

# Highway 401 Interchange Improvements at County Road 41

Transportation Environmental Study Report

G.W.P 4459-04-00 Class Environmental Assessment and Preliminary Design Study

**Ontario Ministry of Transportation** 

Book 1 of 2 (Main Report)

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Ontario Ministry of Transportation
Transportation Environmental Study Report
Highway 401 Interchange Improvements at County Road 41

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Prepared for: Ontario Ministry of Transportation G.W.P. 4459-04-00

# **Executive Summary**

The Ontario Ministry of Transportation (MTO) retained AECOM to undertake a Preliminary Design and Class Environmental Assessment (EA) Study for improvements to the Highway 401interchange at County Road 41 (G.W.P. 4459-04-00), located in the Town of Greater Napanee within the County of Lennox and Addington.

Highway 401 (MacDonald-Cartier Freeway) is a Controlled Access Highway under the jurisdiction of MTO. The highway has a four-lane cross-section throughout the study area (two lanes in each direction with a concrete median barrier), and a posted speed limit of 100 km/h. The highway locally connects Napanee to Kingston in the east and Belleville in the west. County Road 41 is a four-lane road, designated as 'Rural Arterial (County)' according to the *County of Lennox and Addington Official Plan* (2015) and has a posted speed of 60 km/h within the study area.

The Highway 401 interchange at County Road 41 has a Parclo B configuration in the northwest and southeast quadrants, along with a Parclo A-style off-ramp in the northeast quadrant of the interchange which was constructed under MTO Contract 2004-4016. The new westbound off-ramp is signed for northbound traffic only (i.e. East-North ramp), while the westbound B-loop off-ramp is signed for southbound County Road 41 traffic (i.e. East-South ramp).

Two Highway 401 bridges were reviewed as part of this study:

- Highway 401 bridge over County Road 41. This bridge was constructed in 1958 and underwent major rehabilitations in 1982 and 1987. An additional minor rehabilitation of the bridge underside was completed in 2017. The bridge is considered in overall fair condition;
- Highway 401 bridge over Selby/Sucker Creek. This bridge was constructed in 1960, rehabilitated in 1987 and 1993, and widened to the north in 2004 to accommodate construction of the new westbound off-ramp to County Road 41. The structure is considered in overall fair condition.

The primary focus of this Preliminary Design Environmental Assessment Study is to:

- Review the structural requirements (e.g. major rehabilitation or replacement) of the two above noted structures at this interchange;
- Identify interim and long-term interchange improvements to address geometric and operational concerns;
- Develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.

Given the age and condition of the Highway 401 bridges over both County Road 41 and Selby/Sucker Creek and the time since the last rehabilitation, major rehabilitation of the structures is anticipated to be required within the short-term (5-year) planning horizon. Based on the current interchange configuration, these rehabilitations cannot be completed without long-term temporary lane closures along Highway 401, partial widening of the bridges for staging purposes, and/or temporary removal of the existing eastbound and westbound off-ramp speed change lanes from the structures.

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In addition to the short term rehabilitation requirements of the two structures, full replacement of the County Road 41 structure and replacement of the original segment of the Selby/Sucker Creek structure is anticipated to be required within the 20-25 year planning horizon of the study. While timelines for a future widening of Highway 401 to 6-lanes through this section are presently unknown, it is anticipated that such a widening would occur within the life span of the replacement structures and the new structures should be designed to accommodate these future needs.

The study also included a traffic operational analysis and review of existing geometric elements for the Highway 401 interchange at County Road 41. The following operational and geometric issues associated with the existing interchange were identified:

- A lack of dedicated left-turn lanes along County Road 41 to Highway 401 results in some queuing and delay to through traffic, and operations will continue to deteriorate with further increases in traffic volumes;
- Tight horizontal curvature along four of five interchange ramps, which creates operational concerns along the ramps;
- Short length of speed change lane for the eastbound on-ramp, which causes slow moving traffic to merge with freeway traffic;
- Insufficient sight distance to the eastbound and westbound off-ramp bullnose which is restricted by the vertical crest curve over Highway 401 and the location of the ramps past the structure; and;

In order to minimize the traffic impacts during the major structural rehabilitations or replacements, as well as to address the existing and future geometric and traffic operational concerns at the interchange, the development of an ultimate plan for the County Road 41 interchange is necessary. Development of an ultimate plan allows for the structural works to be implemented efficiently and in a cost effective manner, minimizing future throw-away while improving traffic operations.

#### Environmental Assessment Process

This Study has followed the approved planning process for a Group 'B' project under the MTO *Class EA for Provincial Transportation Facilities* (2000). This Transportation Environmental Study Report (TESR) documents the Class EA Process that has been followed for the Study and includes the following:

- A description of the EA process and consultation that was undertaken throughout the study;
- Existing environmental (natural, socio-economic and cultural environments) and transportation conditions within the study area;
- An assessment of identified transportation problems and needs within the study area, along with opportunities to address the identified issues;
- The generation, assessment, and evaluation of interchange improvement alternatives:
- Details of the Technically Preferred Preliminary Design Alternative; and,

 Potential impacts associated with the Technically Preferred Alternative and proposed measures to avoid, minimize and mitigate potential impacts.

As required under the Class EA, this TESR is being made available for a 30-day public review period commencing on **October 10<sup>th</sup>**, **2019**. If, after consulting with Ministry of Transportation staff, a person (or persons) have serious unresolved concerns that have not been addressed through the Class EA process, they may request the Minister of the Environment, Conservation and Parks (MECP) to issue a Part II Order (i.e. "bump up") for this project. If no Part II Order requests are received by **November 9<sup>th</sup>**, **2019**, the project will be considered to have met the requirements of MTO's Class EA and may proceed to the next stages of design and EA process involving the completion of Detail Design, followed by construction.

#### Consultation

Municipal, agency, public and Indigenous community input was sought upon study commencement and opportunities for additional input were pursued as the design progressed. The Project Team held two Public Information Centres (PICs) to present the evaluation of alternatives and gather feedback, held meetings with municipal staff from the Town of Greater Napanee and the County of Lennox and Addington, and presented the project to the Town of Greater Napanee Council.

Key comments included the following:

- Preference for a Parclo A4 style interchange;
- Support for the interchange improvements;
- Comments noting that closely spaced signals should be coordinated; and,
- Questions about the timing of construction and construction staging.

Details related to the Study and consultation process are provided in **Section 2.3**.

#### Generation, Assessment and Evaluation of Alternatives

Following the identification of problems and opportunities associated with the Project, the Project Team determined that improvements to the interchange was the preferred solution. The Project Team examined alternatives to address the operational challenges associated with the Highway 401 and County Road 41 interchange and to accommodate the structural rehabilitation or replacement requirements. Alternatives were developed and assessed separately for the north and south sides of the interchange.

First, a "Long List" of alternatives to reflect the ultimate interchange configuration and address the structural needs was developed by the Project Team and presented at PIC #1. The Long List was subjected to a screening-level qualitative assessment, which led to the identification of a "Short List" of alternatives. The Short List of alternatives was then evaluated applying a weighted score arithmetic evaluation system to a set of criteria. A weighted score arithmetic evaluation system was applied to a set of criteria to select the Technically Preferred Preliminary Design Alternatives for the north side and south side of the interchange. Details related to the generation, assessment and evaluation of alternatives are provided in **Section 5**.

#### The Technically Preferred Preliminary Design Alternative

Based on the outcome of the evaluation, the long-term Technically Preferred Preliminary Design Alternative for the interchange includes the reconfiguration of the County Road 41 interchange to a full Parclo A4 interchange configuration (refer to **Section 6** for further details and **Appendix A** for the full plan). The recommended interchange improvements generally include the following:

- Reconfiguration of the existing interchange ramps from a Parclo B configuration to a full Parclo A4 configuration including new inner loop on-ramps (northbound County Road 41 to westbound Highway 401 and southbound County Road 41 to eastbound Highway 401) and new directional on-ramps (southbound County Road 41 to westbound Highway 401 and northbound County Road 41 to eastbound Highway 401);
- Short-term (1-5 years) rehabilitation of the Highway 401 bridge over County Road 41 consisting of repairing deteriorated concrete on the deck and patch repairs to the barrier walls;
- Short-term (1-5 years) rehabilitation of the Highway 401 bridge over Selby/Sucker Creek consisting of repairing the original portion of the deck and widening the structure on the south side to accommodate the construction of a new northbound to eastbound on-ramp. The structural widening will accommodate the Highway 401 ultimate 6-lane cross-section.
- Replacement of the Highway 401 bridge over County Road 41 in approximately 25 years. This long-term bridge replacement will be constructed to accommodate the Highway 401 ultimate 6-lane cross-section.
- Replacement of the original segment of the Selby/Sucker Creek structure in approximately 20-25 years.

Opportunities to incorporate interim interchange improvements in advance of the ultimate interchange improvements were considered. However, the existing structures require major rehabilitation in the short-term, and the proposed solution to address these short-term structural needs requires construction of the new interchange ramps. As such, all aspects of the Technically Preferred interchange reconfiguration described above will be implemented in the short-term.

The Technically Preferred Preliminary Design Alternative will require approximately 0.45 ha of property from one commercial property in the southwest quadrant of the interchange.

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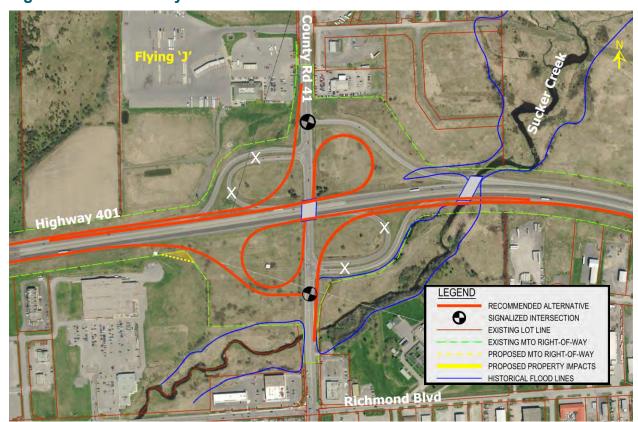


Figure E-1: Technically Preferred Plan

#### Traffic Management and Staging during Construction

In general, long-term lane closures along Highway 401 and interchange ramps are not anticipated to be required to complete the interchange improvements. Short term night-time and/or weekend ramp closures are anticipated, as well as single lane closures in either direction along County Road 41 to rehabilitate the underside of the bridge. Advance notification and signage of ramp or lane closures will be provided.

A conceptual construction staging strategy has been developed to complete the bridge replacement and interchange improvement works, and is outlined in **Section 6.9.** The construction staging strategy will be confirmed during Detail Design.

#### **Environmental Issues and Commitments**

Following selection of the Technically Preferred Preliminary Design Alternative, the Project Team conducted a more detailed assessment of potential environmental (natural, socio-economic and cultural environments) and transportation impacts. Key environmental impacts associated with the Technically Preferred Alternative include:

- Up to 11.1 ha of Cultural Meadow (CUM1) will be affected by the recommended interchange improvements. The Overall Study Area is considered to be potentially suitable habitat for up to 12 Species at Risk, of which the construction footprint may represent habitat for up to 4 of these including Barn Swallow, Bobolink, Eastern Meadowlark and Snapping Turtle.
- Portions of Sucker Creek and its associated riparian area designated as an Environmental Protection Area within the Town of Greater Napanee Official Plan

will be impacted by the proposed works, and construction activities may alter surface water runoff or groundwater inputs including sediment runoff and/or debris into vegetation communities and drainage ditches.

- The Technically Preferred Alternative will require approximately 0.45 ha from one commercial property in the southwest quadrant of the Highway 401 interchange.
- Occasional night-time and/or weekend interchange ramp closures and single lane closures will be required along Highway 401 and County Road 41.

The impact assessment included the development of proposed measures to avoid, minimize and mitigate the identified potential impacts, which are outlined in **Section 7.0** and summarized in **Table 16**. Provided these mitigation measures and commitments to further work during Detail Design are followed, negative impacts as a result of the Project are anticipated to be minimal.

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#### The Public Record

A copy of this Transportation Environmental Study Report (TESR) is available for review at the following locations:

#### County of Lennox and Addington Public Library - Napanee Branch

25 River Road, Napanee, ON K7R 3S6 Telephone: 613-354-2525

Monday to Thursday: 10:00 a.m. to 8:00 p.m.

Friday to Saturday: 10:00 a.m. to 5:00 p.m.

#### **Town of Greater Napanee Town Hall**

124 John Street, Greater Napanee, ON K7R 3L4 Telephone: 613-354-3351

Monday to Friday: 8:30 a.m. to 4:00 p.m.

#### Ministry of Transportation, Eastern Region

1355 John Counter Boulevard Kingston, ON K7L 5A3 Telephone: 1-800-267-0295 Monday to Friday: 8:30 a.m. to 5:00 p.m.

The Project Team is available to discuss information provided within this TESR, or any other project-related inquiries. Members of the Project Team can be contacted as follows:

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# 1. Overview of the Undertaking

## 1.1 Project Summary

#### 1.1.1 Introduction

The Ontario Ministry of Transportation (MTO) retained AECOM to undertake a Preliminary Design and Class Environmental Assessment (EA) Study for improvements to the Highway 401 interchange at County Road 41 (G.W.P. 4459-04-00), located in the Town of Greater Napanee within the County of Lennox and Addington (refer to **Figure 1**).

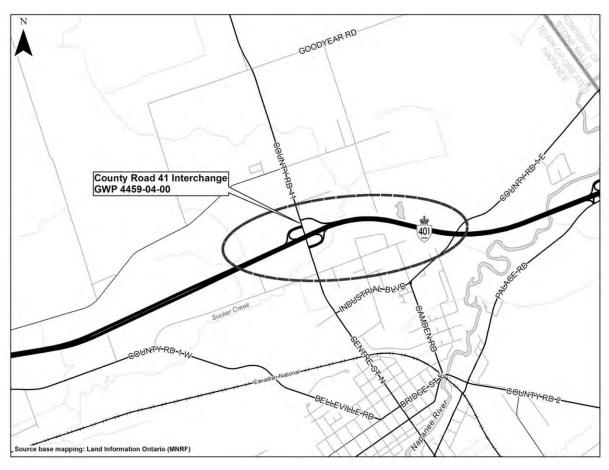


Figure 1: Study Area

This Study followed the requirements of the approved environmental planning process for Group 'B' projects under the MTO *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

Highway 401 (MacDonald-Cartier Freeway) is a Controlled Access Highway under the jurisdiction of MTO. The highway has a four-lane cross-section throughout the study area (two lanes in each direction with a concrete median barrier), and a posted speed limit of 100 km/h. The highway locally connects Napanee to Kingston in the east and Belleville in the west.

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County Road 41 is a four-lane road with two lanes in each direction (north and south) and is designated as 'Rural Arterial (County)' according to the *County of Lennox and Addington Official Plan* (2015).

The Highway 401 interchange at County Road 41 has a Parclo B configuration in the northwest and southeast quadrants, along with a Parclo A-style off-ramp in the northeast quadrant of the interchange which was constructed under MTO Contract 2004-4016. The new westbound off-ramp is signed for northbound traffic only (i.e. East-North ramp), while the westbound B-loop off-ramp is signed for southbound County Road 41 traffic (i.e. East-South ramp).

Two Highway 401 bridges were reviewed as part of this study:

- Highway 401 bridge over County Road 41; and,
- Highway 401 bridge over Selby/Sucker Creek.

The Highway 401 bridge over County Road 41 was constructed in 1959, and rehabilitated in 1982 and 1987. The bridge is a single-span, rigid frame structure with a span length of 17.2 m and carries two through lanes and one speed change lane of Highway 401 in each direction (eastbound and westbound) over County Road 41. The structure underwent major rehabilitations in 1982 and 1987, and is considered in overall fair condition.

The Highway 401 bridge over Selby/Sucker Creek was constructed in 1960. The bridge is a single-span, rigid frame structure with a span length of 17.6 m, and carries two through lanes in both the eastbound and westbound directions, in addition to an eastbound speed change lane and westbound off-ramp. The structure was rehabilitated in 1987 and 1993, and widened by approximately 14.5 m to the north in 2004 to accommodate construction of a new westbound off-ramp to County Road 41. The structure is considered in overall fair condition.

# 1.1.2 Study Purpose

The primary focus of this study is to:

- Review the structural requirements (e.g. major rehabilitation or replacement) of the Highway 401 structures over County Road 41 and Selby/Sucker Creek;
- Identify interim and long-term interchange improvements to address geometric and operational concerns;
- Develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.

The study included a traffic operational analysis for the Highway 401 interchange at County Road 41, which included a review of existing traffic operations at the interchange, an assessment of estimated traffic growth and expected future traffic volumes, analysis of projected future traffic operations based on maintaining the existing road network and the identification of potential operational deficiencies associated with the future traffic growth. The following problems were identified:

• Existing traffic Level of Service (e.g. vehicle delay) operations at the interchange are generally considered acceptable (overall Level of Service 'C' or better),

however left-turning traffic along County Road 41 to Highway 401 results in some queueing and delay to through traffic given the absence of dedicated left-turn lanes. A dedicated northbound left-turn lane to westbound Highway 401 is warranted.

 Future increases in traffic volumes will lead to increased delay and deterioration in operations (overall Level of Service 'D' or better), and will further exacerbate the existing geometric deficiencies at the interchange.

The study also included identification of a number of undesirable geometric elements which lead to further operational concerns including the following (refer to **Figure 2** for a graphic).

- Tight horizontal curvature along four of five interchange ramps, which creates operational concerns along the ramps;
- Short length of speed change lane for the eastbound on-ramp, which causes slow moving traffic to merge with freeway traffic;
- Insufficient sight distance to the eastbound and westbound off-ramp bullnose
  which is restricted by the vertical crest curve over Highway 401 and the location
  of the ramps past the structure; and;
- Absence of dedicated left-turn lanes along County Road 41for access to Highway 401 (northbound and southbound), which results in some queueing and delay to through traffic.

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No NB left turn lane

Poor sight distance to WB off-ramp

Ross left turn lane

No SB left turn lane

Ross left turn lane

Ross left turn lane

Existing Bridge

Figure 2: Overview of Undesirable Geometric Elements or Areas of Concern at the Highway 401 and County Road 41 Interchange

Given the age and condition of the Highway 401 bridges over both County Road 41 and Selby/Sucker Creek and the time since the last rehabilitation, a major rehabilitation of the structures is anticipated to be required within the short-term (5-year) planning horizon. Based on the current interchange configuration, these rehabilitations cannot be completed without long-term temporary lane closures along Highway 401, partial widening of the bridges for staging purposes, and/or temporary removal of the existing eastbound and westbound off-ramp speed change lanes from the structures.

In addition to the short term rehabilitation requirements of the two structures, full replacement of the County Road 41 structure and replacement of the original segment of the Selby/Sucker Creek structure is anticipated to be required within the 20-25 year planning horizon of the study. While timelines for a future widening of Highway 401 to 6-lanes through this section are presently unknown, it is anticipated that such a widening would occur within the life span of the replacement structures and the new structures should be designed to accommodate these future needs.

In order to minimize the traffic impacts during the major structural rehabilitations, as well as to address the existing and future geometric and traffic operational concerns at the interchange, the development of an ultimate plan for the County Road 41 interchange is necessary. Development of an ultimate plan allows for the structural works to be

implemented efficiently and in a cost effective manner, minimizing future throw-away while improving traffic operations.

#### 1.1.3 Previous Studies and Recent Works

In 2001, MTO completed a Preliminary Design Study to determine short, mid and long-term improvements to the Highway 401 and County Road 41 interchange, which recommended upgrading the interchange to a full Parclo A4 configuration.

Based on the short-term improvements recommended from the 2001 Study, MTO completed the Detail Design (W.P. 31-99-00) and construction of various interchange improvements in 2004, including:

- Constructing a new interchange ramp for westbound traffic on Highway 401 to go northbound on County Road 41;
- Widening the Highway 401 bridge over Selby/Sucker Creek to the north to accommodate this new interchange ramp;
- Modifying the old Highway 401 westbound off-ramp to facilitate southbound movements only onto County Road 41 (northbound movements accommodated by the new ramp); and,
- Replacing the County Road 41 bridge over Sucker Creek, south of Highway 401, with a wider bridge to allow for the widening of County Road 41 and improved clearance over the creek.

In early 2016, this current study was initiated to review the structural requirements of the interchange, identify interim and long-term improvements to address geometric and operational concerns, and to develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption, and future throwaway.

In 2017, MTO completed a minor rehabilitation of both the Highway 401/County Road 41 and Highway 401/Selby/Sucker Creek bridges. That work included rehabilitation of the underside of the bridges only. Work to the top portions of the bridges along Highway 401 was excluded from the 2017 construction, given that the major rehabilitation requirements including construction staging along Highway 401 was being confirmed as part of the current study.

MTO is concurrently undertaking a separate Preliminary Design and Class EA Study for improvements to the Highway 401 interchange at Palace Road (G.W.P. 4197-13-00), located to the east of this study area.

#### 1.1.4 Consultation

Municipal, agency, public and Indigenous community input was sought upon study commencement and opportunities for additional input were pursued as the design progressed. The Project Team held two Public Information Centres (PICs) to present the evaluation of alternatives and gather feedback, held meetings with municipal staff from the Town of Greater Napanee and the County of Lennox and Addington, and presented the project to the Town of Greater Napanee Council.

Further details on consultation undertaken are available in **Section 2.3** of this TESR.

#### 1.1.5 Evaluation of Alternatives

Following the identification of problems and opportunities associated with the Highway 401 and County Road 41 interchange, the Project Team examined alternatives to address the operational challenges associated with the interchange and to accommodate both the short-term and long-term structural rehabilitation or replacement requirements. Alternatives were developed and assessed separately for the north and south sides of the interchange.

First a "long-list" of alternatives was developed and presented at PIC #1. The long-list was subjected to a screening-level qualitative assessment, which led to the identification of a "short-list" of alternatives. The alternatives were then evaluated based on the set of criteria (listed in **Section 5.3**) using a weighted score arithmetic evaluation system to select the Technically Preferred Preliminary Design Alternatives. Further details on the evaluation process are available in **Section 5** of this TESR.

# 1.1.6 General Description of the Technically Preferred Preliminary Design Alternative

The Technically Preferred Alternative for the Highway 401 interchange at County Road 41 includes the reconfiguration of the County Road 41 interchange to a full Parclo A4 configuration. While timelines for a future potential widening of Highway 401 to 6-lanes through this section are presently unknown, it is anticipated that such a widening would occur within the life span of a replacement structure. As such, the interchange ramps will be designed to accommodate a future widening to 6-lanes with only minor adjustments required to match the future widened section.

The upgraded interchange will include a combination of alternatives N-1 and S-1 (north and south side Parclo A2) as identified in the Short-List Alternative Evaluation. The Technically Preferred Preliminary Design Alternative is illustrated in **Figure 28** and in the preliminary design plates in **Appendix A**. The recommended interchange improvements include the following:

- Reconfiguration of the existing interchange ramps from a Parclo B configuration to a full Parclo A4 configuration including new inner loop on-ramps (northbound County Road 41 to westbound Highway 401 and southbound County Road 41 to eastbound Highway 401), and new directional on-ramps (southbound County Road 41 to westbound Highway 401 and northbound County Road 41 to eastbound Highway 401);
- Short-term (1-5 years) rehabilitation of the Highway 401 bridge over County Road 41 consisting of repairing deteriorated concrete on the deck and patch repairing the barrier walls;
- Short-term (1-5 years) rehabilitation work on the Highway 401 bridge over Selby/Sucker Creek consisting of repairing the original portion of the deck, installing new waterproofing and asphalt paving, and widening the structure on the south side to accommodate the construction of the new South-East on-ramp. The structural widening will accommodate the Highway 401 ultimate 6-lane cross-section.

- Replacement of the Highway 401 bridge over County Road 41 in approximately 25 years. This long-term bridge replacement will be constructed to accommodate the Highway 401 ultimate 6-lane cross-section.
- Replacement of the original segment of the structure at Selby/Sucker Creek is recommended in approximately 20-25 years given its age and anticipated condition at that time. The recommended structure replacement alternative is a single span reinforced concrete rigid frame.

Opportunities to incorporate interim interchange improvements in advance of the ultimate interchange improvements were considered. However, the existing structures require major rehabilitation in the short-term, and the proposed solution to address these short-term structural needs requires construction of the new interchange ramps. As such, all aspects of the Technically Preferred interchange reconfiguration described above will be implemented in the short-term.

For further information on the Technically Preferred Preliminary Design Alternative, including details on the structures, foundations, pavement, electrical, utilities, drainage and traffic management and staging refer to **Section 6** and **Appendix A**.

# 1.2 Purpose of the TESR

This Transportation Environmental Study Report (TESR) documents the Class EA Process that was followed for the Study and includes the following:

- A description of the EA process and consultation that was undertaken throughout the study;
- Existing environmental (natural, socio-economic and cultural environments) and transportation conditions within the study area;
- An assessment of identified transportation problems and needs within the study area, along with opportunities to address identified issues;
- The generation, assessment, and evaluation of interchange improvement alternatives;
- Details of the Technically Preferred Preliminary Design Alternative; and,
- Potential impacts associated with the Technically Preferred Alternative and proposed measures to avoid, minimize and mitigate potential impacts.

As required under the Class EA, this TESR is being made available to the public, other interested parties and external agencies for a 30-day review period commencing on **October 10**<sup>th</sup>, **2019** (ending **November 9**<sup>th</sup>, **2019**) at the following three (3) locations:

- The County of Lennox and Addington Public Library Napanee Branch and
- The Town of Greater Napanee, Town Hall; and
- Ministry of Transportation, Eastern Region.

A "Notice of Study Completion and TESR Submission" was placed in the Napanee Beaver and Napanee Guide newspapers on October 10<sup>th</sup>, 2019 to notify interested

parties of the opportunity to review this TESR. Letters were also sent to individuals on the project mailing list on **October 3<sup>rd</sup>**, **2019**.

Detailed background information, including supporting study reports, is contained in the environmental study file. The Ministry of Transportation and the AECOM Project Team members are available to discuss this information.

Interested persons are encouraged to review the TESR and provide comments by **November 9**th, **2019**. If, after consulting with Ministry of Transportation staff, a person (or persons) have serious unresolved concerns that have not been addressed through the Class EA process, they may request the Minister of the Environment, Conservation and Parks (MECP) to issue a Part II Order (i.e. "bump up") for this project. Any Part II Order request must be submitted to MECP by **November 9**th, **2019**, using a standard form developed by MECP. The standard Part II Order request form is available on the Ontario government Forms Repository website (<a href="http://www.forms.ssb.gov.on.ca/">http://www.forms.ssb.gov.on.ca/</a>) and can be found by searching "Part II Order" on the Repository's main page. A copy of the completed form and any supporting information must also be forwarded to MTO at their addresses listed in **Table 1**. If no Part II Order requests are received by **November 9**th, **2019**, the project will be considered to have met the requirements of MTO's Class EA and may proceed to further stages of design and then construction.

Comments are being collected to provide and obtain information, and to identify concerns in accordance with the *EA Act*. This material will be maintained on file for use during the project and may be included in study documentation.

Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

If you have any accessibility requirements in order to participate in the review of this TESR, please contact the Project Team.

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### 2. Environmental Assessment Process

# 2.1 The Ontario Environmental Assessment (EA) Act and Class EA Process

The purpose of Ontario's EA Act is to help protect and conserve Ontario's environment by requiring that projects subject to the Act follow a planning process leading to environmentally sound decision-making. For projects subject to the EA Act, an EA 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. An EA document is prepared by the proponent of the project.

The Class EA 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 within a "class" are generally ones that are recurring, carried out routinely and have predictable environmental effects that can usually be mitigated.

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. Project groupings within the Class EA were established for the purposes of consultation, documentation and formal EA challenge (Part II Order or 'bump-up' opportunity). 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; and
- Group "D" Activities that involve operation, routine maintenance, administration and miscellaneous work for provincial transportation facilities. These activities are approved under the Environmental Assessment Act subject to compliance with applicable environmental legislation other than the Environmental Assessment Act.

This project is following the *Class EA* process for a Group 'B' project, which generally includes major improvements to existing provincial transportation facilities. Other aspects of the EA process applicable to Group 'B' projects are contained in the *Class EA*.

This Study was completed with a focus on the principles of the Class EA, including but not limited to:

- Transportation engineering principles:
  - To provide a safe and effective transportation system while avoiding and minimizing negative environmental effects;
- Environmental protection principles:
  - To conduct the study with an inherent approach of avoiding or minimizing overall environmental impacts through consideration of alternatives;
  - To balance environmental protection considerations with transportation engineering considerations during each stage of the study, recognizing that safety and effectiveness of the transportation system is fundamental to decisions;
  - To recognize that it is seldom possible to satisfy all interests when making the tradeoffs necessary in the EA process, and that no single environmental factor is always "paramount";
- External consultation principles:
  - To constructively address input received during the consultation process;
  - To provide timely, user-friendly opportunities for input by the public and agencies whose mandates are most directly affected;
  - To make reasonable efforts to resolve concerns;
- Evaluation principles:
  - To complete an evaluation process that is traceable, replicable and understandable by those who may be affected by the decisions;
  - To give due consideration to all relevant factors including transportation engineering and environmental protection;
  - To capitalize on significant transportation engineering opportunities while protecting significant environmental features as much as possible;
- Documentation principles:
  - To document the results of the study to date;
  - To provide an opportunity for public and stakeholders to review the documentation and provide comments;
- Bump-up principles:
  - To provide a notice that outlines the bump-up opportunity of at least 30 days upon formal submission of the TESR; and,
- Environmental clearance principles:
  - To apply the above principles in the Class EA process.

Readers interested in these matters are encouraged to refer to that document, which can be accessed at http://www.mto.gov.on.ca/english/highway-bridges/pdfs/environmental-assessment-2000.pdf.

## 2.2 The Canadian Environmental Assessment Act (CEEA)

In July 2012, the Government of Canada released new regulations required to implement the *Canadian EA Act, 2012 (CEAA 2012)*. The CEAA 2012 establishes a federal EA process focused on major projects that have a greater potential to have significant adverse effects on areas within federal jurisdiction. The types of activities to which the new *Act* applies ("designated projects") are identified in the regulations. The *Act* requires the proponent of a designated project to submit a description of the project to the Canadian Environmental Assessment Agency (the Agency). Upon receipt of a project description, the Agency has 45 days, including a 20-day public comment period, to determine whether a federal EA is required.

The proposed interchange improvements to Highway 401 at County Road 41 were reviewed and the project is not listed as a "designated project" under the CEAA 2012. Therefore, CEAA requirements do not apply to this undertaking.

#### 2.3 Consultation

Consultation is an integral component of a Group "B" project under the Class EA process, and therefore members of the public, Indigenous communities, municipalities, government agencies, and other stakeholders were engaged at key milestones throughout the study. The following section summarizes the consultation undertaken as part of this study. Relevant correspondence including notification material is included in **Appendix F** of this document.

#### 2.3.1 Notice of Study Commencement

A Notice of Study Commencement was published in the following local newspapers to inform the public of this study on January 21 and January 28, 2016, respectively:

- Napanee Beaver; and
- Napanee Guide.

Notification letters advising of the study were also mailed and/or emailed to everyone on the study contact list (60 contacts) which included:

- Indigenous communities;
- Members of Parliament (MPs) and Members of Provincial Parliament (MPPs);
- External government agencies (federal, provincial, and municipal);
- Emergency Services;
- Utility Services;
- Interest groups; and,
- Members of the public.

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#### 2.3.2 Public Information Centres

#### 2.3.2.1 Public Information Centre #1

The first of two Public Information Centres (PIC #1) was held on July 27, 2016 at the Strathcona Paper Centre in Greater Napanee, Ontario. A one-hour preview session was held for municipalities, MPs/MPPs, external agencies, and Indigenous communities in advance of the PIC. The PIC presented and sought input on the following:

- Study area, purpose, and scope;
- Overall process;
- Timing of study activities;
- Previous studies;
- Overview of existing transportation and environmental conditions;
- Problems and opportunities;
- Identification and screening assessment of the long list of alternatives;
- Evaluation of the short list of alternatives approach and criteria; and,
- Next steps in the study process.

A Notice of PIC #1 was published in the following local newspapers on July 14, 2016 to inform the public of the PIC:

- Napanee Beaver; and
- Napanee Guide.

Notification letters advising of the PIC were also mailed and/or emailed to everyone on the study contact list (177 contacts) on July 11, 2016. Individual letters were also sent to owners of properties that were potentially impacted or in close proximity to one or more of the long-list of interchange alternatives on September 22, 2016 with copies of the interchange alternative plans.

A total of 8 individuals attended PIC #1 (including the preview session) and 1 comment sheet was received at the PIC. The Project Team received most comments verbally at the PIC from municipal and emergency services representatives. Feedback received at PIC #1 included the following:

- Concerns regarding difficulties navigating two-lane roundabouts;
- Concerns with long combination vehicles navigating through roundabouts;
- Preference for the Parclo A4 style alternatives (N-1 and S-1);
- Comments regarding a possible new Comfort Inn hotel being built adjacent to the Royal Napanee Inn on Community Road, northeast of the Highway 401 / County Road 41 interchange;
- Comments noting that closely spaced signals should be coordinated;

- Emergency Services noted that their station is located to the southeast of the Highway 401 / County Road 41 interchange, and that their primary routes are north through the interchange or to the east; and
- Emergency Services noted that they did not prefer roundabouts as this design slows their movements and that they preferred the Parclo A4 style interchange.

Copies of the PIC #1 display materials and the PIC Summary Report are available in **Appendix G**.

#### 2.3.2.2 Public Information Centre #2

A second Public Information Centre (PIC #2) was held on November 22, 2017 at the Selby Community Hall in Selby, Ontario. The purpose of PIC #2 was to present the following:

- Purpose of PIC #2;
- Study area, purpose and scope;
- · Study process;
- Timing of study activities;
- Study overview and PIC #1;
- Summary of problems and opportunities;
- Generation and evaluation of preliminary design alternatives;
- Overview and summary of the evaluation of the short list of alternatives;
- Conceptual construction staging;
- Other improvements being recommended;
- Proposed mitigation measures and recommendations for further work;
- Next steps in the study process; and,
- Freedom of Information and Protection of Privacy Act.

A Notice of PIC #2 was published in the following local newspapers on November 9, 2017 to inform the public of the PIC:

- Napanee Beaver; and
- Napanee Guide.

In order to reach a larger population in the study area who may not have been familiar with the study, a Project brochure was distributed to properties within a 7 km radius of the study area using Canada Post's Neighbourhood Mail service (6,882 brochures) which included similar information to the PIC displays and Project Team contact information for members of the public to submit comments.

Notification letters advising of the PIC were also mailed and/or emailed to everyone on the study contact list (187 contacts) on November 1, 2017.

A total of 20 individuals attended PIC #2 and two (2) comments sheets were received at the PIC. Feedback received at and after PIC #2 included the following:

- Support for traffic lights at County Road 41;
- Support for the directional on-ramps (northbound to eastbound and southbound to westbound) to be free flow at County Road 41;
- Support from the Ontario Provincial Police (OPP) regarding the redesign of the interchange ramps at County Road 41 as they felt the changes address a number of operational and safety concerns;
- Request from the OPP to consider design enhancements along Highway 401 eastbound and westbound between County Road 41 and Palace Road where they could park a police car either off the shoulder or in the median to monitor traffic;
- Request from the OPP to be involved in the construction staging discussions at the beginning of the Detail Design process and that they be invited to a pre-construction meeting;
- Request from the OPP that the two interchanges are not under construction at the same time, as each interchange serves as an emergency detour route for the other;
- Questions regarding the addition of gates at the ramps for highway closures;
- Request for the addition of a queue warning system along Highway 401 during construction;
- Questions about the EA process;
- Questions about timing of construction;
- Questions about a Napanee bypass on the east side of the Town, which would be a Municipal undertaking;
- Questions about the County Official Plan;
- Questions about Council and Municipal staff involvement; and,
- Comments about detours during construction putting a stress on Town infrastructure.

Prior to PIC #2, all potentially impacted property owners were sent a letter indicating that their property would be potentially impacted by the recommended plan and that they were invited to attend PIC #2 to meet with the Project Team or could request to meet at another date.

Copies of the PIC #2 display materials and the PIC Summary Report are available in **Appendix G**.

#### 2.3.3 Permission to Enter

In August 2017, the Project Team sent out Permission to Enter Request letters to numerous properties adjacent to Highway 401 within the study area. The potential property impacts were not known at the time therefore letters were sent to a larger number of properties than where permission was later determined to be required. These letters also functioned as a method to inform the owners of property adjacent to the highway of the study and provide them with a method of contacting the Project Team.

#### 2.3.4 Stakeholder Meetings and Discussions

#### 2.3.4.1 Indigenous Communities

The following Indigenous communities were engaged in the study:

- Aamjiwnaang First Nation;
- Alderville First Nation;
- Beausoleil First Nation;
- Chippewas of Georgina Island First Nation;
- Chippewas of Kettle and Stony Point First Nation;
- Chippewas of Nawash First Nation;
- Chippewas of Rama First Nation;
- Chippewas of Thames First Nation;
- Curve Lake First Nation;
- Hiawatha First Nation;
- M'Chigeeng First Nation;
- Mississaugas of Scugog Island First Nation;
- Mississaugas of New Credit First Nation;
- Mohawks of Akwesasne;
- Mohawks of the Bay of Quinte;
- Métis Nation of Ontario;
- Saugeen First Nation;
- Six Nations of the Grand River Territory;
- Sheguiandah First Nation;
- Walpole Island First Nation;
- Zhiibaahaasing First Nation;
- Ministry of Indigenous Relations and Reconciliation; and
- Indigenous and Northern Affairs Canada.

The Mohawks of the Bay of Quinte expressed interest in the study and requested to be apprised of study and archaeological documentation available for review.

#### 2.3.4.2 External Agencies and Utility Service Providers

The following external agencies and utility service providers were engaged at key milestones throughout the study (i.e. Study Commencement, existing conditions assessment, PIC #1, PIC #2, and TESR Submission):

- Fisheries and Oceans Canada (DFO);
- Transport Canada;
- Ministry of the Environment, Conservation and Parks (MECP);
- Ministry of Agriculture, Food and Rural Affairs (OMAFRA);
- Ministry of Municipal Affairs and Housing (MAH);
- Ministry of Natural Resources and Forestry (MNRF);
- Ministry of Tourism, Culture and Sport (MTCS);
- Cataragui Region Conservation Authority (CRCA);
- Quinte Conservation:
- Algonquin & Lakeshore Catholic District School Board;
- Limestone District School Board;
- Tri-Board Student Transportation Services;
- Bell Canada;
- Cogeco;
- Enbridge;
- Hydro One;
- Trans Canada Pipeline Ltd.; and,
- Union Gas.

MNRF was consulted early in the study process as part of the preparation of natural environment existing conditions documentation to obtain project-specific data related to natural sciences, Species at Risk (SAR), and drainage.

#### 2.3.4.3 Municipalities and Emergency Services

The Project Team met with the Town of Greater Napanee and the County of Lennox and Addington, and emergency services throughout the Study to discuss the need for the interchange improvements, the evaluation process of the design alternatives (long list and short list), and potential future development within the study area. The Project Team met with staff from the municipalities in advance of both PICs.

The following is a summary of the feedback received by the municipalities and emergency services:

 General support of roundabouts at the interchange, subject to acceptable traffic operations;

- Noted there are development plans for a potential hotel on the north side of Community Road;
- Noted there is insufficient room for standard pedestrian facilities near the bridge, and they anticipate some increase in pedestrian demand with the construction of the hotel along Community Road and other development;
- Would like to see upgrades to provide paved shoulders and have signage implemented through the interchange to be consistent with Salmon River cycling trail facilities;
- The County's Transportation Master Plan was recently updated, and the next update will likely be 2024 or beyond;
- County Road 41 structure requirements should consider long-term municipal requirements (future widening to 6 lanes, although there are no current plans in place for this);
- Consider that the Richmond Street / County Road 41 intersection can be very busy and there are existing concerns with the intersection, as such storage requirements should be considered;
- Eastbound sight distances on Highway 401 should be reviewed, as the OPP is seeing secondary collisions in winter weather between County Road 41 and Palace Road; and,
- Suggested coordinating construction of the interchange improvements with the Town of Greater Napanee's planned replacement of watermain under the Highway 401 overpass.

In addition, the Project Team presented the Technically Preferred Preliminary Design Alternative to the Town of Greater Napanee Council on March 27, 2018. The following is a summary of notable questions and comments raised by Council:

- Inquiries regarding other interchange alternatives that were considered;
- Comment regarding future development in the area resulting in increased traffic throughout the interchange; and,
- Inquiries about a possible future widening of Highway 401.

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# 3. Existing Conditions

All significant features within the study area were identified to determine their sensitivity and for potential impacts associated with the improvements to the Highway 401 interchange at County Road 41. Identifying significant features involved the collection of information from primary and secondary sources and consultation with agencies and the public. The data collected was grouped in the following categories:

- Natural environment;
- Socio-economic environment;
- Cultural environment; and,
- Transportation conditions.

The following sections provide details related to the existing conditions data collection undertaken for this study.

#### 3.1 Natural Environment

#### 3.1.1 Terrestrial Ecosystem

A Terrestrial Ecosystems Existing Conditions and Impact Assessment was prepared for this study in accordance with the *Environmental Reference for Highway Design* (ERHD, 2013), and the MTO's *Environmental Standards and Practices*. A summary of the findings of the report is outlined below and further details can be found in the report itself which is available in **Appendix H** of this TESR.

Background research and field investigations were conducted within an area 600 m in width at the Highway 401 interchange at County Road and extends along Highway 401 from 1000 m west of County Road 41 easterly across Selby/Sucker Creek to the Newburgh Road underpass (hereinafter referred to as the "Overall Study Area"). The Potentially Impacted Area includes the right-of-way (ROW) and adjacent lands. In order to be consistent with the area examined for fish and fish habitat (with respect to riparian vegetation canopy and bank vegetation), the Potentially Impacted Area also extends along Selby/Sucker Creek 50 m upstream and 200 m downstream of the Highway 401 / MTO ROW. The Overall Study Area and the Potentially Impacted Area are represented in **Figure 3**.

A desktop review was completed to obtain background information on known natural heritage features and species records within the Overall Study Area.

In order to acquire information on the existing terrestrial ecosystems within the Overall Study Area, field investigations were conducted on June 2 and 3, 2016 and October 4 and 5, 2016 by AECOM ecologists. Field investigations were completed in accordance with the MTO Environmental Reference for Design (*ERHD*) (2013) to supplement available background information. Field investigations were undertaken for the Potentially Impacted Area, where access was granted. The majority of this area is highway ROW and MTO-owned land. Aerial interpretation was used to determine the vegetation communities located outside of the ROW.

Field investigations included the following:

- Vegetation community mapping, including dominant species associations, using the Ecological Land Classification (ELC) system for southern Ontario to Ecosite or Vegetation Type;
- Location of wetland boundaries relevant to the proposed undertaking;
- List of plant species observed;
- List of wildlife species observed, and evidence of wildlife habitat on manmade structures including direct observation and incidental evidence;
- Location and species of any bird nests on, under or in any structure or individual trees likely to be affected by construction;
- Assessment of habitat potential based on wildlife observations and site conditions:
- Location of any species of conservation concern, or Species at Risk (SAR) or their habitat; and,
- Evidence of groundwater upwelling and high groundwater table.

The delineation of vegetation community boundaries for the Potentially Impacted Area was based on field investigations and aerial photography. Vegetation communities were classified using the *ELC Manual for Southern Ontario*. Floral species lists were compiled for the Potentially Impacted Area.

Incidental wildlife observations were recorded during all field investigations. Incidental observations noted include species sightings, tracks, scat, as well as any other wildlife activity.

#### 3.1.1.1 Physiography, Geology and Soils

The study area is located in Lake Simcoe-Rideau (Ecoregion 6E), which is part of the Mixedwood Plains Ecozone. This Ecoregion extends from Lake Huron in the west to the Ottawa River in the east and is the considered the second most densely populated ecoregion in Ontario.

The surface is gently undulating to rolling terrain of ice-laid materials deeply covering bedrock. Mineral materials represent more than 95% of substrates within this ecoregion. Forests within this ecoregion are diverse. Upland sites typically dominated by Sugar Maple (*Acer saccharum*), American Beech (*Fagus grandifolia*), White Ash (*Fraxinus americana*) and Eastern Hemlock (*Tsuja canadensis*) while lowland forests are often represented by Green Ash (*Fraxinus pennsylvanica*), Silver Maple (*Acer saccharinum*), Red Maple (*Acer rubrum*), Eastern White Cedar (*Thuja occidentalis*), Yellow Birch (*Betula allegheniensis*), Balsam Fir (*Abies balsamea*) and Black Ash (*Fraxinus nigra*).

#### 3.1.1.2 Significant Features

#### Areas of Natural and Scientific Interest

An Area of Natural and Scientific Interest (ANSI) is defined as an area of land and/or water containing natural landscapes or features that have been scientifically identified (by

the MNRF) as having life science or earth science values related to protection, scientific study or education. ANSIs are designated as earth science (geological) or life science (biological) depending on the features present. The background information review of the MNRF Make-a-Map: Natural Heritage Areas Application, indicated that there are no designated ANSIs located within the Overall Study Area.

#### Provincially and Locally Significant Wetlands

Wetlands are described as lands that are seasonally or permanently flooded by shallow water, as well as lands where the water table is close to the surface and present an abundance of water that has caused the formation of hydric soil, which supports primarily hydrophytic or water tolerant plants. The MNRF evaluates the significance of wetlands through the Ontario Wetland Evaluation System. The evaluation system uses a scoring system to assign values to four principal components of the wetland, which are the biological, social, hydrological, and special features. Based on the resulting score of an evaluation, an evaluated wetland can fall into one of two classes: Provincially Significant or Locally Significant.

According to the background information review of the MNRF Make-a-Map: Natural Heritage Areas Application, there are no Provincially or Locally Significant Wetlands located within the Overall Study Area; however, there is an unevaluated wetland located within the Overall Study Area located south of Highway 401 west of the Napanee River, and north of Highway 401 east of the Napanee River.

#### Environmental Protection Areas

The Official Plan of the Town of Greater Napanee applies the Environmental Protection designation to ANSIs, Provincially or non-provincially or locally significant wetlands, significant habitat of endangered and threatened species, fish habitat and lands having inherent environmental hazard, such as poor drainage, organic soils, steep slopes karstic conditions or that are subject to flooding and/or erosion. Within the Overall Study Area, Sucker Creek, as well as its riparian area are designated as Environmentally Sensitive and Environmental Protection Areas, respectively, on Schedule C of the *Town of Greater Napanee Official Plan (2014)*.

#### 3.1.1.3 Vegetation

The majority of the study area is comprised of Cultural Meadow (CUM1), except for a small portion of Mixed Forest (FOM) south of Sucker Creek, east of County Road 41. A map of these ELCs is provided in **Figure 3**.

