualified Biologist. Euthanasia of injured wildlife is not permitted unless conducted by an authorized wildlife rehabilitator. • If a snake hibernacula is discovered, all work must cease, and a Qualified Biologist shall be contacted to discuss mitigation options. Overwintering snakes shall not be relocated. If species at risk are encountered, MECP shall be contacted. • If overwintering turtles are disturbed by construction activities, work shall cease, and a Qualified Biologist shall be contacted to discuss mitigation measures. Overwintering turtles shall not be relocated. If species at risk are encountered, MECP shall be contacted. • Immediately upon observation of an actively nesting female turtle, personnel and vehicles shall clear the area within the turtle's line of sight as much as possible to allow the female to finish laying. Startling a nesting female could lead to abandonment of the partially laid nest before the eggs are concealed. • If potential turtle nest sites (i.e., areas of fresh digging in loose gravel or sandy material) are found within the work areas, all work in that area shall cease. The nests shall be left undisturbed, flagged and a setback applied to protect against construction activities. If avoidance is not possible, egg salvage may be completed by a Qualified Biologist which will be detailed in the Salvage and Relocation Plan.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
		• Wildlife protocols should be developed to educate workers of potential wildlife occurrences, including species at risk, and measures to take in the event of potential encounters. Preventative measures to reduce the likelihood of encounters, injury, and incidental take should also be provided. • Monitoring shall occur to confirm that mitigation and contingency measures are implemented, and performance objectives are being met. A construction monitoring log shall be maintained to identify any deficiencies and corrective actions are documented. • Environmental monitoring during construction shall include, but not be limited to: – Conduct daily visual inspections for wildlife prior to the start of construction during the active season (i.e., April to October). This shall include a thorough walk-through of the work area and searching any vegetation, brush piles, logs or rock piles, and equipment. If wildlife is observed, work shall be suspended until the species is out of harm's way. – Regular inspections of sensitive features to confirm that setbacks are adhered to and that damage/alteration to the demarcations of these features is addressed. – Required monitoring activities to confirm that spills and sediment releases are prevented or addressed quickly and effectively. – Visual inspections and wildlife monitoring shall be required where exclusionary measures have been installed and where wildlife activity has been noted. – Monitoring of environmental features during construction to confirm works are carried out in accordance with the design and specifications. • Specialized environmental monitoring programs shall be developed and implemented as it relates to: – Establishment of restoration and landscaping. – Permit and approval requirements, which will be confirmed as part of the permitting processes (i.e., may include effectiveness monitoring of compensation habitat for species at risk).
6.0	**Migratory Birds (See Section 8.1.4 for further details)**	
	Potential for protected birds to establish nests on existing structures.	• Time vegetation removal to occur outside of the migratory bird nesting period which extends from April 1 to August 31. • Removal of Pileated Woodpecker nests shall not occur at any time unless authorized by the MBR. • If work must take place during the core nesting period and the area is small enough to be effectively searched for nesting birds, then a breeding bird nest survey can be completed by a Qualified Biologist. The area where vegetation is to be removed must be searched within five days prior to the work commencing. • If an active nest, or signs of an active nest are observed during construction, a designated buffer will be delineated within which no activity will be allowed to occur while the nest is active (i.e., with eggs or young). The radius of the buffer will be determined by a Qualified Biologist. Once the nest is determined to be inactive (i.e., the young have fledged the nest), clearing and other activities in the area may proceed.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
7.0	**Fish and Fish Habitat (See Section 8.1.5 for further details)**	
	Potential for changes to direct fish habitat in the study area, and works adjacent to waterbodies have the potential to impact fish and fish habitat.	• Undertake a Fisheries Assessment (i.e., Impact Assessment) to determine the potential for the death of fish or harmful alteration, disruption, or destruction (HADD) of fish habitat based on the final design of the project. • Opportunities for habitat enhancement will be reviewed during the subsequent phase of the project to determine how these measures may be incorporated into the final design. • The in-water construction window for watercourses in the study area is July 16 to March 14, inclusive (i.e., in-water work is not permitted from March 15 to July 15) (MNRF 20232db). The timing window does not apply to work above the high-water level. • Applicable Ontario Provincial Standard Specifications will be identified and incorporated into the Contract Documents during the subsequent phase of the project. • These aspects of the Recommended Plan will require review by Fisheries and Oceans Canada (DFO) to determine the need for a *Fisheries Act* authorization during the subsequent phase of the project.
Socio-Economic Environment		
8.0	**Land Use/Property (See Section 8.2.1 for further details)**	
	It is anticipated that the Recommended Plan will require the acquisition of property to facilitate construction.	• Confirm property impacts and/or acquisitions during the subsequent phase of the project. • Engage with impacted property owners to review, discuss, and confirm impacts to property and associated mitigation measures.
9.0	**Potentially Contaminated Property (See Section 8.2.2 for further details)**	
	Six Areas of Potential Environmental Concern were identified within/adjacent to the study area. Contaminated materials may be encountered during construction activities.	• The Recommended Plan may result in impacts to the Areas of Potential Environmental Concern and will be confirmed during the subsequent phase of the project. • O. Reg. 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O. Reg. 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction. This includes sampling soil that will be disturbed during construction, if required, according to a sampling and analysis plan and analyzing for the specific contaminants of concern, as identified in the *Contamination Overview Study Report* prepared for this project. • Sampling programs should be developed and undertaken under the supervision of a qualified person, as defined in O. Reg. 406/19, and sample selection should take into consideration the presence of anthropogenic substances, such as debris/waste, and unusual odours or staining.
10.0	**Excess Materials Management (See Section 8.2.3 for further details)**	
	Excess materials may be generated/encountered during construction and require proper management/disposal.	• O. Reg. 406/19 (On-Site and Excess Soil Management) and the associated document, *Rules for Soil Management and Excess Soil Quality Standards*, as referenced by O. Reg. 406/19, should be followed for soil that is excavated and managed on-site or off-site during construction.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
11.0	**Noise (See Section 8.2.11 for further details)**	
	Potential increase in noise during construction associated with construction equipment.	• All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices that are in good working order. • There should be explicit indication that Contractors are expected to comply with all applicable requirements of the contract and any applicable local by-laws. • The Contract documents should contain a provision that any initial noise complaint will trigger verification of construction noise and typical noise control measures. • In the presence of persistent noise complaints, all construction equipment should be verified to comply with MECP NPC-115 and NPC-118 limits.
12.0	**Air Quality (See Section 8.2.10 for further details)**	
	Potential for dust and air quality impacts on adjacent land uses during construction.	• Potential impacts will be reviewed and potential mitigation measures will be identified during the subsequent design phase.
13.0	**Utilities**	
	Potential for impacts to municipal services by the Recommended Plan.	• All disruptions to water service will be communicated to those to be affected prior to commencement of the activities impacting the service.
14.0	**Transportation**	
	Temporary full closures and delays are anticipated to be required to facilitate construction.	• Continue consultation with agencies and the public during the subsequent phases of the project to provide and receive input on construction staging, laydown areas, traffic impacts, etc. • Establish and confirm construction staging and laydown areas. • Prepare a detailed Traffic Management Plan. • Maintain access to private entrances and sideroads during construction.
Cultural Heritage Environment		
15.0	**Archaeological Resources (See Section 8.3.1 for further details)**	
	Previously unknown/deeply buried artifacts/human remains could be discovered during construction.	• Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and be subject to Section 48(1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48(1) of the *Ontario Heritage Act*. • The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33, requires any person discovering human remains notify the police or coroner and the Registrar of Cemeteries at the Ministry of Public and Business Service Delivery.