Vegetation composition within the ROW north and south of Highway 401, as well as locations between the entrance and exit ramps, was comprised of Cultural Meadow (CUM1) and appeared to be periodically maintained (i.e., mowed). These areas were dominated by several common grass and meadow species including Reed Canary Grass (*Phalaris arundinacea*), Timothy (*Phleum pratense*), Awnless Brome (*Bromus inermis* ssp. *inermis*), sedges (*Carex* sp.), Goldenrod (*Solidago* sp.), Wild Carrot (*Daucus carota*) and Cow Vetch (*Vicia cracca*). Trees and shrubs included Norway Maple (*Acer platanoides*), Austrian Pine (*Pinus nigra*), Common Buckthorn (*Rhamnus cathartica*), Sweetbriar (*Rosa rubiginosa*), Gray Dogwood (*Cornus racemosa*) and Choke Cherry (*Prunus virginiana*). A small patch of the highly invasive species Common Reed (*Phragmites australis*) was also identified south of Highway 401

approximately 40 m west of County Road 41, as well as north of Highway 401 within the Mineral Cultural Meadow north of the westbound exit ramp.

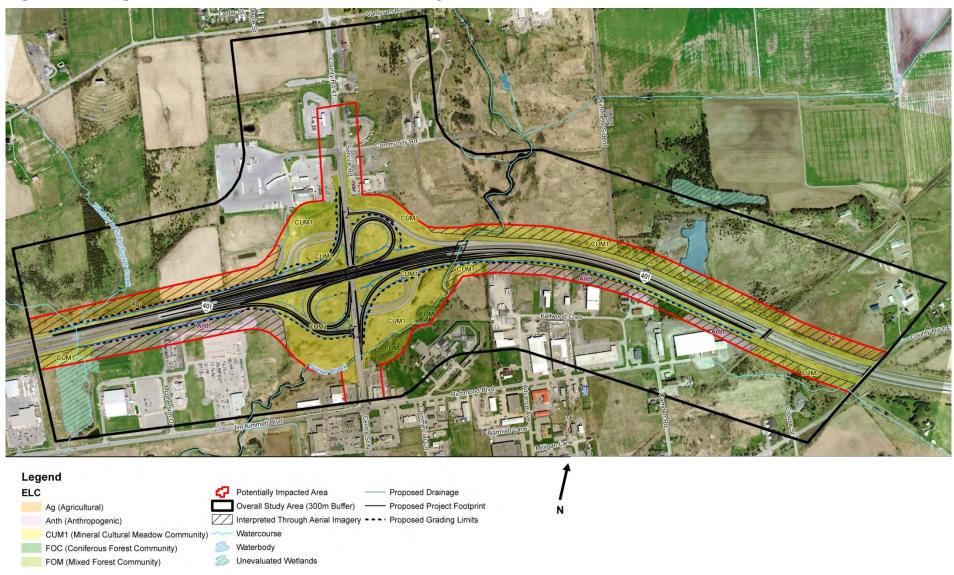
A Mixed Forest (FOM) community was found to exist south of Selby/Sucker Creek, east of County Road 41 and northeast of urban development. Tree and shrub species noted included White Ash, Austrian Pine, Common Buckthorn and Honeysuckle (Lonicera sp.).

Not all lands within the Potentially Impacted Area could be accessed and, as such, ELC was determined based on aerial interpretation. These lands were predominately represented by agricultural fields, anthropogenic lands (landscaped) and cultural meadow communities, with one small coniferous forest community.

Prepared for: Ontario Ministry of Transportation **AECOM** G.W.P. 4459-04-00

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Figure 3: Ecological Land Classifications within the Study Area



#### 3.1.1.4 Wildlife

During field investigations, bird species observed included Common Yellowthroat (*Geothlypis trichas*), Yellow Warbler (*Setophaga petechia*) and Red-winged Blackbird (*Agelaius phoeniceus*). Nest searches were conducted on the structures (the Highway 401 bridge over County Road 41 and the Highway 401 bridge over Selby/Sucker Creek) and within the vegetation in the study area (i.e., where field investigations occurred). No nests were found on these bridges at the time of the 2016 field investigations or within the vegetation within the Study Area (i.e., where field investigations occurred). No other incidental wildlife observations were made during the 2016 field investigations.

The Overall Study Area provides suitable habitat for a variety of wildlife species. Although the existing Highway 401 presents a barrier to wildlife movement, it is likely that structure at Selby/Sucker Creek provides some opportunity for wildlife movement under the existing Highway.

According to the Atlas of the Mammals of Ontario, a total of 23 common mammal species have been recorded within 10 x 10 km UTM block 18QU40 that encompasses the Overall Study area. **Table 2** below provides a summary of these species and their *Endangered Species Act (ESA) 2007* status. The Little Brown Bat (*Myotis lucifugus*) identified in this background review is listed as Endangered in Ontario and will be further discussed in **Section 3.1.1.5**.

Table 2: Atlas of the Mammals of Ontario Records

Common Name	Scientific Name	ESA Status
Virginia Opossum	Dedelphis virginiana	not applicable
Common Shrew	Sorex cinereus	not applicable
Northern Short-tailed Shew	Blarina brevicauda	not applicable
Star-nosed Mole	Condylura cristata	not applicable
Little Brown Bat	Myotis lucifuga	Endangered
Big Brown Bat	Eptesicus fuscus	not applicable
Eastern Red Bat	Lasiurus borealis	not applicable
Hoary Bat	Lasiurus cinereus	not applicable
Eastern Cottontail	Sylvilagus floridanus	not applicable
Snowshoe Hare	Lepus americanus	not applicable
Eastern Chipmunk	Tamias striatus	not applicable
Woodchuck	Marmota monax	not applicable
Gray Squirrel	Sciurus carolinensis	not applicable
Red Squirrel	Tamiasciurus hudsonicus	not applicable
Northern Flying Squirrel	Glaucomys sabrinus	not applicable
White-footed Mouse	Peromyscus leucopus	not applicable
Deer Mouse	Peromyscus maniculatus	not applicable
Meadow Vole	Microtus pennsylvanicus	not applicable
Muskrat	Ondatra zibethicus	not applicable

Common Name	Scientific Name	ESA Status
Norway Rat	Rattus norvegicus	not applicable
House Mouse	Mus musculus	not applicable
Porcupine	Erethizon dosatum	not applicable
Beaver	Castor Canadensis	not applicable

### 3.1.1.5 Species at Risk (SAR)

There were no Species at Risk (SAR) observed within the Potentially Impacted Area during the 2016 field investigations; however, based on a review of background information, there is potential for a number of SAR to occur within the Overall Study Area.

The Little Brown Bat was identified as potentially occurring within the Overall Study Area during background review. It should also be noted that three other bat species have recently been uplisted to the Specias at Risk Ontario List including Eastern Small-footed Myotis (*Myotis leibii*), Tri-colored Bat (*Perimyotis subflavus*) and Northern Myotis (*Myotis septentrionalis*). These species may find suitable habitat within the FOM communities in the Potentially Impacted Area.

According to the Ontario Breeding Bird Atlas (OBBA), a total of 107 bird species have been recorded within the in 10 x 10 km UTM block 18QU40 that encompasses the Overall Study Area. The OBBA has records of 10 bird Species at Risk, either confirmed or possibly breeding in the Overall Study Area. **Table 3** below provides a summary of these bird species and their *ESA 2007* status.

Table 3: Ontario Breeding Bird Atlas Bird Species at Risk Records

Common Name	Scientific Name	ESA Status	Habitat Potential
Bank Swallow	Riparia riparia	Threatened	No suitable habitat present
Barn Swallow	Hirundo rustica	Threatened	Foraging habitat present
Bobolink	Dolichonyx oryzivorus	Threatened	Suitable habitat present
Chimney Swift	Chaetura pelagica	Threatened	Foraging habitat present
Common Nighthawk	Chordeiles minor	Special Concern	Suitable habitat present
Eastern Meadowlark	Sturnella magna	Threatened	Suitable habitat present
Eastern Wood-Pewee	Contopus virens	Special Concern	Suitable habitat present
Loggerhead Shrike	Lanius Iudovicianus	Endangered	Suitable habitat present
Eastern Whip-poor- will	Caprimulgus vociferous	Threatened	Suitable habitat present
Wood Thrush	Hylocichla mustelina	Special Concern	Suitable habitat present

According to the species range map provided by Bat Conservation International (2017), the Overall Study Area encompasses the ranges of the four bat species, which are listed as Endangered on the SAR in Ontario List: Little Brown Myotis, Northern Myotis,

Eastern Small-footed Myotis and Tri-Colored Bat. **Table 4** below provides a summary of these bats SAR and their *ESA 2007* status.

Table 4: Bat Species at Risk with Ranges that Overlap the Study Area

Common Name	Scientific Name	ESA Status	Habitat Potential
Little Brown Myotis	Myotis lucifugus	Endangered	Suitable habitat present
Northern Myotis	Myotis septentrionalis	Endangered	Suitable habitat present
Eastern Small-footed Myotis	Myotis leibii	Endangered	Suitable habitat present
Tri-Colored Bat	Perimyotis subflavus	Endangered	Suitable habitat present

An information request was sent to the MNRF Peterborough District on March 15, 2016 asking for identification of any SAR records within the Overall Study Area. A response from the MNRF was given on March 16, 2016 and indicated the following SAR in **Table 5** as potentially occurring within or in the vicinity the Overall Study Area.

**Table 5: MNRF Species at Risk Consultation Results** 

Common Name	Scientific Name	ESA Status	Habitat Potential
Eastern Musk Turtle	Sternotherus odouratus	Threatened	No suitable habitat present
Four-leaved Milkweed	Asclepias quadrifolia	Endangered	No suitable habitat present
Northern Map Turtle	Graptemys geographica	Special Concern	No suitable habitat present
Ogden's Pondweed	Potamogeton ogdenii	Endangered	No suitable habitat present
Snapping Turtle	Chelydra serpentine	Special Concern	Suitable habitat present

A total of 19 SAR were identified as having potential to occur within or in the vicinity of the Overall Study Area based on the review of background information from the OBBA, the Atlas of the Mammals of Ontario, Bat Conservation International and through consultation with the MNRF. It should be noted that the MNRF had identified the potential for Eastern Milksnake (*Lampropeltis triangulum*) within the Overall Study Area. At the time, Eastern Milksnake was listed as a Species of Special Concern; however, this species was removed from the Species at Risk in Ontario (SARO) list in June 2016.

An assessment was completed to determine the presence of suitable habitat for each of the 19 SAR identified during background review. This assessment was completed using aerial photo interpretation to delineate habitat communities in the study area and was further refined after ELC community delineation during field investigations. A habitat assessment of each of the 19 SAR, including their habitat preferences and assessment

of potential occurrence in the Overall Study Area is provided below with further detail in the *Terrestrial Ecosystem Existing Conditions and Impact Assessment Report.* 

Bank Swallow (*Riparia riparia*) – This species is listed as Threatened in Ontario. Bank Swallows nest in erodible soils on vertical or near-vertical banks and bluffs in lowland areas that are dominated by rivers, streams, lakes, and oceans. Through the background information review of the OBBA, Bank Swallow were identified to occur within the OBBA survey square 18QU40 which encompasses the Overall Study Area. During the field investigations, no vertical faces in silt and sand deposits were identified for nesting along the Napanee River; therefore there is no suitable habitat for the Bank Swallow in the Potentially Impacted Area.

**Barn Swallow** (*Hirundo rustica*) – This species is listed as Threatened in Ontario. Barn Swallows occur in close association with human-made structures, building their cupshaped mud nests almost exclusively on structures such as open barns, under bridges and in culverts. Potentially suitable habitat (i.e., bridges) was present within the Potentially Impacted Area. However, visual nest surveys were conducted during field investigations and no nests were observed on any of the structures within the Potentially Impacted Area.

**Bobolink** (*Dolichonyx oryzivorus*) – This species is listed as Threatened in Ontario. Bobolink utilizes large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes. Bobolink prefers larger grasslands, generally greater than 10 ha in size. Cultural Meadow (CUM1) communities represent a large portion of the Potentially Impacted Area, while agricultural land exists within the Potentially Impacted Area. As such, suitable habitat may exist within the Potentially Impacted Area.

**Chimney Swift** (*Chaetura pelagica*) – This species is listed as Threatened in Ontario. Chimney Swifts are found in and around urban settlements where they nest and roost in chimneys and other manmade structures. Based on the results of the habitat assessment there is no suitable habitat for the Chimney Swift in the Potentially Impacted Area and the species is unlikely to occur.

**Common Nighthawk** (*Chordeiles minor*) – This species is listed as Special Concern in Ontario. Common Nighthawk is usually found in open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. The species may also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways but generally prefer natural areas. Suitable habitat may exist within the Potentially Impacted Area.

**Eastern Meadowlark** (*Sturnella magna*) – This species is listed as Threatened in Ontario. Eastern Meadowlark utilizes native grasslands, savannah, old fields, hayfields, lightly grazed pastures, weedy meadows, fields with occasional shrubs. Eastern Meadowlark requires a core habitat of at least 5 ha and can be negatively impacted by habitat fragmentation. Cultural Meadow (CUM1) communities were common within the Potentially Impacted Area and may provide suitable habitat

**Eastern Musk Turtle** (*Sternotherus odouratus*) – This species is listed as Threatened in Ontario. The Eastern Musk Turtle utilizes ponds, lakes, marshes and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that they burrow into for winter hibernation. Based on the results of the habitat assessment

there is no suitable habitat for the Eastern Musk Turtle in the Potentially Impacted Area and the species is unlikely to occur.

**Eastern Small-footed Myotis** (*Myotis leibii*) – Eastern Small-Footed Myotis roosts in a variety of habitats, including under rocks and bridges and in rock outcrops, caves, mines, and hollow trees. Individuals may change their roosting location daily. Along with other bat species, the Eastern Small-footed Myotis swarming occurs at or near their hibernacul. This species hibernates in caves and abandoned mines, preferring colder, drier sites and showing strong hibernation site fidelity. This species was recently emergency listed under the *ESA* as it is one of the rarest bats in eastern North America, and was one of the rarest even prior to the introduction of White Nose Syndrome. Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Eastern Whip-Poor-Will** (*Caprimulgus vociferous*) – This species is listed as Threatened in Ontario. Whip-poor-Will is usually found in areas with a mix of open and forested areas, such as savannahs, open woodlands or openings in more mature, deciduous, coniferous and mixed forests. The mixed forest community may provide suitable habitat for this species. Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Eastern Wood-Pewee** (*Contopus virens*) – This species is listed as Special Concern in Ontario. Eastern Wood-Pewee can be found in deciduous, coniferous and mixed forests in eastern North America. Additionally, the size of the forest does not appear to be an important factor in habitat selection as this species has been found in both small fragmented forests and larger forest tracks. Suitable habitat may be present within the mixed forest community in the Potentially Impacted Area.

**Four-leaved Milkweed** (*Asclepias quadrifolia*) – This species is listed as Endangered in Ontario. The Four-leaved Milkweed is found in two types of habitat in Ontario: dry woodlands dominated by Tallgrass prairie herbs, Bur Oak and Shagbark Hickory, and in woodland alvar communities dominated by Red Cedar pasture grasses, cultivated by human activity. Based on the results of the habitat assessment there is no suitable habitat for the Four-leaved Milkweed in the Potentially Impacted Area and the species is unlikely to occur.

**Little Brown Myotis** (*Myotis lucifugus*) – This species is listed as Endangered in Ontario. Little Brown Myotis are typically between four or five centimeters long, with wingspans of 22 to 27 centimeters. Little Brown Myotis are active in two or three hours after sunset, feeding on insects. During the day, Little Brown Myotis roost in trees and buildings, and are known to use attics, abandoned buildings and barns during the summer to raise their young and hibernate in caves or abandoned mines during the winter months. Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Loggerhead Shrike** (*Lanuis Iudovicianus*) – This species is listed as Endangered in Ontario. The Loggerhead Shrike prefers pasture or grassland habitats with scattered trees and low shrubs. Remaining Loggerhead Shrikes are found in two core grassland habitats, the Carden Plain north of Lindsay, and the Napanee Limestone Plain. There is low potential habitat for this species to occur within the Potentially Impacted Area.

**Northern Map Turtle** (*Graptemys geographica*) – This species is listed as Special Concern in Ontario. Northern map turtle inhabits lakes and rivers, showing a preference

for slow moving currents, muddy bottoms, and abundant aquatic vegetation. Based on the results of the habitat assessment there is no suitable habitat for the Northern Map Turtle within the Potentially Impacted Area and the species is unlikely to occur.

**Northern Myotis** (*Myotis septentrionalis*) – Northern Myotis is primarily a forest-dwelling species (Owen *et al.*, 2002). It is often associated with old growth mixed or coniferous forests and is known to roost under loose bark or in tree cavities. Unlike other bats, this species rarely roosts in anthropogenic structures. Breeding occurs in late summer in maternal colonies, and migration to hibernation sites in caves or mines begins in October. This species remains in hibernation until late March or April (MNRF, 2016o). Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Ogden's Pondweed** (*Potamogeton ogdenii*) – This species is listed as Endangered in Ontario. Ogden's pondweed is an underwater plant with branching, thread-like stems and is found in clear, slow moving streams, beaver ponds and lakes. In Canada, Ogden's Pondweed was found only in southeastern Ontario at Murphys Point Provincial Park and Davis Lock on the Rideau Canal between 1970 and 1990. There is no suitable habitat present within the Potentially Impacted Area.

**Snapping Turtle** (*Chelydra serpentine*) – This species is listed as Special Concern in Ontario. The Snapping Turtle utilizes a wide variety of shallow freshwater water habitats including: ponds, sloughs, shallow bays, river edges, slow streams, or areas combining several of these wetland habitats. Individual turtles can also persist in urbanized water bodies, such as golf course ponds and irrigation canals, but it is unlikely that a population could become established in such habitats. Sucker Creek provides potential habitat for the Snapping Turtle within the Potentially Impacted Area and Snapping Turtle may nest in the gravel or lose soil adjacent to the highway near Sucker Creek.

**Tri-colored Bat** (*Perimyotis subflavus*) – Tri-colored Bat lives in a variety of forested habitats, forming day roosts and maternity colonies in older forests and occasionally in anthropogenic structures. This species is rare and thus has a scattered distribution in southern Ontario. The Tri-colored Bat forages over water and along streams in the forest where it eats flying insects and spiders. At the end of the summer, individual bats swarm to an overwintering location generally underground or near a cave. Similar to Little Brown Myotis and Northern Myotis, mating occurs during swarming behaviour which is typically associated with hibernacula. Individual overwintering bats typically roost by themselves rather than as part of a group. Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Wood Thrush** (*Hylocichla mustelina*) – This species is listed as Special Concern in Ontario. Wood Thrush can be found in the interior and along the edges of well-developed upland deciduous and mixed forests. To be considered suitable, these forests should have: trees that are greater than 16 m in height, a high variety of deciduous tree species, a moderate sub-canopy and shrub density, shade, a fairly open forest floor, moist soils and decaying leaf litter. The mixed forest community located south of Sucker Creek east of County Road 41 may provide suitable habitat for this species.

### 3.1.2 Fish and Fish Habitat

A Fish and Fish Habitat Existing Conditions and Impact Assessment was prepared for this study in accordance with the *ERHD* (2013), and the MTO's Environmental Standards and Practices. A summary of the findings of the report is outlined below and further details can be found in the report itself which is available in **Appendix I** of this TESR.

Consistent with the Terrestrial Ecosystem Assessment, the Overall Study Area for this project is 600 m in width, extending along Highway 401 from 100 m west of County Road 41 easterly across Selby/Sucker Creek to the Newburgh Road underpass. In compliance with the MTO *Environmental Guide for Fish and Fish Habitat* (2009), the area of assessment extends along Selby/Sucker Creek 50 m upstream and 200 m downstream of the Highway 401 ROW.

The existing conditions assessment was completed by AECOM to fulfill the requirements under the MTO/DFO/MNRF Fisheries Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 3 (the protocol, 2016).

# 3.1.2.1 Background Review and Field Investigations

In accordance with Step 2 of the Fisheries Protocol (2016), pertinent information on the fish and fish habitat features of the study area were obtained through review of secondary source material. Selby/Sucker Creek is within the jurisdiction of Quinte Conservation and Peterborough District Ministry of Natural Resources and Forestry (MNRF). The Overall Study Area does not contain any Provincially Significant Wetlands.

Based on email correspondence from the Peterborough MNRF, American Eel (listed as Endangered with the Provincial *Endangered Species Act;* ESA) is present in Selby/Sucker Creek. Further information on this can be found in **Section 3.1.2.7.** 

The Selby/Sucker Creek watercourse was found to contain fish habitat that is managed as warmwater habitat by the MNRF. Selby/Sucker Creek is a permanent warmwater system that supports warmwater and coolwater forage and baitfish. Selby/Sucker Creek likely provides spawning habitat for the forage and baitfish at the cobble and riffle areas.

On June 3, 2016, AECOM ecologists conducted a Fisheries and Aquatic Habitat assessment to determine the existing conditions of the Selby/Sucker Creek. The Fisheries and Aquatic Habitat Assessment was completed in accordance with the Guide (June 2009). Fish community sampling was carried out immediately upstream of the bridge structure at County Road 41 using dip nets. All fish captured were immediately transferred to a bucket of water where they were held until they were identified, enumerated and live released back into the water.

As per Section 3.1.2 of the MTO ERHD (2013), for the purposes of investigating the potential impacts of the Project on fish and fish habitat, the study area, for each respective structure, was divided into two (2) zones: the Zone of Detailed Assessment (ZDA), which includes the areas within the MTO ROW, from 0 m to 50 m downstream of the ROW, and from 0 m to 20 m upstream of the ROW and the Zone of General Assessment (ZGA), which included from 50 m to 200 m downstream of the ROW and

from 20 m to 50 m upstream of the ROW (of which only a general description of the aquatic environment is documented).

The recorded criteria included the following:

- Surrounding natural features and land uses (i.e., wetland, agriculture, industrial etc.);
- Channel dimensions, channel morphology and bank stability;
- Stream morphology dimensions:
  - Runs typically deep, fast moving water with little to no turbulence of water
  - Riffles shallow, fast moving water typically running over rocks; riffles provide areas of high oxygenated waters
  - Flats low flowing water with a smooth un-agitated surface
  - Pools are described as deep pockets of slow moving water that provide ideal habitat for fish;
- Substrate composition (e.g., clay, silt, sand, gravel, cobble, rock, boulder, muck and detritus);
- Indicators of water clarity, water colour, presence and type of aquatic macrophytes, algal growth and evidence of runoff;
- Potential enhancement opportunities; and,
- Pollution sources (i.e., tile drain discharges, other piped discharges and road runoff).

In-stream cover was documented based on the percentage of cover provided by woody debris, boulders (>256 millimetres (mm) diameter), cobble (256-64 mm diameter), gravel (64-2 mm), aquatic vegetation and undercut banks. In-stream cover was classified as high if there was in-stream coverage between the areas of 76-100%; moderate 31-75%; and low 0-30%. Riparian vegetation canopy cover was provided as a percentage of cover over the site of investigation. Overall canopy cover was classified as: high 61-100%; moderate cover 31-60%; and low cover 0-30%.

### 3.1.2.2 Selby/Sucker Creek

Selby/Sucker Creek is a permanently flowing warmwater watercourse with a naturalized channel comprised of mainly pools, riffles, and flats. The structure at Highway 401 is a single-span concrete bridge with exposed banks under the bridge. No fish barriers were observed during the site reconnaissance. A small inlet to the creek was present downstream of the bridge located at County Road 41. The inputs appeared to be from overland flow and drainage from the surrounding area. Also, upstream of the same bridge structure, an outlet was observed though a corrugated steel pipe (CSP) culvert on the south side. This was likely outletting overland flow into the creek from the asphalt lot to the south. The creek was at low flow during the site visit. The substrate varied along the upstream and downstream reaches, however, Selby/Sucker Creek is largely bedrock controlled.

#### 3.1.2.3 Zone of Detailed Assessment

# Selby/Sucker Creek at County Road 41

Upstream (extending 20 m upstream of the highway ROW)

The riparian zone was approximately 5-10 m wide and dominated by herbaceous and grass species. Beyond this zone was meadow to the northwest and industrial to the south. The reach was dominated by riffles (50%), pools (30%), and flats (20%). The dominant substrate is cobble, rock, and boulders with sand/silt in lesser amounts. Mean wetted width was 12 m and mean wetted depth was 0.12 m. In stream cover was high and consisted of boulders (35%), cobble (75%), undercut banks (35%), woody debris (30%), and vegetation (80%). The instream vegetation accounted for 60%, mainly mosses and Canada waterweed, while the overhanging vegetation accounted for 20%. Depositional islands were observed approximately 15 m upstream from the bridge. consisting of grasses. Riffles were located in this area adjacent to the deposited silt. The banks were observed to be unstable and very silty, also evidenced by the depositional islands. No evidence of groundwater was observed, however, specialized fish habitats (e.g., spawning, feeding, nursery areas), for a warmwater fishery were identified within the study area. Many young of year (YOY) cyprinids were observed within the reach, mainly congregated at the bridge. No barriers to fish passage were observed. Habitat conditions upstream of the bridge were similar to the downstream reach.

### Downstream (extending 50 m downstream of the highway right-of-way)

Downstream of the bridge the riparian zone was approximately 10-15 m wide and dominated by herbaceous and grass species. Beyond this zone was meadow immediately to the north and meadow/industrial to the south. The reach was dominated by pools (50%), flats (30%), and riffles (20%). Mean wetted width was 14 m and mean wetted depth was 0.10 m. In stream cover was high and consisted of submergent and emergent vegetation including Yellow water lily (Nuphar lutea), Canada waterweed (Elodea canadensis), and filamentous algae. The substrate consisted of mainly cobble (85%). The substrate became siltier closer to the bridge at County Road 41. The silt was approximately 0.30 m in depth in some areas. Instream vegetation accounted for 75% cover, mainly mosses and Canada waterweed, while the overhanging vegetation accounted for 5%. Moss and algae was observed on rocks. The banks were grass covered and moderately unstable as the silty areas were eroding or beginning to erode. Many YOY cyprinids were observed throughout the reach. A dead Banded killifish (Fundulus diaphanous) was identified mid reach with no obvious signs of trauma. No overhead canopy cover existed, however some small shrubs and trees were present at the inlet of overland flow. No evidence of groundwater was observed, however; some specialized fish habitats (e.g., spawning, feeding, nursery areas) were identified within the study area. No barriers to fish passage were observed.

# Selby/Sucker Creek at Highway 401

Upstream (extending 20 m upstream of the highway right-of-way)

The riparian zone was approximately 2-3 m wide and dominated by herbaceous and grass species. Beyond this zone was the Highway 401 to the northeast and meadow to the northwest. The reach was dominated by riffles (70%), pools (20%), and flats (10%). The dominant substrate was cobble, rocks, and boulders with sand/silt in lesser amounts.

Mean wetted width was between 4 and 8 m, while mean wetted depth was an average of 0.15 m. In stream cover was high and consisted of vegetation (80%), woody debris (15%), undercut banks (5%). The instream vegetation accounted for 50%, mainly mosses and Canada waterweed, while the overhanging vegetation (herbaceous grasses and shrubs) accounted for 20%. Large depositional islands (approximately 6 m long by 2 m wide) were observed approximately 30 m upstream from the bridge, consisting of grasses. Riffles were located in this area adjacent to the deposition silt. The banks were observed to be unstable, consisting of silt, however the banks were of limited height (0.20 m), meaning the floodplain is well connected to the creek. No evidence of groundwater was observed, however, specialized fish habitats for a warmwater fishery (e.g., spawning, feeding, nursery areas) were identified within the study area. Some YOY cyprinids were observed within the reach. No barriers to fish passage were observed. Upstream of the bridge the creek was similar to the downstream reach.

Downstream (-extending 50 m downstream of the highway right-of-way)

Downstream of the bridge the riparian zone was approximately 10-15 m wide and dominated by herbaceous and grass species. Beyond this zone was meadow/small mixed forest immediately to the southeast and meadow to the west. The reach is dominated by pools (50%), flats (30%), and riffles (20%). The dominant substrate was silt with some boulders and cobble/gravel present. Mean wetted width was 10 m and mean wetted depth was 0.30 m. In stream cover was high and consisted of submergent and emergent vegetation including Yellow water lily (*Nuphar lutea*), Canada waterweed (*Elodea canadensis*), and a variety of unidentified mosses and filamentous algae, which was observed on rocks. The banks were grass covered and moderately unstable as the silty areas were eroding or beginning to erode. Limited YOY cyprinids were observed in the reach. Limited overhead canopy cover existed in the immediate riparian area; however some small shrubs and trees were present throughout the meadow lands. No evidence of groundwater was observed, however; some specialized fish habitats (e.g., spawning, feeding, nursery areas) were identified within the study area. No barriers to fish passage were observed.

#### 3.1.2.4 Zone of General Assessment

Upstream (extending from 20 m to 30 m upstream of the highway right-of-way)

The upstream habitat is similar to that of the habitat within the detailed zone of assessment. The banks were silty and moderately unstable. The adjacent land uses are highway, retail, and industrial. Overland flow is directed into the creek approximately 100 m upstream from the asphalt area on the property in the southeast quadrant. Some specialized habitat was observed in the zone of general assessment, including potential feeding and nursery areas within the highly vegetated areas. The mean wetted depth was 0.15 m.

Downstream (extending from 50 m - 150 m downstream of the highway right-of-way)

The downstream habitat consists of more riffles and cobble substrate, as the channel narrows to approximately 5 m wetted width in areas. The narrowing of the channel is natural and appeared to have been the reason for the change in morphology and substrate composition (changing to cobble from silt). The adjacent land uses were highway and industrial. A meadow area existed outside of the riparian area where a

White-tailed deer was observed. Some specialized habitat (possible spawning areas like riffles) was observed within the downstream zone of general assessment.

The wetted width of the creek increased to approximately 10-15 m in the upper portion of the assessed reach. A large pool, approximately 0.95 m deep, was observed with depositional islands located throughout the creek. Agricultural fields and meadows were located adjacent to the creek further upstream of Highway 401. The substrate was predominantly silt with some boulders.

The downstream habitat consisted of a grassy riparian area, with a narrow channel of approximately 4-5 m in wetted width. Some boulders and woody debris were observed in the channel. Overland flow was directed to a small CSP culvert on the southeast bank likely collecting water from the asphalt parking lots to the southeast. Limited specialized habitat was observed in this reach.

### 3.1.2.5 Extended Study Area

The extended Study Area was included to encompass the additional land that extends to Newburgh Road from east of Sucker Creek. The area to the east of Newburgh Road is included in the study area for the *Improvements to the Highway 401 Interchange at Palace Road (G.W.P. 4197-13-00)* which is documented in the *Fish and Fish Habitat Existing Conditions Report (December 2016)* for that study.

### Northeast of the County Road 41 Interchange

At Selby/Sucker Creek there may be inundation in the ditch area, however; rock check dams prevent the connection of any water further along the ditch. No fish habitat is present further east along the ditch, however; a large pond was observed immediately North of Highway 401. The pond is offline and surrounded by upland vegetation. It is unclear if the pond is natural or manmade.

#### Northwest of the County Road 41 Interchange

A 20 m rip rap lined channel is present leading to the creek. Cattails are present in the ditch which may be inundated during periods of increased flow. No fish habitat was observed.

#### Southeast of County Road 41 Interchange

The creek is well connected to the floodplain on the Southeast bank. During high flow there is the potential for inundation along the Highway 401 Southeast interchange. There is no defined channel and no fish habitat beyond the ~75 m of potential inundation.

### Southwest of County Road 41 Interchange

This area is located immediately north of the Walmart. It includes a manicured lawn and asphalt. No fish habitat is present.

### 3.1.2.6 Fish Community Structure

Fish community sampling was carried out immediately upstream of the bridge structure at County Road 41. The substrate consisted of mainly cobble with some silt and sand. At this location young-of-the-year (YOY) cyprinids were captured (>100). These fish were too small to be identified; however, they are likely thought to be YOY Bluntnose

minnow. Also captured in this location were: two (2) Banded killifish and two (2) Bluntnose minnow (*Pimephales notatus*). Fish collection was carried out immediately upstream of the bridge via dip netting the area where many fish were observed at the time of the site investigation. Since no barriers to fish passage were present under the bridge, the assumption can be made that these species may also be present downstream of the bridge at County Road 41 and as such fish community sampling was limited to visual schooling of fish in the upstream reach. **Table 6** summarizes the existing fish community assemblage based on Template 10.2 of the MTO Fish Guide.

**Table 6: Summary of Existing Fish and Fish Habitat Conditions** 

GWP or Project Name	Waterbody	Latitude	Longitude	Flow	Thermal Regime		Fish Species Present	Substrate Type	Vegetation	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	*In-water Works Timing Window
Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04- 00)	Sucker Creek	44.245657	76.948770	Permanent	Warm	Yes	Source: Earth Tech	boulders with sand and silt	Riparian-herbaceous plants and grass species In-stream-Moss and Canada Waterweed	Unstable, eroding banks, depositional islands from silt/sediment accumulation American Eel present	The assessed reach provides habitat for fish migration, spawning, feeding and rearing however, no limiting important or exceptional habitat was identified.	Potential habitat for American Eel.	In water works are restricted between: - April 1 and June 30 (no in water work allowed) Source: MNRF Peterborough District Office correspondence, dated March 16, 2016.

### 3.1.2.7 Species at Risk (SAR)

As noted in **Section 3.1.2.1**, based on email correspondence from the Peterborough MNRF, American Eel (listed as Endangered with the Provincial *Endangered Species Act, ESA*) was not identified on the species list for Selby/Sucker Creek. However; clarification from the Peterborough MNRF stated that an MNRF researcher has caught American Eel in the nearby Napanee River in 2010 and therefore may have the potential to inhabit Napanee River and its connected tributaries. Further, although American Eel are not currently listed as a Species at Risk (SAR) under the federal Species at Risk Act (SARA), it is considered Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and DFO has indicated American Eel is under consideration for listing to Schedule 1 of SARA.

Present science considers the American Eel to consist of a single breeding population in which all individuals travel to the Sargasso Sea in the Atlantic Ocean to spawn. From there, young eels drift with ocean currents and most eventually migrate inland into streams, rivers and lakes.

American Eel begin moving upstream to freshwater habitats when the water temperatures reach 10°C and continue until the temperatures exceed 20°C. In Canada this is typically between late April and early August. However, the eels can tolerate a wide range of water temperatures and lotic conditions.

Selby/Sucker Creek exhibits many of the habitat characteristics that American Eel require. This includes a silty substrate and pools. Further, habitat conditions within the assessed reach contain non-limiting feeding and migratory habitat that is likely conducive to eels, including pools for elvers protection and silt substrate for periods of rest.

# 3.1.3 Hydrogeology and Groundwater

A groundwater assessment was completed as part of this study to:

- Evaluate the local hydrogeological conditions within the study area;
- Identify potential impacts from the interchange improvement work to the local hydrogeology of the study area;
- Identify existing and potential drinking water threats within the study area and
  potential impacts from the interchange improvement work to the drinking water
  wells located within the study area; and,
- Recommend measures that could mitigate the identified potential impacts.

The assessment followed the *ERHD* (2013) and the *Environmental Standards and Practices for Groundwater*. The following sections include a summary of the findings, further information can be found in the *Groundwater Assessment Report*, available in **Appendix K** of this TESR.

#### 3.1.3.1 Physiography, Topography and Drainage

The study area is located within the Napanee Plain physiographic region. The study area is dominated by bare limestone terrain and bedrock-drift complex topography. Bedrock ridges are exposed at the ground surface intermixed with valleys and low-lying

depressions. While the majority of the limestone terrane exhibits shallow soil cover of only a few inches, glacial till deposits present along the stream valley could be deep (up to 60 m) in some areas .

According to the topographic map for the area and site observations, the topography in the vicinity of the study area is undulating in nature. Limestone (with interbeded shale) bedrock ridges are exposed at the ground surface intermixed with valleys and low-lying depressions. The study area has a general downward slope from the northwest to the southeast. The elevations of the study area ranged from approximately 95 m above mean sea level (amsl) at the eastern end, to greater than 110 m amsl at the northern end in the vicinity of County Road 41 and Vanluven Road.

The study area is located within the Napanee River Watershed. The Napanee River Watershed has a drainage area of 800 square kilometres and originated on the Canadian Shield, descending 172 metres through the Limestone Terrane to the Bay of Quinte. Sucker Creek crosses the study area in a northeast-southwest orientation from the southwest, southeast and northeast quadrants of the Highway 401 and County Road 41 intersection. The Napanee River is located approximately 300 m southeast of the study area. Both the Sucker Creek and Napanee River drain southwesterly to the Bay of Quinte, which is located on the Lake Ontario.

Based on the groundwater elevation table map covering the Greater Napanee area, the regional groundwater flow direction consists of different components, including to the southeast, south and southwest towards the Napanee River and the Bay of Quinte. Locally, surface water runoff and shallow groundwater flow is influenced by ground surface topography, flowing from elevated areas to low lying areas and surface water bodies.

### 3.1.3.2 Geology

According to the *Quaternary Geology of Ontario*, *Southern Sheet*, the quaternary deposit within the majority of the study area consists of glaciolacustrine deposits of silt and clay (basin and quiet water deposit) on top of limestone bedrock. Modern alluvial deposits of clay, silt, sand and gravel are observed along the Sucker Creek valley.

According to the *Bedrock Geology of Ontario, Southern Sheet*, and available well records, underlying the overburden deposits within the study area is the Upper Ordovician aged limestone of the Simcoe Group. Minor shale is present within the upper layer of the limestone bedrock. Bedrock exposure at the ground surface is mapped at the western and eastern portions of the study area along the Highway 401 corridor, and along the Sucker Creek in the northeastern quadrant of the Highway 401 and County Road 41 intersection. During the site visit, bedrock was observed exposed at the ground surface in the vicinity of a former gravel pit in the eastern portion of the study area immediately north of Highway 401. Sucker Creek is observed flowing over a limestone bed in the vicinity of Vanluven Road.

As discussed in the earlier sections, the study area is situated within a limestone terrane. The majority of the limestone terrane exhibits shallow soil cover (a few inches), while glacial till deposits present along the stream valleys could be deep (up to 60 m) in some areas. Based on the MECP well records and overburden deposit thickness map generated as part of the July 2014 Quinte SPR Assessment Report, the thickness of the

overburden deposits ranged from 0 m (bedrock exposed at the groundwater surface) to approximately 19.8 m below ground surface within the study area.

### 3.1.3.3 Hydrogeology

### Overburden and Bedrock Aquifers

Based on the aquifer information provided in the Assessment Report for Quinte Source Protection Authority (SPA), the majority of wells (approximately 95 percent) in the region obtain supply from fractured bedrock aquifers. The remaining 5 percent obtain supply from overburden aquifers comprising of sand and gravel where the soil is of sufficient thickness. There are two major bedrock aquifer systems in Greater Napanee area: the shallow limestone aquifer and the deep Precambrian aquifer. Yield from the Quinte Source Protection Region aquifers is typically low to moderate and considered adequate for meeting most domestic and agricultural needs.

The quality of supply from the Quinte SPA aquifers is normally good with fresh water reported on well records. However the water is often hard and in some areas natural water quality problems such as mineralization, gas and sulphur may be experienced. These natural water quality problems are typically encountered when wells are drilled deep (i.e., depths greater than 30 metres in limestone bedrock) or in areas of groundwater discharge.

Potable water in Napanee is municipally supplied with water obtained from Lake Ontario. The study area is located at the northern end of Napanee and based on the MECP well records, there are a large number of private wells present within the study area. All existing water wells within the study area are bedrocks wells, with the majority of them drawing water from the limestone aquifer.

### Water Table Elevations and Groundwater Flow

Groundwater flow is controlled by the permeability and porosity of the soil / rock material and by the existing hydraulic gradients. In general, shallow groundwater flow within the overburden deposits is associated with the surface topography and conveyed to topographic lows, wetlands, and surface watercourses. The deeper aquifer systems, including bedrock aquifer, tend to be more uniform and are less influenced by topographic variations. Vertically, groundwater flow in the shallow aquifer will travel downwards towards the deeper aquifer system. Variations to the flow direction will change depending on proximity to surface watercourses and subsurface geology.

As discussed earlier, there are two major bedrock aquifer systems in Greater Napanee area: the shallow limestone aquifer and the deep Precambrian aquifer. The limestone aquifer is the predominant aquifer for potable water supplies in the vicinity of the study area. The movement of groundwater in the limestone aquifer is typically a reflection of surface topography with groundwater flowing from areas of high elevations to low. Based on the MECP well records, the static groundwater level in the existing water wells ranges from approximately 0.3 m to 12.6 m below ground surface within the study area, which reflects the water table elevations in both the shallow and deep bedrock aquifers. The water table elevation in the limestone aquifer is generally within 5 m below ground surface (bgs). Based on the water table elevation map covering the Greater Napanee, the regional groundwater flow direction in the vicinity of the study area is towards the Napanee River and the Bay of Quinte.

### Groundwater Recharge and Discharge Conditions

Recharge areas are characterized by permeable soils exposed at the ground surface, such as sand or gravel which allows rain water to seep easily into the ground to recharge the underlying aquifer. A recharge area is considered significant when it helps maintain the water level in an aquifer that supplies a community with drinking water, or supplies groundwater recharge to a cold water ecosystem that is dependent on this recharge to maintain its ecological function.

According to the Tier 1 Water Budget Report completed as part of the July 2014 Quinte SPR Assessment Report, the annual recharge rates for the limestone aquifer were calculated in the order of 81 to 109 mm with an average of 93 mm. The average annual recharge rate of the Precambrian (granite) aquifer was approximately 50 mm. The groundwater recharge in the vicinity of the study area is considered medium and according to the Significant Groundwater Recharge Areas (SGRAs) mapped as part of the July 2014 Quinte SPR Assessment Report, there are no significant SGRAs present within the study area.

Groundwater discharges from the groundwater system to the surface as springs, seeps or upwellings and groundwater discharge occurs along surface water bodies, streams and wetlands. Within the study area, groundwater discharge likely occurs along Sucker Creek, its tributaries and associated wetlands, and a former gravel pit which is currently filled with water (north side of Highway 401 and west of the abandoned railway).

# Groundwater Vulnerability to Contamination

Aquifer vulnerability is a measure of how easy and how fast contamination at the ground surface reaches the underlying production aquifers. The degree of groundwater vulnerability largely depends on the presence or absence of permeable surficial materials, the depth to the water table and location relative to surface water features and water wells. Generally, aquifer vulnerability is higher in areas characterized as having a shallow aquifer system and overlain by permeable surficial soil deposits.

Within the study area, the limestone bedrock aquifer is the dominant aquifer in use for domestic and commercial water supply. This aquifer is most susceptible to potential sources of surface contamination where bedrock outcrops at the surface or where the overburden deposit is thin. The rate of groundwater and contaminant transmission depends on the amount of fractured zones of the bedrock.

Given the fact that shallow soil/bedrock and shallow groundwater table conditions (generally within 5 m bgs) are present throughout the study area, the groundwater vulnerability within the study area is rated as having a high potential for contamination.

This is consistent with the highly vulnerable aquifers (HVAs) mapped as part of the July 2014 Quinte SPR Assessment Report.

#### Water Well Records Review and Groundwater Usage

According to the MECP well records, there are 25 existing water supply wells identified within the study area. The primary water use for 13 wells is domestic (i.e., used by private homes), and for the remaining is commercial. There are no municipal wells identified within the study area.

All existing water wells are bedrock wells with well depths ranging from 3.4 to 82.6 m bgs. Among the 25 existing water wells, there are 7 shallow wells with well depths less

than 15 m bgs. Depths to bedrock ranged from 0 (i.e., bedrock exposed at the ground surface) to 19.8 m bgs. All existing water wells identified by the MECP well records appear drilled with a casing diameter of 15.24 cm. The static water levels for the water wells ranged from 0.3 m bgs to 9.4 m bgs.

Based on the well records, the recommended pumping rates for the existing water wells ranged from approximately 0.004 Litre/Second (L/s) (1 gallon/minute (GPM)) to 0.09 L/s (25 GPM). There are no high yield wells (yield a rate of more than 60 L/s), as defined by the Ontario Well Regulation (Regulation 903 as amended under the *Ontario Water Resources Act* R.R.O. 1990).

The study area is located within the Town of Greater Napanee and potable water in the town is municipally supplied with water obtained from Lake Ontario. The study area consists of both rural (north of Highway 401) and urban (south of Highway 401) areas. Both dug and drilled wells were observed on the residential properties along Vanluven Road, implying groundwater somehow is being used by the private home owners within the study area.

### Municipal Wells and Wellhead Protection Areas

According to the MECP well records discussed in the previous section and the wellhead protection areas delineated as part of the July 2014 Quinte SPR Assessment Report, there are no municipal water supply wells and/or their associated wellhead protection areas (WHPAs) located within or adjacent to the study area. The closest municipal well is located approximately 33 km southwest of the study area in the community of Peats Point.

#### Surface Water Intakes

Surface Water Intake Protection Zones are areas of land and water delineated around the end of the municipal intake pipes. These zones are typically determined by the amount of time it would take for a spilled material to reach the water intake. Up to three zones may be established around an intake. The nearest to the intake is Zone 1 and extending out sequentially are Zones 2 and 3. Each zone provides opportunity for the source protection committee or municipality to apply different levels of protective measures on activities planned or existing within the zone.

According to the July 2014 Quinte SPR Assessment Report, a piece of land along Selby/Sucker Creek and its tributaries have been classified as Intake Protection Zone (IPZ) 3 for the Deseronto Intake. In addition, a portion of the study area at the eastern end (Highway 401 and south of Highway 401, to the east Kimmetts Side Road) is located within the surface water Intake Protection Zone (IPZ) 2 for the Napanee Intake. IPZs are considered vulnerable areas from the source water protection perspective.

### 3.1.3.4 Drinking Water Source Protection

The study area is located within the Quinte Source Protection Region (SPR). The Quinte Source Protection Area, together with the Town of Greater Napanee, are identified as having important roles in implementing the Source Protection Plan for the Quinte SPR in the vicinity of the study area. The key objectives of the Source Protection Plan are outlined within the *Clean Water Act* and require existing and future drinking water sources within the source protection area be protected. Key objectives also include ensuring that, for areas where an activity is or would be a significant drinking

water threat; the activity never becomes or ceases to be a significant drinking water threat.

## 3.2 Socio-Economic Environment

### 3.2.1 Land Use

### 3.2.1.1 Location and Population

The study area is located within the Town of Greater Napanee within the County of Lennox and Addington. Based on 2016 Statistics Canada census data, the Town of Greater Napanee has a population of 15,892.

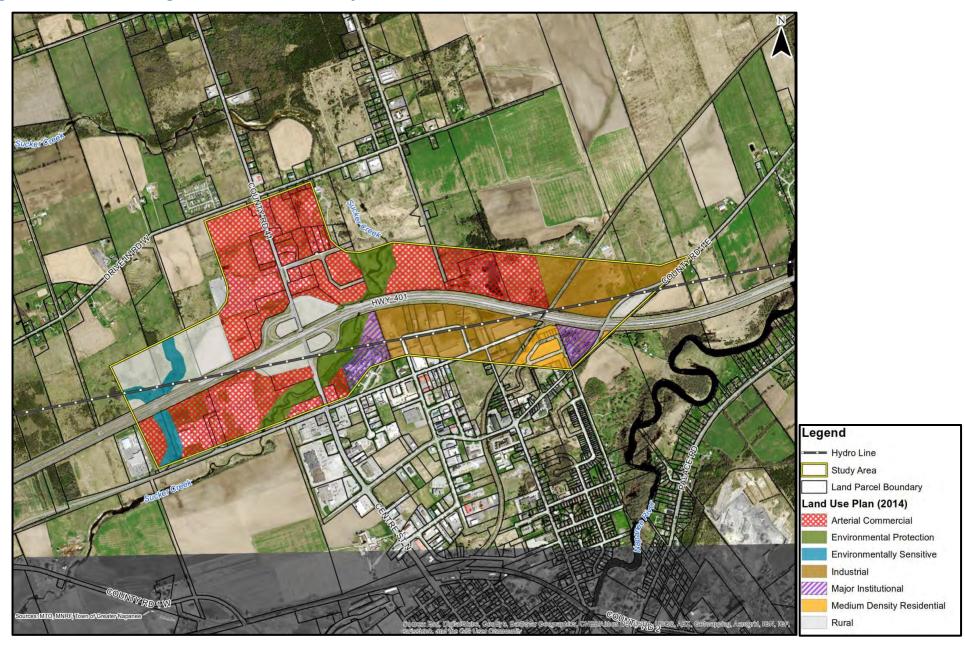
## 3.2.1.2 Existing Land Use

The majority of the study area currently consists of 'Arterial Commercial' land use located in the northeast, northwest, and southwest quadrants of the interchange. The lands surrounding Sucker Creek are designated as 'Environmental Protection', which occur in the southwest, southeast, and northeast quadrants of the study area. Some lands within the study area are designated 'Major Institutional', which are found in the southeast quadrant of the study area. 'Environmentally Sensitive' land use can be found at the easterly limit of the study area. There are no residences adjacent to County Road 41; however, there is a small parcel of land designated 'Medium Density Residential' in the proximity of Highway 401 and County Road 41 Interchange just southeast of the old rail tracks. A map of land use designations is provided in **Figure 4**.

The Richmond Industrial Park is 800 acres and located on County Road 41 immediately north of Highway 401. The site is zoned 'Arterial Industrial' and includes a 800,000 square foot facility operated by Goodyear and includes development opportunities promoted for 'General Industrial' and warehousing and distribution. A number of businesses operate north and south of Highway 401 and on both east and west sides of County Road 41, including but not limited to the following:

- Pilot Flying J / Shell gas station;
- Denny's restaurant;
- Chevrolet / Buick / GMC Peter Boyer;
- Swiss Chalet restaurant;
- McDonald's restaurant;
- Two (2) plazas with various restaurants; and,
- Canadian Tire.

Figure 4: Land Use Designations within the Study Area



#### 3.2.1.3 Recreational Areas

The County of Lennox and Addington is known for its trails and launched a network in 2006 as a tourism and economic development initiative and public health and safety program. These trails are actively used during the summer and may be affected by proposed improvements. One (1) active cycling trail is located within the study area. The Salmon River cycling trail crosses Highway 401 via County Road 41 connecting Napanee, Newburgh, Croydon, Roblin and Selby.

#### 3.2.1.4 Natural Areas

Notable natural features within the study area include Sucker Creek, which crosses Highway 401 to the east of the interchange. Sucker Creek has a rich riparian zone and is zoned as 'Environmental Protection' land in the *Town of Greater Napanee Official Plan* (2014). Selby/Sucker Creek is warmwater fish habitat with low sensitivity.

#### 3.2.1.5 Aesthetics

The study area presents a rural setting with various commercial and industrial developments. County Road 41 is heavily travelled by commercial vehicles accessing the service centre northwest of the interchange and the commercial, industrial and residential areas in the area.

### 3.2.1.6 Related Projects and Initiatives

The Highway 401 Interchange Improvements at Palace Road, to the east of the Highway 401 Interchange at County Road 41, is being undertaken as a separate Preliminary Design and Class Environmental Assessment Study (G.W.P 4197-13-00) by MTO; however, many of the environmental impact studies were undertaken in conjunction with this study.

### 3.2.1.7 Future Planned Development

The *Town of Greater Napanee Official Plan* (2014) notes that the Town is expected to grow to a population of between 19,700 to 21,600 people by 2023. The Town is encouraging development and balances growth with environmental protection and protection of areas with resource potential. There is land in the southeast quadrant of the interchange and land to the north of Highway 401 to the east of Selby/Sucker Creek, which is zoned for 'Arterial Commercial' and has future development potential.

#### 3.2.2 Waste and Contamination

A Contamination Overview Study (COS) was undertaken to identify and review properties within the Study Area with actual or potential site contamination that may the highway design, and to identify appropriate future environmental work and mitigation measures to be implemented. The analysis included determining the relative potential (high, medium and low potential) for soil and groundwater contamination in the COS study area. The analysis was generally based on current and historical land use (sources of contamination); and on surficial geology, hydrogeology and topography (contaminant migration and sensitive receptors).

Properties of "high" environmental concern generally include gas stations/service centres, and industrial or manufacturing sites. Gas stations/service centres operate pump islands (i.e., USTs for storing fuel), small chemical storage areas, and may include service areas for changing engine oil or full automotive repair. Gasoline and diesel fuel are usually delivered from bulk container trucks to large on-site USTs. Spills at transfer areas and pumps, along with overfilling of and leakage from the USTs, are potential sources of site contamination.

Properties which were never developed or were developed but only used for agricultural, residential or parkland uses were rated as having a "low" potential for contamination.

The results of the COS identified 22 parcels as having a "high" potential for environmental contamination and 35 parcels with "medium" potential. In addition, there were 14 spill records representing approximately 8 different locations within the COS Study Area that had significant historical spills which were also considered as having "high" potential for contamination. Further details of the study are available in the *Contamination Overview Study* (AECOM, October 2017).

Preliminary Site Screenings were completed on all private properties that have been identified as required for the Technically Preferred Preliminary Design Alternative in order to determine the need for specific environmental site assessments.

# 3.3 Cultural Environment

# 3.3.1 Archaeology

A Stage 1 Archaeological Assessment and a Stage 2 Archaeological Assessment were completed for the Highway 401 and County Road 41 interchange in 1999 and 2003 respectively by Archaeological Services Inc. These assessments determined that the study area was found to be disturbed, reflecting typical ROW disturbance as well as previous activities associated with the construction of roads and the installation of various utilities

# 3.4 Transportation

### 3.4.1 Road Network

# 3.4.1.1 Highway 401

Highway 401 (MacDonald-Cartier Freeway) is a Controlled Access Highway under the jurisdiction of MTO. The highway has a posted speed limit of 100 km/h and locally connects Napanee to Kingston in the east and Belleville to the west. Highway 401 crosses over County Road 41 with a single-span, rigid frame structure constructed in 1959.

Highway 401 through the study limits includes four through lanes (two lanes in each direction) and additional speed change lanes located within the limits of the County Road 41 interchange. The eastbound and westbound lanes are typically separated by a variable width paved median protected by concrete median barrier. Typical sections of

Highway 401, including at the County Road 41 structure, are presented in **Figures 5** and **6**.

Figure 5: Typical Section – Highway 401 with Paved Median

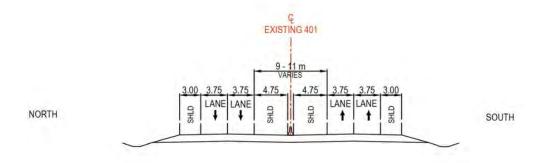
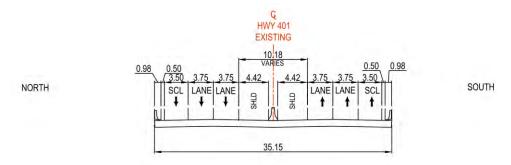


Figure 6: Typical Section - Highway 401 at County Road 41 Overpass



### 3.4.1.2 County Road 41 and Highway 401Interchange at County Road 41

County Road 41 is a four-lane road designated as 'Rural Arterial (County)' according to the *County of Lennox and Addington Official Plan* (2015). The current Highway 401 interchange at County Road 41 has a Parclo B configuration in the northwest and southeast quadrants, along with a Parclo A-style off-ramp in the northeast quadrant of the interchange which was constructed under MTO Contract 2004-4016. This new westbound off-ramp is signed for northbound traffic only (i.e. East-North ramp), while the westbound B-loop off-ramp is signed for southbound County Road 41 traffic (i.e. East-South ramp). An overpass structure carries Highway 401 over County Road 41. A schematic illustration of the County Road 41 interchange is provided in **Figure 7**.

RAMP N/S-W
RAMP E-S
RAMP E-N
RAMP W-N/S
RAMP N/S-E

Figure 7: County Road 41 / Highway 401 Interchange Schematic

The County Road 41 (Centre Street) interchange provides access to Napanee commercial and retail destinations on both sides of Centre Street south of the interchange. Heavy commercial vehicles utilize the County Road 41 interchange to access "Flying J" Service Centre in the northwest quadrant of the interchange.

County Road 41 has a posted speed of 60 km/h in the vicinity of Highway 401, and crosses beneath Highway 401. County Road 41 originates in Napanee and continues northerly to Highway 7, in Kaladar. The road then continues as Highway 41 under the jurisdiction of the Ministry of Transportation and terminates in Pembroke. A typical section of County Road 41 under Highway 401, which includes one through lane and one combined through / left turn lane in both directions, is provided in **Figure 8**.

Figure 8: Typical Section – County Road 41 at Highway 401

### 3.4.2 Structures

Two Highway 401 bridges were reviewed as part of this study:

- Highway 401 bridge over County Road 41; and,
- Highway 401 bridge over Selby/Sucker Creek.

The County Road 41 Overpass was originally constructed in 1959 and consists of a single span reinforced concrete rigid frame. The bridge has a clear span length of 17.2 m measured between the front face of abutments and carries two lanes of Highway 401 eastbound traffic and two lanes of Highway 401 westbound traffic, including an

additional ramp lane in each direction. The structure underwent major rehabilitation in 1982 and 1987, in addition to a minor rehabilitation in 2017, which was limited in scope due to lane and ramp closure restrictions.

The Sucker Creek Bridge was originally constructed in 1960 and consists of a single span reinforced concrete rigid frame. The bridge has a clear span length of 13.7 m measured perpendicular between the front face of abutments. The bridge carries two lanes of Highway 401 eastbound traffic and two lanes of Highway 401 westbound traffic, including an additional ramp lane in each direction. The north end of the structure was widened in 2004 by 14 m with a new rigid frame to accommodate the new westbound off-ramp and future widening of Highway 401. The structure underwent major rehabilitation in 1983 and 1987, in addition to a minor rehabilitation in 2017, which was limited in scope due to lane and ramp closure restrictions.

Given the age and condition of the Highway 401 bridges over both County Road 41 and Selby/Sucker Creek and the time since the last rehabilitation, major rehabilitation of the structures is anticipated to be required within the short-term (5-year) planning horizon. Based on the current interchange configuration, these rehabilitations cannot be completed without long-term temporary lane closures along Highway 401, partial widening of the bridges for staging purposes, and/or temporary removal of the existing eastbound and westbound off-ramp speed change lanes from the structures.

In addition to the short term rehabilitation requirements of the two structures, full replacement of the County Road 41 structure and replacement of the original segment of the Selby/Sucker Creek structure is anticipated to be required within the 20-25 year planning horizon of the study. While timelines for a future potential widening of Highway 401 to 6 lanes through this section are presently unknown, it is anticipated that such a widening would occur within the life span of any potential replacement structures and the future replacement structure(s) should be designed to accommodate this potential highway widening.

# 3.4.3 Traffic Operations

A traffic operational analysis for the Highway 401 interchange at County Road 41 and along Highway 401 within the Study Area was undertaken. This analysis included a review of existing traffic operations at the interchange, an assessment of estimated traffic growth and expected future traffic volumes, analysis of projected future traffic operations based on maintaining the existing roadway network, and the identification of potential operational deficiencies associated with the future traffic growth.

Level of service (LOS) refers to a combined measure of vehicle delay and traffic volume, describing operational conditions with the roadway network, and their perception by motorists and/or passengers. LOS 'A' through 'D' typically reflect adequate operations, while LOS 'E' reflects increasing congestion and operations at capacity, and LOS 'F' reflects unstable traffic flows, long delays, and, in some cases, severe traffic congestion.

Existing traffic LOS operations at the interchange are generally acceptable with overall LOS 'A' or 'B' at the north and south ramp terminal intersections and all turning movements operating with LOS 'C' or better. Queue lengths approaching 50 m were identified for the southbound left-turn movement to the eastbound on-ramp, resulting in

some delay to through traffic along County Road 41 given the absence of a dedicated left-turn lane. Based on the current roadway configuration and traffic volumes, a dedicated northbound left-turn lane to westbound Highway 401 is warranted at the north ramp terminal intersection. Acceptable traffic Level of Service (LOS 'A' or 'B') was identified along the Highway 401 mainline including at all ramp merge/diverge locations.

A future conditions analysis was undertaken based on projected traffic volumes along Highway 401 and at the interchange. This analysis was undertaken for horizon years of 2023, 2028 and 2038, representing 5, 10 and 20 years from an assumed 2018 project completion date. Future traffic volumes were derived based on historical annual growth rates, and consideration of annual growth rates taken from the County of Lennox and Addington Transportation Master Plan.

Based on the analysis, traffic flow prior to horizon year 2038 operates with an acceptable level of service of "C" or better. By 2038 however, it is expected that increased traffic volumes will lead to increased delay (overall LOS 'D' or better) along the eastbound off-ramp with queue lengths approaching or exceeding 50m for most approaches. Possible mitigation measures to improve the delay for the off-ramp include the addition of separate right-turn and left-turn lanes on the ramp.

An assessment of potential construction staging requirements and anticipated traffic impacts associated with rehabilitation of the bridges based on the current bridge and interchange configuration was undertaken. In this scenario, rehabilitation of the two structures would require a reduction to a single lane in each direction along Highway 401 for a portion of the bridge rehabilitation. A queue analysis was completed to analyze the effects of the single lane closure along Highway 401 approaching the County Road 41 and Sucker Creek structures. The analysis utilized 24 hour traffic counts along Highway 401 taken during both a summer and fall period to determine a range of potential queues that may be expected. Based on the analysis, it is anticipated that the queue along eastbound Highway 401 approaching County Road 41 would extend between 9.3 km (fall) to 12.7 km (summer). In the westbound direction, the anticipated queue would extend between 6.6 km (fall) to nearly 20 km (summer).

In addition to the operational concerns along Highway 401 associated with the single lane reduction, the structural rehabilitation would require temporary closure of the westbound to southbound off-ramp (converting the westbound to northbound off-ramp to provide access to both northbound and southbound County Road 41), and both eastbound ramps, impacting traffic operations along the surrounding municipal road network. With these ramp closures, a 7.5 km (minimum) detour via local roads or along westbound Highway 401 (if turning around at Palace Road) would be required for the Highway 401 eastbound traffic to access County Road 41. Closure of the eastbound on-ramp would result in an approximate 7.8km detour via local roads, with vehicles utilizing the signed Emergency Detour Route crossing at Newburgh Road to Palace Road to access eastbound Highway 401.

## 3.4.4 Pavement

A visual pavement condition survey was completed in May 2016, in accordance with the MTO Document SP-024, Manual for Condition Rating of Flexible Pavements. **Table 7** below summarizes the observed conditions:

**Table 7: Pavement Condition Rating (PCR) and Ride Condition Rating (RCR)** 

	Location		Pavement Condition	Ride Quality						
Facility	From (Road)	To (Road)	Condition	Ride						
Highway 401										
Eastbound	County Road 41	Palace Road	Fair	Fair						
Westbound	Palace Road	County Road 41	Fair	Good						
		County	Road 41							
Northbound	Jim Kimmett	Community	Good	Fair						
Southbound	Community	Jim Kimmett	Fair	Fair						
	С	ounty Road	41 Interchange							
North/South- West On-Ramp	County Road 41	Bullnose	Excellent	Good						
North/South- West SCL	Bullnose	Highway 401	Excellent	Good						
East-South Speed Change Lane	Highway 401	Bullnose	Excellent	Good						
East-South Off- Ramp	Bullnose	County Road 41	Excellent	Good						
West- North/South Speed Change Lane	Highway 401	Bullnose	Excellent	Good						
West- North/South Off-Ramp	Bullnose	County Road 41	Excellent	Excellent						
North/South- East On-Ramp	County Road 41	Bullnose	Fair	Fair						
North/South- East Speed Change Lane	Bullnose	Highway 401	Excellent	Good						
East-North Speed Change Lane	Highway 401	Bullnose	Good	Good						
East-North Off- Ramp	Bullnose	County Road 41	Good	Fair						

### 3.4.5 Electrical

The existing lighting system within the study limits includes partial illumination along Highway 401 at the County Road 41 interchange off-ramps and ramp terminals. There is continuous illumination at County Road 41 between the ramp terminals. There are traffic signals at the eastbound off-ramp terminal intersection. The temporary signals at the westbound off-ramp north ramp terminal intersection were removed when the westbound off-ramp was modified to provide access to northbound County Road 41 only.

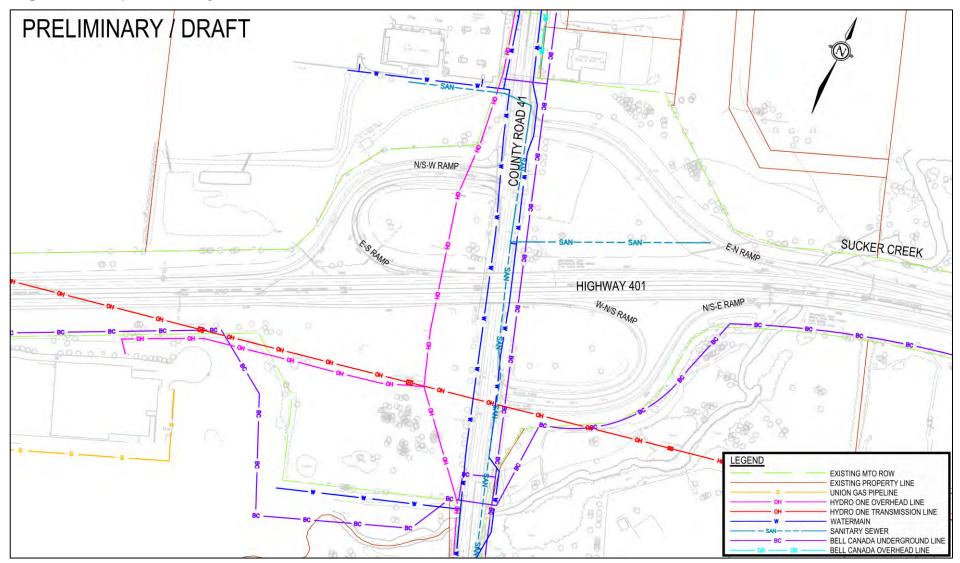
### 3.4.6 Utilities

The following utilities are located within or adjacent to the study area:

- Bell Canada;
- Cogeco;
- Enbridge;
- Hydro One;
- Trans Canada Pipeline Ltd.; and
- Union Gas.

Existing utilities within the study area are illustrated below in Figure 9.

Figure 9: Composite Utility Plan



# 3.4.7 Drainage

The study area is located in two watersheds, the Selby/Sucker Creek and Napanee River. The western part of the study area including the Highway 401 interchange at County Road 41, the Highway 401 bridge at Sucker Creek and Highway 401 up to Kimmetts Sideroad is located in the Sucker Creek watershed. Highway 401 from Kimmetts Sideroad to the eastern limits of the project is located in the Napanee River watershed. Both watersheds are managed by Quinte Conservation Authority.

## Highway 401 Corridor Drainage

Within the study area, Highway 401 drains to the Selby/Sucker Creek and Napanee River through median storm sewer and road side ditches. The highway consists of a rural cross section with a median storm sewer and ditches on both sides. The median storm sewer collects runoff from the inner lanes and shoulders and conveys this to ditches and ultimately to the Selby/Sucker Creek or Napanee River as shown on **Figure 11a** to **Figure 11e**. At locations near the Napanee River, instead of a median storm sewer, a central ditch collects the runoff from the inner lanes and conveys it across the Highway 401 through the ditch inlets and crossing sewers.

During site reconnaissance, MTO maintenance staff informed that water ponding has been observed in the median of the Highway 401 segment between the Sucker Creek Bridge and Napanee River Bridge. The MTO staff further informed that cleaning of the catchbasins is also an issue as gratings on some of the catchbasins have been stuck between the concrete median barriers (as illustrated in **Figure 10**) and cannot be removed for cleaning. During subsequent site visits, AECOM staff observed that some of the outlets are partially blocked with sediment deposits and would have caused flooding/water ponding in the median.

Figure 10: Catchbasin in the Highway 401 Median



The sewer system was rehabilitated at some locations by removing portions of the sewer under the median and placing a new sewer at one side of the median barrier under the Contract No. 2003-4015.

AECOM conducted hydraulic analysis for the sewer system where data was available and observed that some segments of the system are over capacity.

## County Road 41 Interchange Drainage

The existing drainage system of the Highway 401 interchange at County Road 41 is described in detail below and illustrated in Figure 11.

Drainage Culverts: There are seven drainage culverts within the County Road 41 Interchange. Among these culverts, six are located beneath the highway 401 ramps and the remaining one is underneath Highway 401. The inventory of these culverts is presented in **Table 8**. The catchments of these culverts were delineated based on the Ontario Base Map (OBM) 5 m contour. The runoff generated from the catchments flow through these culverts and ultimately discharged into the Sucker Creek.

Northwest Quadrant: Storm runoff from northwest quadrant of Highway 401 and County Road 41 interchange is collected through road side ditches and conveyed across Highway 401 through a box culvert (C03-EX) into a ditch located southwest of Highway 401 and County Road 41. The ditch ultimately discharges into Sucker Creek downstream of the County Road 41 bridge over Sucker Creek.

Northeast Quadrant: The northeast quadrant of Highway 401 and County Road 41 interchange is drained through road side ditches and conveyed across the E-N/S Ramp through a culvert (C02-EX) and ultimately discharges into the Sucker Creek upstream of the Highway 401 bridge over Sucker Creek.

Southeast Quadrant: Runoff from the southeast quadrant of Highway 401 and County Road 41 interchange is collected through road side ditches and conveyed across the W-N/S and N/S-E ramps through a culvert (C07-EX) and ultimately discharges into the Sucker Creek upstream of the County Road 41 bridge.

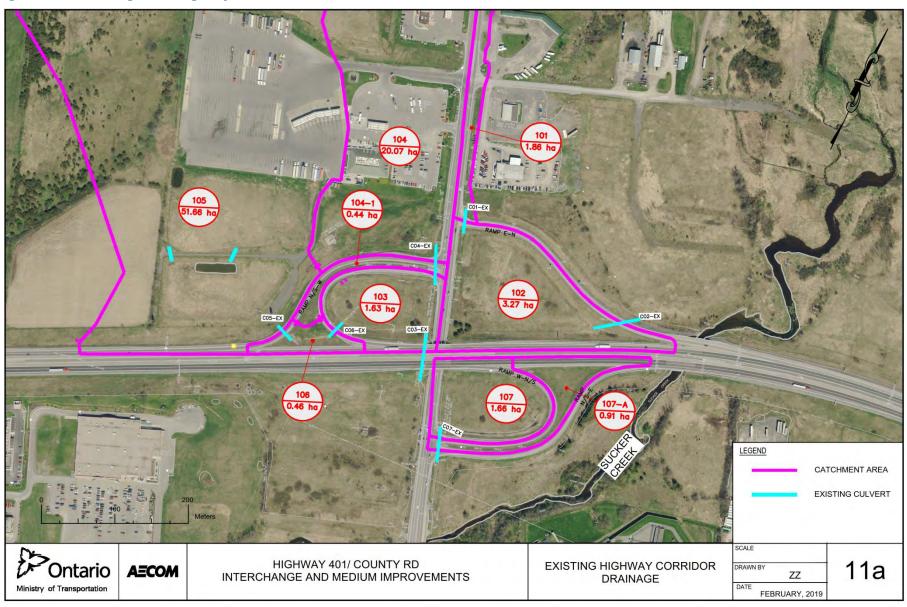
Highway 401 Surface: Storm runoff generated on the Highway 401 surface is collected through the median sewer and road side ditches. The median sewer outlets into a ditch (Outlet 1) located south of Highway 401 which ultimately drain into the Sucker Creek.

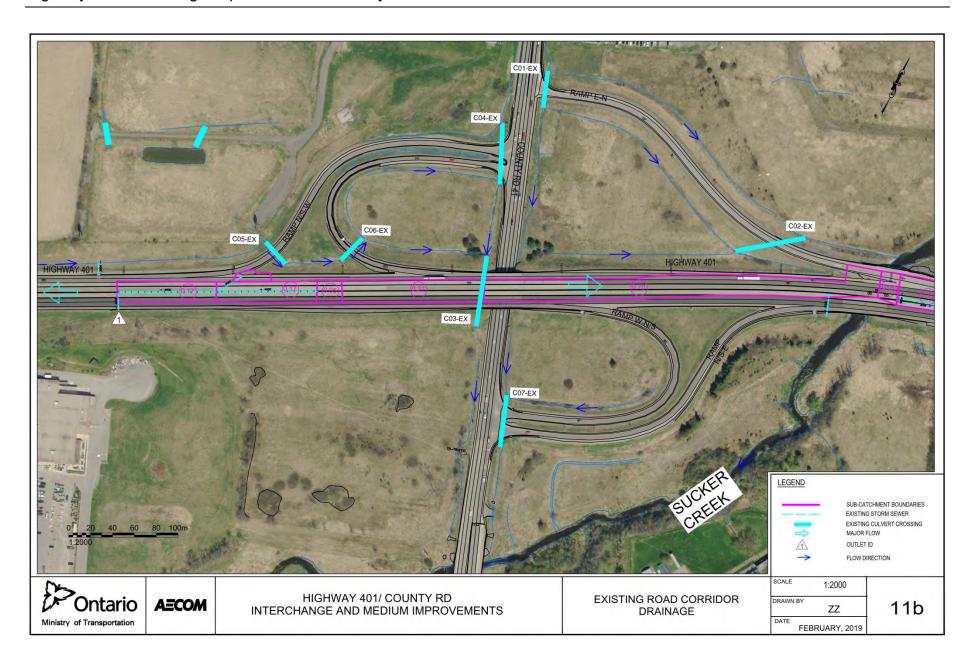
Further details regarding existing drainage conditions can be found in the *Drainage and* Hydrology Report (AECOM, February 2019).

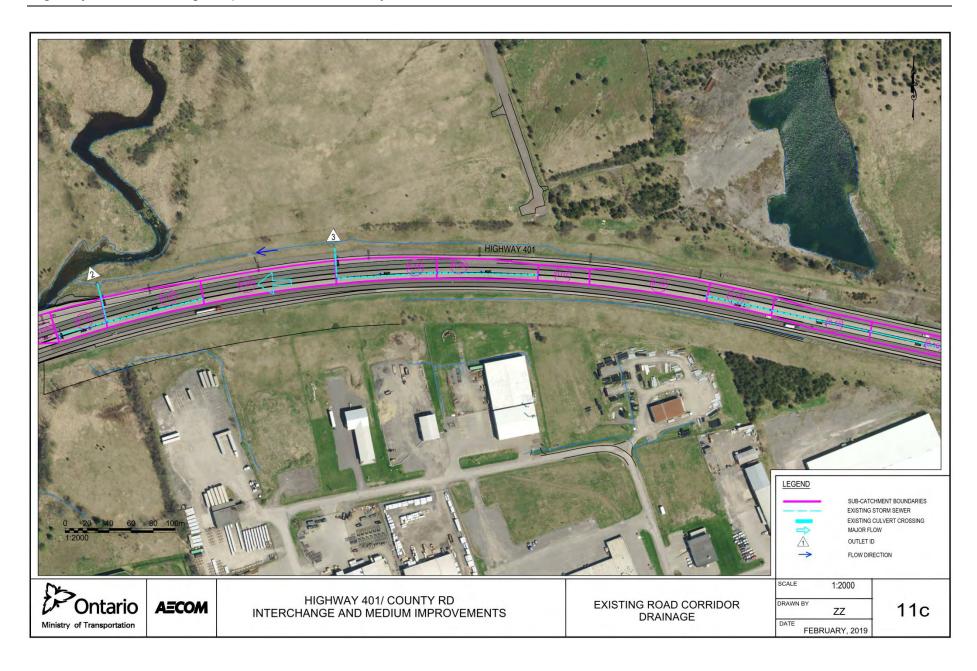
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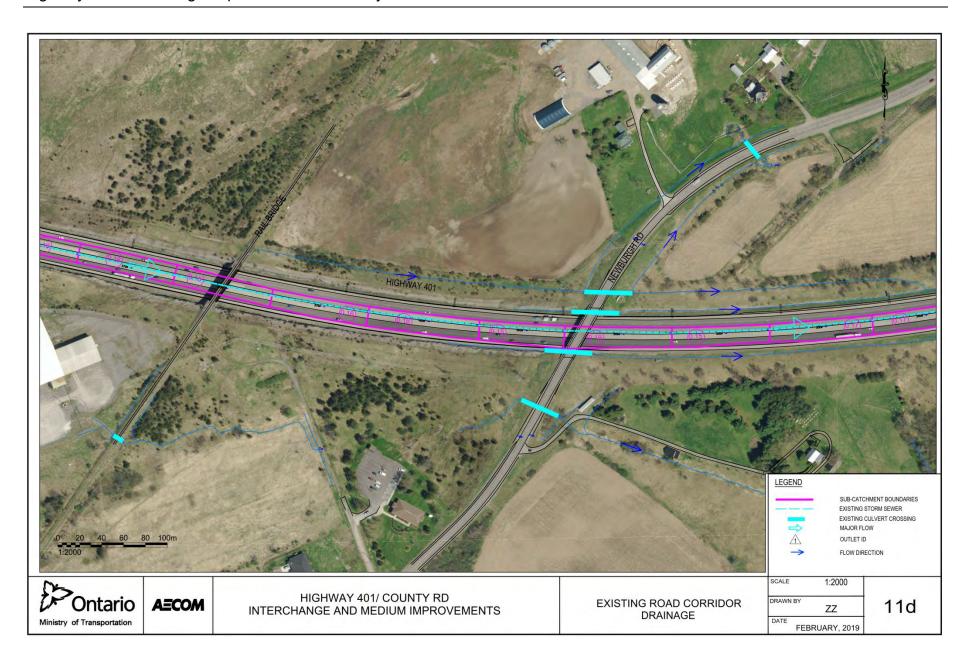
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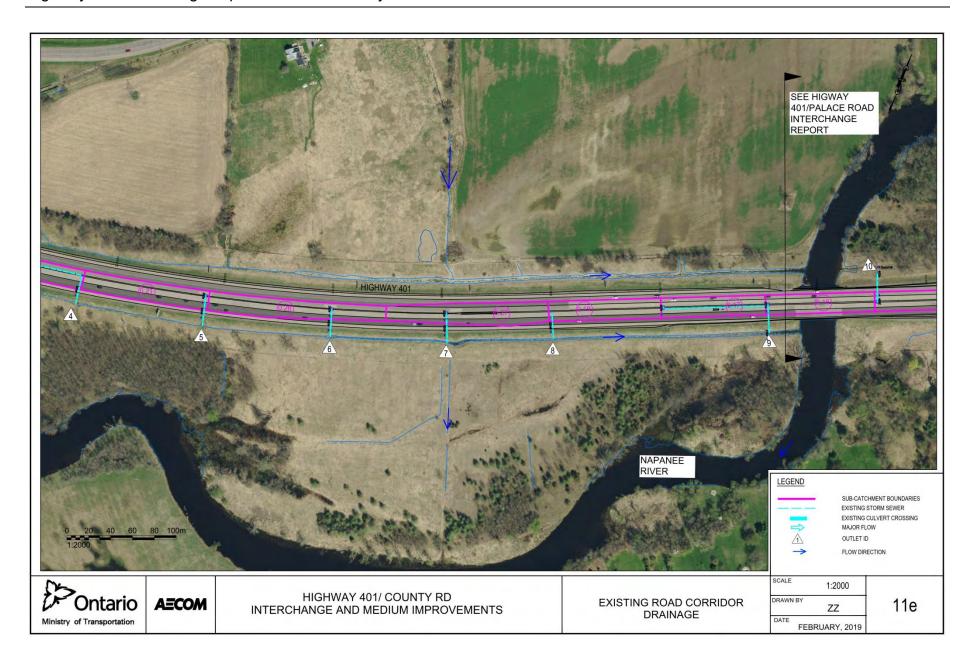
**Figure 11: Existing Drainage System** 











**Table 8: Existing Culverts Inventory** 

Cubrant		Existing Culvert Dimensions					Observed Osnalitism based	
Culvert ID	Location	Span (mm)	Rise / Diameter (mm)	Length (m)	Culvert Type	Material	Flow Direction	Observed Condition based on Visual Inspection
C01-EX	E-N/S Ramp	-	850	33.9	Pipe Culvert	HDPE	$N \rightarrow S$	<ul> <li>Excellent condition</li> <li>No spalling/cracks/ settlement/exposed footing at US and DS of culvert</li> <li>Medium vegetation at culvert opening</li> <li>No Water</li> <li>Sediment at U/S of culvert</li> </ul>
C02-EX	E-N/S Ramp	-	850	50	Pipe Culvert	HDPE	$SW \rightarrow NE$	<ul> <li>Excellent condition</li> <li>No spalling/cracks/ settlement/exposed footing at US and DS of culvert</li> <li>Medium vegetation at culvert opening</li> <li>Standing water inside and D/S of culvert</li> <li>Sediment at U/S of culvert</li> </ul>
C03-EX	Highway 401	1400	1600	67.03	Box Culvert	Concrete	$N \rightarrow S$	<ul> <li>Good condition</li> <li>Minor spalling/cracks at US and DS of culvert</li> <li>Medium to heavy vegetation at culvert opening</li> <li>Flowing water through culvert</li> <li>Sediment at U/S and D/S of culvert</li> </ul>

Culvert		Existing Culvert Dimensions		Culvert	Flow	Observed Condition based		
Culvert ID	Location	Span (mm)	Rise / Diameter (mm)	Length (m)	Type	Material		on Visual Inspection
C04-EX	N/S-W Ramp & E-N/S Ramp	-	1500	35.97	Pipe Culvert	Corrugated Steel	$N \rightarrow S$	<ul> <li>Excellent condition</li> <li>No spalling/cracks/ settlement/exposed footing at US and DS of culvert</li> <li>Heavy vegetation at D/S of culvert</li> <li>Standing water inside and U/S and D/S of culvert</li> <li>Sediment at D/S of culvert</li> </ul>
C05-EX	N/S-W Ramp	-	762	26.94	Pipe Culvert	Corrugated Steel	$NW \rightarrow SE$	-
C06-EX	E-N/S Ramp	-	762	28.62	Pipe Culvert	Corrugated Steel	SW → NE	-
C07-EX	W-N/S Ramp & N/S-E Ramp		1372	47.93	Pipe Culvert	Corrugated Steel	$N \to S$	<ul> <li>Good condition</li> <li>Minor spalling/cracks at US and DS of culvert</li> <li>Medium to heavy vegetation at culvert opening</li> <li>No Water</li> <li>No sediment</li> </ul>

## 4. Needs Assessment

A review of existing and future transportation and infrastructure conditions was undertaken for the Highway 401 interchange at County Road 41 and adjacent segments of Highway 401 (i.e. problems and opportunities). The review included consideration of structural requirements, existing and future traffic operations, geometric conditions and deficiencies, collision history, and drainage concerns. Opportunities to address the existing and future transportation and infrastructure needs were subsequently identified.

The following sections summarize the identified transportation problems and needs within the study area, along with opportunities to address these issues, and to provide a reference point for the generation and assessment of alternatives.

## 4.1 Problems

#### Structural

A structural evaluation of the existing structures was carried out in accordance with the *Canadian Highway Bridge Design Code* (CHBDC), CAN/CSA S6-14 and the MTO Structural Manual. Based on the structural evaluation the following was determined:

- Major rehabilitation of the Highway 401 bridge over County Road 41 and Highway 401 bridge over Selby/Sucker Creek are anticipated within the shortterm (5 years). Traffic across the existing structures cannot be accommodated during these rehabilitations without significant modifications and/or Highway 401 lane or ramp closures.
- Full replacement of the Highway 401 bridge over County Road 41 and of the original segment of the Selby/Sucker Creek bridge is anticipated within the planning horizon (20 to 25 years) of this study.

#### Traffic Operations and Geometrics

As outlined in **Section 3.4.3**, a traffic operational analysis for the Highway 401 interchange at County Road 41 was undertaken which included a review of existing traffic operations at the interchange, an assessment of estimated traffic growth and expected future traffic volumes, analysis of projected future traffic operations based on maintaining the existing road network and the identification of potential operational deficiencies associated with the future traffic growth. The following problems were identified:

- Existing traffic LOS (e.g. vehicle delay) operations at the interchange are generally considered acceptable (overall LOS 'C' or better), however left-turning traffic along County Road 41 to Highway 401 results in some queueing and delay to through traffic given the absence of dedicated left-turn lanes. A dedicated northbound left-turn lane to westbound Highway 401 is warranted.
- Future increases in traffic volumes will lead to increased delay and deterioration in operations (overall LOS 'D' or better), and will further exacerbate the existing geometric deficiencies and collision risks at the interchange.
- A number of collision-prone areas and locations with undesirable geometric elements were identified (refer to **Figure 12**). These elements pose a potential

safety and operational concern at the interchange, which may lead to further increased collision risk as traffic volumes increase over time. The most notable geometric and operational concerns include:

- Sight distance to the eastbound and westbound off-ramp bullnose which is restricted by the vertical crest curve over Highway 401 and the location of the ramps past the structure;
- Length of the eastbound on-ramp speed change lane and adjacent profile of Highway, which slows down the acceleration of trucks entering the highway;
- Horizontal curvature which is considered undesirable along four of five interchange ramps; and,
- The absence of dedicated left-turn lanes along County Road 41 for access to Highway 401 (northbound and southbound).
- Elevated or higher than anticipated collision records were identified along Highway 401 in the eastbound and westbound directions, directly west of County Road 41.
- The queue length along Highway 401 that would be anticipated with a reduction to a single lane during a bridge rehabilitation (without improvements to the road network or new bridge construction) would extend between 9.3 km (fall) to 12.7 km (summer) in the eastbound direction. In the westbound direction of Highway 401, the anticipated queue would extend between 6.6 km (fall) to nearly 20 km (summer). In addition, the structural rehabilitation would require temporary closure of the westbound to southbound off-ramp, with conversion of the westbound to northbound off-ramp to provide access to both northbound and southbound County Road 41. Closure of both the eastbound off-ramp and on-ramp would also be required, requiring detours of between 7.5 km and 7.8 km via the local road network.

### Highway 401 Median and Drainage

Based on an assessment of the existing drainage and hydrology, the following problems were determined:

- Temporary concrete barrier of varying type and size is presently provided along the centerline of Highway 401 through the Study Area. This barrier type is not desirable for this type of highway facility, and the variation in barrier type leads to maintenance challenges.
- The existing median drainage system is not functioning properly and is in need or upgrade or replacement.

# 4.2 Opportunities

Based on the problems identified in **Section 4.1**, the following opportunities were determined:

 Development of a strategy to address both the short-term and long-term structural rehabilitation needs at the Highway 401 bridge over County Road 41 and the Highway 401 bridge over Selby/Sucker Creek is required.

- Improvements of interchange geometrics would assist to reduce collision risks, improve overall safety at the interchange, and provide for good overall traffic operations along Highway 401, County Road 41 and at the interchange into the future;
- Development of an ultimate plan for the County Road 41 interchange is necessary to provide for efficient and cost-effective implementation of the structural rehabilitation or replacement works and minimize future throwaway. A staged approach towards implementing the ultimate interchange plan can be developed that would allow for construction of interim improvements that both improve traffic operations and safety and facilitate the structural rehabilitation requirements; and,
- Upgrades or replacement of the existing Highway 401 median barrier and storm sewer system would address the existing drainage concerns along the corridor. Full re-construction of the median will likely be required to facilitate rehabilitation of the Highway 401 bridge over County Road 41 and Highway 401 bridge over Selby/Sucker Creek, and improvements to the existing drainage system can be implemented concurrent with those staging works.



Figure 12: Transportation Issues at the Interchange

# 5. Generation, Assessment and Evaluation of Interchange Improvement Alternatives

Following the identification of problems and opportunities associated with the Project, the Project Team developed and assessed broad-based alternatives to address the identified transportation needs. Once the preferred solution was determined, alternatives to address the operational challenges associated with the interchange and to accommodate both the short-term and long-term structural rehabilitation or replacement requirements were developed. Alternatives were developed and assessed separately for the north and south sides of the interchange.

First, a "long-list" of alternatives was developed and presented at PIC #1. The long list was subjected to a screening-level qualitative assessment, which led to the identification of a "short-list" of alternatives. The alternatives were then evaluated based on the set of criteria (listed in **Section 5.3**) using a weighted score arithmetic evaluation system to select the Technically Preferred Preliminary Design Alternative.

# 5.1 Alternatives to the Undertaking

Alternatives to the Undertaking are broad-based alternatives that represent functionally different ways of addressing the identified transportation needs. As described below, the Project Team considered a range of Alternatives to the Undertaking, as well as the "Do Nothing" alternative, which was used as a baseline for comparison purposes:

- Do nothing;
- Structural improvements; and,
- Improvements to the Highway 401 and County Road 41 Interchange (including improvements to the structure).

The do nothing alternative does not address the existing structural needs (e.g. the existing structures cannot accommodate the necessary structural works without long-term lane closures or staging impacts along Highway 401) and future structural needs (e.g. full replacement of the County Road 41 structure is anticipated within the planning horizon of the study).

The structural improvements alternative addresses the short term rehabilitation requirements of the County Road 41 bridge and the full replacement of the bridge (anticipated to take place within the 20-25 year planning horizon of this study). However it does not address the undesirable geometric elements or collision-prone areas that have been identified as part of this study (i.e. poor sight distance to the eastbound and westbound off-ramps, tight horizontal curvature along four or five interchange ramps, etc.). As such this alternative may be considered along with other alternatives.

Improvements to the Highway 401 interchange at County Road 41 have the potential to resolve the majority of the main structural, operational and geometric deficiencies at the interchange.

After careful consideration, it was determined that improvements to the Highway 401 interchange at County Road 41 was the preferred solution to be carried forward.

# 5.2 Long List of Alternatives

A long list of interchange alternatives was developed and subjected to a screening-level qualitative assessment based on the following technical and environmental criteria:

- Construction staging;
- Traffic operations, including geometrics and safety;
- Structural requirements
- Construction cost
- Socio-economic impacts;
- Natural environment impacts; and
- Cultural heritage impacts.

The long list of interchange alternatives are illustrated in **Appendix B**, and included a "do-nothing" alternative along with 7 alternatives for the north half of the interchange and 5 alternatives for the south half of the interchange. The "do nothing" alternative was considered in order to provide a baseline against which of the effects of other alternatives could be compared. The "do nothing" alternative involved no change to the existing interchange ramps and would include a rehabilitation or replacement of the existing Highway 401 bridge over County Road 41 and a rehabilitation of the existing Highway 401 bridge over Selby/Sucker Creek. The 'do nothing' alternative to the Project does not address the problems and opportunities identified in **Section 4**, and was therefore not considered as a feasible alternative.

The following sections describe the north and south alternatives that were considered.

# 5.2.1 North Side of the Interchange

The following alternatives for the north side of the Highway 401 interchange at County Road 41 were considered:

- Alternative N-1: Parclo A2 and Rehabilitation / Replacement of Existing Structures:
  - Construction new inner loop on-ramp (northbound County Road 41 to westbound Highway 401);
  - Construct new directional on-ramp (southbound County Road 41 to westbound Highway 401);
  - Close existing westbound on-ramp and inner loop off-ramp; and,
  - Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 structure over Selby/Sucker Creek.
- Alternative N-2: Parclo A1 with Southbound Left Turn and Rehabilitation / Replacement of Existing Structures:

- Construct new inner loop on-ramp (northbound County Road 41 to westbound Highway 401);
- Provide southbound left-turn to westbound inner loop on-ramp;
- Close existing westbound on-ramp and inner loop off-ramp; and,
- Rehabilitate / replace the existing county Road 41 structure at the existing location and rehabilitation the Highway 401 structure over Selby/Sucker Creek.
- Alternative N-3: Diamond with Existing Westbound Off-Ramp and Rehabilitation / Replacement of Existing Structures:
  - Construct a new westbound diamond on-ramp intersecting County Road
     41 opposite of the existing westbound off-ramp (north leg);
  - Provide a northbound left-turn to westbound on-ramp;
  - Close the existing westbound on-ramp and inner loop off-ramp; and,
  - Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.
- Alternative N-4: Tight Diamond and Rehabilitation / Replacement of Existing Structures:
  - Reconstruct the existing westbound off-ramp to intersect with County Road 41 opposite of the existing westbound on-ramp;
  - Provide a northbound left-turn to the westbound on-ramp;
  - Partially re-align the existing westbound on-ramp;
  - Close the existing westbound on-ramp and inner loop off-ramp; and,
  - Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.
- Alternative N-5: Parclo A1 with Roundabout and Rehabilitation / Replacement of Existing Structures:
  - Construct a new roundabout at the westbound off-ramp (north leg);
  - Construct a new inner loop on-ramp from the roundabout (to westbound Highway 401);
  - Close the existing westbound on-ramp and inner loop off-ramp; and.
  - Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/ Sucker Creek.
- Alternative N-6: Diamond with Existing Westbound Off-Ramp and Roundabout and Rehabilitation / Replacement of Existing Structures:

- Construct a new roundabout at the westbound off-ramp (north leg);
- Construct a new directional on-ramp from the roundabout (to westbound Highway 401);
- Close the existing westbound on-ramp and inner loop off-ramp; and,
- Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.
- Alternative N-7: Tight Diamond with Roundabout and Rehabilitation / Replacement of Existing Structures:
  - Re-construct the existing westbound off-ramp to connect with County Road 41 opposite of the existing westbound on-ramp;
  - Construct a new roundabout a the ramp terminal intersection;
  - Construct a new directional on-ramp from the roundabout (to westbound Highway 401);
  - Close the existing westbound on-ramp and inner loop off-ramp; and,
  - Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.

Of the long-list of alternatives, 2 north alternatives (Alternatives N-4 and N-7) were screened out and not carried forward for further analysis. The full long-list alternative screening summary can be found in **Appendix C**. The alternatives that were carried forward are further described in **Section 5.3** under the Short List of Alternatives.

# 5.2.2 South Side of the Interchange

The following alternatives for the south side of the Highway 401 interchange at County Road 41 were considered:

- Alternative S-1: Parclo A2 and Rehabilitate / Replace the Existing Structures:
  - Construct a new eastbound off-ramp intersecting County Road 41 south of the existing eastbound on-ramp;
  - Construct a new inner loop on-ramp (southbound of County Road 41 to eastbound Highway 401);
  - Construct a new directional on-ramp (northbound County Road 41 to eastbound Highway 401);
  - Close the existing eastbound on-ramp and inner loop off-ramp;
  - Rehabilitate / replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek; and.