I.D. #	Environmental Issues/Concerns and Potential Effects	Mitigation/Protection/Monitoring/Commitments to Further Work
16.0	**Built Heritage and Cultural Heritage Landscapes (See Section 8.3.2 for further details)**	
	Four built heritage resources are located in the study area and have the potential to be impacted through disruption, displacement, encroachment, and/or the introduction of non-sympathetic elements due to the Recommended Plan.	• Impacts to the four built heritage resources will be confirmed during the subsequent phase of the project. • The need for property-specific *Cultural Heritage Evaluation Report(s)* (CHERs) will be determined during the subsequent phase of the project. CHERs may be required prior to the completion of a Heritage Impact Assessment. • Mitigation measures may be required once impacts are determined. In general, the preferred approach to mitigate direct impacts is to avoid potential built heritage resources. Additionally, the preferred approach to mitigate indirect impacts is to establish a buffer zone around built heritage resources to avoid construction activity within 50 m and to have staging and laydown areas be non-invasive and avoid built heritage resources. • Where avoidance is not feasible, it is recommended that a Qualified Building Condition Specialist or Engineer develop a strategy to carry out condition surveys and vibration monitoring, where required. The pre-condition survey may include screening activities to identify critical properties and determine appropriate vibration levels based on building type, age, and condition. Vibration monitoring may consist of random confirmatory vibration monitoring during construction. A post-condition survey should be carried out on an as-needed basis to be determined by a Qualified Building Condition Specialist or Engineer. • Mitigation measures and vibration monitoring, if required, will be confirmed during the subsequent phase of the project.