- Construct a new or widened structure at Highway 401 over Selby/Sucker Creek for the eastbound on-ramp.
- Alternative S-2: Parclo A1 with a Northbound Left-Turn and Rehabilitation / Replacement of the Existing Structures:
  - Construct a new eastbound off-ramp intersecting County Road 41 south of the existing eastbound on-ramp;
  - Construct a new inner loop on-ramp (southbound County Road 41 to eastbound Highway 401);
  - Provide a northbound left-turn to eastbound inner loop on-ramp;
  - Close the existing eastbound on-ramp and inner loop off-ramp; and,
  - Rehabilitate or replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.
- Alternative S-3: Diamond and Rehabilitation / Replacement of Existing Structures:
  - Construct a new eastbound diamond off-ramp intersecting County Road
     41 opposite of the existing eastbound on-ramp;
  - Provide a southbound left-turn to the eastbound on-ramp;
  - Close the existing eastbound on-ramp and inner loop off-ramp; and,
  - Rehabilitate or replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.
- Alternative S-4: Parclo A1 with Roundabout and Rehabilitation / Replacement of Existing Structures:
  - Construct a new eastbound off-ramp intersecting County Road 41 south of the existing eastbound on-ramp;
  - Construct a new roundabout at the eastbound off-ramp;
  - Construct a new inner loop on-ramp from the roundabout (to the eastbound Highway 401);
  - Close the existing eastbound on-ramp and the inner loop off-ramp; and,
  - Rehabilitate or replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.
- Alternative S-5: Diamond with Roundabout and Rehabilitation / Replacement of Existing Structures:

- Construct a new eastbound diamond off-ramp intersecting County Road
   41 opposite the existing eastbound on-ramp;
- Construct a new roundabout at the eastbound off-ramp;
- Construct a new directional on-ramp from the roundabout (to westbound Highway 401);
- Close the existing eastbound on-ramp and inner loop off-ramp; and,
- Rehabilitate or replace the existing County Road 41 structure at the existing location and rehabilitate the Highway 401 bridge over Selby/Sucker Creek.

Of the long-list of alternatives, all alternatives were carried forward for further analysis. The full long-list alternative screening summary can be found in **Appendix C**. The alternatives that were carried forward are further described in **Section 5.3** under the Short List of Alternatives

## 5.3 Short List of Alternatives

The short list of interchange alternatives that were carried were evaluated based on the set of criteria provided in **Table 9**. The short-list alternatives are available in **Appendix D**.

A weighted score arithmetic evaluation system was used, which involves assigning relative weightings to each of the evaluation categories and criteria based on their level of importance. Criteria were measured either quantitatively or qualitatively, and then these scores were multiplied by a relative weight for that indicator. The weighted scores for each indicator were then summed to arrive at a total score for each alternative. The alternative that produced the highest total weighted score was preferred as it had the best balance of benefits and impacts to the natural, socio-economic, and cultural environmental, as well as transportation and cost considerations.

Table 9: Criteria for Evaluation of Alternatives

<b>Evaluation Component</b>	Category Weighting	Criteria
Transportation	60%	<ul><li>Interchange operations</li><li>Safety</li><li>Geometrics</li></ul>
Natural Environment	15%	<ul><li>Terrestrial ecosystems</li><li>Fish and fish habitat</li><li>Groundwater</li></ul>
Socio-Economic Environment	10%	<ul><li>Aesthetics</li><li>Noise</li><li>Community effects</li><li>Waste and contamination</li></ul>
Cultural Environment	5%	Archaeological resources

Evaluation Component	Category Weighting	Criteria
		Built heritage
Cost and Constructability	10%	Construction staging
		Construction cost
		Utility impacts

The following sections describe the alternatives that were carried forward and summarize the evaluation outcomes.

## 5.3.1 North Side of Interchange

#### 5.3.1.1 Alternative N-1: Parclo A2

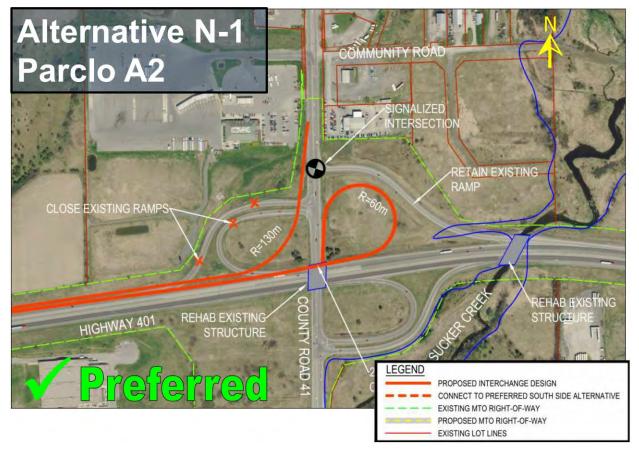
Alternative N-1 is described as a Parclo A2 configuration (refer to **Figure 13**). This alternative involves the following improvements:

- Construct a new inner loop on-ramp (northbound County Road 41 to westbound Highway 401);
- Construct a new directional on-ramp (southbound County Road 41 to westbound Highway 401);
- Close existing westbound on-ramp and inner loop off-ramp; and
- Rehabilitate/replace of existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural, socio-economic, and cultural environment perspective.

Alternative N-1 has the highest construction cost, however it provides the most desirable interchange configuration, associated level of service and operations including reduced collision risk.

Figure 13: Alternative N-1 Parclo A2



#### 5.3.1.2 Alternative N-2: Parclo A1

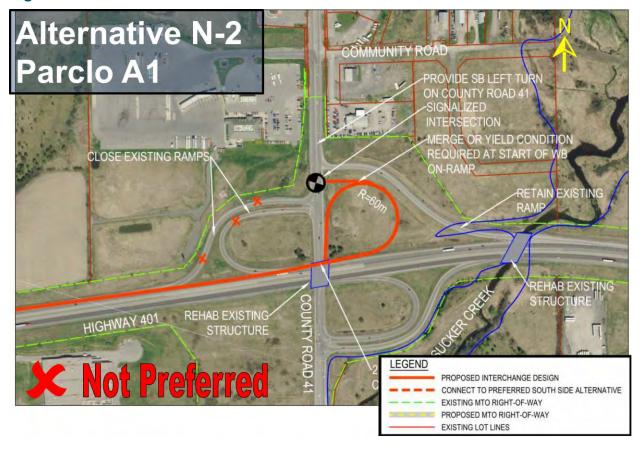
Alternative N-2 is described as a Parclo A1 configuration with a southbound left-turn onto County Road 41 (refer to **Figure 14**). This alternative involves the following improvements:

- Construct a new inner loop on-ramp (northbound County Road 41 to westbound Highway 401);
- Provide southbound left-turn to westbound inner loop on-ramp;
- Close existing westbound on-ramp and inner loop off-ramp; and
- Rehabilitate/replace existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural, socio-economic, and cultural environment perspective.

While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative N-1 and requires a southbound left-turn and merge along the westbound on-ramp, it is anticipated to result in acceptable operations and can be constructed with lower interchange footprint and at a lower overall construction cost.

Figure 14: Alternative N-2 Parclo A1



#### 5.3.1.3 Alternative N-3: Diamond

Alternative N-3 is described as a diamond configuration (refer to **Figure 15**) that maintains the existing westbound off-ramp. This alternative involves the following improvements:

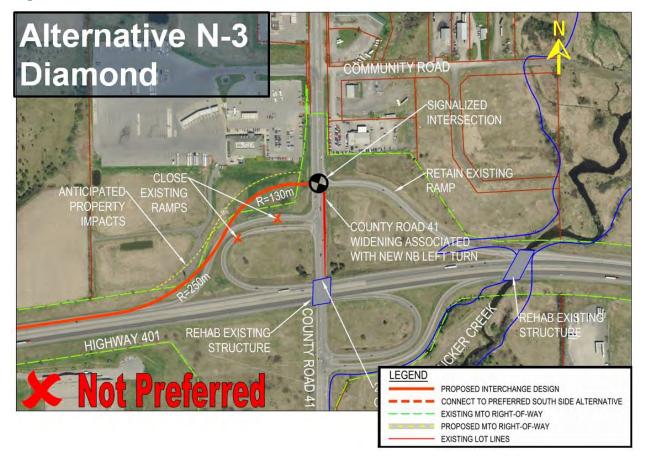
- Construct westbound diamond on-ramp intersecting County Road 41 opposite existing westbound off-ramp (north leg);
- Construct a new directional on-ramp (southbound County Road 41 to westbound Highway 401);
- Close existing westbound on-ramp and inner loop off-ramp; and
- Rehabilitate/replace of existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural and cultural environment perspective.

While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative N-1 and requires a northbound left-turn, it is anticipated to result in acceptable operations, removes the westbound speed change lane from the County Rd 41 structure, and can be constructed at a lower overall

construction cost. Further, a directional inner loop on-ramp can be provided in northeast quadrant of interchange at later date if required for traffic operations.

Figure 15: Alternative N-3 Diamond



#### 5.3.1.4 Alternative N-5: Parclo A1 with Roundabout

Alternative N-5 is described as a Parclo A1 configuration with a roundabout (refer to **Figure 16**). This alternative involves the following improvements:

- Construct new roundabout at westbound off-ramp (north leg);
- Construct new inner loop on-ramp from roundabout (to westbound Highway 401);
- Close existing westbound on-ramp and inner loop off-ramp; and
- Rehabilitate/replace of existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from natural and cultural environments.

While the alternative does not provide the same level of service or operational benefits as Alternative N-1 and requires a southbound left-movement to the westbound on-ramp, it is anticipated to result in acceptable operations and can be constructed with lower property footprint and at a lower overall construction cost.

Alternative N-5 MMUNITY ROAD Parclo A1 with **LEGEND** Roundabout PROPOSED INTERCHANGE DESIGN **EXISTING MTO RIGHT-OF-WAY** PROPOSED MTO RIGHT-OF-WAY **EXISTING LOT LINES** HISTORICAL FLOOD PLAIN 0 SIGNALIZED INTERSECTION ANTICIPATED-PROPERTY IMPACTS **CLOSE EXISTING** EHAB EXISTING HIGHWAY 401 REHAB EXISTING STRUCTUR STRUCTURE 2 m WIDENING REQUIRED FOR CONSTRUCTION STAGING

Figure 16: Alternative N-5 Parclo A1 with Roundabouts

#### 5.3.1.5 Alternative N-6: Diamond with Roundabout

Alternative N-6 is described as a diamond configuration with a roundabout and existing westbound off-ramp maintained (refer to **Figure 17**). This alternative involves the following improvements:

- Construct new roundabout at westbound off-ramp (north leg);
- Construct new directional on-ramp from roundabout (to westbound Highway 401);
- Close existing westbound on-ramp and inner loop off-ramp; and
- Rehabilitate/replace of existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural and cultural environment perspective.

While the alternative does not provide the same level of service or operational benefits as Alternative N-1 and requires a northbound left movement to the westbound on-ramp, it is anticipated to result in acceptable operations, removes the westbound speed change lane from the County Road 41 structure, and can be constructed at a lower overall construction cost.

**Alternative N-6** OMMUNITY ROAD Diamond with LEGEND Roundabout PROPOSED INTERCHANGE DESIGN EXISTING MTO RIGHT-OF-WAY PROPOSED MTO RIGHT-OF-WAY EXISTING LOT LINES HISTORICAL FLOOD PLAIN 0 SIGNALIZED INTERSECTION ANTICIPATED PROPERTY IMPACTS **CLOSE EXISTING** HAB EXISTING HIGHWAY 401 REHAB EXISTING STRUCTURE STRUCTURE m WIDENING REQUIRED FOR CONSTRUCTION STAGING

Figure 17: Alternative N-6 Diamond with Roundabout

## 5.3.2 South Side of Interchange

#### 5.3.2.1 Alternative S-1: Parclo A2

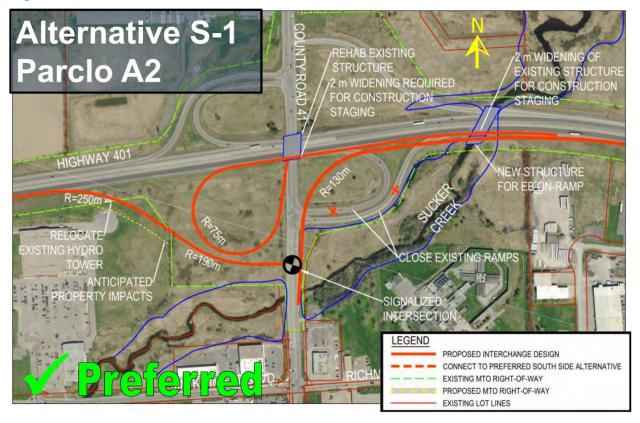
Alternative S-1 is described as a Parclo A2 configuration (refer to **Figure 18**). This alternative involves the following improvements:

- Rehabilitate/replace existing County Road 41 structure and rehab Highway 401/Sucker Creek structure;
- Eastbound inner loop on-ramp speed change lane to be located on County Road
   41 structure; and
- New or widened structure at Highway 401/Sucker Creek required for eastbound on-ramp.

This alternative is preferred or equally preferred from a natural, socio-economic, and cultural environment perspective.

Alternative has highest construction cost, however it also provides the most desirable interchange configuration, associated level of service and operations including reduced collision risk.

Figure 18: Alternative S-1 Parclo A2



#### 5.3.2.2 Alternative S-2: Parclo A1

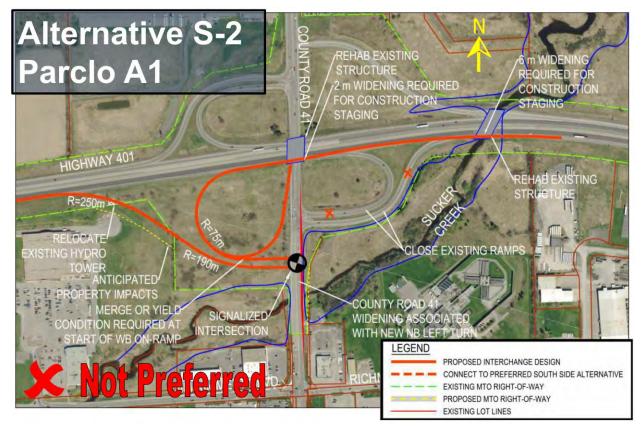
Alternative S-2 is described as a Parclo A1 configuration with a northbound left-turn onto County Road 41 (refer to **Figure 19**). This alternative involves the following improvements:

- Rehabilitate/replace existing County Road 41 structure and rehab Highway 401/Sucker Creek structure; and
- Eastbound inner loop on-ramp speed change lane to be located on County Road
   41 structure.

This alternative is preferred or equally preferred from a natural and cultural environment perspective.

While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative S-1 and requires a northbound left-turn and merge along the eastbound on-ramp, it is anticipated to result in acceptable operations and can be constructed with a lower footprint and at a lower overall construction cost.

Figure 19: Alternative S-2 Parclo A1



#### 5.3.2.3 Alternative S-3: Diamond

Alternative S-3 is described as a diamond configuration (refer to **Figure 20**). This alternative involves the following improvements:

- Construct new eastbound diamond off-ramp intersecting County Road 41 opposite existing eastbound on-ramp;
- Provide southbound left-turn to eastbound on-ramp;
- Close existing eastbound on-ramp and inner loop off-ramp; and,
- Rehabilitate/replace existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural and cultural environment perspective.

While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative S-1 and requires a southbound left-turn, it is anticipated to result in acceptable operations, removes the eastbound speed change lane from the County Rd 41 structure, has a lower interchange footprint and can be constructed at a lower overall construction cost.

Figure 20: Alternative S-3 Diamond



#### 5.3.2.4 Alternative S-4: Parclo A1 with Roundabout

Alternative S-4 is described as a Parclo A1 configuration with a roundabout (refer to **Figure 21**). This alternative involves the following improvements:

- Construct new eastbound off-ramp intersecting County Road 41 south of existing eastbound on-ramp;
- Construct new roundabout at eastbound off-ramp;
- Construct new inner loop on-ramp from roundabout (to eastbound Highway 401);
- Close existing eastbound on-ramp and inner loop off-ramp; and,
- Rehabilitate/replace existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural and cultural environment perspective.

While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative S-1 and requires a northbound left movement to the eastbound on-ramp, it is anticipated to result in acceptable operations and can be constructed with a lower interchange footprint and at a lower overall construction cost.

**Alternative S-4** REHAB EXISTING STRUCTURE Parclo A1 with 2 m WIDENING REQUIRED CONSTRUCTION OR CONSTRUCTION Roundabout HIGHWAY 401 REHAB EXISTING R=250m ISTING HYDRO ANTICIPATED IN S OF INTERCHANGE SCRIBED D = 55r PROPOSED INTERCHANGE DESIGN EXISTING MTO RIGHT-OF-WAY PROPOSED MTO RIGHT-OF-WAY EXISTING LOT LINES HISTORICAL FLOOD PLAIN SIGNALIZED INTERSECTION

Figure 21: Alternative S-4 Parclo A1 with Roundabout

#### 5.3.2.5 Alternative S-5: Diamond with Roundabout

Alternative S-5 is described as a diamond configuration with a roundabout (refer to **Figure 22**). This alternative involves the following improvements:

- Construct new eastbound diamond off-ramp intersecting County Road 41 opposite existing eastbound on-ramp;
- Construct new roundabout at eastbound off-ramp;
- Construct new directional on-ramp from roundabout (to westbound Highway 401);
- Close existing eastbound on-ramp and inner loop off-ramp; and,
- Rehabilitate/replace existing County Road 41 structure at existing location and rehab Highway 401/Sucker Creek structure.

This alternative is preferred or equally preferred from a natural and cultural environment perspective.

While the alternative is not anticipated to the same level of service or operational benefits as Alternative S-1 and requires a southbound left-movement to the eastbound on-ramp, it is anticipated to result in acceptable operations, removes the eastbound speed change lane from the County Road 41 structure, has a lower interchange footprint and can be constructed at a lower overall construction cost.

Alternative S-5 8 REHAB EXISTING Diamond with STRUCTURE 2 m WIDENING REQUIRED CONSTRUCTIO FOR CONSTRUCTION Roundabout HIGHWAY 401 R=340m CLOSE EXISTING RAMPS **LEGEND** PROPOSED INTERCHANGE DESIGN EXISTING MTO RIGHT-OF-WAY PROPOSED MTO RIGHT-OF-WAY HMOND BLVD EXISTING LOT LINES HISTORICAL FLOOD PLAIN SIGNALIZED INTERSECTION

Figure 22: Alternative S-5 Diamond with Roundabout

# 5.4 Summary of Evaluation

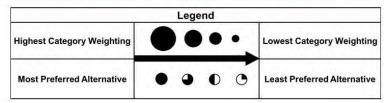
Based on the evaluations of alternatives on both sides of the interchange, the Technically Preferred Preliminary Design Alternatives for the ultimate interchange are Alternatives N-1: Parclo A2 on the north side and Alternative S-1: Parclo A2 on the south side. These alternatives were selected for the following reasons:

- Most desirable configurations from a Transportation perspective with no left-turns required (directional movements for all maneuvers);
- Highest construction cost and slightly greater Environmental impacts on south side, however the short and long-term operational and safety benefits of these configurations are considered to outweigh these impacts.

The results of the evaluation are provided in **Tables 10** and **11**, and detailed evaluation tables are available in **Appendix E**.

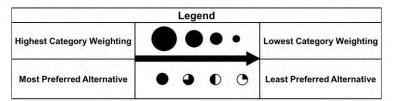
**Table 10: North Side Evaluation** 

Factor	Alternative N-1 Parclo A2	Alternative N-2 Parclo A1	Alternative N-3 Diamond	Alternative N-4 Parclo A1 with Roundabout	Alternative N-5 Diamond with Roundabout
Transportation		0	•	0	•
Natural Environment	•	•	•	•	•
Socio-Economic Environment	•	•	•	•	•
Cultural Environment	•	•	•	•	•
Cost	•	•	•	•	•
Recommendation	<b>✓</b>	×	×	×	×



**Table 11: South Side Evaluation** 

Factor	Alternative S-1 Parclo A2	Alternative S-2 Parclo A1	Alternative S-3 Diamond	Alternative S-4 Parclo A1 with Roundabout	Alternative S-5 Diamond with Roundabout
Transportation		•			•
Natural Environment	•	•	•	•	•
Socio-Economic Environment	•	•	•	•	•
Cultural Environment	•	•	•	•	•
Cost	0	•	•	•	•
Recommendation	1	×	×	×	x



## 5.5 Storm Sewer Alternatives

Alternatives for the Highway 401 median sewer system were assessed in order to address the identified concerns with the existing system, including the following options:

- Cleaning and flushing of the entire system;
- Replacement of sewers with capacity issues;
- Relocating catchbasins located in the median and blocked by the existing median barrier;
- Re-grading of ditches to provide positive drainage at sewer outfalls.

The existing median consists of temporary concrete barrier of varying type and size, and upgrade to tall wall median barrier is recommended for this type of highway facility. The variation in barrier type and location of existing catchbasins within gaps in the median pose significant maintenance challenges. In addition, some segments of the existing system are over capacity, and a potential future widening of Highway 401 to 6-lanes will intensify these concerns. Finally, it is noted that a portion of the existing median in the west segment of the study area, through the Highway 401 interchange at County Road 41 and across Selby/Sucker Creek, will require partial re-construction for construction staging purposes for the interchange and bridge works. Given these concerns, it may not be possible to make the current system operational again with full capacity. As such, it was agreed that the existing median sewer system should be replaced in conjunction with the proposed median reconstruction works. The median sewer replacement would extend from west of the County Road 41 interchange easterly towards the Napanee River.

# 6. The Recommended Plan

The following sections summarize the proposed improvements to the Highway 401 interchange at County Road 41 and within the project limits, including the recommendations for the short-term and long-term improvements. The Technically Preferred Preliminary Design Alternative for the short-term improvements along the corridor is illustrated below in **Figure 23** and in the Preliminary Design plates provided in **Appendix A**. Additional details regarding the recommended improvements and rehabilitation needs are provided in the various technical reports prepared as part of this study, under separate cover.

# 6.1 Technically Preferred Interchange Configuration

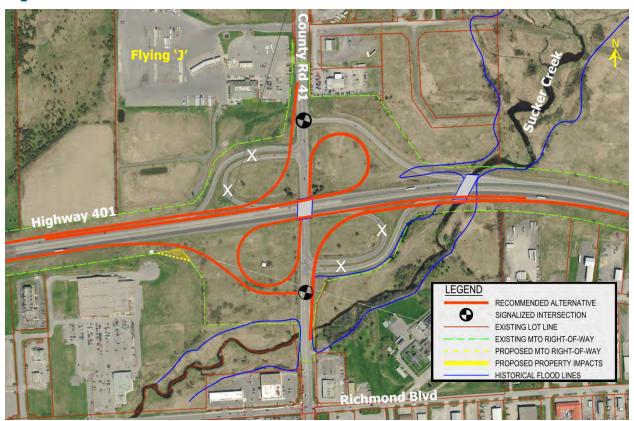
The short-term construction works at the Highway 401 interchange at County Road 41 will include major bridge rehabilitation of the Highway 401 bridge over County Road 41 and Highway 401 bridge over Selby/Sucker Creek. In conjunction with the bridge works, the interchange will be upgraded to the ultimate "Parclo A4" configuration, as identified as Alternative N-1 (Parclo A2) and S-1 (Parclo A2) in the Short-List Alternative Evaluation (Section 5.3). The recommended interchange configuration is illustrated in Figure 23 and in the preliminary design plates in Appendix A. The recommended interchange improvements include the following:

- Replacement of the existing westbound on-ramp and inner loop off-ramp with a new directional on-ramp (southbound County Road 41 to eastbound Highway 401) and inner loop on-ramp (northbound County Road 41 to westbound Highway 401);
- Replacement of the existing eastbound on and off-ramps with a new directional on-ramp (northbound County Road 41 to eastbound Highway 401), inner loop on-ramp (southbound County Road 41 to eastbound Highway 401), and new eastbound off-ramp.

Prepared for: Ontario Ministry of Transportation G.W.P. 4459-04-00

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Figure 23: Recommended Plan



County Road 41 is a four-lane road with a design speed of 70 km/h and designated as 'Rural Arterial (County)' according to the *County of Lennox and Addington Official Plan* (2015). No notable changes to the through lanes of County Road 41 are included as part of the Recommended Plan, and the existing cross-section will remain unchanged with lane widths of 3.5 m (median lane) and 3.75 m (curb lane). In order to accommodate construction of the new inner loop ramps across the existing structure, a localized reduction in the Highway 401 median shoulders from 4.75 m to 2.0 m will be required until the County Road 41 structure is replaced at a later date.

As discussed in **Section 4.1**, there are a number of geometric concerns associated with the existing interchange that will be improved by the Recommended Plan. In particular, the horizontal curvature and configuration of a number of the existing ramps are less than desirable and will be improved. The proposed modifications to the horizontal curvature are summarized in **Table 12**.

Table 12: Horizontal Curvature Modifications

Ramp	Radius of Critical Curvature (m)	Equivalent Design Speed of Curve (km/h)
Existing Interchange Configuration		
Ramp N/S-E (Eastbound On-Ramp)	80	40
Ramp W-N/S (Eastbound Off-Ramp)	40	<40
Ramp N/S-W (Westbound On-Ramp)	75	40

Ramp	Radius of Critical Curvature (m)	Equivalent Design Speed of Curve (km/h)
Ramp E-S (Westbound to Southbound Off-Ramp)	40	<40
Ramp E-N (Westbound to Northbound Off-Ramp)	190	70
Proposed Interchange Configuration		
Ramp N-E (Southbound to Eastbound On-Ramp)	60	40
Ramp S-E (Northbound to Eastbound On-Ramp)	170	60
Ramp W-N/S (Eastbound Off-Ramp)	200	70
Ramp N-W (Southbound to Westbound On-Ramp)	130	60
Ramp S-W (Northbound to Westbound On-Ramp)	60	40
Ramp E-N/S (Westbound Off-Ramp) (no change)	190	70

The Recommended Plan will also include improvements to the existing speed change lane lengths and sight distance along Highway 401 to meet the requirements for the 120 km/h design speed of Highway 401, improving safety conditions along Highway 401 for vehicles entering and exiting the freeway. Existing sight distances along Highway 401 to either the end of the speed change lane (for vehicles entering the highway) or to an exit ramp (for vehicles exiting the highway) are presently considered substandard in some locations. This is due to the proximity of the ramps with the vertical curve over County Road 41, and the Highway 401 horizontal curvature east of County Road 41. The existing and proposed speed change lane lengths along Highway 401 and sight distance for each ramp are summarized in **Table 13**.

**Table 13: Speed Change Lane Length Modifications** 

	Speed Ch	nange Lane	Sight Distance to Exit Bullnose / End of Speed Change Lane			
Ramp	Length of Speed Change Lane (m)	Equivalent Design Speed (km/h)	Sight Distance (m)	Equivalent Design Speed (km/h)		
Existing Interchange Configuration						
Ramp N/S-E (Eastbound On-Ramp)	410	110	270	90		
Ramp W-N/S (Eastbound Off-Ramp)	350	120	160	<60		
Ramp N/S-W (Westbound On-Ramp)	560	120	>470	120		
Ramp E-S (Westbound to Southbound Off-Ramp)	340	120	195	60		
Ramp E-N (Westbound to Northbound Off-Ramp)	345	120	>470	120		
Proposed Interchange Configuration						
Ramp N-E (Southbound to Eastbound On-Ramp)	500	120	>470	120		

	Speed Ch	nange Lane	Sight Distance to Exit Bullnose / End of Speed Change Lane		
Ramp	Length of Speed Change Lane (m)	Equivalent Design Speed (km/h)	Sight Distance (m)	Equivalent Design Speed (km/h)	
Ramp S-E (Northbound to Eastbound On-Ramp)	850	120	370	120	
Ramp W-N/S (Eastbound Off-Ramp)	345	120	>470	120	
Ramp N-W (Southbound to Westbound On-Ramp)	500	120	>470	120	
Ramp S-W (Northbound to Westbound On-Ramp)	500	120	370	120	
Ramp E-N/S (Eastbound Off-Ramp)	345	120	>470	120	

## 6.2 Structures

## 6.2.1 County Road 41

#### Short-Term Rehabilitation

The proposed short-term (1-5 years) rehabilitation of the County Road 41 Overpass consists of repairing deteriorated concrete on the deck and patch repairing the barrier walls. New asphalt and waterproofing system will be placed over the repaired deck surface. As noted above, the median shoulders across the structure will be reduced from 4.75 m to 2.0 m as part of these works to accommodate construction of the new inner loop on-ramps. A preliminary General Arrangement drawing for the short-term structural rehabilitation is provided in **Figure 24.** 

#### Long-Term Replacement

Given the age and condition of the structure and the anticipated lifespan of the proposed rehabilitation works, it is estimated that replacement of the County Road 41 overpass may be required in approximately 25 years. This long-term bridge replacement will be constructed to accommodate the Highway 401 ultimate cross-section. Should the bridge be replaced prior to widening Highway 401 to 6-lanes, an interim configuration with 4.75 m inside shoulders will be provided. It is anticipated that a future widening to 6-lanes at this location would be accommodated by widening primarily to the outside, with a reduction in the overall median width from approximately 10 m to 7.5 m. This configuration is illustrated in **Figure 25**, and will be confirmed as part of a future study.

The recommended structure replacement consists of twin precast concrete box girder structures with a 20 m span. Each bridge consists of 18 side-by-side precast prestressed B700 concrete box girders supporting a 21.96 m wide and 150 mm-thick reinforced concrete topping slab with new 90 mm waterproofing and paving. It is estimated that 29 weeks, within two construction seasons will be required to construct

the replacement bridge, including removing the existing structure. A preliminary General Arrangement drawing for the future replacement structure is provided in **Figure 25.** 

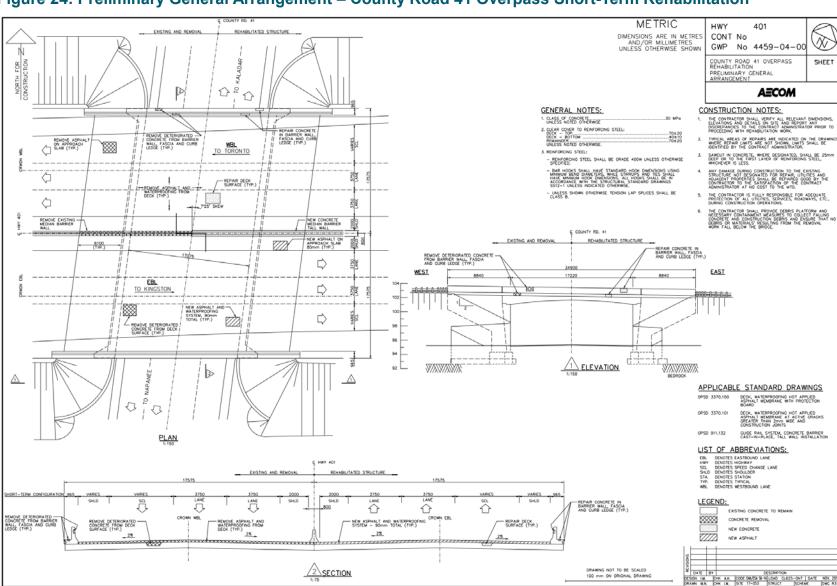


Figure 24: Preliminary General Arrangement – County Road 41 Overpass Short-Term Rehabilitation

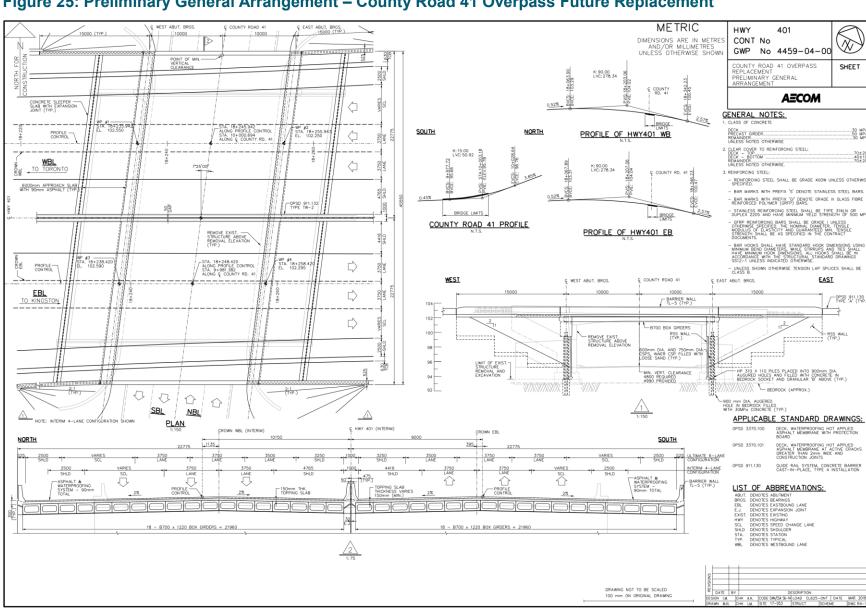


Figure 25: Preliminary General Arrangement – County Road 41 Overpass Future Replacement

## 6.2.2 Sucker / Selby Creek

#### Short-Term Rehabilitation

The proposed short-term (1-5 years) rehabilitation strategy of the Sucker Creek Bridge consists of repairing the original portion of the deck, installing new waterproofing and asphalt paving, and widening the structure on the south side to accommodate the construction of a new eastbound on-ramp. The bridge will be widened retaining the existing one span arrangement. The concrete rigid frame with precast deck units and reinforced concrete topping slab is recommended for widening with a clear span length of 13.4 m measured between the front face of abutments. The widened bridge will accommodate a future widening of Highway 401 to 6-lanes. No notable works are required for the north portion of the bridge, which was constructed in 2004 to accommodate the new westbound off-ramp and future widening of Highway 401. A preliminary General Arrangement drawing for the short-term structural rehabilitation and south side widening is provided in **Figure 26.** 

## Long-Term Replacement

Given its age and condition, replacement of the middle (original) segment of the structure at Sucker Creek is recommended in approximately 20-25 years. The recommended preferred structure replacement is a single span reinforced concrete rigid frame with precast deck units and a reinforced concrete topping slab. The bridge will have a clear span length of 13.4 m measured between the front face of abutments. A preliminary General Arrangement drawing for the future replacement structure is provided in **Figure 27**.

**METRIC** GENERAL NOTES: HWY 401 CLASS OF CONCRETE: DIMENSIONS ARE IN METRES 0808 OSAV81 CONT No A COLOR W AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN GWP 4459-04-00 UNLESS NOTED OTHERWISE 2. CLEAR COVER TO REINFORCING STEEL: SHEET PRELIMINARY GENERAL ARRANGEMENT PRECAST DECK - TOP....... PRECAST DECK - BOTTOM 2 UNLESS NOTED OTHERWIS **AECOM** 3. REINFORCING STEEL -REINFORCING STEEL SHALL BE GRADE 400W UNLESS OTHERWISE SPECIFIED. CONSTRUCTION NOTES: THE CONTRACTOR SHALL VERIFY ALL RELEVANT DIMENSIONS, ELEVATIONS AND DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR PRIOR TO PROCEEDING WITH REHABILITATION WORK. -BAR MARKS WITH PREFIX 'S' DENOTE STAINLESS STEEL BARS. TYPICAL AREAS OF REPAIRS ARE INDICATED ON THE DRAWINGS WHERE REPAIR LIMITS ARE NOT SHOWN, LIMITS SHALL BE IDENTIFIED BY THE CONTRACT ADMINISTRATOR. -UNLESS SHOWN OTHERWISE TENSION LAP SPLICES SHALL BE CLASS B. SAWCUT IN CONCRETE, WHERE DESIGNATED, SHALL BE 25mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS. **X** PROTECTION SYSTEM SHALL MEET REQUIREMENTS FOR PERFORMANCE LEVEL 2. EXACT LIMITS AND LOCATION SHALL BE DETERMINED BY THE CONTRACTOR. ANY DAMAGE DURING CONSTRUCTION TO THE EXISTING STRUCTURE NOT DESIGNATED FOR REPAIR, UTILITIES AND ADJACENT PROPERTIES SHALL BE REPAIRED GOOD BY THE CONTRACTOR TO THE SATISFACTION OF THE CONTRACT ADMINISTRATION AND AT NO COST TO THE OWNER. APPLICABLE STANDARD DRAWINGS: QUIDE RAIL SYSTEM, CONCRETE BARRIER
CAST-IN-PLACE, TYPE "A"INSTALLATION
QUIDE RAIL SYSTEM, CONCRETE BARRIER
CAST-IN-PLACE, TALL WALL INSTALLATION
WALLS ABUTMENT, BACKFILL MINIMUM GRANULAR
REQUIREMENT. OPSD 911.130 OPSD 3101.150 REQUIREMENT
DECK, WAITERPROOFING HOT APPLED
ASPHALT MEMBRANE WITH PROTECTION BOARD
DECK, WAITERPROOFING HOT APPLED
ASPHALT MEMBRANE AT ACTIVE CRACKS
GREATER HANA Zern WIDE AND
CONSTRUCTION JOINTS
BARRIERS AND RALINGS, STEEL GUIDE RAIL
AND CHANNEL ANCHORAGE BRIDGE LIMITS OPSD 3370.100 THE CONTRACTOR SHALL PROVIDE DEBRIS PLATFORMS AND NECESSARY CONTAINMENT MEASURES TO ENSURE THAT NO DEBRIS OR MATERIALS, RESULTING FROM THE REMOVAL WORK FALL INTO THE CREEK. S-E RAMP PROFILE OPSD 3419,100 EBL WEST EAST S-E RAMP PROFILE CONTROL - EXIST, GROUND FROM CONT. No. 2004-4016 DRAWINGS, JULY 2004 <u>PLAN</u> € HWY 401 SOUTH <u>NORTH</u> 30365 (WEST) 30125 (EAST) 28210± (WEST) 27075± (EAST) LIST OF ABBREVIATIONS: DENOTES ABUTMENT DENOTES EASTBOUND LANE  $\bigcirc$ DENOTES EASTBOUND LANE
DENOTES HIGHWAY
DENOTES ORIGINAL CONSTRUCTION
DENOTES SPEED CHANGE LANE
DENOTES SHOULDER
DENOTES STATION
DENOTES TYPICAL
DENOTES WESTBOUND LANE LIMITS OF REHABILITATION VARIES LEGEND: EXISTING CONCRETE/ASPHALT TO REMAIN -CONSTRUCTION JOINT (TYP.) NEW CONCRETE WIDENING VARIES FROM 12790±(WEST) TO 12550±(EAST) NEW ASPHALT DRAWING NOT TO BE SCALED DATE BY DESCRIPTION
ESIGN I.M. CHK A.K. CODE CAN/CSA 56-16 LOAD CL-625-CNT DATE MAR. 2010. 100 mm ON ORIGINAL DRAWNO

Figure 26: Preliminary General Arrangement – Sucker Creek Bridge Short-Term Rehabilitation and Widening

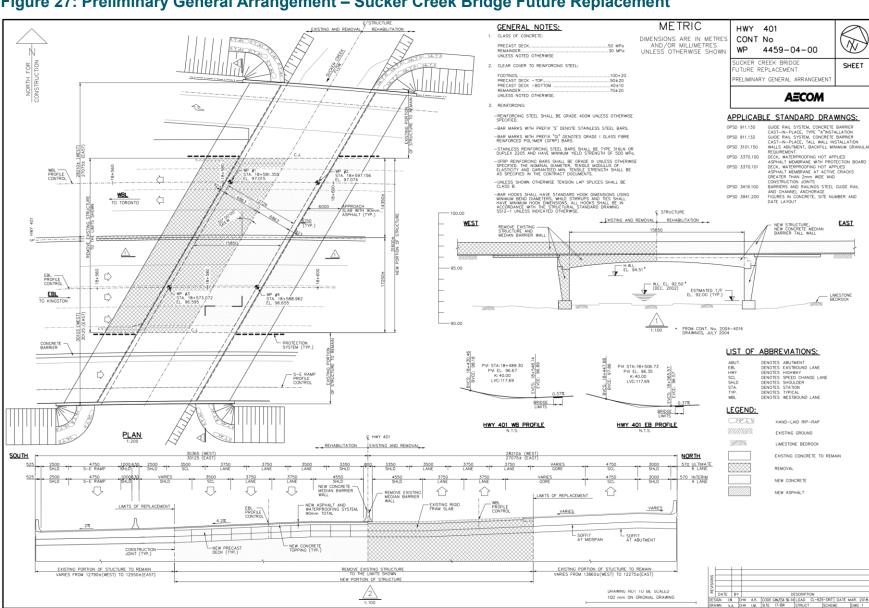


Figure 27: Preliminary General Arrangement - Sucker Creek Bridge Future Replacement

## 6.3 Pavement

The recommended pavement structure for new construction on soil subgrade is summarized below in **Table 14**.

**Table 14: Recommended Pavement Structure** 

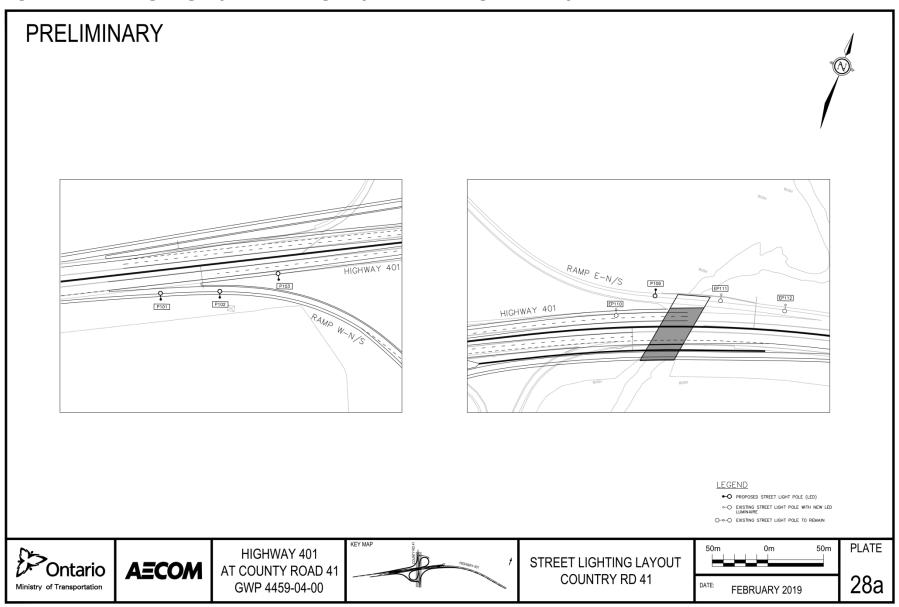
	Highway 401 Median	EB Off-Ramp and SB to WB On-Ramp	NB to WB and NB to EB On- Ramps	SB to EB On-Ramp	WB Off-Ramp
Superpave 12.5 FC2	40 mm	40 mm	40 mm	60 mm	60 mm
Superpave 19	50 mm	50 mm	60 mm	70 mm	70 mm
Superpave 19	-	60 mm	-	-	-
Granular A Base	350 mm	200 mm	200 mm	200 mm	150 mm
Granular B Type I Subbase	-	600 mm	500 mm	600 mm	450 mm
Granular B Type II Subbase	400 mm	-	-	-	-

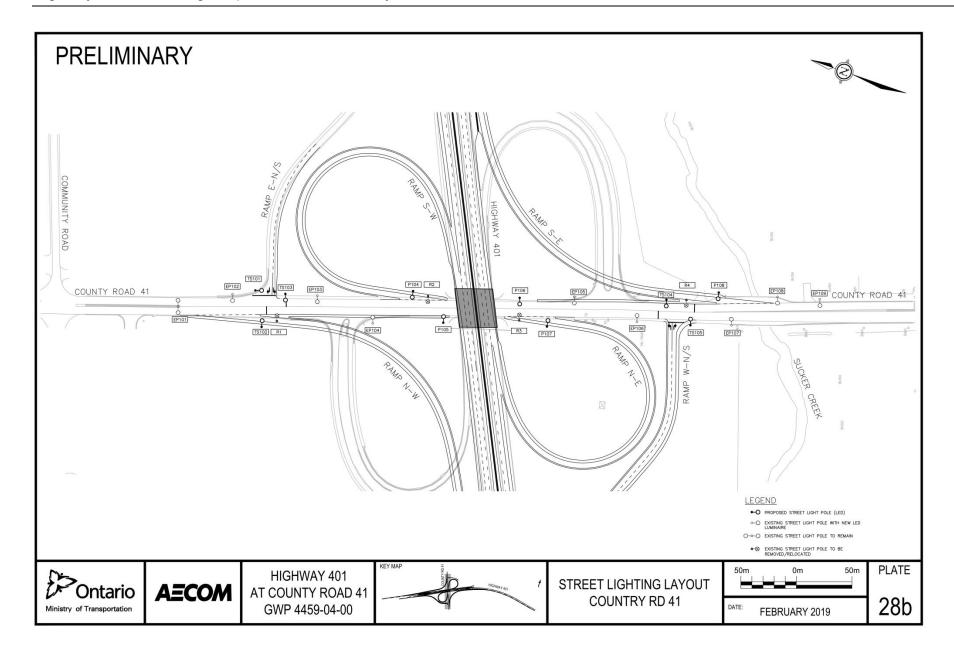
Where bedrock or rock fill subgrade is present, the thickness of the subbase layer can be reduced to 200 mm. A rock shatter layer will be required on bedrock subgrade.

## 6.4 Electrical

Modifications or upgrades to existing lighting systems will be provided to accommodate the recommended roadway improvements. New partial illumination at decision points will be provided for the realigned interchange off-ramps and ramp terminal intersections (refer to **Figure 28** for the street lighting layout). Permanent signals will be added to the north ramp terminal intersection. The existing signals at the south ramp terminal will be modified for one stage of construction, and ultimately new signals added at the new ramp terminal location.

Figure 28: Street Lighting Layout at the Highway 401 Interchange at County Rd 41





# 6.5 Utilities

Bell Canada, Hydro One, and Town of Napanee (watermain and sanitary sewer) all have plant located within the project limits. Due to the recommended interchange improvements, a number of utilities are anticipated to require relocation prior to the construction of these improvements. The potential utility impacts may include the following:

- Sanitary sewer, watermain, and underground Bell on east side of County Road 41, where the road requires widening approaching the start of the onramps to eastbound and westbound Highway 401; and,
- Hydro One overhead distribution lines west of County Road 41 due to the new eastbound off-ramp and inner loop on-ramp. Direct impacts to the Hydro One transmission lines and high voltage towers in the vicinity of the interchange are not anticipated.

All potentially affected utility companies will be contacted early during Detail Design to confirm plant location and discuss relocation strategies / mitigation strategies. Utility relocations will be undertaken prior to construction as required.

The potential utility impacts are highlighted on the utility plan in Figure 29.

# 6.6 Drainage

Modifications to the drainage layout at Palace Road are required due to the interchange reconfiguration. The proposed drainage works are illustrated in **Figure 30** and summarized below:

- Four existing culverts will be removed within the County Road 41 interchange (C04-EX, C05-EX, C06-EX, and C07-EX) due to ramp realignment;
- Seven new culverts will be installed within the County Road 41 interchange and new ditches will be constructed to convey the flows from/to the new culverts;
- The invert of the existing culvert under Highway 401 (C03-EX, immediate west of Highway 401 overpass bridge at County Road 41) is higher than adjacent road top of County Road 41. The hydraulic assessment indicates that spill to County Road 41 occurs between 2 to 5 year return period. However, there is no flooding issues at the location. It is recommended that the culvert remain for the interim conditions, and be replaced along with the replacement of the Highway 401 Bridge over County Road 41 under the ultimate conditions.

Further details can be found in the *Drainage and Hydrology Report* (AECOM, February 2019).

## 6.6.1 Median Storm Sewers

The existing median storm sewers will be replaced with new and upsized storm sewers capable of conveying the existing flows and future climatic change scenario flows. The

median storm sewers will be designed to accommodate a future widening of Highway 401 to 6-lanes.

Under the existing conditions, one lane and shoulder on each direction of Highway 401 drain to the median storm sewer. For the future condition, with 6-lanes on Highway 401, the existing drainage pattern will be maintained and the sewer outlets will be provided at approximately the same location. At certain outfalls, channel re-gradation will be required to provide positive drainage and avoid sediment deposition in the sewers and outfalls. The proposed storm sewer design is illustrated in **Figure 30** and additional details are provided in the *Drainage and Hydrology Report* (AECOM, February 2019).

**Figure 29: Potential Utility Impacts** 

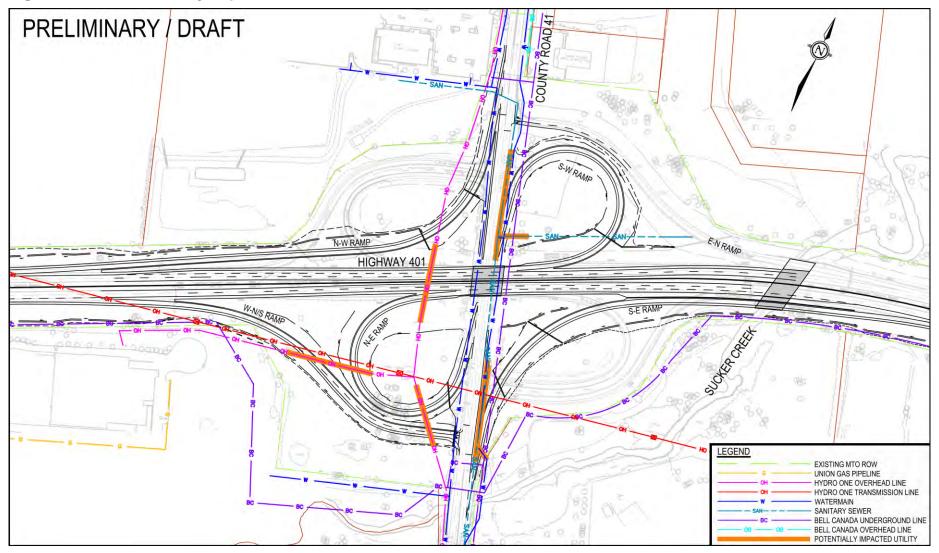
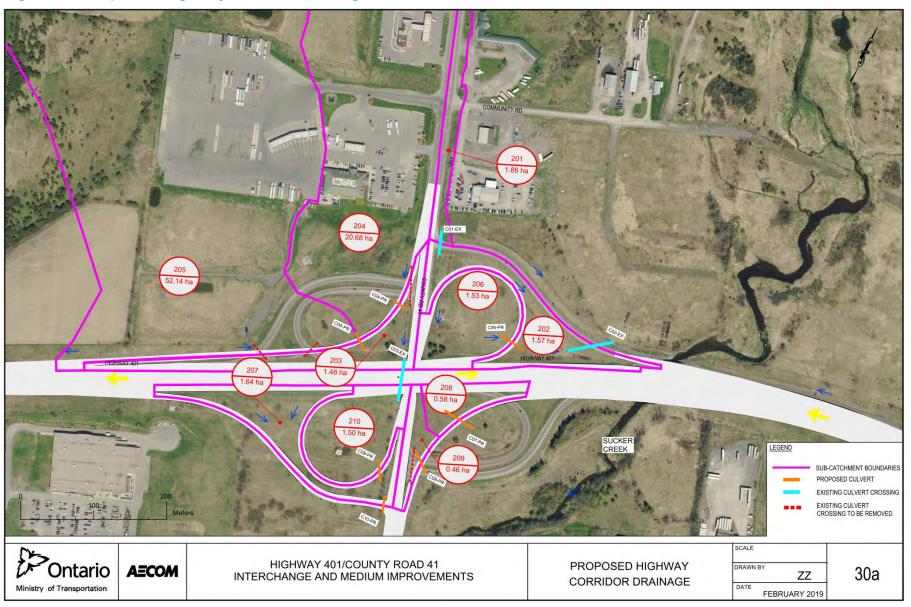
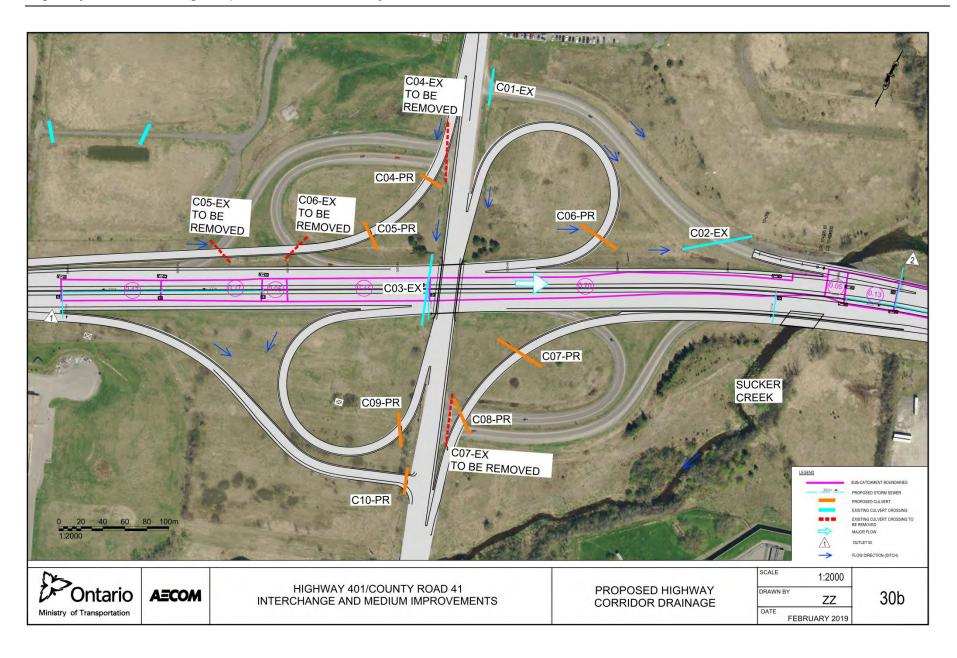
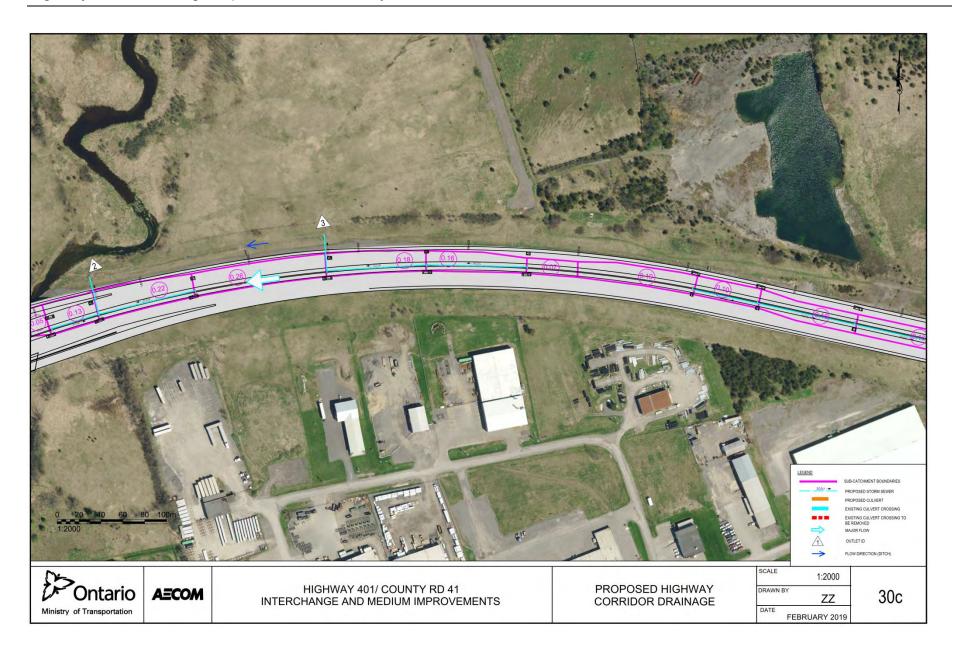
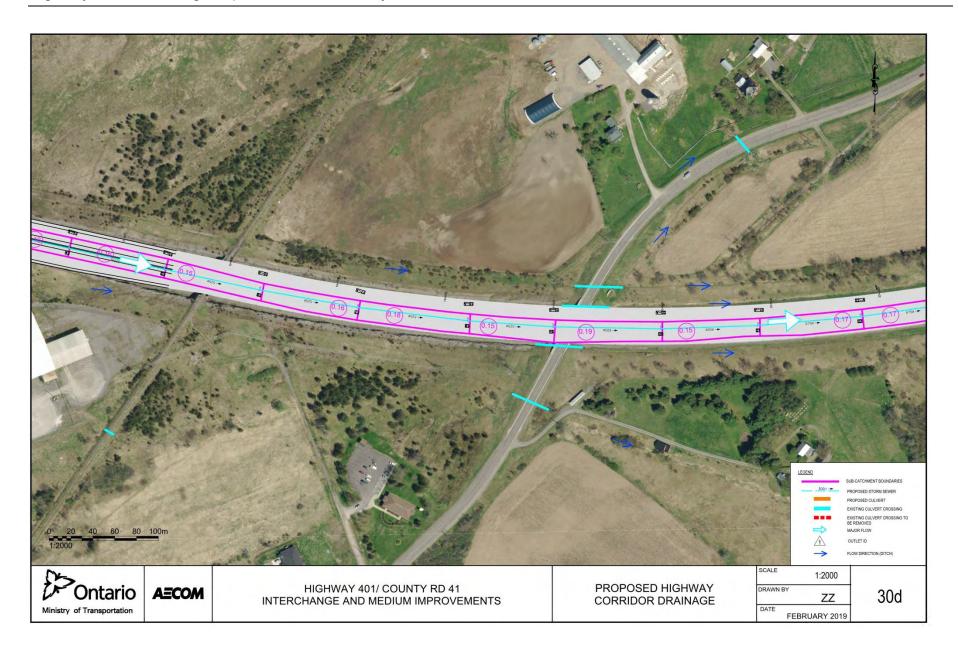


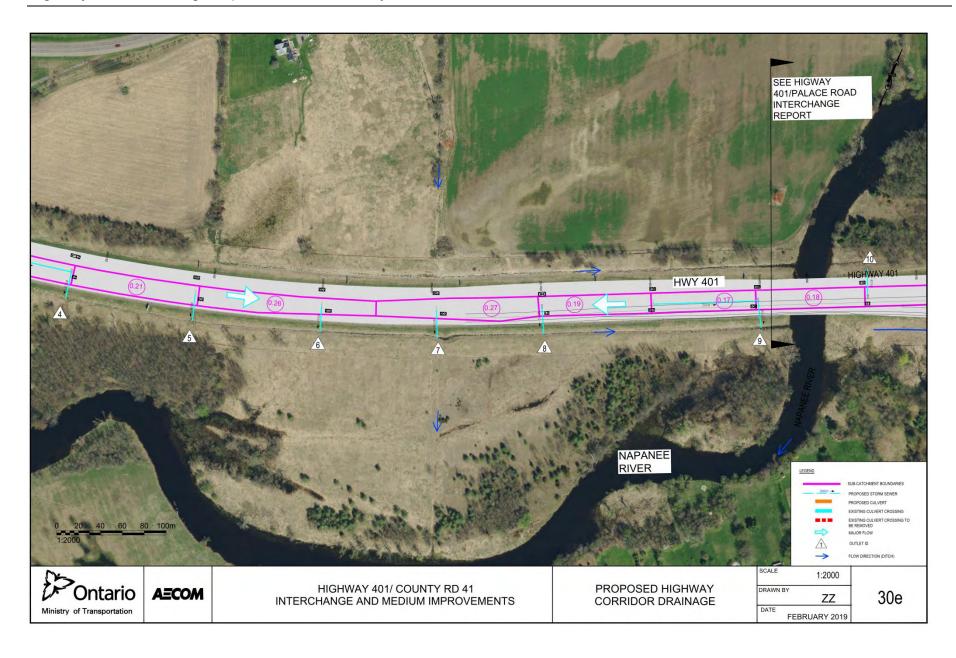
Figure 30: Proposed Highway Corridor Drainage Plan











# 6.7 Foundations

Preliminary foundation engineering analysis was undertaken as part of this study, consisting of a desktop study only. The foundations recommendations are summarized as follows:

## County Road 41

- The bedrock surface is typically comprised of fine-grained dolomitic limestone with shaley partings.
- Construction of integral abutments supported on end-bearing steel H-piles placed in holes augured into bedrock is considered to be a suitable foundation system for the future bridge replacement.
- Spread footings supported on bedrock are also considered feasible.

# Sucker / Selby Creek

- The bedrock surface is typically comprised of limestone.
- The original foundation investigation described the bedrock as fine-grained and very sound, exhibiting no signs of fracture or weathering.
- Spread footings supported on bedrock are considered a feasible foundation type for the short-term widening and future bridge replacement due to the relatively shallow depth of bedrock.

Additional investigations consisting of boreholes located within the foundation footprints will be undertaken during detail design to complete the design of the foundations for the short-term widening of the Sucker Creek bridge. Additional boreholes will also be undertaken in the future to confirm requirements for the long-term bridge replacements at both sites.

## Median Sewer

Based on the available soil information and for planning purposes, the anticipated subgrade for replacement of the Highway 401 median is summarized in **Table 14** below. Further investigation including boreholes along the sewer alignment will be required during detail design to confirm soil conditions along the median alignment and requirements for placement of sewer pipe bedding and dewatering.

**Table 15: Anticipated Subgrade for Median Sewer** 

Sewer Section	Anticipated Subgrade
County Road 41 to Sucker Creek	Highway fill, especially at County Road 41, or native earth
Sucker Creek to 500 m east of Sucker Creek	Through this section, the pavement boreholes indicate rock fill or bedrock. However, the "refusal" in the pavement boreholes is more likely a thin layer of rock fill, which will be underlain by earth.
500 m east of	This is basically the stretch where the highway is in a rock
Sucker Creek to	cut or nearly at grade. Therefore, unless the sewer invert

east of Newburgh Road	is very shallow, it should be anticipated that the subgrade will be bedrock and some bedrock excavation may be required to reach the desired profile.				
East of Newburgh	In this section, the bedrock surface will be plunging into				
Road to Napanee	the buried valley. Accordingly, earth/earth fill/granular fill				
River	subgrade would be anticipated except where rock fill has				
	been placed.				

Further foundation analysis including borehole investigations will be completed during detail design to confirm foundation details at each location.

# 6.8 Property

The Technically Preferred Alternative will require approximately 0.45 ha of property from one commercial property in the southwest quadrant of the Highway 401 / County Road 41 interchange. Property impacts will be confirmed during the subsequent Detail Design phase. Further details are outlined in **Section 7.2.2** of this TESR.

# 6.9 Traffic Management and Staging during Construction

In general, long-term lane reductions along Highway 401 and interchange ramps are not anticipated to be required to complete the interchange improvements. Short term night-time and/or weekend ramp closures are anticipated, as well as a reduction to a single lane in either direction along County Road 41 to rehabilitate the underside of the bridge. Detailed staging plans will be confirmed and further refined in detail design.

A conceptual construction staging strategy has been developed to complete the short-term bridge rehabilitation and interchange works, and is available in **Appendix M**. The short-term construction staging strategy is summarized below.

#### Pre-Stage

- 1. Construction new eastbound off-ramp with temporary connection to existing south ramp terminal.
- Construct new eastbound on-ramp structure over Selby/Sucker Creek including modified speed change lane.
- 3. Modify existing north ramp terminal intersection to provide access to southbound County Road 41, including installation of permanent traffic signals.

## Stage 1

- 1. Permanent closure of existing eastbound off-ramp and westbound to southbound County Road 41 off-ramp.
- 2. Shift Highway 401 traffic to outside and replace/upgrade existing median drainage system.
- 3. Rehabilitate centre portions of the Highway 401 bridges over County Road 41 and Selby/Sucker Creek.

#### Stage 2

1. Shift Highway 401 eastbound lanes to north and rehabilitate south sides of the Highway 401 bridges over County Road 41 and Selby/Sucker Creek.

2. Construct ultimate westbound and eastbound on-ramps to Highway 401.

# Stage 3

- 1. Shift Highway 401 to south and rehabilitate north sides of the Highway 401 bridges over County Road 41 and Selby/Sucker Creek.
- 2. Complete construction/tie-ins of new ramps (weekend and short-term ramp closures anticipated).

# 7. Environmental Issues, Effects, Mitigation Measures and Commitments

The following sections document the potential impacts and proposed mitigation measures pertaining to the natural, socio-economic and cultural environments, and traffic operations as a result of the proposed Highway 401 interchange improvements at County Road 41. These sections describe impacts based on the existing conditions described in **Section 3**. These impacts and mitigation measures will be reviewed and refined in detail design and documented in a future Design and Construction Report (DCR).

# 7.1 Natural Environment

# 7.1.1 Terrestrial Ecosystem

A terrestrial ecosystems impact assessment was prepared in accordance with the MTO ERHD (2013) to provide an assessment of impacts and proposed mitigation measures based on the proposed design. The following sections summarize the impact assessment and proposed mitigation measures. Additional information is available in the Terrestrial Ecosystems Impact Assessment Report (AECOM, January 2019) included in Appendix H.

# 7.1.1.1 Potential Impacts

# Vegetation Communities and Designated Natural Areas

There are no ANSIs or PSWs present within the construction footprint; therefore no impacts to provincially designated natural areas are anticipated; however, the Sucker Creek Environmentally Sensitive Area and the Sucker Creek Environmental Protection Area, as designated by Schedule C of the Town of Greater Napanee Official Plan occurs within the construction footprint. As such, the Environmentally Sensitive Area and the Environmental Protection Area are may be impacted by the proposed works.

The potential impacts to vegetation communities and municipally designated natural areas are described as follows:

- In order accommodate the proposed works, it is anticipated that a total of up
  to 11.1 ha of Cultural Meadow (CUM1) may be required to be removed within
  the construction footprint. The existing Cultural Meadow (CUM1) is
  considered to be disturbed by anthropogenic influences (i.e., periodic mowing
  and proximity to Highway 401) and at the time of field investigation was
  largely dominated by non-native species. No SAR plants were present within
  the construction disturbance footprint.
- Based on a review of the Town of Greater Napanee Official Plan, portions of the Sucker Creek Environmentally Sensitive Area and the Sucker Creek Environmental Protection Area and their associated riparian areas will be affected by the proposed works.
- Reduction of surface water and groundwater to vegetation communities.

- Alteration of surface water runoff or groundwater inputs may result in damage or alteration to the vegetation communities.
- During the proposed works, fill, sediment runoff and/or debris from the active construction area may enter vegetation communities and drainage ditches.
- The proposed works and use of construction equipment may perpetuate the spread and establishment of non-native and invasive species. Twenty-seven (27) of the 64 plants (42%) recorded within the Potentially Impacted Area during field investigations are non-native, which includes some highly invasive species such as common reed (*Phragmites australis*) and common buckthorn. A small patch of common reed was identified within the study area on the south of Highway 401, approximately 40 m west of County Road 41 along a fence line north of Selby/Sucker Creek. A second small patch of common reed was located north of Highway 401, east of County Road 41, within Mineral Cultural Meadow community (CUM1) located north of the 401 exit ramp. Common reed may be present elsewhere within the study area as the species is commonly associated with disturbed habitats such as those found in highway right-of-ways. The proposed works and movement of construction equipment may perpetuate the spread and establishment of these species.

#### Wildlife

The majority of the lands within the proposed construction footprint consist of a large Cultural Meadow (CUM1) community that is considered disturbed by anthropogenic influences (i.e., periodic mowing and proximity to Highway 401). A small Mixed Forest (FOM) community is also present within the Potentially Impacted Area but outside of the proposed construction footprint. The proposed construction footprint crosses Sucker Creek and portions of the Cultural Meadow (CUM1); therefore, these features will be affected by the construction. The vegetation communities and planted trees present within the Overall Study Area are likely to support breeding birds.

The potential impacts to breeding birds as a result of the proposed works include:

Vegetation clearing during the breeding bird season of April 1st to August 31st could result in the disturbance/displacement of breeding birds and/or destruction of their active nests. The proposed works will result in a loss of some vegetated areas and habitat for some common species; however, the area lost provides only marginal habitat which is disturbed by existing anthropogenic impacts.

# Species at Risk (SAR)

The Overall Study Area was considered to be potentially suitable habitat for a total of 12 SAR, of which the construction footprint may represent habitat for up to 4 of these including Barn Swallow, Bobolink, Eastern Meadowlark and Snapping Turtle. The Cultural Meadow (CUM1) located within the construction footprint is considered disturbed anthropogenic influences (i.e., periodic mowing and proximity to Highway 401) and is largely dominated by non-native species. These areas are considered poor quality habitat for Bobolink and Eastern Meadowlark and it is unlikely that the species are using this area for breeding. As such, no impacts to these SAR are anticipated as a result of the proposed works. Snapping Turtle are listed as Special Concern and thus do

not receive protection under the *ESA 2007*. Nevertheless, specific mitigation measures necessary to protect Snapping Turtle during construction are provided **Section 7.1.1.2**.

Suitable habitat for Barn Swallow may be present within the construction footprint for the improvements to the Highway 401 Interchange at County Road 41 at the County Road 41 and Selby/Sucker Creek bridges. The potential impacts to Barn Swallow as a result of the proposed works are described as follows:

- Disturbance / Displacement or Mortality of SAR
  - Barn Swallow may be displaced or disturbed as a result of noise during construction. These potential impacts would result in a contravention of the ESA 2007.
- Habitat Removal
  - The rehabilitation, replacement or widening of the bridges may result in the temporary loss of habitat for Barn Swallow.

# 7.1.1.2 Proposed Mitigation Measures

Proposed mitigation and avoidance measures for the potential impacts on terrestrial features are described below:

#### General

 To assist in mitigating potential impacts to terrestrial ecosystems applicable MTO Provisions should be included in contract documents and utilized during construction.

## Vegetation Communities and Designated Natural Areas

- Vegetation removal for the proposed works should be kept to a minimum and will be limited to the construction disturbance footprint;
- A landscape plan should be developed to address removal of woody vegetation using similar native species;
- Areas of herbaceous vegetation disturbed during proposed works should be seeded with a site appropriate native MTO approved seed mix;
- Construction material should be stored within authorized location and any soil stockpiles should be located within a suitable sediment fenced and protected location only;
- The construction disturbance areas should be clearly delineated to define the working area and prevent accidental intrusion into adjacent vegetation;

#### Wildlife and Species at Risk

 Schedule vegetation removal to occur outside of the breeding bird seasons of April 1<sup>st</sup> to August 31<sup>st</sup> to avoid disturbance to breeding birds and destroying active nests, including any bird SAR. If vegetation removal must occur within this time period, active nest searches may be conducted prior to vegetation removal by a qualified biologist within 'simple habitats' to ensure that no active nests of breeding birds or bird SAR are destroyed, in order to prevent any contravention of the *Migratory Birds Convention Act*, 1994 and / or the ESA 2007.

- In the event a nesting Snapping Turtle is observed, the individual should be permitted to continue nesting and the nest location shall be reported to MTO and MNRF immediately; and,
- Any SAR observations should be reported to MTO and MNRF and protection should be implemented immediately to ensure compliance with the ESA (2007).

If mitigation measures identified above are implemented, impacts to SAR, SAR habitat and terrestrial ecosystems within the Overall Study Area, and net effects are expected to be minimal.

# 7.1.1.3 Commitments to Work during Detail Design

- The precise locations of the highly invasive species Common Reed shall be identified to aid in the development of mitigation measures to halt the spread of this species.
- In order to minimize the spread of invasive species it is recommended that the contractor removes and disposes of excess soil from areas identified as containing invasive species including but not limited to Common Reed and Common Buckthorn;
- It is recommended that nest surveys be undertaken at all affected structures to confirm if nesting birds, particularly Barn Swallow, are breeding or nesting at or on structures. Findings from these surveys will determine whether or not proposed works on the structure require registration under the *ESA 2007*.

## 7.1.2 Fish and Fish Habitat

A fish and fish habitat impact assessment was completed based on the recommended plan to identify any potential constraints to proposed activities, and suggest general mitigation measures to avoid harm to fish and fish habitat which shall be refined in Detail Design. The following sections are a summary of the impact assessment which is further documented in the *Fish and Fish Habitat Impact Assessment* (AECOM, February 2019) included in **Appendix J** 

# 7.1.2.1 Summary of Proposed Works

## Highway 401 Bridge over Selby/Sucker Creek

The proposed bridge widening to the south at Highway 401 over Sucker Creek will require in water work to allow for construction of a new eastbound on ramp at the County Road 41 interchange. This will likely require dewatering of the work area at the abutments on the south (downstream) end to drive structural piles and build forms to pour concrete at both the east and west abutments. This will result in the removal of some aquatic habitat and vegetation, particularly herbaceous grasses, however; no limiting important/exceptional habitat was observed in the direct area of impact. Grading activities are proposed to extend approximately 40 m south from the southern (downstream) edge of the bridge and remain within the MTO ROW along the highway.

There will be no temporary or permanent materials placed below the high water mark (HWM) of Sucker Creek at the upstream reach and so protective erosion and sediment controls shall be used in order to protect sensitive habitat features along the grading limits. However; at the downstream reach there is proposed in water work based on the Preliminary Design of the technically preferred alternative. Since Sucker Creek has been identified by the MNRF as American Eel habitat, a Notice of Activity (NOA) under the Endangered Species Act (ESA) is likely required, however further consultation with MNRF is recommended to determine the appropriate permitting requirements as they pertain to ESA.

In accordance with Step 1 of the Protocol, proposed activities at this location have the potential to affect fish and fish habitat and as such, these have been carried forward through Steps 2 (Existing Conditions characterization; completed under separate cover) and 3 of the Protocol (applicability of MTO BMP) as outlined herein.

## County Road Bridge over Selby/Sucker Creek

There is no proposed work within 30 m of Sucker Creek at the County Road 41 bridge over Sucker Creek. The work on the west side of County Road 41 will remain outside of the historical floodplain and within the MTO ROW with the exception of a small portion area adjacent to Highway 401 and the commercial plaza. The grading on the east side of the bridge will be within the historical floodplain north of the creek at the corner of the on and off ramps to County Road 41.

There will be no temporary or permanent materials placed below the high water mark (HWM) of Sucker Creek at this location. Protective erosion and sediment controls shall be used in order to mitigate indirect impacts to habitat features in proximity to grading limits. As proposed work is greater than 30 m from the watercourse and mitigation can prevent sediment from entering the watercourse, in accordance with Step 1 of the Protocol, no further assessment of the proposed activities this location is warranted or presented herein.

#### 7.1.2.2 Summary of Potential Impacts

The proposed works as described above at the Highway 401 bridge over Sucker Creek are anticipated to require in-water works in the potential presence of American Eel, an aquatic SAR afforded protection provincially under the ESA. Since MTO Best Management Practices cannot be applied, proposed works at this location should be carried forward through Step 4 of the fisheries assessment process and in consultation with MNRF and MECP. The efficacy of mitigation measures to negate or avoid impacts and the determination of Serious Harm cannot be completed at this time, but will need to be conducted concurrent with development of the Detail Design. The fisheries assessment process will continue in Detail Design when the scope of work has been determined and an impact assessment, including a Pathways of Effects, can be competed with the proper level of detail to determine the likelihood of serious harm and identify mitigation measures to address any residual effects.

The proposed work at the County Road 41 bridge over Sucker Creek are anticipated to occur above the HWM and at least 30 m from the nearest watercourse. Protective erosion and sediment controls shall be used in order to mitigate indirect impacts to habitat features in proximity to grading limits. It is expected that proposed works at this

location will not result in Serious Harm and Notification to MTO Head Office and to DFO would not be required.

# 7.1.2.3 Proposed Mitigation Measures

The following section provides a summary of proposed mitigation measures to avoid or mitigate potential impacts to fish and fish habitat. Additional information is provided in Table 16. A detailed assessment of impact in accordance with the fisheries assessment process is required for proposed activities at the Highway 401 bridge over Sucker Creek. Although mitigation measures presented below are anticipated to be generally applicable for proposed works at this bridge, the efficacy of these mitigation measures to negate or avoid impacts will need to be evaluated through detailed impact assessment in accordance with the fisheries assessment process concurrent with development of the Detail Design.

# Timing of Work

- No in-water work should occur between April 1 and June 30 of any given year, unless otherwise amended in consultation with MNRF; and,
- Near-water works at Selby/Sucker Creek will be timed to avoid wet and windy conditions;

#### Erosion and Sediment Control

 An Erosion and Sediment Control Plan shall be developed and implemented before starting the work, and be maintained for the site that minimizes risk of sedimentation of the waterbody during all phases of the project;

# Operation of Machinery

- Activities near water shall be conducted such that materials such as paint, primers, blasting abrasives, rust, solvents, degreasers, grout or other chemicals do not enter the watercourse:
- A response plan for spills shall be developed before work commences. This
  plan shall be implemented immediately in the event of a sediment release or
  spill of a deleterious substance and an emergency spill kit shall be maintained
  on site;
- Clearing of riparian vegetation shall be kept to a minimum to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting:

## Dewatering Activities

- A temporary water passage/isolation/containment system should be implemented during construction to isolate the work area from the open area of the watercourse, in order to maintain fish passage and water flow that is both adequate and clean;
- Where by-pass pumping of flows is required or temporary channel restriction occurs, the contractor will limit the discharge pump velocity and/or partial channel restriction to ensure discharge velocities will not result in localized scouring in the receiving water feature;

- Any water intakes or outlet pipes will be screened to prevent entrainment or impingement of fish;
- Any sediment laden dewatering discharge shall be pumped to a filtering system
  at least 30 m from the watercourse and allowed to settle and/or filter through
  riparian vegetation before being discharged downstream of the construction area
  and controls shall be monitored for their effectiveness; and,
- A spill management plan (including materials, instructions regarding their use, education of contract personnel, and emergency contact numbers) will be ensured on site at all times for implementation in event of an accidental spill during construction.

# 7.1.2.4 Commitments to Work during Detail Design

 Proposed in-water works are anticipated at the Highway 401 bridge over Sucker Creek in the potential presence of American Eel. The proposed inwater works should be carried forward in the fisheries assessment process (Step 4 of the Fisheries Protocol) and in consultation with MNRF, concurrent with the development of Detail Design. The assessment of impacts, efficacy of mitigation measures to negate or avoid impacts, and potential for residual harm to fish and fish habitat can be best determined with the refinement of Detail Design. The appropriate Project Notification Forms (in accordance with Step 5 of the Fisheries Protocol) or Request for Review (Step 6 of the Fisheries Protocol) will be completed contingent on the outcome of the Step 4 fisheries assessment process.

# 7.1.3 Hydrogeology and Groundwater

# 7.1.3.1 Potential Impacts

The shallow groundwater levels in this area are high, generally with 5 m below ground surface. It is anticipated that excavations will be required during construction which have the potential for groundwater interference therefore an Environmental Activity Sector Registry (EASR) / Permit to Take Water (PTTW) will likely be required. Further analysis will be undertaken once further details are known during the Detail Design stage to confirm and support the need for an EASR / PTTW for these works.

The potential impacts from the interchange improvement work to the local groundwater system include, but are not limited to, the following:

- Changes to recharge/discharge regimes resulting from the disturbance of the ground surface, ground clearing, compaction, road cuttings, placement of fill and the potential addition of impervious road surface;
- Dewatering impacts (if dewatering is required) that include a reduction in groundwater level and/or reduced flow to the nearby water wells and groundwater dependent water bodies;
- Potential spills of hydrocarbons and other chemicals used during construction activities that could impact the groundwater aquifer and groundwaterdependent water bodies; and,

 The use of salt for road de-icing in winter seasons during future highway operations.

Threat to drinking water assessment has been completed for Quinte Source Protection Region for highly vulnerable aquifers, Significant Groundwater Recharge Areas and wellhead protection areas by the Quinte Source Protection Area. There are no municipal water supply wells or their associated WHPAs located within the study area. Therefore, the proposed interchange rehabilitation work will not pose significant drinking water threats from a WHPA perspective.

# 7.1.3.2 Proposed Mitigation Measures

The following mitigation measures are recommended to manage the potential impacts:

- If dewatering is required during the future interchange improvement work:
  - Dewatering activities shall be conducted in accordance with the control procedures as specified in the Ontario Provincial Standard Specification (OPSS) 518 Construction Specification for Control of Water from Dewatering Operations;
  - As per Ontario Regulation 387/04 (water taking regulation) and Ontario Regulation 63/16 (water taking registration regulation), the dewatering activities will need to be registered as "prescribed activities" on the EASR, if the amount of water taking exceeds 50 m³/day and is below 400 m³/day. A Category 3 Permit to Take Water (PTTW) must be obtained from the Ministry of the Environment, Conservation and Parks (MECP) if the amount of water taken exceeds 400 m³/day;
  - A pre-construction door-to-door water well survey is recommended to confirm the presence or absence of existing water wells in the vicinity (within 500 m radius) of the future dewatering locations, if required, and document the baseline conditions (both quality and quantity) of these wells. A water well monitoring program shall be developed and implemented during and after the dewatering activities, if deemed necessary. In addition, any water wells to be removed during the interchange improvement activities will have to be decommissioned properly as per the Ontario Wells Regulation (R.R.O. 1990, Reg. 903);
- Minimize disturbance to existing vegetation and grassed slopes where regrading is required (disturbed areas should be re-vegetated as quickly as possible after completion of construction activities);
- Prepare and implement a stormwater management plan to protect the quality of surface runoff that may infiltrate groundwater resources;
- Minimize groundwater recharge impacts in the area by directing the surface runoff to roadside ditches and improve ditch conditions;
- Prepare and implement a spill prevention and control management plan as per the Plan policies and MTO's best management practices;

 Minimize salt usage and runoff during road de-icing applications by following the Plan polices and best practices consistent with those used across North America and employ the latest winter maintenance technologies.

# 7.1.3.3 Commitments to Work during Detail Design

 Further analysis will be undertaken during Detail Design once further details regarding excavations that have potential for groundwater interference are known, to confirm and support the need for an Environmental Activity Sector Registry (EASR) / Permit to Take Water (PTTW)

# 7.1.4 Stormwater Management

As noted in **Section 6.6,** a *Drainage and Hydrology Report* (AECOM, February 2019) was completed as part of this study to assess existing drainage conditions in the study area, identify the potential drainage impacts associated with the proposed improvements, and recommend measures to mitigate potential impacts with the proposed improvements.

# Water Quantity Control

The study area drains to two large water bodies, the Sucker/Selby Creek and Napanee River. The increase in peak flow rates due to the proposed improvement works appears to be relatively insignificant as the study area drains to existing larger watercourses and would not require flow attenuation. Since no adverse impacts are anticipated from the proposed improvement works, no quantity control is recommended.

# **Water Quality Control**

Enhanced level of protection i.e. 80% Total Suspended Solids (TSS) removal on a long-term basis is required (MOE, 2003) for the study area. Under existing conditions, no specific water quality measures exist within the study area. The additional paved surfaces could potentially impact the water quality which will be mitigated through the construction of grass swales with check dams. Grassed swales are provided to collect, store, treat, and convey storm runoff. The following features shall be incorporated into the design of swales during Detail Design:

- Convey flows up to and including the 100-year storm events;
- Mild slope with check dams to reduce velocity, facilitate attenuation, encourage infiltration and recharge of groundwater;
- Plantation along grassed swales to provide dense shading to mitigate thermal impact, where possible; and,
- Appropriate landscape treatment to facilitate evapotranspiration and remove pollutants, where possible.

## **Erosion and Sediment Control**

Bridge rehabilitation, culverts removal/construction, ramps removal/realignment and ditches realignment/re-gradation activities have the potential to result in sediment transport to the receiving water courses. General ESC considerations are discussed in

MTO's document "Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects" (February 2007), which represents the most current and comprehensive document that addresses the Ministry's approved methods for providing erosion and sediment control during construction.

A comprehensive construction staging plan will be required at the detailed design stage to be in the final Contract Drawings to document the construction sequencing for instream works related to rehabilitation/extension, removal of culverts, bridges, installation of new culverts and realignment/reinstatement of channel. All construction activities occurring in-water would be completed in accordance with timing restrictions mandated by MNRF.

# 7.2 Socio-Economic Environment

#### 7.2.1 Land Use

The Highway 401 interchange improvements will primarily take place within the existing MTO ROW with minor edge impacts to arterial commercial land use in the southwest quadrant.

Opportunities to minimize impacts will be investigated during Detail Design and consultation will be undertaken with local businesses to minimize impacts to their operations as much as feasible.

Refer to **Appendix A** for an outline of the Recommended Plan.

# 7.2.2 Property

The Technically Preferred Alternative will require approximately 0.45 ha from one commercial property in the southwest quadrant of the Highway 401 interchange. Property impacts will be confirmed during the subsequent Detail Design phase.

Safe access to the commercial and private entrances shall be maintained at all times during construction. If there are impacts to signs, vegetation, landscaping or driveways of any of the commercial, private or municipal properties, the area of impact shall be returned to the conditions of the land prior to construction or better.

# 7.2.3 Landscaping

The recommended improvements will result in changes to the existing landscape due to edge impacts associated with the increased footprint and construction. A Landscape Opportunities Plan was developed to provide an overview of areas where the existing vegetation will require protection and where there are opportunities to implement landscaping if desired. This should be reviewed with the future detail design plan. The plan is available in **Appendix L**.

# 7.2.4 Waste and Contamination

As noted in **Section 3.2.2**, a Contamination Overview Study (COS) was undertaken to identify and review properties within the study area with actual or potential site contamination, and to identify appropriate future environmental work and mitigation

measures to be implemented. The review identified 22 parcels within the Study Area as having a "high" potential for environmental contamination and 35 parcels with "medium" potential. In addition, 14 spill records representing 8 different locations within the Study Area were found to have had significant historical spills, which were also considered as having "high" potential for contamination.

Several properties of "high" environmental concern were identified to be present within the overall COS Study Area. These include gas stations/service centres, and industrial or manufacturing sites. Gas stations/service centres operate pump islands (i.e., USTs for storing fuel), small chemical storage areas, and may include service areas for changing engine oil or full automotive repair. Gasoline and diesel fuel are usually delivered from bulk container trucks to large on-site USTs. Spills at transfer areas and pumps, along with overfilling of and leakage from the USTs, are potential sources of site contamination.

Based on the recommended plan for improvements at the County Road 41 interchange, one property identified as having a "high" potential for environmental contamination will be directly impacted. The parcel identified is the Walmart located in the south west quadrant of the interchange. The property also contains a tire & lube centre and observed soil mounds which are considered potential sources of impact for soil and /or groundwater quality.

In addition to the COS, a Preliminary Site Screening was completed for this property as it was identified as partially required to construct the recommended interchange improvements. No environmental concerns or evidence of contamination was identified as part of these screening assessments. However, given the proximity of the impacted property to Highway 401 and due to de-icing activities during winter months, elevated levels of Sodium Adsorption Ration, Electrical Conductivity, Sodium and Chloride may be encountered in soil and groundwater near the roadways. During construction of the improvements, the environmental quality of the soil should be evaluated for salt impact prior to removal of soil from the site. In addition, during construction special attention should be given to the soil and groundwater in the area for any visual evidence of contamination from highway spills. If visual evidence of contamination is noted, further investigation of the soil and/or groundwater quality in the area will be required.

If during Detail Design, additional properties are determined to be required, beyond those identified in this TESR, a Preliminary Site Screening shall be undertaken on each property to determine the need for further environmental site assessments.

#### 7.2.5 Construction Noise

The potential for construction noise impacts to sensitive receivers is not anticipated as there are no Noise Sensitive Areas adjacent to the proposed area of work; however, best management practices for construction noise mitigation shall be employed by the use of standard special provisions in the contract during detail design.

The Town of Napanee restricts construction-type activities between the hours of 9:00 p.m. and 7:00 a.m. of the following day under By-Law Number 04-06, as amended by By-Law Number 04-49, Consolidated Noise By-Law. If construction is deemed to be required during these times, then discussions with the Town during detail design should be undertaken.

# 7.3 Cultural Environment

# 7.3.1 Archaeology

# Potential Impacts

As noted in **Section 3.3.1** previous archaeological assessments have determined that the area within the Recommended Plan is clear of archaeological potential.

# Proposed Mitigation Measures

During construction there is the possibility of encountering deeply buried archaeological material. In the event the following situations are encountered during construction, the Contractor shall stop work immediately and undertake the actions as described below:

- Should previously undocumented archaeological resources be discovered, there may be a new archaeological site which would 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 licenced consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act. The Heritage Operations Unit of the Ministry of Tourism, Culture and Sport must be notified immediately;
- The Cemeteries Act, R.S.O. 1990, c.C 4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 20002, c33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services; and,
- Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

# 7.4 Traffic Operations

# 7.4.1 Community Access & Out of Way Travel

No permanent community access impacts are anticipated as a result of implementing the recommended plan. Construction activities will result in temporary impacts, such as short-term night-time and/or weekend ramp or lane closures, which will be mitigated through advance notice and signage. The Town of Napanee, County of Lennox and Addington, Emergency service providers and adjacent property and business owners will be notified in advance of temporary lane and/or ramp closures.

While long-term lane closures along Highway 401 are not anticipated, short term night-time and/or weekend ramp closures are anticipated, as well as single lane closures along County Road 41 to rehabilitate the underside of the bridge. A conceptual construction staging strategy has been developed to complete the bridge replacement

and interchange works. The strategy is discussed further in **Section 6.9** and presented in **Appendix M**.

While detailed staging and detour plans will be confirmed and further refined in detail design, the following closures are anticipated:

 Closure of the eastbound on and off-ramps, in addition to the westbound onramps is anticipated for 1-2 full weekends each to complete tie-in work for construction of the new on-ramps. The ramps will not be closed at the same time.

# 7.5 Summary of Environmental Concerns, Mitigation Measures and Commitments to Future Work

**Table 16** summarizes the environmental concerns and mitigation measures and commitments to future work to be undertaken and confirmed during Detail Design.

#### Legend

MTO – Ministry of Transportation

MUN – Applicable municipalities (Town of Greater Napanee, County of Lennox and Addington)

MNRF - Ministry of Natural Resources and Forestry

MECP - Ministry of the Environment, Conservation and Parks

MTCS - Ministry of Tourism, Culture and Sport

CRCA- Cataraqui Region Conservation Authority

QC – Quinte Conservation

The following commitments to future work during detail design are included in **Table 16**: *Terrestrial Environment* 

- The precise locations of Common Reed shall be identified to aid in the development of mitigation measures to halt the spread of this species.
- It is recommended that nest surveys be undertaken at all affected structures to confirm if nesting birds, particularly Barn Swallow, are breeding or nesting at or on structures. Findings from these surveys will determine whether or not proposed works on the structure require registration under the *ESA 2007*.

#### Fish and Fish Habitat

• Proposed in-water works are anticipated at the Highway 401 bridge over Sucker Creek in the potential presence of American Eel. The proposed inwater works should be carried forward in the fisheries assessment process (Step 4 of the Fisheries Protocol) and in consultation with MNRF, concurrent with the development of Detail Design. The assessment of impacts, efficacy of mitigation measures to negate or avoid impacts and potential for residual harm to fish and fish habitat can be best determined with the refinement of Detail Design. The appropriate Project Notification Forms (in accordance with Step 5 of the Fisheries Protocol) or Request for Review (Step 6 of the Fisheries Protocol) will be completed contingent on the outcome of the Step 4 fisheries assessment process.

# Hydrogeology and Groundwater

• Further analysis will be undertaken during Detail Design once further details regarding excavations that have potential for groundwater interference are known, to confirm and support the need for an Environmental Activity Sector Registry (EASR) / Permit to Take Water (PTTW).

## Land Use and Property

 Opportunities to minimize impacts will be investigated during Detail Design and consultation will be undertaken with local businesses to minimize impacts to their operations as much as feasible.

#### Waste and Contamination

- If any contamination is identified during Detail Design or during construction, mitigation measures may need to be developed and implemented which may include environmental site clean-up / remediation and/or risk assessment.
- A Preliminary Site Screening will be undertaken on any properties not identified as impacted during this study to determine the need for further environmental site assessments.

#### Construction Noise

 If construction is deemed to be required between the house of 9:00 p.m. and 7:00 a.m, then discussions with the Town of Napanee should be undertaken during detail design.