10.0 Future Consultation

During the subsequent design stage of this undertaking, relevant agencies, authorities, Indigenous Communities, and property owners will continue to be engaged with respect to detail design and commitments to future work as outlined in this document, as appropriate.

10.1 Future Commitments

Consultation will be ongoing during the next phase of planning and design to address all outstanding issues, including permits and approvals and more detailed environmental and engineering investigations to confirm the Final Design. A summary of the proposed future consultation activities is provided in **Table 17**.

Table 17: Future Consultation Commitments

External Agency	Subject of Consultation
Emergency service agencies (i.e., OPP, Fire, Ambulance, Police Services, etc.)	• Traffic Management Plan • Construction timing • Final detour plans
Fisheries and Oceans Canada	• Request for Review form for project review under the *Fisheries Act*
Canadian National Rail (CNR)	• Work Permit Application
Transport Canada	• Notice of Railway Works, if required
Ministry of Natural Resources and Forestry	• Terrestrial Species and Habitat • Construction timing windows/restrictions
Ministry of Citizenship and Multiculturalism	• Stage 2 and Stage 3 Archaeological Assessment • Stage 4 Archaeological Assessment, if required
Ministry of Environment, Conservation and Parks	• Terrestrial and/or aquatic species at risk and/or habitat • *Endangered Species Act* authorization/permit
Indigenous Communities	• Stage 2 and Stage 3 Archaeological Assessment • Stage 4 Archaeological Assessment, if required
Municipalities (City of St. Thomas, Township of Southwold, Municipality of Central Elgin, Elgin County)	• Traffic Management Plan • Construction timing • Utility relocations • Public concerns, as required • Cost sharing agreements
	• Detour routes • Permanent changes to existing infrastructure (i.e., closure of Ford Road, realignment of Longhurst Line) • Operational improvements (i.e., signalizing intersections, etc.)
Kettle Creek Conservation Authority	• Source Water Protection
Utility Companies	• Utility relocations • Construction timing

Other issues to be dealt with during subsequent planning and design processes include:

- Property concerns and negotiations with individual property owners.
- Additional details of the Recommended Plan such as tree clearing.

11.0 Monitoring

The Planning and Preliminary Design phase of the project is now complete. Specific mitigation measures identified in this report will require confirmation during the next design phase, and monitoring during construction.

Monitoring will be conducted by on-site construction supervisory staff to ensure that environmental protection measures, as outlined in this report and confirmed during subsequent design phases, and as they are included in the contract package, are implemented. This includes ensuring that the implementation of mitigation measures and key design features is consistent with commitments made to external agencies prior to construction.

For certain activities, monitoring by a Qualified Environmental Specialist will be required.

In the event that protective measures do not address concerns identified or if major problems develop, the appropriate agency will be contacted to receive additional input.

In the event that the impacts of construction are different than anticipated, or that the method of construction is such that there are greater than anticipated impacts, the Contractor’s method of operation will be modified to reduce those impacts.