Table 16: Summary of Environmental Concerns, Mitigation Measures and Commitments from this TESR to be confirmed during Detail Design

	Summary of Environmental Concerns, Mitigation Measures and Commitments from this TESR to be Confirmed during Detail Design							
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design				
1.0 Ter	restrial							
Genera	al							
1.1	Impacts to terrestrial ecosystems must be identified and appropriate mitigation measures utilized during construction	MTO / MNRF / QCA / CRCA	1.1.1	Applicable MTO Provisions should be included in contract documents and utilized during construction				
Vegeta	tion							
1.2	The proposed improvements may affect up to 11.1 ha of Cultural Meadow (CUM1).	MTO / MNRF / QCA / CRCA	1.2.1	Vegetation removal for the proposed works should be kept to a minimum and will be limited to the construction disturbance footprint				
				A landscape plan should be developed to address removal of woody vegetation using similar native species				
1.3	Construction activities may impact portions of Sucker Creek and its associated riparian area designated as an Environmental Protection Area, and may alter surface water runoff or groundwater inputs including sediment runoff and/or debris into vegetation communities and drainage ditches.	MTO / MNRF / QCA / CRCA	1.3.1	The construction disturbance areas should be clearly delineated to define the working area and prevent accidental intrusion into adjacent vegetation				
			1.3.2	Construction material should be stored within authorized location and any soil stockpiles should be located within a suitable sediment fenced and protected location only				
			1.3.3	Areas of herbaceous vegetation disturbed during proposed works should be seeded with a site appropriate native MTO approved seed mix				
1.4	Construction activities may perpetuate the spread and establishment of non-native and invasive species.	MTO / MNRF / QCA / CRCA	1.4.1	<ul> <li>During Detail Design, it is recommended that the precise locations of the highly invasive species</li> <li>Common Reed be identified to aid in the development of mitigation measure to halt the spread of this species</li> </ul>				
Wildlife	e and Species at Risk (SAR)							
1.5	Vegetation clearing may result in disturbance and potential destruction of breeding bird active nests and loss of vegetated areas and habitat for some common species. This includes disturbance of habitat potentially suitable for Species at Risk.	MTO / MNRF / QCA / CRCA	1.5.1	<ul> <li>Vegetation removal should be scheduled to occur outside of the breeding bird seasons of April 1<sup>st</sup> to August 31<sup>st</sup> to avoid disturbance to breeding birds and destroying active nests, including any bird SAR. If vegetation removal must occur within this time period, active nest searches may be conducted prior to vegetation removal by a qualified biologist within 'simple habitats' to ensure that no active nests of breeding birds or bird SAR are destroyed, in order to prevent any contravention of the Migratory Birds Convention Act, 1994 and / or the ESA 2007</li> </ul>				

	Summary of Environmental Concerns, Mitigation Measures and Commitments from this TESR to be Confirmed during Detail Design						
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design			
			1.5.2	• It is recommended that nest surveys be undertaken at all affected structures to confirm if nesting birds, particularly Barn Swallow, are breeding or nesting at or on structures. Findings from these surveys will determine whether or not proposed works on the structure require registration under the <i>Endangered Species Act (2007)</i> .			
			1.5.3	In the event a nesting Snapping Turtle is observed, the individual should be permitted to continue nesting and the nest location shall be reported to MTO and MNRF immediately			
			1.5.4	Any SAR observations should be reported to MTO and MNRF and protection should be implemented immediately to ensure compliance with the ESA 2007			
2.0 Fish	n and Fish Habitat						
2.1		MTO / MNRF / DFO / QCA / CRCA	2.1.1	The proposed in-water works at Sucker Creek should be carried forward in the fisheries assessment process (Step 4 of the Fisheries Protocol) and in consultation with MNRF, concurrent with the development of Detail Design. The assessment of impacts, efficacy of mitigation measures to negate or avoid impacts, and potential for residual harm to fish and fish habitat can be best determined with the refinement of Detail Design. The appropriate Project Notification Forms (in accordance with Step 5 of the Fisheries Protocol) or Request for Review (Step 6 of the Fisheries Protocol) will be completed contingent on the outcome of the Step 4 fisheries assessment process.			
			2.1.2	No in-water work should occur between April 1 and June 30 of any given year, unless otherwise amended in consultation with MNRF			
			2.1.3	Near-water works at Selby/Sucker Creek will be timed to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries timing windows (no in-water work permitted April 1 to June 30)			
2.2	Grading adjacent to Sucker / Selby Creek may result in erosion and sedimentation of the river and adjacent	MTO / MNRF / DFO / QCA / CRCA	2.2.1	An Erosion and Sediment Control Plan should be developed and implemented and maintained for the site that minimizes risk of sedimentation of the waterbody during all phases of the project			
	floodplain and ditching.	CNOA	2.2.2	Effective erosion and sediment control measures should be installed before starting work to prevent sediment from entering the water body			
			2.2.3	Grading should be carried out in stages and stabilized as soon as possible			
			2.2.4	Grading within 30 m of Sucker Creek should be conducted in the appropriate timing window (listed above), as to avoid impacts to sensitive habitat (potential Northern Pike spawning areas south of the Sucker Creek bridge)			

	Summary of Environmental Concern	s, Mitigation M	easures	and Commitments from this TESR to be Confirmed during Detail Design
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
			2.2.5	<ul> <li>Measures should be undertaken to contain and stabilize waste material (e.g., dredging spoils, construction waste and materials, uprooted or cut plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry</li> </ul>
			2.2.6	<ul> <li>Regular inspection and maintenance of erosion and sediment control measures and structures should occur during the course of construction, and repairs to erosion and sediment control measures and structures should be completed promptly if damage occurs;</li> </ul>
2.3	Operation of machinery adjacent to watercourses may result in debris or spills entering the watercourse.	MTO / MNRF / DFO / QCA / CRCA	2.3.1	<ul> <li>Activities near water should be conducted such that materials such as paint, primers, blasting abrasives, rust, solvents, degreasers, grout or other chemicals do not enter the watercourse</li> </ul>
		ONON	2.3.2	<ul> <li>A response plan for spills should be developed before work commences. This plan should be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit should be maintained on site</li> </ul>
			2.3.3	<ul> <li>Machinery should arrive on site in a clean condition and be maintained free of fluid leaks, invasive species and noxious weeds</li> </ul>
			2.3.4	<ul> <li>Machinery should be washed, refuelled and serviced and fuel and other materials will be stored in such a way as to prevent any deleterious substances from entering the watercourse</li> </ul>
			2.3.5	<ul> <li>Refuelling should be conducted 30 m or further from the watercourse, at a minimum, on a refuelling pad to prevent spills from entering the watercourse</li> </ul>
			2.3.6	Construction materials should be removed from site upon completion of the project
			2.3.7	Clearing of riparian vegetation shall be kept to a minimum to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting
2.4	De-watering of the Sucker / Selby Creek work area at the south (downstream) abutments will likely be required to drive structural piles and build forms to pour concrete at both the east and west abutments.	DFO / QCA /	2.4.1	<ul> <li>If dewatering is necessary, a temporary water passage/isolation/containment system should be implemented during construction to isolate the work area from the open area of the watercourse, in order to maintain fish passage and water flow that is both adequate and clean</li> </ul>
	כמסו מווע שכטו מטענוווכוונט.		2.4.2	The contractor will be required to retain a qualified fisheries biologist to complete fish salvage activities from the isolated work area, as applicable
			2.4.3	An appropriate back up pump will be available on-site as a contingency in the event of primary pump failure

	Summary of Environmental Concerns, Mitigation Measures and Commitments from this TESR to be Confirmed during Detail Design						
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design			
			2.4.4	Where by-pass pumping of flows is required or temporary channel restriction occurs, the contractor will limit the discharge pump velocity and/or partial channel restriction to ensure discharge velocities will not result in localized scouring in the receiving water feature			
			2.4.5	<ul> <li>Any water intakes or outlet pipes will be screened to prevent entrainment or impingement of fish. Screens will be located away from natural or artificial structures that may attract fish that are migrating, spawning or in rearing habitat;</li> </ul>			
			2.4.6	<ul> <li>Screens will be located away from natural or artificial structures that may attract fish that are migrating, spawning or in rearing habitat;</li> </ul>			
			2.4.6	Pumps will be shut down when fish screens are removed for inspection and cleaning;			
			2.4.7	<ul> <li>Any sediment laden dewatering discharge shall be pumped to a filtering system at least 30 m from the watercourse and allowed to settle and/or filter through riparian vegetation before being discharged downstream of the construction area and controls shall be monitored for their effectiveness</li> </ul>			
			2.4.8	<ul> <li>A spill management plan (including materials, instructions regarding their use, education of contract personnel, and emergency contact numbers) will be ensured on site at all times for implementation in event of an accidental spill during construction</li> </ul>			
3.0 Hyd	rogeology and Groundwater						
3.1	De-watering activities required during construction may affect the local groundwater system	MTO / MECP / QCA/ CRCA	3.1.1	Further analysis will be undertaken during Detail Design once further details regarding excavations that have potential for groundwater interference are known, to confirm and support the need for an Environmental Activity Sector Registry (EASR) / Permit to Take Water (PTTW).			
			3.1.2	If dewatering is required during construction:			
				<ul> <li>Dewatering activities shall be conducted in accordance with the control procedures as specified in the OPSS 518 Construction Specification for Control of Water from Dewatering Operations</li> </ul>			
				<ul> <li>As per Ontario Regulation 387/04 (water taking regulation) and Ontario Regulation 63/16 (water taking registration regulation), the dewatering activities will need to be registered as "prescribed activities" on the EASR, if the amount of water taking exceeds 50 m³/day and is below 400 m³/day. A Category 3 Permit to Take Water (PTTW) must be obtained from the MECP if the amount of water taken exceeds 400 m³/day</li> </ul>			
				<ul> <li>A pre-construction door-to-door water well survey is recommended to confirm the presence or absence of existing water wells in the vicinity (within 500 m radius) of the future dewatering locations, if required, and document the baseline conditions (both quality and quantity) of</li> </ul>			

	Summary of Environmental Concern	s, Mitigation M	easures	and Commitments from this TESR to be Confirmed during Detail Design
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
				these wells. A water well monitoring program shall be developed and implemented during and after the dewatering activities, if deemed necessary. In addition, any water wells to be removed during the interchange improvement activities will have to be decommissioned properly as per the Ontario Wells Regulation (R.R.O. 1990, Reg. 903)
			3.1.3	<ul> <li>Minimize disturbance to existing vegetation and grassed slopes where re-grading is required (disturbed areas should be re-vegetated as quickly as possible after completion of construction activities)</li> </ul>
			3.1.4	<ul> <li>Prepare and implement a stormwater management plan to protect the quality of surface runoff that may infiltrate groundwater resources</li> </ul>
			3.1.5	Minimize groundwater recharge impacts in the area by directing the surface runoff to roadside ditches and improve ditch conditions
			3.1.6	<ul> <li>Prepare and implement a spill prevention and control management plan as per the Plan policies and MTO's best management practices</li> </ul>
			3.1.7	<ul> <li>Minimize salt usage and runoff during road de-icing applications by following the Plan polices and best practices consistent with those used across North America and employ the latest winter maintenance technologies</li> </ul>
4.0 Sto	rmwater Management			
4.1	Additional paved surfaces associated with the construction works will require drainage modifications and could affect water quality along ditches outletting to Sucker / Selby Creek	MTO / QCA / CRCA / MECP	4.1.1	<ul> <li>Grassed swales with check dams will be provided to collector, store, treat and convey storm runoff. The swales will be designed to:</li> </ul>
		/ MUN		<ul> <li>Convey flows up to and including the 100-year storm events;</li> </ul>
				<ul> <li>Include mild slopes with check dams to reduce velocity, facilitate attenuation, encourage infiltration and recharge of groundwater; and,</li> </ul>
				<ul> <li>Include plantation along the grassed swales to provide dense shading to mitigate thermal impact</li> </ul>
			4.1.2	Appropriate landscape treatment will be incorporated into the design of swales to facilitate evapotranspiration and remove pollutants
5.0 Lan	d Use			
5.1	The recommended improvements will result in direct impacts to commercial land use adjacent to the interchange.	MTO / MUN	5.1.1	Opportunities to minimize impacts will be investigated during Detail Design and consultation will be undertaken with local businesses to minimize impacts to their operations as much as feasible

	Summary of Environmental Concerns	s, Mitigation M	easures	and Commitments from this TESR to be Confirmed during Detail Design
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
6.0 Pro	perty			
6.1	The Technically Preferred Alternative will require approximately 0.45 ha of property from one commercial property in the southwest quadrant of the Highway 401 / County Road 41 interchange.	MTO / MUN / Property Owners	6.1.1	<ul> <li>Property impacts will be confirmed during the subsequent Detail Design phase and compensation will be provided at market value, which is determined at the time of purchase by a property appraisal report forming the basis of negotiations</li> </ul>
			6.1.2	<ul> <li>Safe access to the commercial and private entrances shall be maintained at all times during construction.</li> </ul>
			6.1.3	<ul> <li>If there are impacts to signs, vegetation, landscaping or driveways of any of the commercial, private or municipal properties, the area of impact shall be returned to the conditions of the land prior to construction or better</li> </ul>
7.0 Lar	ndscaping			
7.1	The recommended improvements will result in changes to the existing landscape due to edge impacts associated with the increased footprint and construction.	MTO / MECP / MUN / Property Owners	7.1.1	The preliminary Landscape Opportunities Plan developed during Preliminary Design provides an overview of areas where the existing vegetation will require protection and where there are opportunities to implement landscaping if desired. This plan will be reviewed and refined further during detail design.
8.0 Wa	ste and Contamination			
8.1	Contaminated soil and groundwater may be identified during Detail Design or construction which will require further assessment and possible clean-up.	MTO / MECP	8.1.1	<ul> <li>If any contamination is identified during Detail Design or during construction, mitigation measures may need to be developed and implemented which may include environmental site clean-up / remediation and/or risk assessment</li> </ul>
8.2	Additional properties not identified as impacted during this study may be identified as impacted during Detail Design	MTO / MECP	8.2.1	A Preliminary Site Screening will be undertaken on any properties not identified as impacted during this study to determine the need for further environmental site assessments
9.0 Coi	nstruction Noise			
9.1	The potential for construction noise impacts to sensitive receivers is not anticipated as there are no Noise Sensitive Areas adjacent to the proposed area of work	MTO / MECP / MUN	9.1.1	Best management practices for construction noise mitigation shall be employed by the use of standard special provisions in the contract during detail design.
	Thous adjacent to the proposed area of work		9.1.2	<ul> <li>The Town of Napanee restricts construction-type activities between the hours of 9:00 p.m. and 7:00 a.m. of the following day under By-Law Number 04-06, as amended by By-Law Number 04-49, Consolidated Noise By-Law. If construction is deemed to be required during these times, then discussions with the Town during detail design should be undertaken.</li> </ul>

	Summary of Environmental Concerns, Mitigation Measures and Commitments from this TESR to be Confirmed during Detail Design						
ID#	Environmental Element / Concern and Potential Impact	Concerned Agencies	ID#	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design			
10.0 Ar	chaeology						
	Archaeological material may be encountered during construction of the proposed improvements.	MTO / MTCS	10.1.1	Should previously undocumented archaeological resources be discovered, there may be a new archaeological site which would 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 licenced consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the Ontario Heritage Act. The Heritage Operations Unit of the Ministry of Tourism, Culture and Sport must be notified immediately			
			10.1.2	The Cemeteries Act, R.S.O. 1990, c.C 4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 20002, c33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services			
			10.1.3	<ul> <li>Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence</li> </ul>			
11.0 Cd	11.0 Community Access & Out of Way Travel						
11.1	Community Access & Out of Way Travel	MTO / MUN/	11.1.1	Temporary lane and/or ramp closures should be minimized during Detail Design to minimize the duration of the closures			
		Ontario / Emergency Services	11.1.2	Advance notice and signage will be provided advising of construction activities including lane and ramp closures. Emergency service providers will also be notified of all temporary lane and/or ramp closures.			

# 8. Application of the Class EA Principles and Process

The Class EA and preliminary design for the *Highway 401 Interchange Improvements at County Road 41* followed the study principles and process set forth in the *Class EA for Provincial Transportation Facilities.* This TESR outlines how the transportation, environmental, consultation, environmental, documentation, bump-up, and environmental clearance principles (outlined in **Section 2.1**) were met through the study process undertaken for this project.

# **List of Reports Available under Separate Cover**

- AECOM (October 2017) Contamination Overview Study Preliminary Design and Class Environmental Assessment Study Highway 401 Interchange Improvements, County Road 41 (G.W.P. 4459-04-00)
- AECOM (February 2019) Drainage and Hydrology Report: Highway 401 / County Road 41 Interchange (IC 579) and Median Improvements
- AECOM (March 2018) Preliminary Structural Design Report: Highway 401 County Road 41 Overpass, Site No. 17-053.
- AECOM (April 2018) Preliminary Structural Design Report: Highway 401 Sucker Creek Bridge, Site No. 17-054.
- AECOM (July 2016) Socio-Economic Review Technical Memorandum: Highway 401 Interchange Improvements at County Road 41
- AECOM (August 2018) Operational Performance Review Report: Highway 401 Interchange Improvements at County Road 41
- Archaeological Services Inc. (May 1999) Stage 1 Archaeological Assessment of Highway 401 / City Road 41 Interchange.
- Archaeological Services Inc. (September 2003) Stage 2 Archaeological Resource
  Assessment: Highway 401 / County Road 41 Interchange Short-Term Improvements.

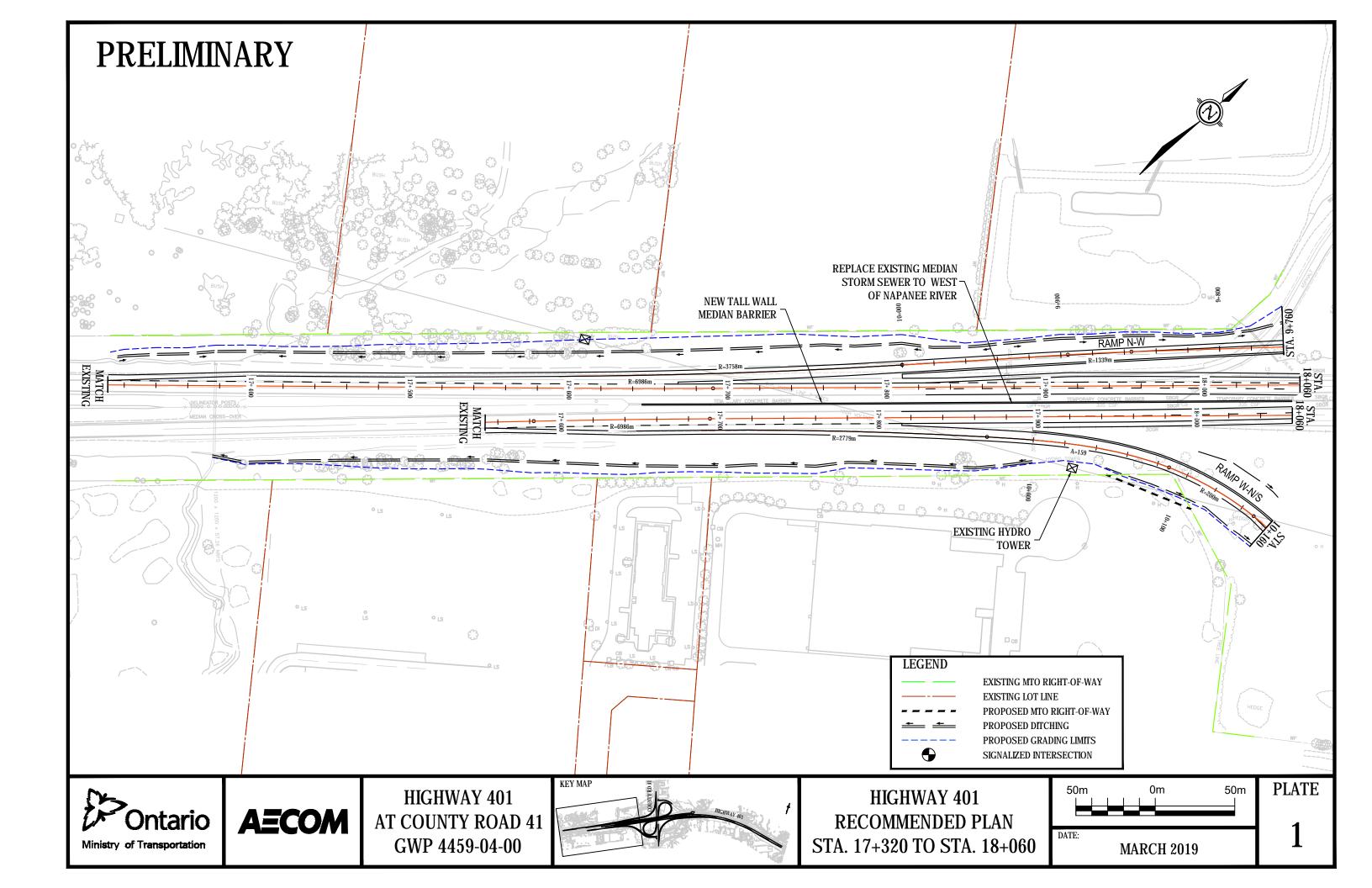
Prepared for: Ontario Ministry of Transportation

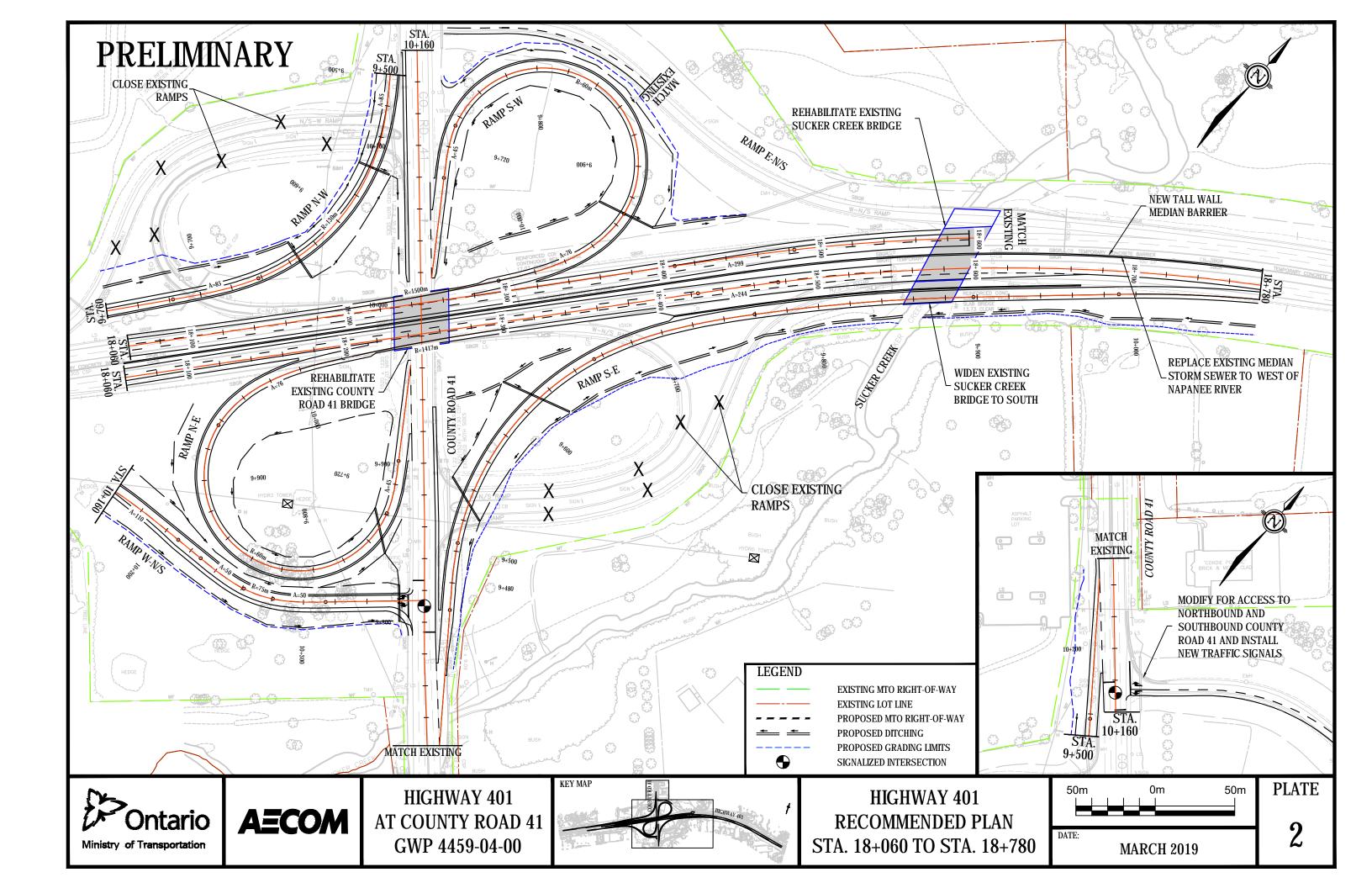
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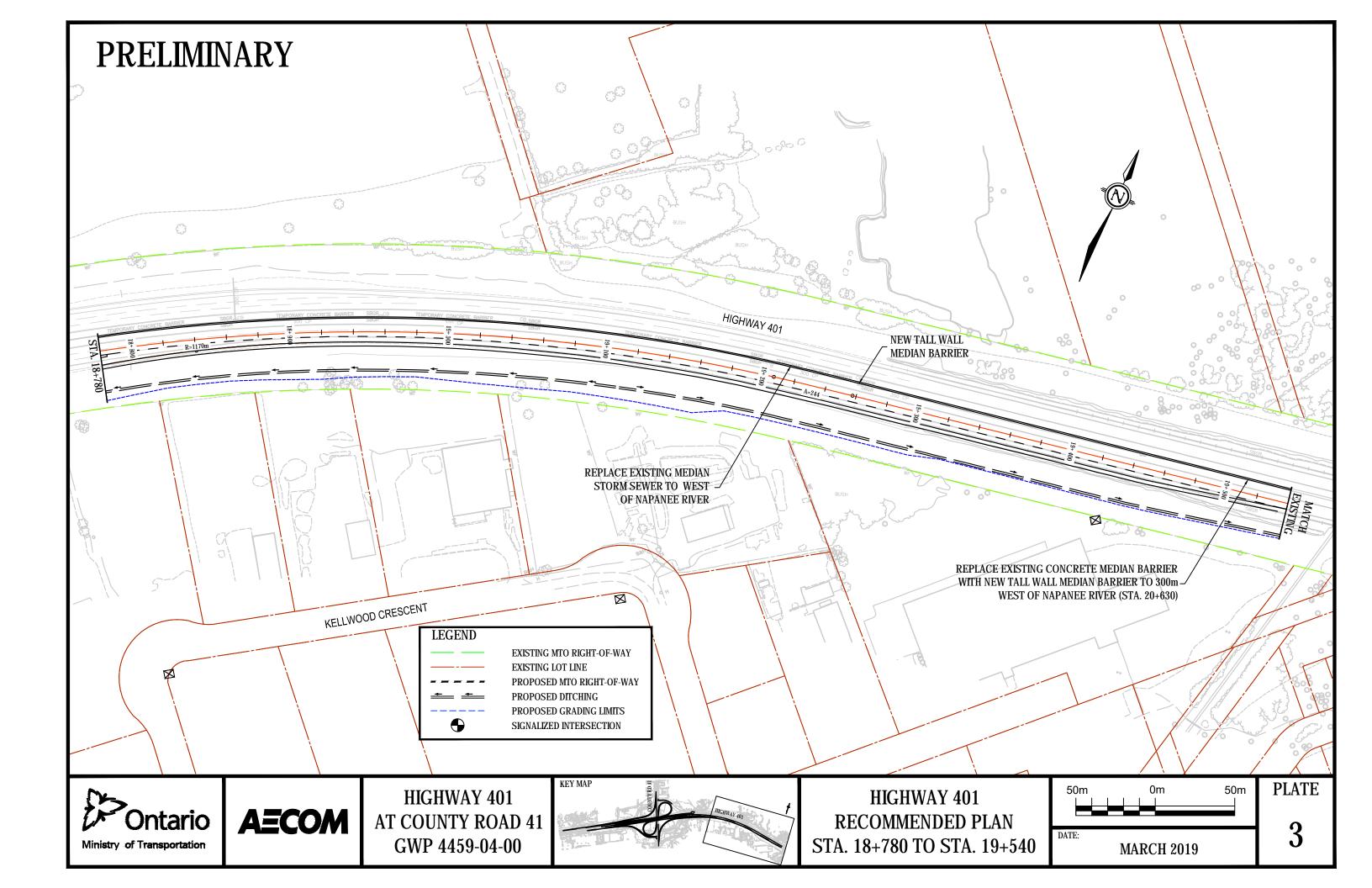


#### **Appendix A – Recommended Plan**

Prepared for: Ontario Ministry of Transportation

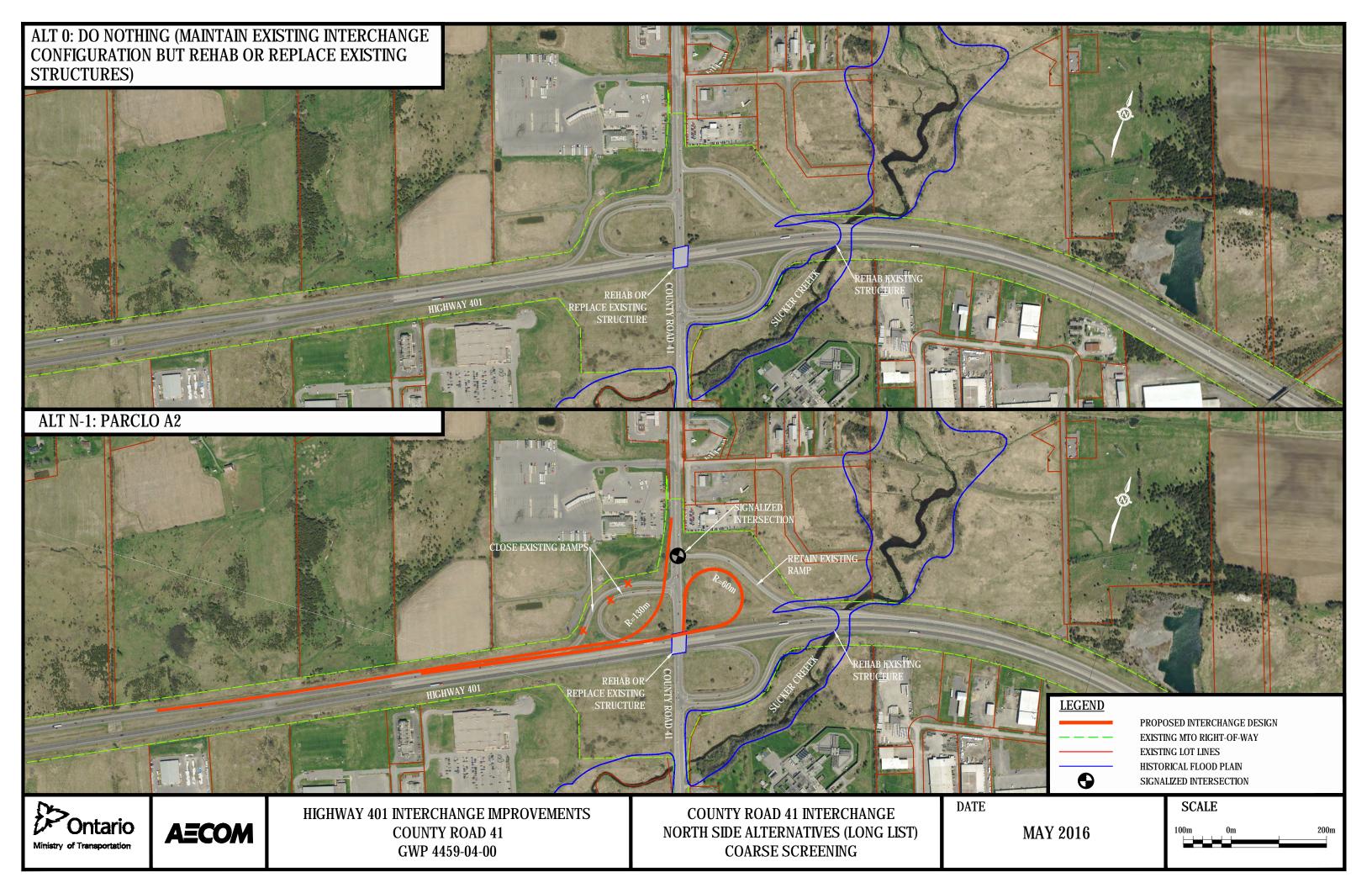


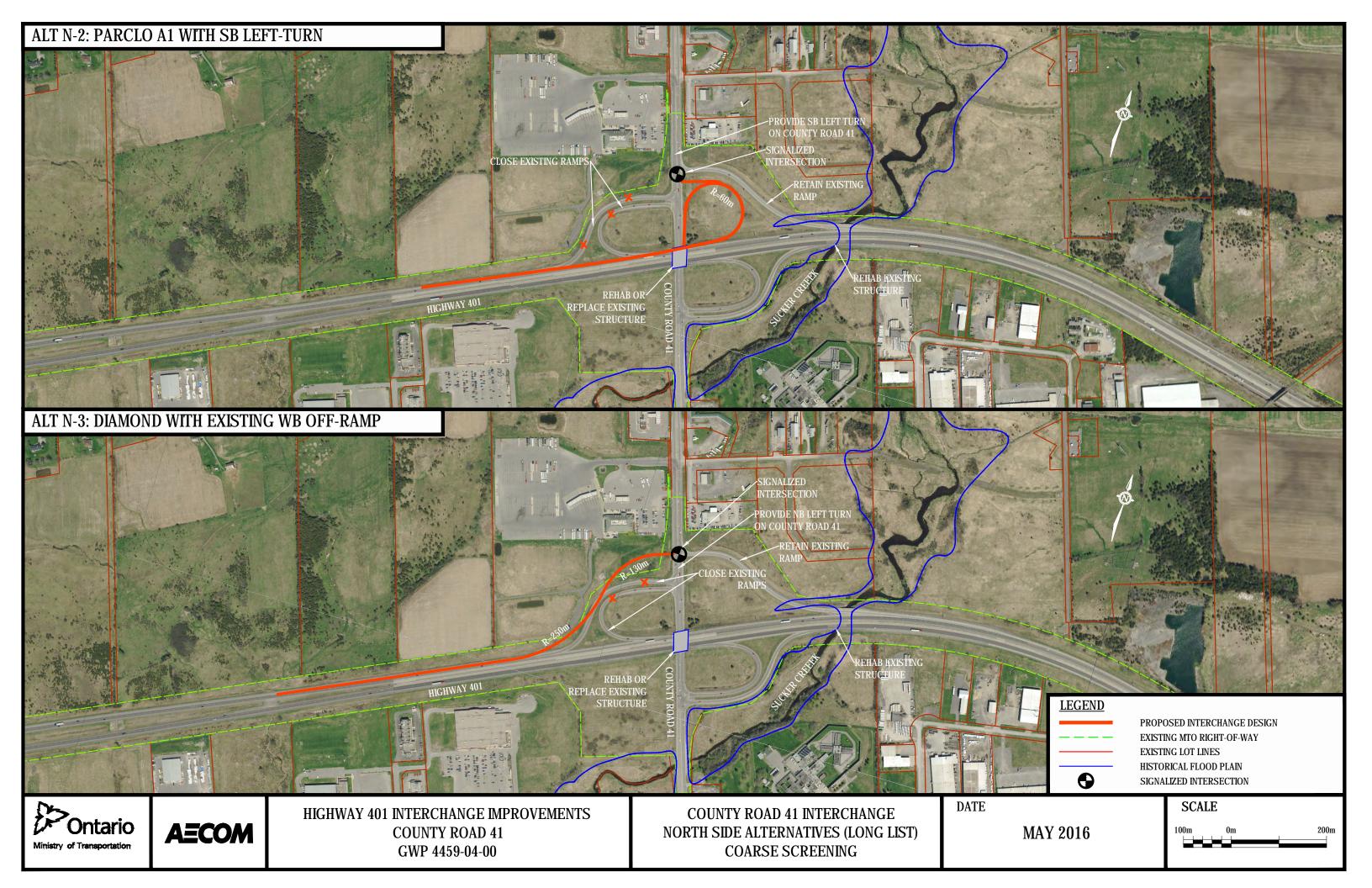


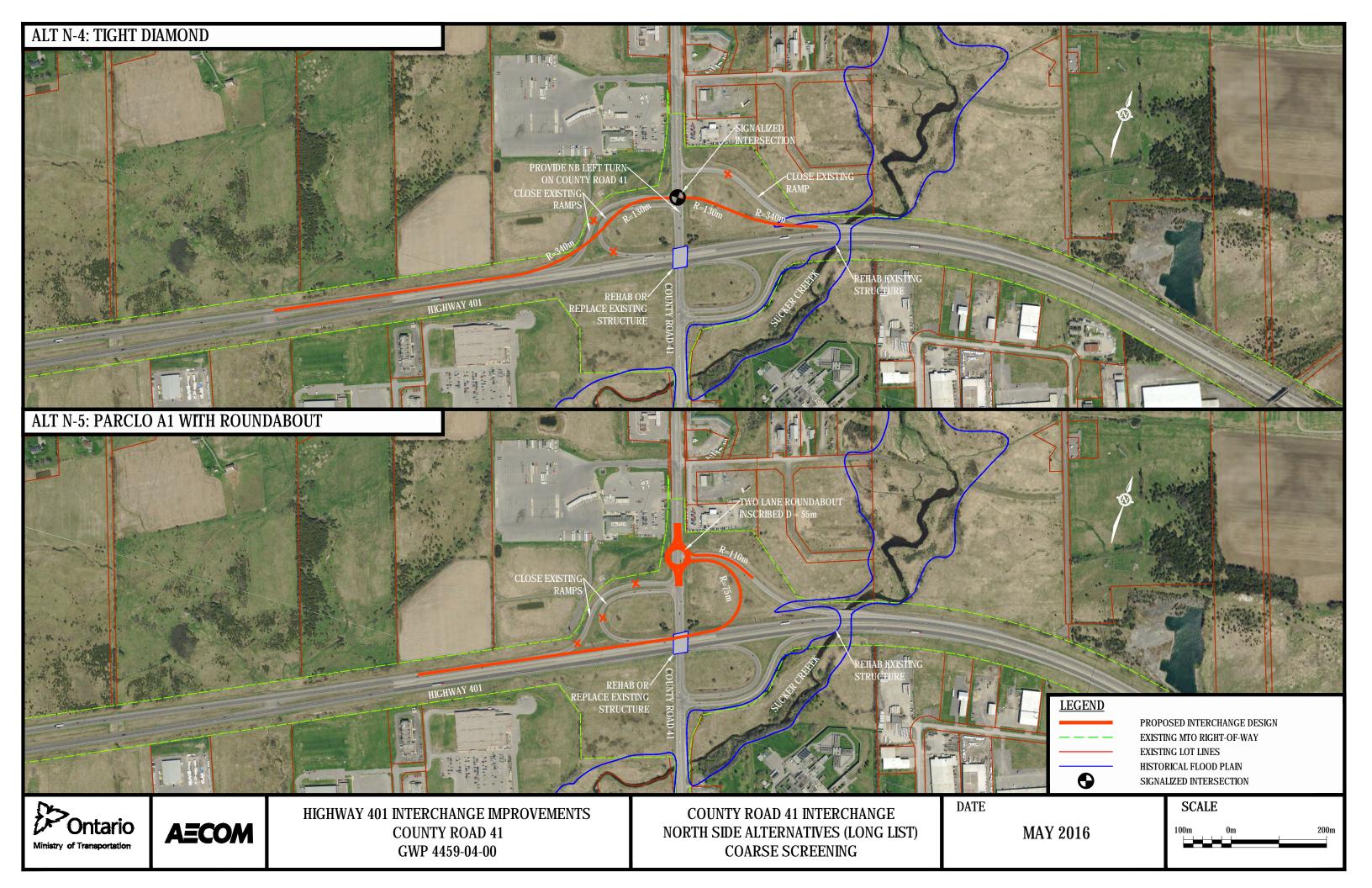


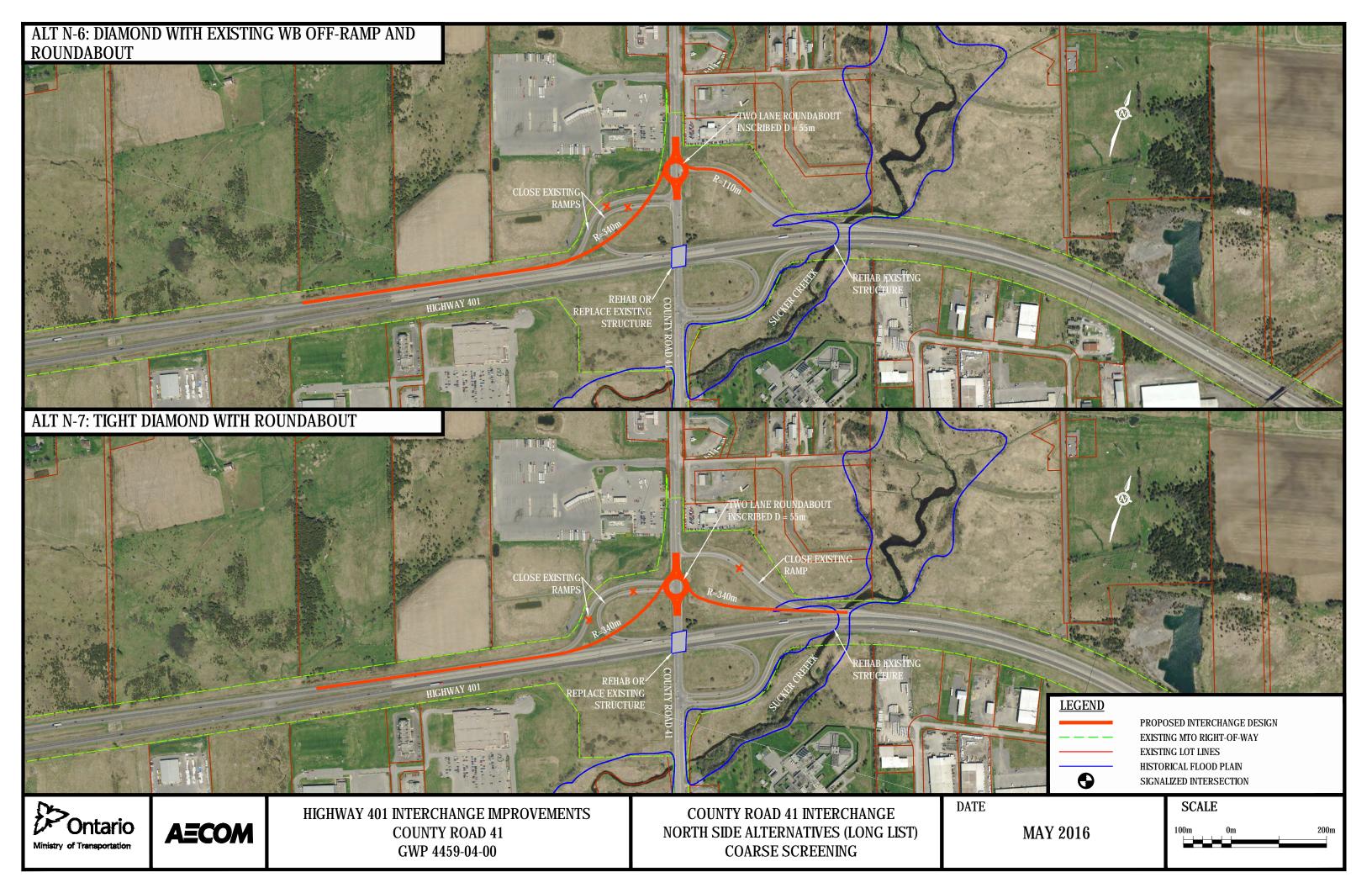
# **Appendix B – Highway 401 Interchange Improvement Alternatives Long List of Alternatives**

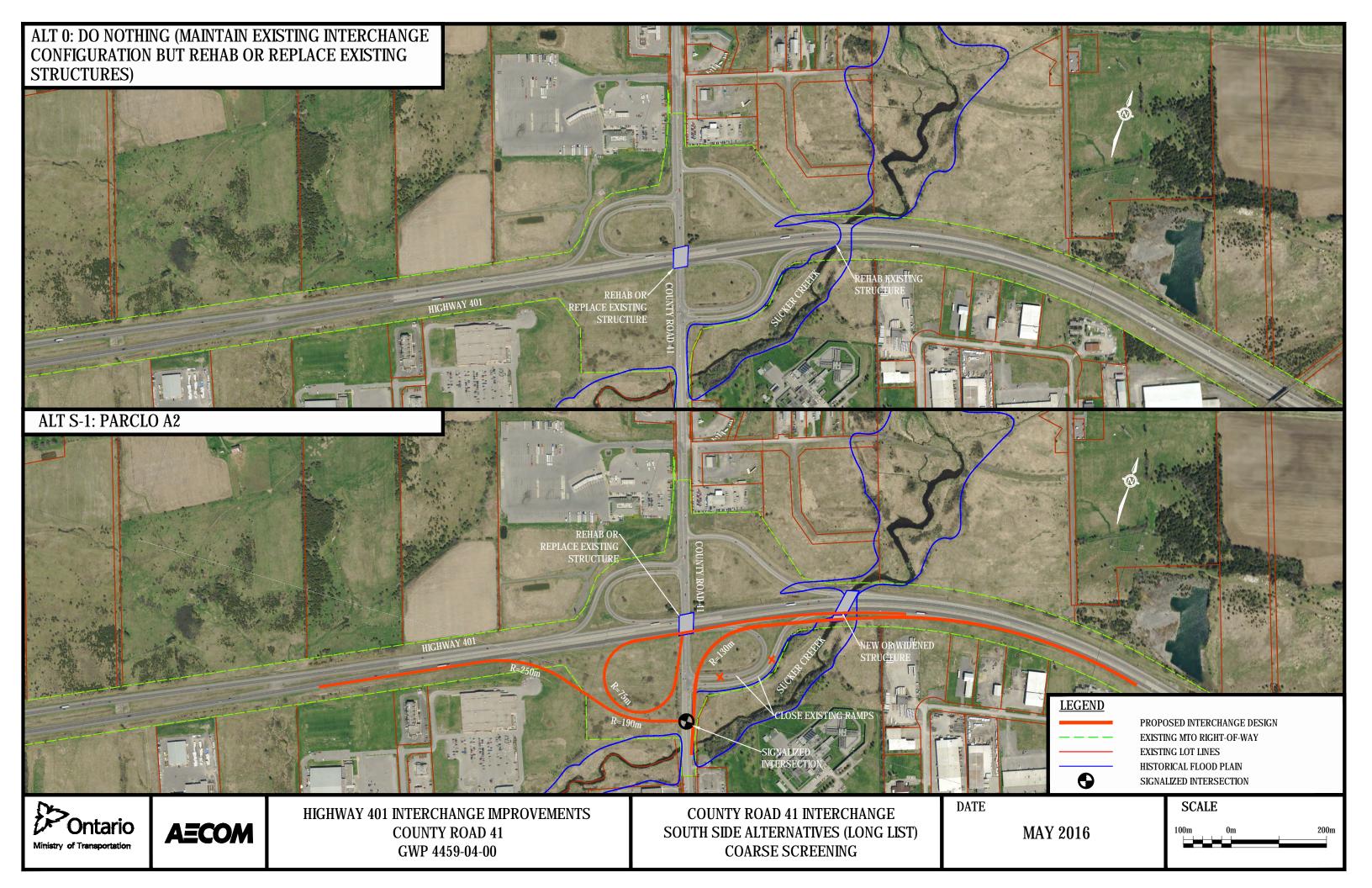
Prepared for: Ontario Ministry of Transportation

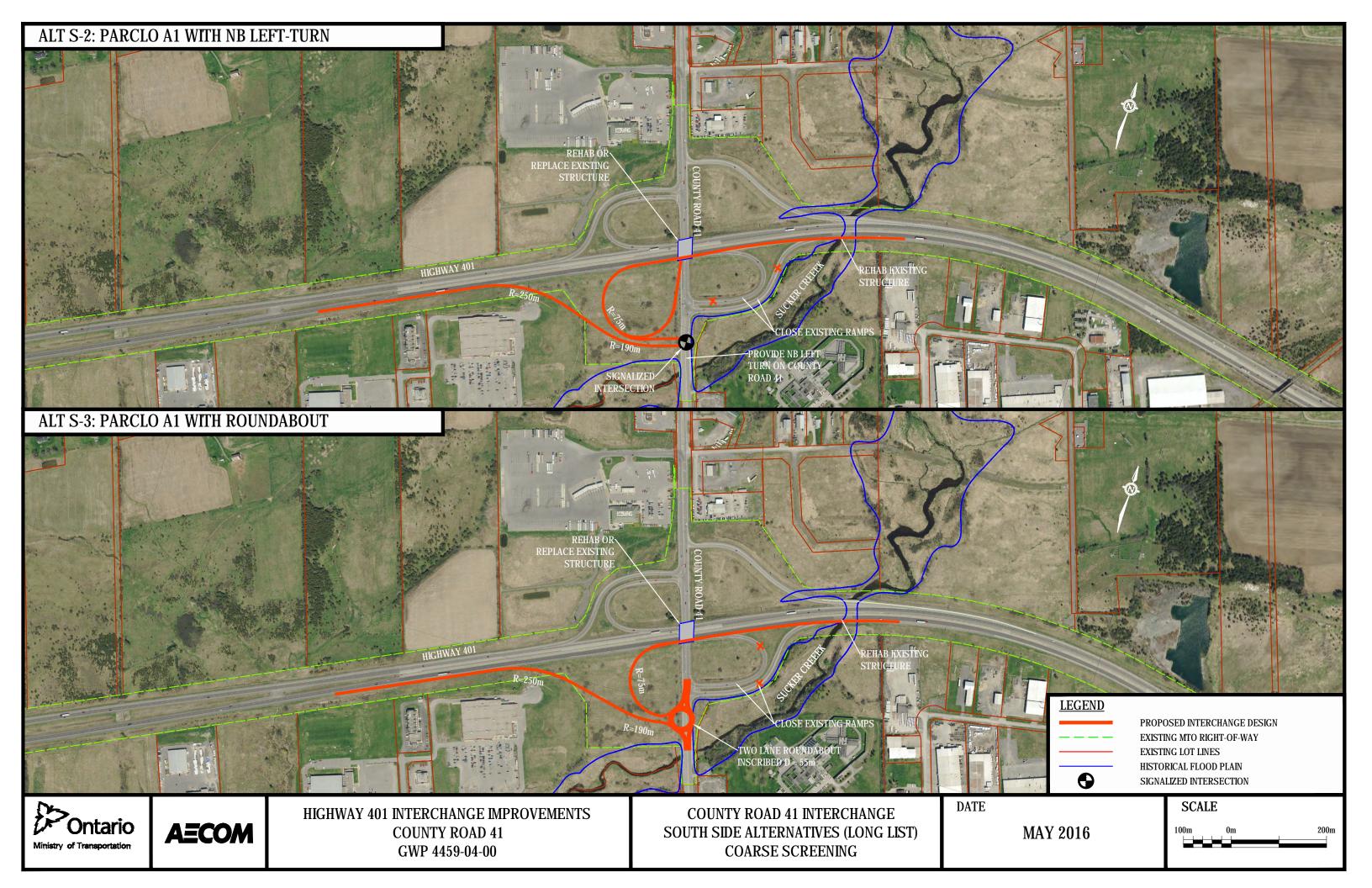


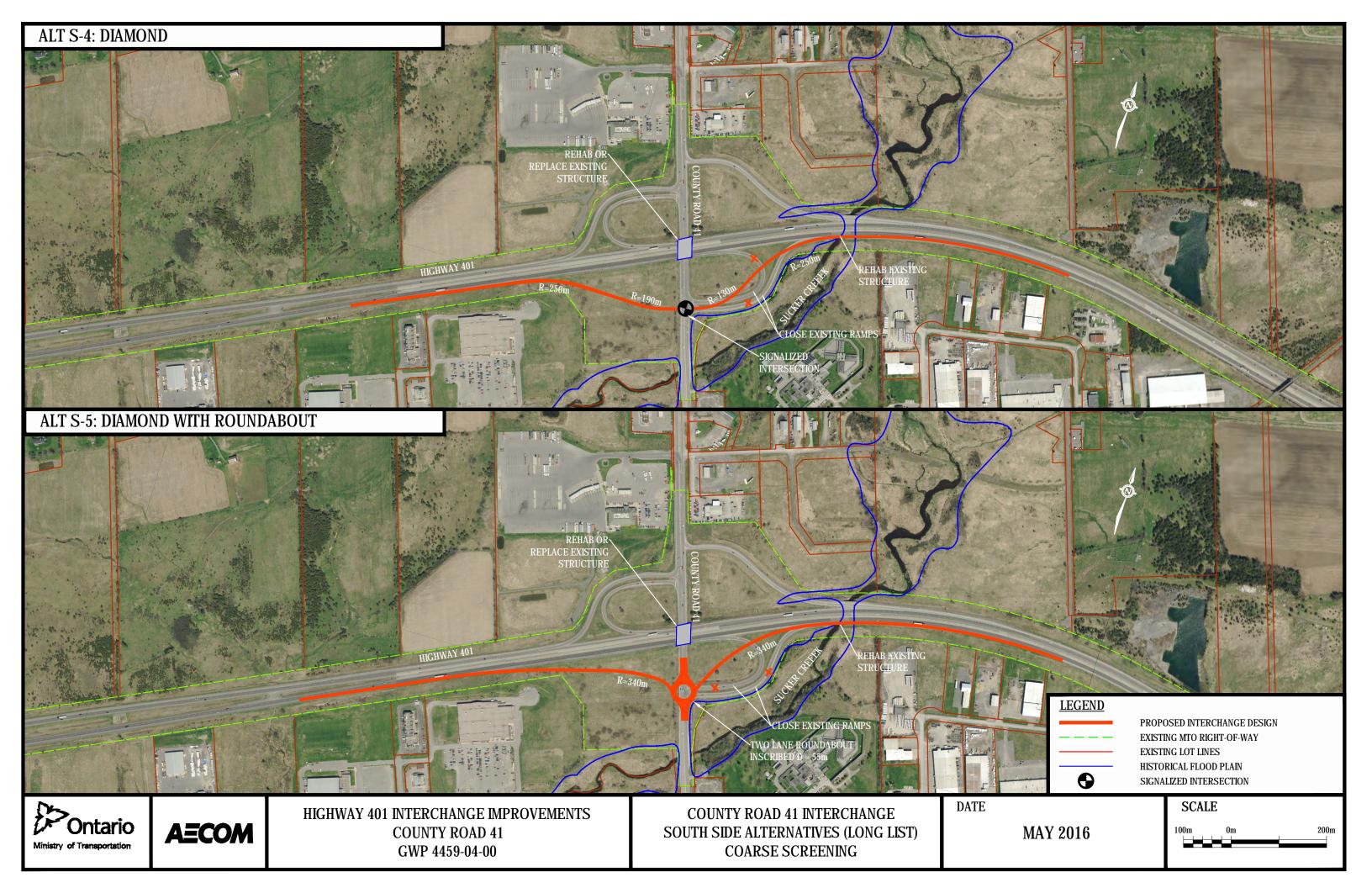












## **Appendix C – Long List of Alternatives Evaluation Tables**

Prepared for: Ontario Ministry of Transportation

		County Ro	oad 41 Interchange Alternatives – North (Table 1	County Road 41 Interchange Alternatives – North (Table 1: Do Nothing, Alternatives N-1 to N-3)										
	CATEGORY	Do Nothing	Alternative N-1	Alternative N-2	Alternative N-3									
		(Maintain existing interchange configuration,	(Parclo A2, and rehab/replace existing structures)	(Parclo A1 with Southbound Left Turn,	(Diamond with Existing Westbound Off-Ramp,									
		and rehab/replace existing structures)		and rehab/replace existing structures)	and rehab/replace existing structures)									
	Description	No change to existing interchange ramps	Construct new inner loop on-ramp (northbound     County Pd 41 to weeth avaid bloom 401)	• Construct new inner loop on-ramp (northbound	Construct westbound diamond on-ramp     interpretable County Bd 41 appreside suicities.									
		Rehab/replace existing County Rd 41 structure     and rehab Hypy 401/Sucker Crook structure	County Rd 41 to westbound Hwy 401)  • Construct new directional on-ramp (southbound)	County Rd 41 to westbound Hwy 401)  • Provide southbound left-turn to westbound	intersecting County Rd 41 opposite existing westbound off-ramp (north leg)									
		and rehab Hwy 401/Sucker Creek structure	County Rd 41 to westbound Hwy 401)	inner loop on-ramp	Provide northbound left-turn to westbound on-									
			Close existing westbound on-ramp and inner	Close existing westbound on-ramp and inner	ramp									
			loop off-ramp	loop off-ramp	Close existing westbound on-ramp and inner									
<b>&gt;</b>			• Rehab/replace existing County Rd 41 structure at	• Rehab/replace existing County Rd 41 structure at	loop off-ramp									
OVERVIEW			existing location and rehab Hwy 401/Sucker	existing location and rehab Hwy 401/Sucker	• Rehab/replace existing County Rd 41 structure at									
VEF			Creek structure	Creek structure	existing location and rehab Hwy 401/Sucker									
					Creek structure									
ALTERNATIVE	Schematic		SCO-WILZED NTERSECTION	PROVIDE SBLEFT TURN ON COUNTY ROAD 41	NTERSECTION  PROVIDE HE LEFT TURN ON COLUMN 2017 (1)									
N N			CLOSE EXISTING RAMPS	CLOSE EXISTING RAMPS INTERSECTION	RETAIN EXISTING RAMP									
里			RAMP	RETAIN EXISTING RAMP	CLOSE EXISTING RAMPS									
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		FEHAS EXSTING	REHAB BXSffNG	REPAS EXISTING	SEHAB BXISTING									
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	Recommendation	CARRY FORWARD FOR COMPARISON PURPOSES	CARRY FORWARD	CARRY FORWARD	CARRY FORWARD									
	Construction	Rehabilitation work of County Rd 41 and Hwy	Interchange improvements and structure work	Interchange improvements and structure work	Interchange improvements and structure work									
		Rehabilitation work of County Rd 41 and Hwy     401/Sucker Creek structures cannot be	Interchange improvements and structure work can be staged with low to moderate impacts to	Interchange improvements and structure work can be staged with low to moderate impacts to	Interchange improvements and structure work can be staged with low to moderate impacts to									
	Construction	Rehabilitation work of County Rd 41 and Hwy     401/Sucker Creek structures cannot be     undertaken without ramp or lane closures and	Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic	Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic	Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic									
	Construction	<ul> <li>Rehabilitation work of County Rd 41 and Hwy 401/Sucker Creek structures cannot be undertaken without ramp or lane closures and associated impacts/delay to Hwy 401 and</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction</li> </ul>									
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RIA	Construction Staging  Traffic Operations	<ul> <li>Rehabilitation work of County Rd 41 and Hwy 401/Sucker Creek structures cannot be undertaken without ramp or lane closures and associated impacts/delay to Hwy 401 and interchange traffic.</li> <li>Existing geometric deficiencies including sight</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> <li>Most desirable interchange configuration (no</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> <li>Good interchange Level of Service operations</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> <li>Good interchange Level of Service operations</li> </ul>									
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		County Ro	oad 41 Interchange Alternatives – North (Table 1	1: Do Nothing, Alternatives N-1 to N-3)	
	CATEGORY	Do Nothing (Maintain existing interchange configuration, and rehab/replace existing structures)	Alternative N-1 (Parclo A2, and rehab/replace existing structures)	and rehab/replace existing structures)	Alternative N-3 (Diamond with Existing Westbound Off-Ramp, and rehab/replace existing structures)
				across County Rd 41 structure)	
CRITERIA IPACTS)	Socio-Economic Impacts	No socio-economic impacts	No notable socio-economic impacts anticipated	No notable socio-economic impacts anticipated	Minor property acquisition required in northwest quadrant
ENVIRONMENTAL CF (FOOTPRINT IMPA	Natural Environment Impacts	No natural environmental impacts	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated
ENVIROI (FOO <sup>-</sup>	Cultural Heritage Impacts	No cultural heritage impacts	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated
SUMMARY	KEY ADVANTAGES  KEY DISADVANTAGES	Low construction cost     No environmental or property impacts      Does not accommodate rehabilitation work of County Rd 41 and Hwy 401/Sucker Creek structures without significant impacts to Hwy	<ul> <li>Most desirable interchange configuration and associated level of service and operations (capacity and delay)</li> <li>Addresses existing geometric and operational concerns</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> <li>High construction cost relative to other alternatives</li> <li>On-ramp speed change lane required on County</li> </ul>	<ul> <li>Addresses existing geometric and operational concerns</li> <li>Moderate construction cost relative to other alternatives</li> <li>Removes all ramps from northwest quadrant of interchange</li> <li>Directional ramp can be provided in the northwest quadrant of interchange at later date if required for traffic operations</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> <li>Southbound left-turn to westbound inner loop on-ramp required (less desirable operations than Alternative N-1)</li> </ul>	<ul> <li>Addresses existing geometric and operational concerns</li> <li>No speed change lanes required on County Rd 41 structure</li> <li>Low-Moderate construction cost relative to other alternatives</li> <li>Directional inner loop on-ramp can be provided in northeast quadrant of interchange at later date if required for traffic operations</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> <li>Northbound left-turn to westbound on-ramp required (less desirable operations than Alternative N-1)</li> </ul>
SCREENING SU		<ul> <li>401 and interchange traffic (lane and/or ramp closures required)</li> <li>Does not address existing and future geometric and operational concerns at interchange and associated collision risk</li> </ul>	Rd 41 structure (increased staging complexity to complete future structure rehabilitations)	<ul> <li>Merge or yield condition required at start of on- ramp with traffic entering from two directions</li> <li>On-ramp speed change lane required on County Rd 41 structure (increased staging complexity to complete future structure rehabilitations)</li> </ul>	Minor property acquisition required in northwest quadrant
	Recommendation	CARRY FORWARD FOR COMPARISON PURPOSES	CARRY FORWARD	CARRY FORWARD	CARRY FORWARD
	Rationale	Alternative will be carried forward for comparison purposes only	Alternative has the highest construction cost, however it provides the most desirable interchange configuration, associated level of service and operations including reduced collision risk	While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative N-1 and requires a southbound left-turn and merge along the westbound on-ramp, it is anticipated to result in acceptable operations and can be constructed with lower interchange footprint and at a lower overall construction cost	While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative N-1 and requires a northbound left-turn, it is anticipated to result in acceptable operations, removes the westbound speed change lane from the County Rd 41 structure, and can be constructed at a lower overall construction cost. Further, a directional inner loop on-ramp can be provided in northeast quadrant of interchange at later date if required for traffic operations.

			alace Road Interchange Alternatives – North <i>(Ta</i>			
	CATEGORY	Alternative N-4 (Tight Diamond, and rehab/replace existing structures)	Alternative N-5 (Parclo A1 with Roundabout, and rehab/replace existing structures)	Alternative N-6 (Diamond with Existing Westbound Off-Ramp, and Roundabout and rehab/replace existing structures)	Alternative N-7 (Tight Diamond with Roundabout, and rehab/replace existing structures)	
IVE OVERVIEW	Description	<ul> <li>Re-construct existing westbound off-ramp to intersect County Rd 41 opposite existing westbound on-ramp</li> <li>Provide northbound left-turn to westbound on-ramp</li> <li>Partial re-alignment of existing westbound on-ramp</li> <li>Close existing westbound on-ramp and inner loop off-ramp</li> <li>Rehab/replace existing County Rd 41 structure at existing location and rehab Hwy 401/Sucker Creek structure</li> </ul>	<ul> <li>Construct new roundabout at westbound offramp (north leg)</li> <li>Construct new inner loop on-ramp from roundabout (to westbound Hwy 401)</li> <li>Close existing westbound on-ramp and inner loop off-ramp</li> <li>Rehab/replace existing County Rd 41 structure at existing location and rehab Hwy 401/Sucker Creek structure</li> </ul>	<ul> <li>Construct new roundabout at westbound offramp (north leg)</li> <li>Construct new directional on-ramp from roundabout (to westbound Hwy 401)</li> <li>Close existing westbound on-ramp and inner loop off-ramp</li> <li>Rehab/replace existing County Rd 41 structure at existing location and rehab Hwy 401/Sucker Creek structure</li> </ul>	<ul> <li>Re-construct existing westbound off-ramp to connect with County Rd 41 opposite existing westbound on-ramp</li> <li>Construct new roundabout at ramp terminal intersection</li> <li>Construct new directional on-ramp from roundabout (to westbound Hwy 401)</li> <li>Close existing westbound on-ramp and inner loop off-ramp</li> <li>Rehab/replace existing County Rd 41 structure a existing location and rehab Hwy 401/Sucker Creek structure</li> </ul>	
ALTERNATIVE	Schematic	PROVIDE NB LEFT TURN ON COUNTY ROAD 41 CLOSE EXISTING RAMPS  REHAB OR REHAB OR STRUCTURE SIGNALIZED  CLOSE EXISTING RAMP  REPLACE EXISTING STRUCTURE STRUCTURE STRUCTURE STRUCTURE STRUCTURE SAMP  REPLACE EXISTING STRUCTURE STRUCTURE STRUCTURE STRUCTURE SAMP  REPLACE EXISTING STRUCTURE S	CLOSE EXISTING REHAB OR STRUCTURE OF STRUCTU	CLOSE EXISTING RAMPS REHAB OR OSTRUCTURE STRUCTURE TO OSTRUCTURE TO OSTR	CLOSE EXISTING RAMPS REPLACE EXISTING REPLACE EXISTING STRUCTURE REPLACE EX	
	Recommendation	DO NOT CARRY FORWARD	CARRY FORWARD	CARRY FORWARD	DO NOT CARRY FORWARD	
ΑΙ <sub>Α</sub>	Construction Staging	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> </ul>	
TECHNICAL SCREENING CRITERIA	Traffic Operations (including Geometrics and Safety)	<ul> <li>Good interchange Level of Service operations         (capacity and delay) anticipated, however         reduced separation distance to the south ramp         terminal intersection may result in potential         operational concerns between intersections</li> <li>Northbound left-turn to westbound on-ramp         required</li> <li>Addresses existing geometric and operational         concerns associated with existing westbound to         southbound off-ramp</li> </ul>	<ul> <li>Good interchange Level of Service operations anticipated through roundabout in short and long-term</li> <li>Reduced risk of severe collisions through roundabout relative to signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing westbound to southbound off-ramp</li> </ul>	<ul> <li>Good interchange Level of Service operations anticipated through roundabout in short and long-term</li> <li>Reduced risk of severe collisions through roundabout relative to signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing westbound to southbound off-ramp</li> </ul>	<ul> <li>Good interchange Level of Service operations anticipated through roundabout in short and long-term</li> <li>Reduced risk of severe collisions through roundabout relative to signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing westbound to southbound off-ramp</li> </ul>	
	Structure Requirements	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41 structure</li> </ul>	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>Westbound inner loop on-ramp speed change lane to be located on County Rd 41 structure</li> </ul>	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41 structure</li> </ul>	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41 structure</li> </ul>	

	Palace Road Interchange Alternatives – North (Table 2: Alternatives N-4 to N-7)											
	CATEGORY	Alternative N-4 (Tight Diamond, and rehab/replace existing structures)	Alternative N-5 (Parclo A1 with Roundabout, and rehab/replace existing structures)	Alternative N-6 (Diamond with Existing Westbound Off-Ramp, and Roundabout and rehab/replace existing structures)	Alternative N-7 (Tight Diamond with Roundabout, and rehab/replace existing structures)							
	Construction Cost (Qualitative)	<ul> <li>Moderate-High construction cost relative to other alternatives (one new and one re- constructed ramp, northbound left-turn lane on County Rd 41 and beneath structure)</li> </ul>	Moderate construction cost relative to other alternatives (one new ramp, roundabout at ramp terminal, speed change lane across County Rd 41 structure)	Low-Moderate construction cost relative to other alternatives (one new ramp, roundabout at ramp terminal)	<ul> <li>Moderate-High construction cost relative to other alternatives (two new ramps, roundabout at ramp terminal)</li> </ul>							
CRITERIA IPACTS)	Socio-Economic Impacts	Potential for minor property acquisition required in northwest quadrant	No notable socio-economic impacts anticipated	No notable socio-economic impacts anticipated	No notable socio-economic impacts anticipated							
ENVIRONMENTAL C	Natural Environment Impacts	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated							
ENVIROI (FOOT	Cultural Heritage Impacts	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated							
ARY	KEY ADVANTAGES	<ul> <li>Addresses existing geometric and operational concerns associated with existing westbound to southbound off-ramp</li> <li>No speed change lanes required on County Rd 41 structure</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> </ul>	<ul> <li>Addresses existing geometric and operational concerns associated with existing westbound to southbound off-ramp</li> <li>Reduced risk of severe collisions through roundabout</li> <li>Removes all ramps from northwest quadrant of interchange (potential carpool lot location)</li> <li>Moderate construction cost relative to other alternatives</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> </ul>	concerns associated with existing westbound to southbound off-ramp  risk of severe collisions through out all ramps from northwest quadrant of age (potential carpool lot location) e construction cost relative to other res  m structure works can be staged with  concerns associated with existing westbound to southbound off-ramp  Reduced risk of severe collisions through roundabout  No speed change lanes required on County Rd 41 structure  Low-Moderate construction cost relative to other alternatives  Short-term structure works can be staged with								
SCREENING SUMMARY	KEY DISADVANTAGES	<ul> <li>Recently constructed westbound off-ramp not utilized (throw-away)</li> <li>Northbound left-turn to westbound on-ramp required (less desirable operations than Alternative N-1)</li> <li>Reduced separation distance between north and south ramp terminal intersections (potential for queuing / operational concerns)</li> <li>Moderate-High construction cost relative to other alternatives</li> <li>Directional inner loop on-ramp cannot be provided in northeast quadrant of interchange if required at a later date for traffic operations.</li> </ul>	<ul> <li>Southbound left-turn move to westbound inner loop on-ramp required through roundabout (less desirable operations than Alternative N-1)</li> <li>Roundabouts less compatible with LCVs as compared with traditional intersections</li> <li>On-ramp speed change lane required on County Rd 41 structure (increased staging complexity to complete future structure rehabilitations)</li> </ul>	<ul> <li>Northbound left-turn move to westbound on- ramp required through roundabout (less desirable operations than Alternative N-1)</li> <li>Roundabouts less compatible with LCVs as compared with traditional intersections</li> </ul>	<ul> <li>Recently constructed westbound off-ramp not utilized (throw-away)</li> <li>Northbound left-turn move to westbound onramp required through roundabout (less desirable operations than Alternative N-1)</li> <li>Roundabouts less compatible with LCVs as compared with traditional intersections</li> <li>Moderate-High construction cost relative to other alternatives</li> <li>Directional inner loop on-ramp cannot be provided in northeast quadrant of interchange if required at a later date for traffic operations.</li> </ul>							
	Recommendation	DO NOT CARRY FORWARD	CARRY FORWARD	CARRY FORWARD	DO NOT CARRY FORWARD							
		While the alternative is anticipated to result in										



	P	alace Road Interchange Alternatives – North (Ta	ble 2: Alternatives N-4 to N-7)	
CATEGORY	Alternative N-4	Alternative N-5	Alternative N-6	Alternative N-7
	(Tight Diamond,	(Parclo A1 with Roundabout,	(Diamond with Existing Westbound Off-Ramp,	(Tight Diamond with Roundabout,
	and rehab/replace existing structures)	and rehab/replace existing structures)	and Roundabout and rehab/replace existing	and rehab/replace existing structures)
			structures)	
	acceptable Level of Service operations and lower	level of service or operational benefits as	level of service or operational benefits as	acceptable operations and lower property
	property footprint relative to Alternative N-3, it	Alternative N-1 and requires a southbound left-	Alternative N-1 and requires a northbound left	footprint relative to Alternative N-6, it does not
	does not utilize the recently constructed	movement to the westbound on-ramp, it is	movement to the westbound on-ramp, it is	utilize the recently constructed westbound off-
	westbound off-ramp, reduces separation distance	anticipated to result in acceptable operations and	anticipated to result in acceptable operations,	ramp, reduces separate distance to the south
	to the south ramp terminal intersection (potential	can be constructed with lower property footprint	removes the westbound speed change lane from	ramp terminal intersection (potential operational
	operational concerns) and is more costly than	and at a lower overall construction cost.	the County Rd 41 structure, and can be	concerns) and is more costly than other
	other alternatives. Further, construction of new		constructed at a lower overall construction cost.	alternatives. Further, construction of new WB off-
	WB off-ramp restricts ability to provide directional			ramp restricts ability to provide directional inner
	inner loop on-ramp in northeast quadrant of			loop on-ramp in northeast quadrant of
	interchange if required at a later date for traffic			interchange if required at a later date for traffic
	operations.			operations.

		County Road 41 Interchan	nge Alternatives – South (Table 1: Do Nothing, Alternatives S-1 and S-2)					
	CATEGORY	Do Nothing (Maintain existing interchange configuration, and rehab/replace existing structures)	Alternative S-1 (Parclo A2 and rehab/replace existing structures)	Alternative S-2 (Parclo A1 with Northbound Left Turn and rehab/replace existing structures)				
OVERVIEW	Description	<ul> <li>No change to existing interchange ramps</li> <li>Rehab or replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> </ul>	<ul> <li>Construct new eastbound off-ramp intersecting County Rd 41 south of existing eastbound on-ramp</li> <li>Construct new inner loop on-ramp (southbound County Rd 41 to eastbound Hwy 401)</li> <li>Construct new directional on-ramp (northbound County Rd 41 to eastbound Hwy 401)</li> <li>Close existing eastbound on-ramp and inner loop off-ramp</li> <li>Rehab or replace existing County Rd 41 structure at existing location and rehab Hwy 401/Sucker Creek structure</li> <li>Construct new or widened structure at Hwy 401/Sucker Creek for eastbound on-ramp</li> </ul>	<ul> <li>Construct new eastbound off-ramp intersecting County Rd 41 south of existing eastbound on-ramp</li> <li>Construct new inner loop on-ramp (southbound County Rd 41 to eastbound Hwy 401)</li> <li>Provide northbound left-turn to eastbound inner loop on-ramp</li> <li>Close existing eastbound on-ramp and inner loop off-ramp</li> <li>Rehab or replace existing County Rd 41 structure at existing location and rehab Hwy 401/Sucker Creek structure</li> </ul>				
ALTERNATIVE OV	Schematic	REHAB OR COUNT REPLACE EXISTING STRUCTURE ON STRUCTURE OF	REHAB OR REPLACE EXISTING STRUCTURE  NEW OR WIDENE STRUCTURE  OLOSE EXISTING RAMPS  NEW OR WIDENE STRUCTURE  SIGNALIZED INTERSECTION	REHAB DR REPLACE EXISTING STRUCTURE  REHAB DXSTING STRUCTURE  CLOSE EXISTING RAMPS  REHAB DXSTING STRUCTURE  CLOSE EXISTING RAMPS  REHAB DXSTING STRUCTURE  REHAB DXSTING S				
	Recommendation	CARRY FORWARD FOR COMPARISON PURPOSES	CARRY FORWARD	CARRY FORWARD				
NING CRITERIA	Construction Staging	<ul> <li>Rehabilitation work of County Rd 41 and Hwy 401/Sucker Creek structures cannot be undertaken without ramp or lane closures and associated impacts/delay to Hwy 401 and interchange traffic.</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Temporary connection between new eastbound off-ramp and existing on-ramp potentially required during construction</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> </ul>	<ul> <li>Interchange improvements and structure work can be staged with low to moderate impacts to ramps and Hwy 401 traffic</li> <li>Temporary connection between new eastbound off-ramp and existing on-ramp potentially required during construction</li> <li>Reduction to single lane in either direction required along County Rd 41 during bridge work</li> </ul>				
TECHNICAL SCREENING	Traffic Operations (including Geometrics and Safety)	<ul> <li>Existing geometric deficiencies including sight distance concerns at ramps and associated collision risk not addressed</li> <li>Level of Service 'D' operations anticipated in future at eastbound off-ramp, with queuing along County Rd 41 for left-turn to eastbound Hwy 401 continuing to worsen and impact through traffic</li> </ul>	<ul> <li>Most desirable interchange configuration (no left-turns required) with good interchange Level of Service operations (capacity and delay) anticipated and reduced conflict points at ramp terminal</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> </ul>	<ul> <li>Good interchange Level of Service operations (capacity and delay) anticipated</li> <li>Northbound left-turn to eastbound inner loop on-ramp required</li> <li>Merge or yield condition required at start of on-ramp with traffic entering from two directions</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> </ul>				

	CATEGORY	Do Nothing	ge Alternatives – South (Table 1: Do Nothing, Alternatives S-1 a  Alternative S-1	Alternative S-2
		(Maintain existing interchange configuration, and rehab/replace existing structures)	(Parclo A2 and rehab/replace existing structures)	(Parclo A1 with Northbound Left Turn and rehab/replace existing structures)
	Structure Requirements	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>Existing eastbound off-ramp speed change lane maintained on County Rd 41 structure</li> </ul>	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>Eastbound inner loop on-ramp speed change lane to be located on County Rd 41 structure</li> <li>New or widened structure at Hwy 401/Sucker Creek required for eastbound on-ramp</li> </ul>	<ul> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>Eastbound inner loop on-ramp speed change lane to be located on County Rd 41 structure</li> </ul>
	Construction Cost (Qualitative)	<ul> <li>Low construction cost relative to other alternatives (bridge rehab/replacement costs only)</li> </ul>	<ul> <li>High construction cost relative to other alternatives (three new ramps, speed change lane across County Rd 41 structure, ramp structure requirements at Hwy 401/Sucker Creek)</li> </ul>	<ul> <li>Moderate construction cost relative to other alternatives (two new ramps, northbound left-turn lane on County Rd 41, speed change lane across County Rd 41 structure)</li> </ul>
'AL RINT	Socio-Economic Impacts	No socio-economic impacts	Minor property requirement in southwest quadrant of interchange	<ul> <li>Minor property requirement in southwest quadrant of interchange</li> </ul>
ENVIRONMENTAL RITERIA (FOOTPRINT IMPACTS)	Natural Environment Impacts	No natural environmental impacts	Eastbound on-ramp crossing at Hwy 401/Sucker Creek results in minor floodplain and fisheries impacts	No notable natural environment impacts anticipated
ENVIRC CRITERIA IMI	Cultural Heritage Impacts	No cultural heritage impacts	Low potential for archaeological impacts given crossing at Hwy 401/Sucker Creek	No notable cultural heritage impacts anticipated
	KEY ADVANTAGES	Low construction cost     No environmental or property impacts	<ul> <li>Most desirable interchange configuration and associated level of service and operations (capacity and delay)</li> <li>Addresses existing geometric and operational concerns</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> </ul>	<ul> <li>Addresses existing geometric and operational concerns</li> <li>Removes all ramps from southeast quadrant of interchange</li> <li>Moderate construction cost relative to other alternatives</li> <li>Directional ramp can be provided in the southeast quadrant of interchange at later date if required for traffic operations</li> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> </ul>
SCREENING SUMMARY	KEY DISADVANTAGES	<ul> <li>Does not accommodate rehabilitation work of County Rd 41 and Hwy 401/Sucker Creek structures</li> <li>Does not address existing and future geometric and operational concerns at interchange and associated collision risk</li> </ul>	<ul> <li>On-ramp speed change lane required on County Rd 41 structure (increased staging complexity to complete future structure rehabilitations)</li> <li>New or widened structure required at Hwy 401/Sucker Creek for eastbound on-ramp</li> <li>Temporary connection between new eastbound off-ramp and existing on-ramp potentially required during construction</li> <li>Minor property requirements in SW quadrant of interchange</li> <li>High construction cost relative to other alternatives</li> </ul>	<ul> <li>Northbound left-turn to eastbound inner loop on-ramp required (less desirable operations than Alternative S-1)</li> <li>Merge or yield condition required at start of on-ramp with traffic entering from two directions</li> <li>Temporary connection between new eastbound off-ramp and existing on-ramp potentially required during construction</li> <li>On-ramp speed change lane required on County Rd 41 structure (increased staging complexity to complete future structure rehabilitations)</li> <li>Minor property requirements in SW quadrant of interchange</li> </ul>
	Recommendation	CARRY FORWARD FOR COMPARISON PURPOSES	CARRY FORWARD	CARRY FORWARD
	Rationale	Alternative will be carried forward for comparison purposes only	Alternative has highest construction cost, however it also provides the most desirable interchange configuration, associated level of service and operations including reduced collision risk	While the alternative is not anticipated to provide the same level of service or operational benefits as Alternative S-1 and requires a northbound left-turn and merge along the eastbound on-ramp, it is anticipated to result in acceptable operations and can be constructed with a lower footprint and at a lower overall construction cost

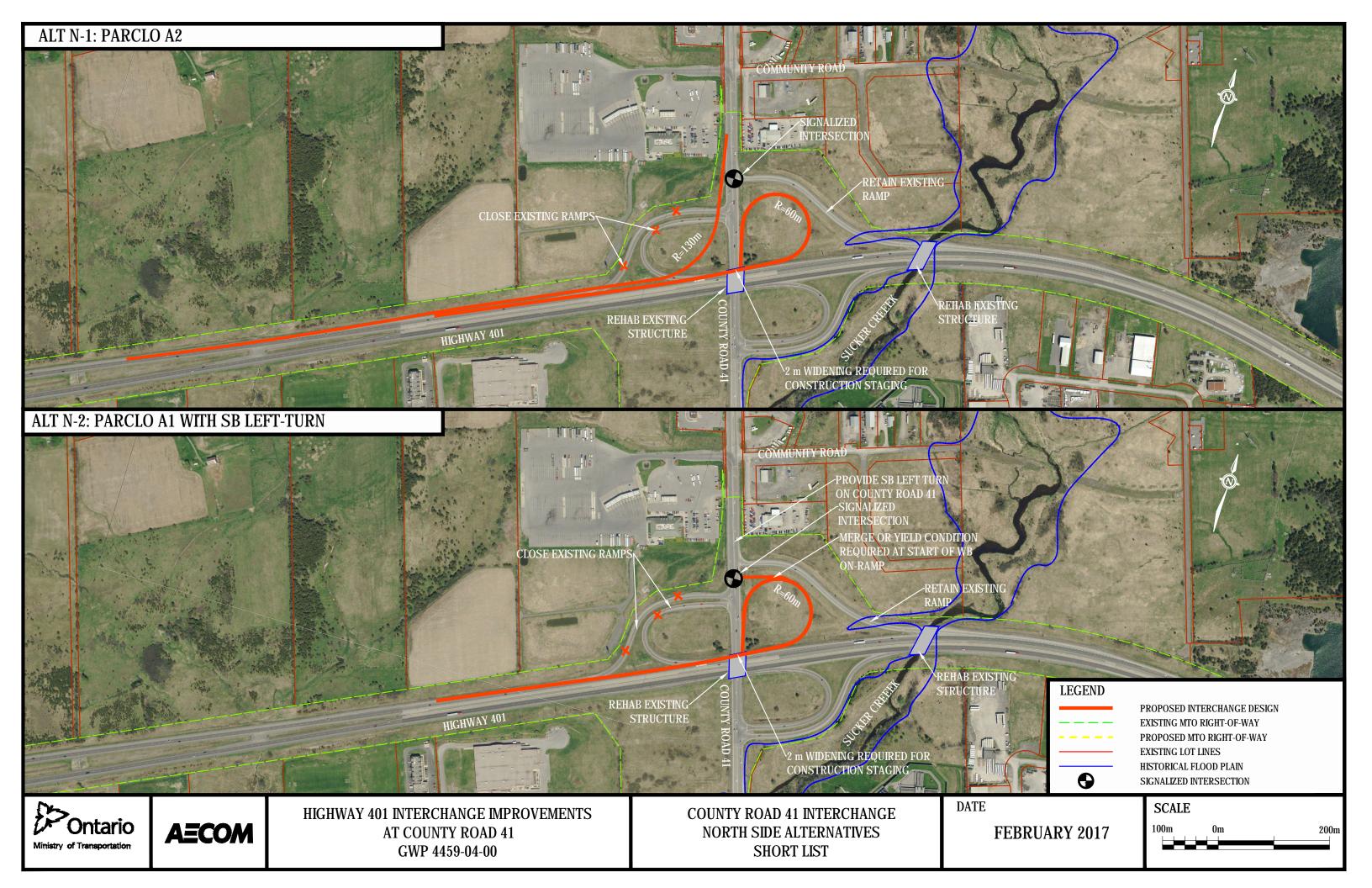


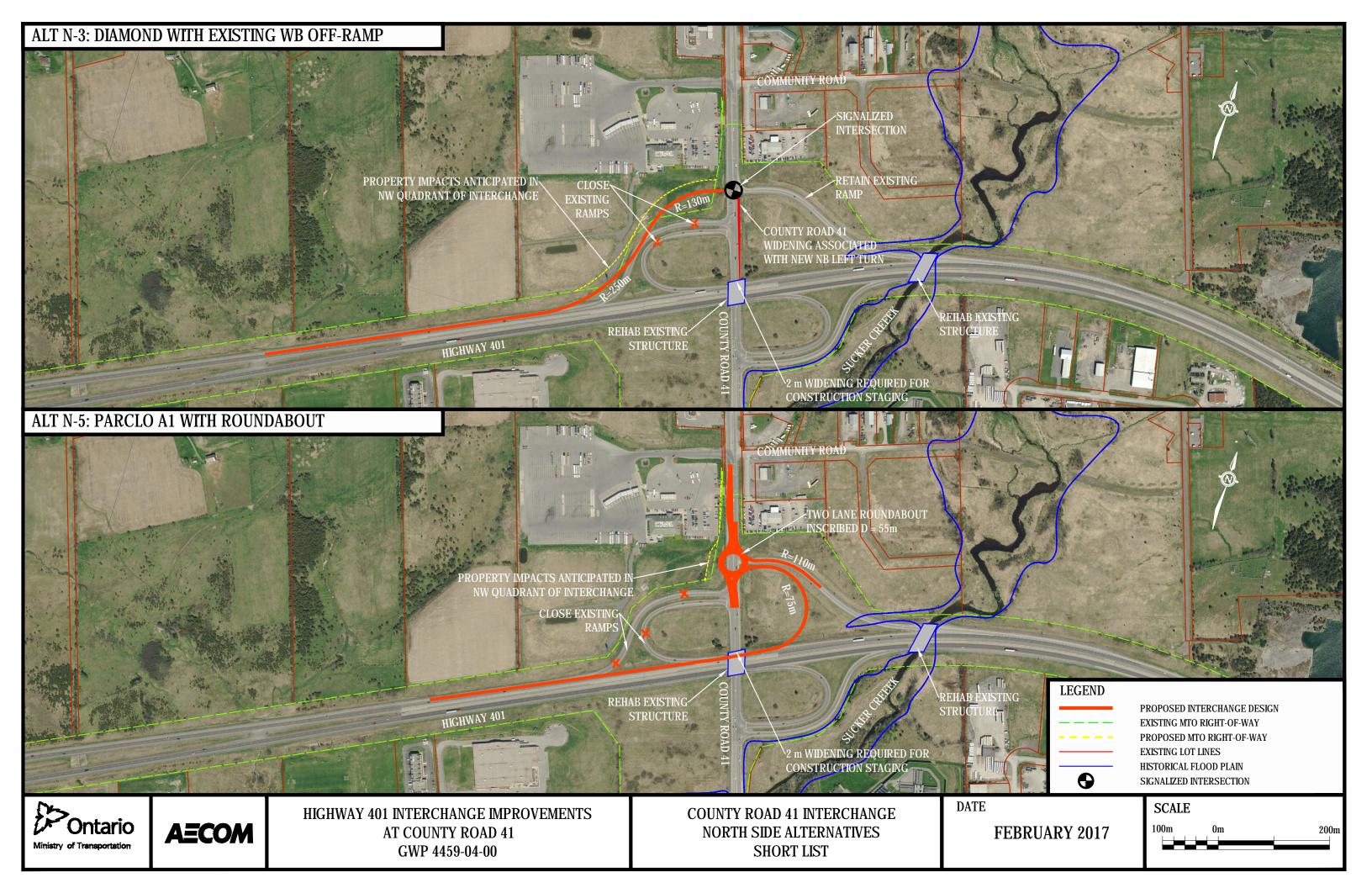
		Palace Road Inter	Palace Road Interchange Alternatives – South (Table 2: Alternatives S-3 to S-5)													
	CATEGORY	Alternative S-3	Alternative S-4	Alternative S-5												
		(Diamond and rehab/replace existing structures)	(Parclo A1 with Roundabout	(Diamond with Roundabout												
			and rehab/replace existing structures)	and rehab/replace existing structures)												
	Description	Construct new eastbound diamond off-ramp intersecting County	Construct new eastbound off-ramp intersecting County Rd 41	Construct new eastbound diamond off-ramp intersecting County												
		Rd 41 opposite existing eastbound on-ramp	south of existing eastbound on-ramp	Rd 41 opposite existing eastbound on-ramp												
		Provide southbound left-turn to eastbound on-ramp	Construct new roundabout at eastbound off-ramp	Construct new roundabout at eastbound off-ramp												
		Close existing eastbound on-ramp and inner loop off-ramp	Construct new inner loop on-ramp from roundabout (to	Construct new directional on-ramp from roundabout (to												
		Rehab or replace existing County Rd 41 structure at existing	eastbound Hwy 401)	westbound Hwy 401)												
		location and rehab Hwy 401/Sucker Creek structure	Close existing eastbound on-ramp and inner loop off-ramp	Close existing eastbound on-ramp and inner loop off-ramp												
			Rehab or replace existing County Rd 41 structure at existing	Rehab or replace existing County Rd 41 structure at existing												
E			location and rehab Hwy 401/Sucker Creek structure	location and rehab Hwy 401/Sucker Creek structure												
ALTERNATIVE OVERVIEW	Schematic	REHAB EXISTING STRUCTURE  WITHOUT  REHAB EXISTING STRUCTURE  REHAB EXISTING STRUCTURE  S	REPLACE EXISTING STRUCTURE  REPLACE EXISTING STRUCTURE  REPLACE EXISTING STRUCTURE  REPLACE EXISTING STRUCTURE  REPLACE EXISTING RAMPS  CLOSE EXISTING RAMPS  TWO LÂNE ROUNDASOUT INSCRIBED D = 55m.	REHAB FX:STING STRUCTURE  REHAB FX:STING STRUCTURE  REHAB FX:STING STRUCTURE  CLOSE EXISTING RAMPS  TWO DANE ROUNDABOUT INSCRIBED D = 550												
	Recommendation	CARRY FORWARD	CARRY FORWARD	CARRY FORWARD												
	Construction	• Interchange improvements and structure work can be staged with	Interchange improvements and structure work can be staged with	Interchange improvements and structure work can be staged with												
	Staging	low to moderate impacts to ramps and Hwy 401 traffic	low to moderate impacts to ramps and Hwy 401 traffic	low to moderate impacts to ramps and Hwy 401 traffic												
		Reduction to single lane in either direction required along County	Temporary connection between new eastbound off-ramp and	Reduction to single lane in either direction required along County												
		Rd 41 during bridge work	existing on-ramp potentially required during construction	Rd 41 during bridge work												
RIA			Reduction to single lane in either direction required along County													
CRITE			Rd 41 during bridge work													
	Traffic Operations	Good interchange Level of Service operations (capacity and delay)	Good interchange operations anticipated through roundabout in	Good interchange operations anticipated through roundabout in												
N N	(including	anticipated	short and long-term	short and long-term												
	Caanaatuiaa anal															
	Geometrics and	Southbound left-turn to eastbound on-ramp required	Reduced risk of severe collisions through roundabout relative to	Reduced risk of severe collisions through roundabout relative to												
CRE	Geometrics and Safety)	Addresses existing geometric and operational concerns associated	signalized intersection	signalized intersection												
L SCREENING		·	signalized intersection  • Addresses existing geometric and operational concerns associated	signalized intersection  • Addresses existing geometric and operational concerns associated												
	Safety)	Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41	signalized intersection  • Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41	signalized intersection  • Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41												
	Safety) Structure	<ul> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy</li> </ul>	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy</li> </ul>	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy</li> </ul>												
	Safety)	<ul> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> </ul>	signalized intersection  • Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41  • Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure	signalized intersection  • Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41  • Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure												
TECHNICAL SCRE	Safety) Structure	<ul> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy</li> </ul>	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>Eastbound inner loop on-ramp speed change lane to be located on</li> </ul>	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy</li> </ul>												
	Safety) Structure	<ul> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41</li> </ul>	signalized intersection  • Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41  • Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41</li> </ul>												
	Structure Requirements	<ul> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41 structure</li> </ul>	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>Eastbound inner loop on-ramp speed change lane to be located on County Rd 41 structure</li> </ul>	<ul> <li>signalized intersection</li> <li>Addresses existing geometric and operational concerns associated with existing eastbound off-ramp and queuing along County Rd 41</li> <li>Rehab/replace existing County Rd 41 structure and rehab Hwy 401/Sucker Creek structure</li> <li>No ramp or speed change lanes required over County Rd 41 structure</li> </ul>												

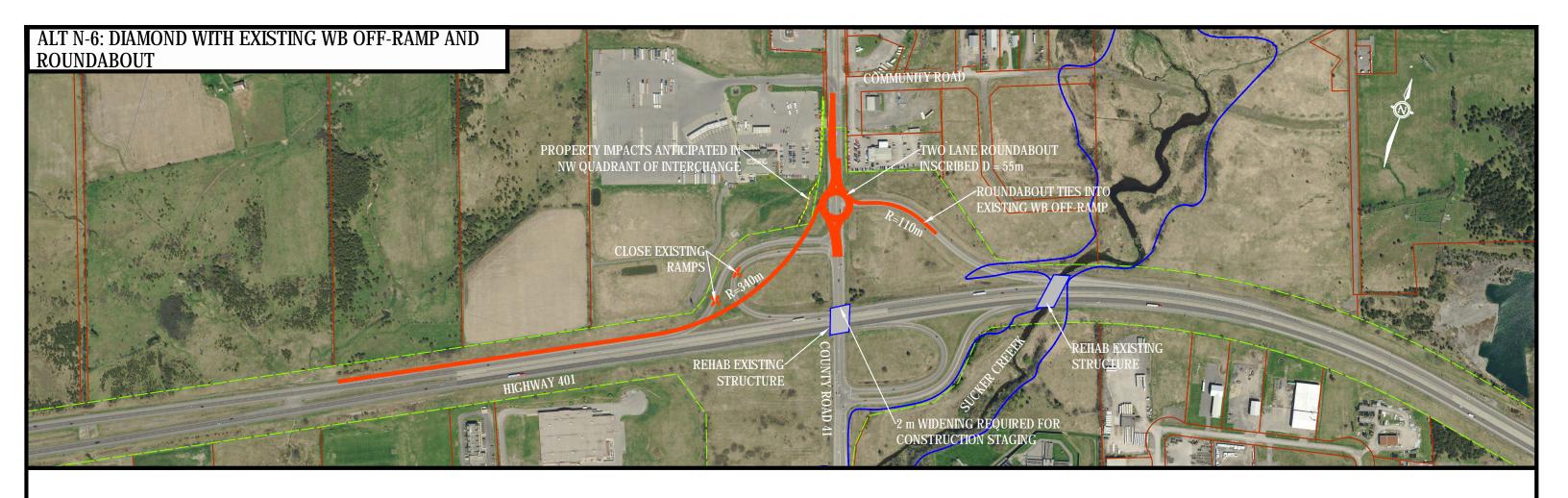
		Palace Road Inter	change Alternatives – South (Table 2: Alternatives S-3 to S-5)	
	CATEGORY	Alternative S-3	Alternative S-4	Alternative S-5
		(Diamond and rehab/replace existing structures)	(Parclo A1 with Roundabout and rehab/replace existing structures)	(Diamond with Roundabout and rehab/replace existing structures)
	Socio-Economic	No notable socio-economic impacts anticipated	Minor property requirement in southwest quadrant of	No notable socio-economic impacts anticipated
RITERIA (CTS)	Impacts		interchange	
ENVIRONMENTAL CRITERIA (FOOTPRINT IMPACTS)	Natural Environment Impacts	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated	No notable natural environment impacts anticipated
ENVIRO (FOO	Cultural Heritage Impacts	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated	No notable cultural heritage impacts anticipated
	KEY ADVANTAGES	Addresses existing geometric and operational concerns	Addresses existing geometric and operational concerns	Addresses existing geometric and operational concerns
		No speed change lanes required on County Rd 41 structure	Reduced risk of severe collisions through roundabout	Reduced risk of severe collisions through roundabout
		Low-Moderate construction cost relative to other alternatives	Removes all ramps from southeast quadrant of interchange	No speed change lanes required on County Rd 41 structure
		No property impacts anticipated     Short town attractive words and be attached with levels and denote and another actions.	<ul><li>(potential carpool lot location)</li><li>Moderate construction cost relative to other alternatives</li></ul>	No property impacts anticipated  A law Madagata apparation and relative to other alternatives.
		<ul> <li>Short-term structure works can be staged with low to moderate impacts to traffic</li> </ul>	Short-term structure works can be staged with low to moderate	<ul> <li>Low-Moderate construction cost relative to other alternatives</li> <li>Short-term structure works can be staged with low to moderate</li> </ul>
		impacts to traine	impacts to traffic	impacts to traffic
RY	KEY DISADVANTAGES	<ul> <li>Southbound left-turn to eastbound on-ramp required (less desirable operations than Alternative S-1)</li> <li>Left-turn lane may extend beneath County Rd 41 structure (wider</li> </ul>	Northbound left-turn move to eastbound inner loop on-ramp required through roundabout (less desirable operations than Alternative S-1)	Southbound left-turn move to eastbound on-ramp required through roundabout (less desirable operations than Alternative S-1)
UMMARY		structure required)	Roundabouts less compatible with LCVs as compared with traditional intersections	Roundabouts less compatible with LCVs as compared with traditional intersections
S			Temporary connection between new eastbound off-ramp and	
ENING			existing on-ramp potentially required during construction	
Z			Minor property requirements in SW quadrant of interchange	
SCRE			• On-ramp speed change lane required on County Rd 41 structure	
Ñ			(increased staging complexity to complete future structure rehabilitations)	
	Recommendation	CARRY FORWARD	CARRY FORWARD	CARRY FORWARD
	Rationale	While the alternative is not anticipated to provide the same level of	While the alternative is not anticipated to provide the same level of	While the alternative is not anticipated to the same level of service
		service or operational benefits as Alternative S-1 and requires a	service or operational benefits as Alternative S-1 and requires a	or operational benefits as Alternative S-1 and requires a
		southbound left-turn, it is anticipated to result in acceptable	northbound left movement to the eastbound on-ramp, it is	southbound left-movement to the eastbound on-ramp, it is
		operations, removes the eastbound speed change lane from the	anticipated to result in acceptable operations and can be	anticipated to result in acceptable operations, removes the
		County Rd 41 structure, has a lower interchange footprint and can be constructed at a lower overall construction cost	constructed with lower interchange footprint and at a lower overall construction cost	eastbound speed change lane from the County Rd 41 structure, has a lower interchange footprint and can be constructed at a lower overall construction cost

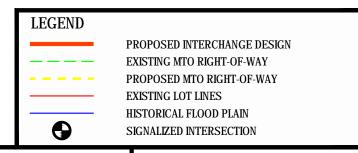
### **Appendix D – Highway 401 Interchange Improvements Short List of Alternatives**

Prepared for: Ontario Ministry of Transportation









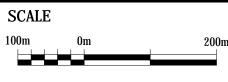


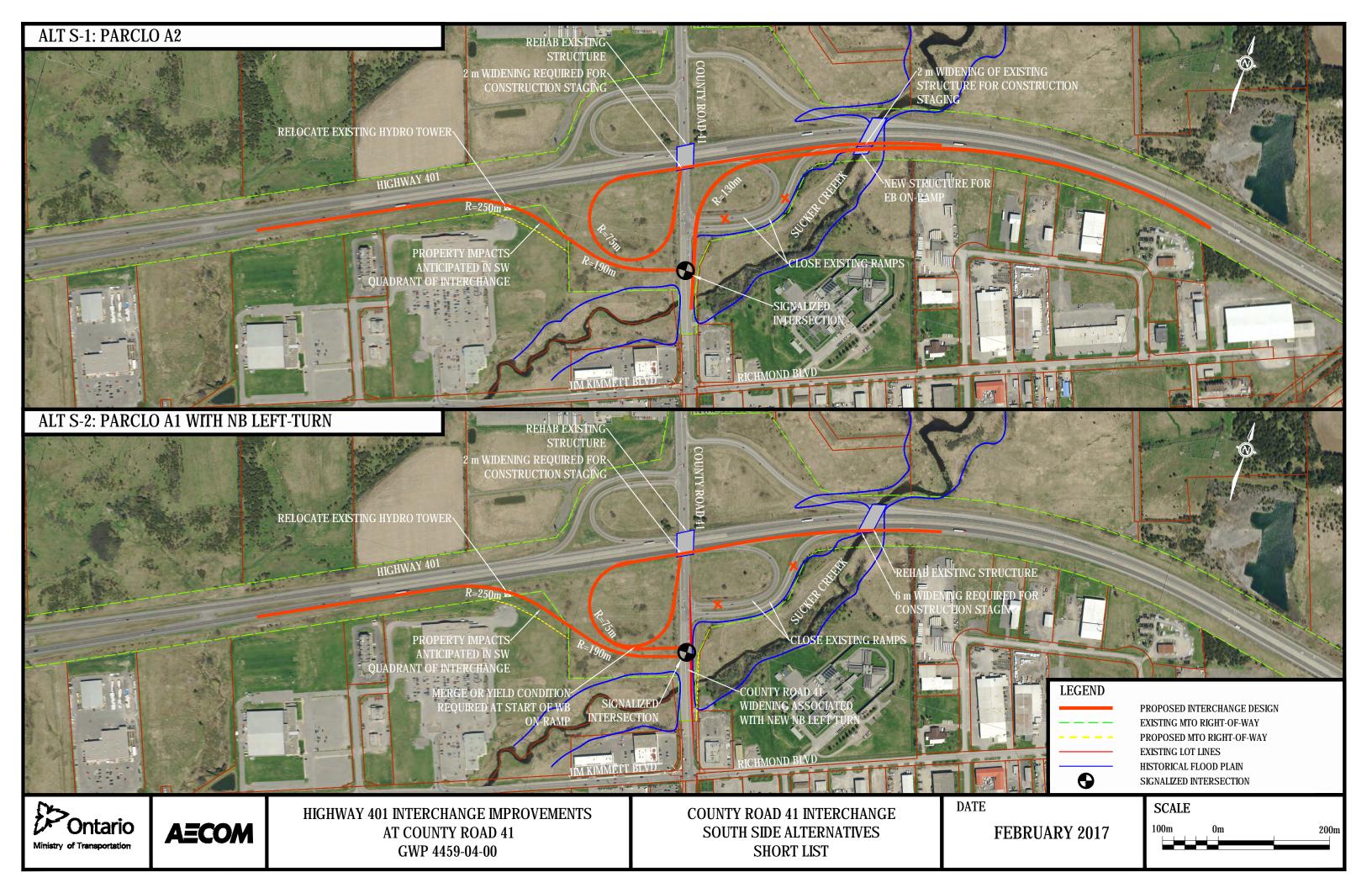


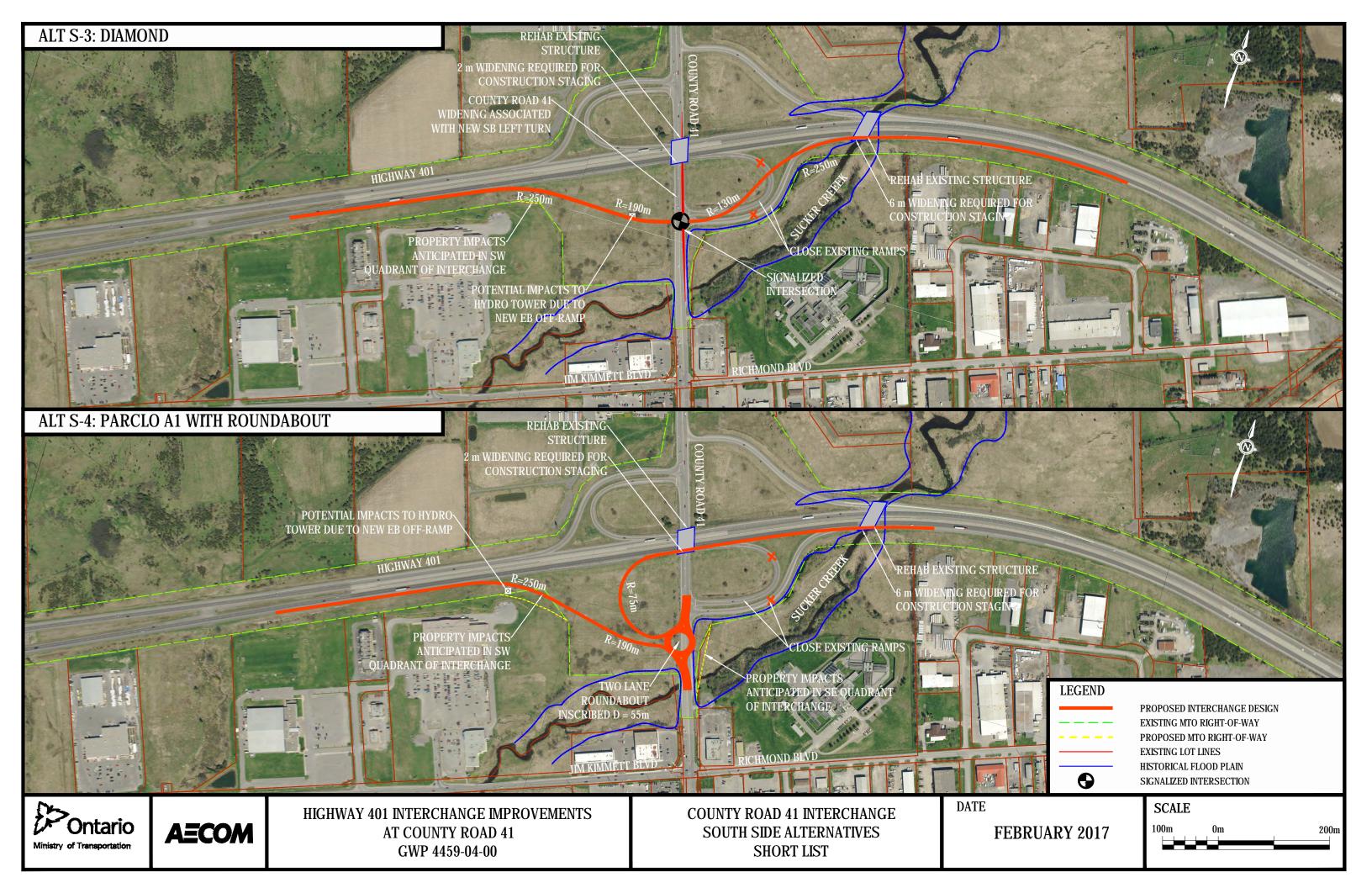
HIGHWAY 401 INTERCHANGE IMPROVEMENTS
AT COUNTY ROAD 41
GWP 4459-04-00

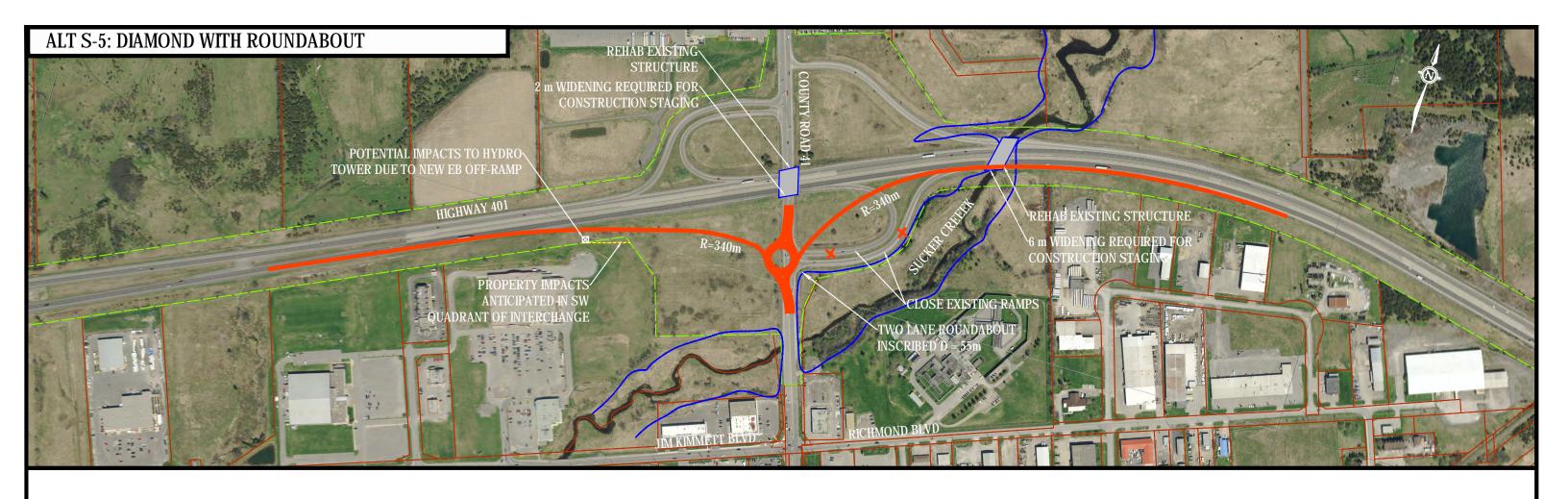
COUNTY ROAD 41 INTERCHANGE NORTH SIDE ALTERNATIVES SHORT LIST DATE

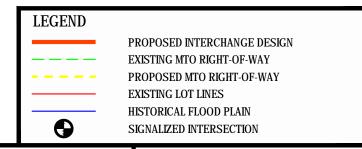
FEBRUARY 2017















HIGHWAY 401 INTERCHANGE IMPROVEMENTS
AT COUNTY ROAD 41
GWP 4459-04-00

COUNTY ROAD 41 INTERCHANGE SOUTH SIDE ALTERNATIVES SHORT LIST DATE

FEBRUARY 2017



### **Appendix E – Short List of Alternatives Evaluation Tables**

Prepared for: Ontario Ministry of Transportation

Low Co	omplexity High (	ery Poor Complexity In Impacts	Indicato Weigl	or not Decision	n Relevant	Alternative N-1: Parclo A2	Alternative N-2: Parclo A1 with Southbound Left Turn	Alternative N-3: Diamond with Existing Westbound Off-Ramp	Alternative N-5: Parclo A1 with Roundabout	Alternative N-6: Diamond with Existing Westbound Off-Ramp and Roundabout	
Factor	Indicator	Measure	Weighting By Category		Description					1.02/1.020	
CATEGORY - TRAI	NSPORTATION (60	)%)									
						l e			Average delay through roundabout <10 seconds and queue	Average delay through roundabout <10 seconds and queue	
	Critical Intersection Delays and Queuing in Peak Periods (2038 Horizon Year) (35%)	Critical delays, 95th Percentile Queue Lengths, etc.	21.0%	12.6%	Description	Average intersection delay along County Road 41 <10 seconds and queue lengths <40 m, with directional moves for all movements. Traffic signal can be coordinated with signal timing at Community Rd (land south ramp terminal) to optimize traffic operations along County Road 41.	Average intersection delay along County Road 41 <15 seconds and queue lengths <50 m with southbound left-turn required. Traffic signal can be coordinated with signal timing at Community Rd (and south ramp terminal) to optimize traffic operations along County Road 41.	Average intersection delay along County Road 41 <15 seconds and queue lengths <40 m with northbound left-turn required. Traffic signal can be coordinated with signal timing at Community Rd (and south ramp terminal) to optimize traffic operations along County Road 41.	lengths <10 m. However, roundabout adjacent to closely spaced signalized intersection at Community Road (and possibly south ramp terminal intersection) not preferable due to unequal flow/distribution of incoming traffic from traffic signals, resulting in less frequent gaps for traffic from off-ramp and temporary reduction in ramp terminal operations.	off-ramp and temporary reduction in ramp terminal operations.	
	110112011 1 (3370)				Measure	Delay < 10 s, Queues < 40 m	Delay < 15 s, Queues < 50 m	Delay < 15 s, Queues < 40 m	Delay < 10 s, Queues < 10 m, Concerns with adjacent traffic signals	Delay < 10 s, Queues < 10 m, Concerns with adjacent traffic signals	
					Score ( /5)	5	4.5	4.5	3.5	3.5	
			Good 9.0%		Weighted Score	12.6	11.3 High truck volumes (including potential for Long	11.3	8.8 High truck volumes (including potential for Long	8.8 Truck traffic (including potential for Long Combination	
	Truck Operations (including Long	Very Poor (1) to Very Good (5)			Description	No notable operational concerns anticipated with high truck volumes (including Long Combination Vehicles) at	Combination Vehicles) utilizing southbound left-turn to enter WB Hwy 401 (including from Flying 'J') may result in	Truck traffic (including potential for Long Combination Vehicles) utilizing northbound left-turn to enter WB Hwy 401	Combination Vehicles) for southbound left-turn movement to enter WB Hwy 401 (including from Flying 'J') may result in	Vehicles) for northbound left-turn movement to enter WB Hwy 401 may result in additional delays through	
	Combination Vehicles)			5.4%	Measure	interchange.  Very Good	additional delays at intersection.  Poor-Moderate	may result in additional delays at intersection.  Moderate	additional delays through roundabout.  Poor-Moderate	roundabout. Moderate	
	through Interchange (15%)				Score ( /5)	5	2.5	3.5	2.5	3	
	(1370)				Weighted Score	5.4  Reduction to single lane in either direction required along	2.7	3.8	2.7	3.2  Construction of roundabout and associated partial re-	
Traffic Operations (60%)	Impacts to Existing Traffic ) during Construction (15%)	High Impacts (1) to	9.0%	5.4%	5.4%	Description	County Rd 41 during bridge rehabilitation work. Two westbound lanes can be maintained along Highway 401 with minor widening of CR41 structure. Existing and/or new ramps can be utilized to avoid ramp / access closures during construction, though short-term closure required for construction of new westbound on-ramp where it crosses	Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Two westbound lanes can be maintained along Highway 401 with minor widening of CR41 structure. Existing and/or new ramps can be utilized to avoid ramp / access closures during construction.	minor widening of CR41 structure. Existing and/or new		construction of County Rd 41 more disruptive than signalized intersection. Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Existing and/or new ramps can be utilized to avoid ramp / access closures during construction, though short-term closure required for construction of new westbound on-
	( ,				Measure	existing on-ramp.  Low-Moderate Impacts	Low Impacts	Low Impacts	Moderate Impacts	ramp where it crosses existing on-ramp.  Moderate Impacts	
					Score ( /5)	4.5	5	5	3.5	3.5	
					Weighted Score	4.9  Replacement of CR41 structure and/or widening of Highway	5.4  Replacement of CR41 structure and/or widening of Highway	5.4  Replacement of CR41 structure and/or widening of Highway	3.8  Replacement of CR41 structure and/or widening of Highway	3.8  Replacement of CR41 structure and/or widening of Highway	
	Impacts to Future Traffic during Construction (e.g. Future Bridge Replacement or	High Impacts (1) to Low Impacts (5)	15.0%	15.0% 9.0%	Description	401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions and ramp closures, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize	401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions and ramp closures, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize	401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions along Highway 401, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize	401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions and ramp closures, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize	401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions along Highway 401, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize	
	Rehabilitations) (25%)				Measure Score ( /5)	duration of closures.  Moderate Impacts	duration of closures.  Moderate Impacts	duration of closures.  Low-Moderate Impacts	duration of closures.  Moderate Impacts	duration of closures.  Low-Moderate Impacts	
						3	3	3.5	3	3.5	
	Flexibility for Future Interchange	Very Poor (1) to Very Good	Poor (1) to Very Good	6.0% 3.6%	Weighted Score  Description	5.4  Parclo A4 represents most desirable interchange configuration operationally to accommodate future growth, therefore no modifications or expansion of interchange would be anticipated in future.	5.4  Interchange can be modified in future to include directional northbound to eastbound on-ramp if warranted based on increased traffic volumes or safety concerns, though additional property and environmental approvals would be	6.3  Future interchange upgrades or expansion to accommodate future growth (beyond 25-year horizon period) can be completed but would require re-construction of all ramps.	5.4  Future interchange upgrades or expansion to accommodate future growth (beyond 25-year horizon period) can be completed but would likely require partial re-construction of roundabout and interchange ramps.	6.3  Future interchange upgrades or expansion to accommodate future growth (beyond 25-year horizon period) can be completed but would require re-construction of roundabout and interchange ramps.	
	Expansion/Upgrades (10%)	(5)	5.5.1	0.0,1	Measure	Very Good	required. Good	Poor	Moderate	Poor	
	(20/0)				Score ( /5) Weighted Score	5 3.6	4.5 3.2	2 1.4	3 2.2	2 1.4	
	Conflicts due to Turning and Weaving Traffic (45%)	High Impacts (1) to Low Impacts (5)	18.0%	10.8%	Description	Directional movements for all moves to access highway eliminates/minimizes conflict points at ramp terminal intersection and along ramps.	Merge or yield condition required at start of westbound on- ramp with traffic entering from two directions resulting in increased collision risk. Southbound left-turn including lane change required to enter left-turn la	Northbound left-turn increases potential collision risk relative to directional movements.	Roundabouts considered to minimize potential conflict	Roundabouts considered to minimize potential conflict points and reduce severity of collisions relative to signalized intersection.	
	(43/0)				Measure Score ( /5)	Low 4.5	Moderate 3	Low-Moderate 4	Low 5	Low 5	
					Weighted Score	9.7	6.5	8.6	10.8	10.8	
Safety and Geometrics (40%)	Horizontal/Vertical Geometrics and Sight	Very Poor (1) to Very Good	16.0%	9.6%	Description	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	
	Distance (40%)	(5)			Measure Score ( /5)	Very Good 5	Very Good	Very Good 5	Very Good 5	Very Good	
					Weighted Score	9.6	9.6	9.6	9.6	9.6	
	Driver Expectation (e.g. Intuitive directions and signage through	Very Poor (1) to Very Good	6.0%	3.6%	Description	Alternative 1 configuration considered typical MTO configuration with intuitive directions to enter and exit the highway.	Southbound left-turn to enter westbound Highway 401 considered slightly less intuitive than Alternative 1 configuration	Northbound left-turn to enter westbound Highway 401 considered slightly less intuitive than Alternative 1 configuration	Roundabouts at ramp terminal intersections relatively new for MTO freeway facilities, with slightly more complex signage (longer processing time) and less intuitive design	for MTO freeway facilities, with slightly more complex signage (longer processing time) and less intuitive design	
	interchange /	(5)	0.070	3.3,0	Measure Score ( /5)	Very Good 5	Good 4	Good 4	Moderate 3	Moderate 3	
	intersection) (15%)				Weighted Score	3.6	2.9	2.9	2.2	2.2	
			Score for 1	Transportation	Category (Out of 5)	4.57	3.92	4.12	3.79	3.85	
		Overall Weig			ategory (Out of 60)	54.78	47.04	49.38	45.42	46.14	
			,	-,	g. g (2 22 22 00)						

Low Co	omplexity High (	lery Poor Complexity h Impacts	Indicator	r not Decisio	n Relevant	Alternative N-1: Parclo A2	Alternative N-2: Parclo A1 with	Alternative N-3: Diamond with	Alternative N-5: Parclo A1 with	Alternative N-6: Diamond with Existing Westbound Off-Ramp and
Factor	Indicator	Measure	Weigh Weighting By Category		Description		Southbound Left Turn	Existing Westbound Off-Ramp	Roundabout	Roundabout
<b>CATEGORY - NAT</b>	<b>URAL ENVIRONM</b>	ENT (15%)								
Fish and Fish Habitat (35%)	Impacts to fish and fisheries habitat (100%)	High Impacts (1) to No Impacts (5)	35.0%	5.3%	Description	No impacts to fish and fish habitat anticipated, as existing Selby/Sucker Creek structure (north side) can accommodate required construction staging along Highway 401 and associated interchange improvements	required construction staging along Highway 401 and associated interchange improvements	No impacts to fish and fish habitat anticipated, as existing Selby/Sucker Creek structure (north side) can accommodate required construction staging along Highway 401 and associated interchange improvements	No impacts to fish and fish habitat anticipated, as existing Selby/Sucker Creek structure (north side) can accommodate required construction staging along Highway 401 and associated interchange improvements	No impacts to fish and fish habitat anticipated, as existing Selby/Sucker Creek structure (north side) can accommodate required construction staging along Highway 401 and associated interchange improvements
					Measure Score ( /F)	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts
					Score ( /5) Weighted Score	5.3	5.3	5.3	5.3	5.3
Terrestrial Ecosystems (35%)	Impacts to terrestrial ecosystems (100%)	High Impacts (1) to Low Impacts (5)	35.0%	5.3%	Description	Low potential for impacts to terrestrial ecosystems as construction is primarily within the existing interchange footprint. The vegetation impacted within the interchange is part of a Mineral Cultural Meadow community which has potential habitat for Bobolink and Eastern Meadowlark (SAR) although none were observed during field investigations.	Low potential for impacts to terrestrial ecosystems as construction is primarily within the existing interchange footprint. The vegetation impacted within the interchange is part of a Mineral Cultural Meadow community which has	Low potential for impacts to terrestrial ecosystems as construction is primarily within the existing interchange footprint. The vegetation impacted within the interchange is part of a Mineral Cultural Meadow community which has	Low potential for impacts to terrestrial ecosystems as construction is primarily within the existing interchange footprint. The vegetation impacted within the interchange is part of a Mineral Cultural Meadow community which has	Low potential for impacts to terrestrial ecosystems as construction is primarily within the existing interchange footprint. The vegetation impacted within the interchange is part of a Mineral Cultural Meadow community which has potential habitat for Bobolink and Eastern Meadowlark (SAR) although none were observed during field investigations.
					Measure	Low Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts
					Score ( /5)	5	5	5	5	5
Groundwater (30%)	Susceptibility to construction activities (100%)	High Impacts (1) to	30.0%	4.5%	Weighted Score  Description	5.3  Low potential for impacts to groundwater resources. This alternative will not directly impact any water wells.	5.3  Low potential for impacts to groundwater resources. This alternative will not directly impact any water wells.	5.3  Low potential for impacts to groundwater resources. This alternative will not directly impact any water wells.	5.3  Low potential for impacts to groundwater resources. This alternative will not directly impact any water wells.	5.3  Low potential for impacts to groundwater resources. This alternative will not directly impact any water wells.
		Low Impacts (5)			Measure	Low Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts
					Score ( /5)	5	5	5	5	5
					Weighted Score	4.5	4.5	4.5	4.5	4.5
			Score for Natura	I Environment	Category (Out of 5)	5.00	5.00	5.00	5.00	5.00
		Overall Weighted	Score for Natural	Environment C	ategory (Out of 15)	15.00	15.00	15.00	15.00	15.00
CATECODY SOC		VIRONMENT (10%)								
CATEGORT - 30C	IO-ECONOIVIIC EN	VIROINIVIENT (10%)	)	I						
Noise (10%)	Impact to noise sensitive receivers (100%)	High Impacts (1) to Low Impacts (5)	10.0%	.0.0% 1.0%	Description	No long-term impacts to existing noise levels and noise sensitive receivers anticipated	No long-term impacts to existing noise levels and noise sensitive receivers anticipated	No long-term impacts to existing noise levels and noise sensitive receivers anticipated	No long-term impacts to existing noise levels and noise sensitive receivers anticipated	No long-term impacts to existing noise levels and noise sensitive receivers anticipated
	10070)	Low Impacts (5)			Measure	Low Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts
					Score ( /5) Weighted Score	5 1.0	5 1.0	5 1.0	5	5
Air Quality (10%)	Impacts to air quality	High Impacts (1) to	10.0%	.0% 1.0%	Description			No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.		
	receivers (100%)	Low Impacts (5)			Measure	Low Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts
					Score ( /5)	5	5	5	5	5
	Area of residential and commercial property	Area (ha)	52.5%	5.3%	Weighted Score  Description	1.0  No long-term impacts to residential or commercial properties anticipated	1.0  No long-term impacts to residential or commercial properties anticipated	1.0  Minor property acquisition required from commercial property in northwest quadrant, although impacts are not anticipated to directly impact commercial operations.	1.0  Minor property acquisition required from commercial property in northwest quadrant, although impacts are not anticipated to directly impact commercial operations.	1.0  Minor property acquisition required from commercial property in northwest quadrant, although impacts are not anticipated to directly impact commercial operations.
	impacted (75%)				Measure	0 ha	0 ha	0.73 ha	0.08 ha	0.09 ha
					Score ( /5)	5	5	3	4	4
	-		+		Weighted Score	5.3	5.3  Ramp terminal intersection is signalized thereby providing	3.2	4.2	4.2
Community Effects (70%)	Active Transportation Safety (25%)		d 17.5%	17.5% 1.8%	Description		safe crossing opportunities for pedestrians and cyclists. Left	Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection which could potentially result in severe collisions with pedestrians and cyclists. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	Geometrics of roundabout approaches can promote a slowing down of entering traffic to ensure appropriate vielding, although there are a number of free flow moves. Driver familiarity may be a concern to pedestrians and cyclists trying to cross the roundabout. No conflicts for bike/pedestrian crossings on west side of County Rd 41. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	Geometrics of roundabout approaches can promote a slowing down of entering traffic to ensure appropriate yielding, although there are a number of free flow moves. Driver familiarity may be a concern to pedestrians and cyclists trying to cross the roundabout. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.
					Measure	Good	Good	Good	Fair-Good	Fair-Good
					Score ( /5)	4	4.5	4	3.5	3
					Weighted Score	1.4	1.6	1.4	1.2	1.1

Low Co	omplexity High C	ery Poor Complexity In Impacts	Indicator	r not Decisio	n Relevant	Alternative N-1: Parclo A2	Alternative N-2: Parclo A1 with	Alternative N-3: Diamond with	Alternative N-5: Parclo A1 with	Alternative N-6: Diamond with Existing Westbound Off-Ramp and		
Factor	Indicator	Measure	Weigh Weighting By		Description		Southbound Left Turn	Existing Westbound Off-Ramp	Roundabout	Roundabout		
			Category	Weighting								
Waste and Contamination (10%)	Impact to potentially contaminated areas (100%)	High Impacts (1) to Low Impacts (5)	10.0%	1.0%	Description	This alternative has potential to impact areas within northwest and northeast quadrants of interchange which are considered to have high potential for contamination given the historical or present nature of adjacent properties. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not considered significant.	This alternative has potential to impact areas within northeast quadrant of interchange which are considered to have high potential for contamination given the historical or present nature of adjacent properties. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not considered significant.	This alternative has potential to impact areas within northwest quadrant of interchange which are considered to have high potential for contamination given the historical or present nature of adjacent properties. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not considered significant.	have high potential for contamination given the historical or present nature of adjacent properties. However, roadworks	This alternative has potential to impact areas within northwest quadrant of interchange which are considered to have high potential for contamination given the historical or present nature of adjacent properties. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not considered significant.		
					Measure	Low-Moderate Impacts	Low-Moderate Impacts	Low-Moderate Impacts	Low-Moderate Impacts	Low-Moderate Impacts		
					Score ( /5) Weighted Score	0.8	4 0.8	0.8	0.8	0.8		
	•	Score :	for Socio-Economic	c Environment		4.73	4.81	3.68	4.11	4.03		
	0	overall Weighted Score fo				9.45	9.63	7.35	8.23	8.05		
CATEGORY - CUL	TURAL ENVIRONM	IENT (5%)										
Archaeological	Impact to land with	High Impacts (1) to			Description	Low potential for archaeological impacts given that construction activities are generally located on previously disturbed areas	Low potential for archaeological impacts given that construction activities are generally located on previously disturbed areas	Low potential for archaeological impacts given that construction activities are generally located on previously disturbed areas	Low potential for archaeological impacts given that construction activities are generally located on previously disturbed areas	Low potential for archaeological impacts given that construction activities are generally located on previously disturbed areas		
Resources (50%)	archaeological potential (100%)	Low Impacts (5)	50.0%	2.5%	Measure	Low Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts		
	(100%)				Score ( /5)	5	5	5	5	5		
					Weighted Score	2.5	2.5	2.5	2.5	2.5		
Built Heritage Features and Cultural Heritage	Impacts to built heritage features and cultural	High Impacts (1) to	50.0%	50.0% 2.5%	2.5%	Description	No impacts to built heritage features and cultural heritage landscapes anticipated	No impacts to built heritage features and cultural heritage landscapes anticipated	No impacts to built heritage features and cultural heritage landscapes anticipated	No impacts to built heritage features and cultural heritage landscapes anticipated	No impacts to built heritage features and cultural heritage landscapes anticipated	
Landscapes (50%)	heritage landscapes (100%)	Low Impacts (5)			Measure	Low Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts		
	(100%)				Score ( /5) Weighted Score	2.5	2.5	2.5	2.5	2.5		
			Score for Cultura	I Environment	Category (Out of 5)	5.00	5.00	5.00	5.00	5.00		
		Overall Weighter	d Score for Cultura	I Environment	Category (Out of 5)	5.00	5.00	5.00	5.00	5.00		
CATEGORY - COS	T (10%)											
	Capital Cost (\$) (80%)	Proportional to Lowest Cost (5) 56.	56.0%	5.6%	5.6%	5.6%	Description	Construction cost includes rehabilitation of County Road 41 and Sucker/Selby Creek structures, construction of two new ramps, new traffic signal and construction staging requirements (including minor widening of County Rd 41 structure required for staging purposes).	Construction cost includes rehabilitation of County Road 41 and Sucker/Selby Creek structures, construction of one new ramp, southbound left-turn lane on County Road 41, new traffic signal and construction staging requirements (including minor widening of County Rd 41 structure required for staging purposes).	Construction cost includes rehabilitation of County Road 41 and Sucker/Selby Creek structures, construction of one new ramp, northbound left-turn lane on County Road 41, new traffic signal and construction staging requirements (including minor widening of County Rd 41 structure required for staging purposes).	Construction cost includes rehabilitation of County Road 41 and Sucker/Selby Creek structures, construction of one new ramp, roundabout at ramp terminal included modified approaches along County Road 41, and construction staging requirements (including minor widening of County Rd 41 structure required for staging purposes).	Construction cost includes rehabilitation of County Road 41 and Sucker/Selby Creek structures, construction of one new ramp, roundabout at ramp terminal included modified approaches along County Road 41, and construction staging requirements (including minor widening of County Rd 41 structure required for staging purposes).
					Measure Score ( /E)	\$3,150,000	\$2,330,000	\$2,280,000 5.00	\$3,210,000 3.55	\$3,210,000		
Cost (70%)					Score ( /5) Weighted Score	3.62 4.1	4.89 5.5	5.6	4.0	3.55 4.0		
	Life Cycle / Maintenance Cost (20%)	High Cost / Maintenance (1) to Low Cost /	14.0%	1.4%	Description	Due to Highway 401 speed change lane over County Road 41 additional widening of structure would be required should Highway 401 be widened to 6-lanes. Traffic signals have higher long-term maintenance cost relative to roundabouts.	additional widening of structure would be required should Highway 401 be widened to 6-lanes. Traffic signals have	Potential future widening of Highway 401 to 6-lanes could be accommodated without additional structure width given that no speed change lanes located over County Road 41 structure. Traffic signals have higher long-term maintenance cost relative to roundabouts.	Due to Highway 401 speed change lane over County Road 41, additional widening of structure would be required should Highway 401 be widened to 6-lanes. Roundabouts have lower long-term maintenance cost relative to traffic signals.	Potential future widening of Highway 401 to 6-lanes could be accommodated without additional structure width given that no speed change lanes located over County Road 41 structure. Roundabouts have lower long-term maintenance cost relative to traffic signals.		
		Maintenance (5)	1		Measure	Low-Moderate	Low-Moderate	Low	Low-Moderate	Low		
					Score ( /5) Weighted Score	<u>4</u> 1.1	4 1.1	4.5	<u>4</u> 1.1	5 1.4		
Utilities (30%)	Impacts to existing and planned utilities (100%)	High Impacts (1) to Low Impacts (5)	30.0%	3.0%	Description	Potential impacts to sanitary sewer, watermain and underground Bell as well as overhead hydro line west of County Road 41 due to construction of new westbound onramps	Potential impacts to sanitary sewer, watermain and underground Bell as well as overhead hydro line west of	Potential impacts to sanitary sewer, watermain and underground Bell as well as overhead hydro line west of County Road 41 due to construction of new westbound onramp including northbound left-turn lane	Potential impacts to sanitary sewer, watermain and underground Bell as well as overhead hydro line west of	1.4  Potential impacts to sanitary sewer, watermain and underground Bell as well as overhead hydro line west of County Road 41 due to construction of roundabout including partial re-construction of County Road 41.		
	p.aca acintes (100/0)	2011pacts (5)			Measure Soore ( /E)	Low-Moderate	Low-Moderate	Low-Moderate	Moderate	Moderate		
				Score ( /5) Weighted Score	4 2.4	4 2.4	2.4	3.5	3.5 2.1			
	•	Sc	ore for Cost and Co	onstructability		3.79	4.50	4.63	3.60	3.74		
		Overall Weighted Sco				7.57	9.00	9.26	7.20	7.48		
		To	otal Weighted A	verage Score	/5	4.59	4.28	4.30	4.04	4.08		
			Overal	II Total Score	/100	91.80	85.66	85.99	80.84	81.67		

#### EVALUATION SUMMARY - COUNTY ROAD 41 INTERCHANGE, NORTH SIDE

Most Preferred Alternative

Category Alternative N Parclo A2		Alternative N-1: Parclo A2	Alternative N-2: Parclo A1 with Southbound Left Turn	Alternative N-3: Diamond with Existing Westbound Off-Ramp	Alternative N-5: Parclo A1 with Roundabout	Alternative N-6: Diamond with Existing Westbound Off-Ramp and Roundabout	$\Gamma$
Transportation (60% Weight)				•		•	All alternatives are anticipated to operate well with relatively minor intersection delays and queuing in the short and long-term and have generally good overall geometrics. Alternatives N-2 and N-3 require left-turn movements (additional conflict points) to access Highway 401 increasing potential collision risk relative to directional movements, with Alternative N-2 potentially resulting in additional weaving concerns for trucks exiting the Flying 'J' to access the left-turn lane to the on-ramp. While the roundabout alternatives (N-5 and N-6) eliminate direct left-turns and are anticipated to result in good traffic operations, they are considered less compatible with Long Combination Vehicles (LCV's) including trucks utilizing the Flying 'J'. In addition, roundabouts at ramp terminal intersections are an unfamiliar configuration for many drivers and require more complex signage (driver perception and processing), potentially increasing collision risk. The roundabouts would also be located adjacent to the signalized intersection at Community Road which is undesirable given the unequal flow/distribution of incoming traffic from traffic signals and may result in less frequent gaps for traffic from off-ramp and temporary reduction in ramp terminal operations. The roundabout alternatives will be more disruptive to County Road 41 traffic during construction. Future replacement of the CR41 structure and/or widening of Highway 401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations, though lane reductions along Highway 401 and possible ramp closures will be required for all options. The Alternative N-1 configuration is considered the most desirable from a geometric and safety perspective overall with directional movements for all maneuvers, and is preferred from a Transportation perspective.
		54.8	47.0	49.4	45.4	46.1	movements for all maneavers, and is preferred from a transportation perspective.
Natural Environme	ent (15% Weight)	•	•	•	•	•	All alternatives are anticipated to result in minimal impacts to existing fish and fisheries habitat and terrestrial ecosystems, and low potential to impact groundwater resources. As such, all alternatives are equally preferred from a Natural Environmental perspective.
		15.0	15.0	15.0	15.0	15.0	6
Socio-Economic Environment (10% Weight)		•	•	•	•	•	Alternatives N-3, N-4 and N-5 require minor property acquisition from a commercial property in the northwest quadrant of the interchange, although the impacts are not anticipated to directly impact commercial operations. In terms of Active Transportation, the free-flow movements with the roundabout alternatives (N-5 and N-6) as well as driver unfamiliarity make these options slightly less preferable for pedestrian and cyclist safety.  Alternative N-2 is slightly preferred over Alternatives N-1 and N-3 in terms of pedestrian and cyclist safety, however the difference is considered minor. None of the alternatives are anticipated to have any impacts to residential properties, noise sensitive receivers, long-term air quality, or aesthetic impacts to sensitive viewers. As such, Alternatives N-1 and N-2 are equally preferred from a Socio-Economic Environment perspective.
		9.5	9.6	7.4	8.2	8.1	
Cultural Environm	ent (5% Weight)	•	•	•	•	•	All of the alternatives have low potential to impact lands with archaeological potential, and are not anticipated to impact built heritage features or cultural heritage landscapes. As such, all alternatives are equally preferred from a Cultural Environment perspective.
		5.0	5.0	5.0	5.0	5.0	
Cost (10% Weight)		•	•	•	•	•	The roundabout alternatives (N-4 and N-5) have slightly greater impacts to existing utilities. Alternatives N-3 and N-5 have a slightly lower life-cycle / maintenance cost, while Alternatives N-2 and N-3 have the lowest construction cost (approximately 30% lower than other alternatives) and are
		7.6	9.0	9.3	7.2	7.5	therefore considered equally preferred from a Cost and Constructability perspective.
	TOTAL SCORE	91.8	85.7	86.0	80.8	81.7	
	RANK	1	3	2	5	4	Alternative N-1 is considered the most desirable configuration from a Transportation perspective with directional movements provided for all maneuvers. While the construction cost of Alternative N-1 is higher than the other alternatives, it has similar construction staging and utility impacts
OVERALL ASSESSMENT	RECOMMENDATION	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	NOT RECOMMENDED	NOT RECOMMENDED	NOT RECOMMENDED	and is preferred or equally preferred with the other alternatives from a Natural, Socio-Economic and Cultural Environment perspectives.  As such, Alternative N-1 (Parclo A2) is the preferred overall north-side interchange alternative.
Legend	Heightest Cat	egory Weighting	• •	Lowest Catego	ory Weighting	Factor Not Decision Relevant	

Least Preferred Alternative

Tery Good Very Poor Low Complexity High Complexity No/Low Impacts High Impacts Indicator not Decision Relevant  Weighting					n Relevant	Alternative S-1: Parclo A2	Alternative S-2: Parclo A1 with Northbound Left Turn	Alternative S-3: Diamond	Alternative S-4: Parclo A1 with Roundabout	Alternative S-5: Diamond with Roundabout
Factor	Indicator	Measure	Weighting By Category		Description					
<b>CATEGORY - TRAI</b>	NSPORTATION (60	)%)								
	Critical Intersection Delays and Queuing in Peak Periods (2038 Horizon Year) (35%)	Critical delays, 95th Percentile Queue Lengths, etc.	21.0%	12.6%	Description	Average intersection delay along County Road 41 <10 seconds and queue lengths <40 m, with directional moves for all movements. Traffic signal can be coordinated with signal timing at Richmond Blvd (and north ramp terminal) to optimize traffic operations along County Road 41.	Average intersection delay along County Road 41 <10 seconds and queue lengths <30 m with northbound left-turn required. Traffic signal can be coordinated with signal timing at Richmond Blvd (and north ramp terminal) to optimize traffic operations along County Road 41.	Average intersection delay along County Road 41<10 seconds and queue lengths <40 m with southbound left-turn required, although dedicated SB left-turn cannot be provided until CR41 structure replaced in the future. Traffic signal can be coordinated with signal timing at Richmond Blod (and north ramp terminal) to optimize traffic operations along County Road 41.	lengths < 10 m. However, roundabout adjacent to closely spaced signalized intersection at Richmond Blvd (and possibly north ramp terminal intersection) not preferable due to unequal flow/distribution of incoming traffic from traffic signals, resulting in less frequent gaps for traffic from off-ramp and temporary reduction in ramp terminal operations.	Average delay through roundabout <10 seconds and queue lengths <10 m. However, roundabout adjacent to closely spaced signalized intersection at Richmond Blvd (and possibly north ramp terminal intersection) not preferable due to unequal flow/distribution of incoming traffic from traffic signals, resulting in less frequent gaps for traffic from off-ramp and temporary reduction in ramp terminal operations.
					Measure	Delay < 10 s, Queues < 40 m	Delay < 10 s, Queues < 30 m	Delay < 10 s, Queues < 40 m	Delay < 10 s, Queues < 15 m, Roundabout adjacent to traffic signal not preferable	Delay < 10 s, Queues < 15 m, Roundabout adjacent to traffic signal not preferable
					Score ( /5)	5	4.5	3.5	3.5	3.5
					Weighted Score	12.6	11.3	8.8	8.8	8.8
	Truck Operations (including Long Combination Vehicles) through Interchange	Very Poor (1) to Very Good (5)	9.0%	5.4%	Description	No notable operational concerns anticipated with high truck volumes (including Long Combination Vehicles) at interchange.	may result in additional delays at intersection.	High truck volumes (including potential for Long Combination Vehicles) utilizing southbound left-turn to enter EB Hwy 401 (including from Flying 'J') may result in additional delays at intersection.	Truck traffic (including potential for Long Combination Vehicles) for northbound left-turn movement to enter EB Hwy 401 may result in additional delays through roundabout.	High truck volumes (including potential for Long Combination Vehicles) for southbound left-turn movement to enter EB Hwy 401 (including from Flying 'J') may result in additional delays through roundabout.
					Measure Score ( /5)	Very Good	Moderate	Poor-Moderate	Moderate 2	Poor-Moderate
	(15%)				Weighted Score	5 5.4	3.5 3.8	2.5 2.7	3.2	2.5 2.7
Traffic Operations (60%)	Impacts to Existing Traffic during Construction (15%)	High Impacts (1) to Low Impacts (5)	9.0%	5.4%	Description	Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Two eastbound lanes can be maintained along Highway 401 with minor widening of CR41 and Selby/Sucker Creek structures. Existing and/or new ramps can be utilized to avoid ramp. access closures during construction, with some temporary ramp construction (throwaway) required and short-term closure of ramps for construction of new on-ramp.	Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Two eastbound lanes can be maintained along Highway 401 with minor widening of CR41 and Selby/Sucker Creek structures. Existing and/or new ramps can be utilized to avoid ramp / access closures during construction, with some temporary ramp construction (throwaway) required.	Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Existing and/or new ramps can be utilized to avoid long-term ramp / access closures during construction with minimal ramp throwaway, and short-term closure required for construction of new eastbound on-ramp where it crosses existing on-ramp.	Construction of roundabout and associated partial re- construction of County Rd 41 more disruptive than signalized intersection. Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Two eastbound lanes can be maintained along Highway 401 with minor widening of CR41 and Selby/Sucker Creek structures. Existing and/or new ramps can be utilized to avoid ramp / access closures during construction, with some temporary ramp construction (throwaway) required.	Construction of roundabout and associated partial reconstruction of County Rd 41 more disruptive than signalized intersection. Reduction to single lane in either direction required along County Rd 41 during bridge rehabilitation work. Two eastbound lanes can be maintained along Highway 401 with minor widening of CR41 and Selby/Sucker Creek structures. Existing and/or new ramps can be utilized to avoid ramp / access closures during construction, with some temporary ramp construction (throwaway) required.
					Measure	Low-Moderate Impacts	Low Impacts	Low-Moderate Impacts	Moderate Impacts	Moderate Impacts
					Score ( /5) Weighted Score	4.5 4.9	5.4	4.5 4.9	3.5 3.8	3.5 3.8
	Impacts to Future Traffic during Construction (e.g. Future Bridge Replacement or Rehabilitations) (25%)	High Impacts (1) to Low Impacts (5)	15.0%	9.0%	Description	Replacement of CR41 structure and/or widening of Highway 401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions and ramp closures, though new structure for eastbound on-ramp can be utilized for staging purposes, and short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize duration of closures.	require temporary lane reductions and ramp closures, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize duration of closures.	Replacement of CR41 structure and/or widening of Highway 401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions along Highway 401, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize duration of closures.	401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions and ramp closures, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize duration of closures.	significant impacts to Highway 401 and interchange operations. Future rehabilitations (beyond 20-25 years) may require temporary lane reductions along Highway 401, though short-term median upgrades will provide greater flexibility to shift traffic across median in future and minimize duration of closures.
					Measure Score ( /5)	Low-Moderate Impacts 3.5	Moderate Impacts 3.0	Low-Moderate Impacts 3.5	Moderate Impacts 3.0	Low-Moderate Impacts 3.5
					Weighted Score	6.3	5.4	6.3	5.4	6.3
	Flexibility for Future Interchange Expansion/Upgrades (10%)	Very Poor (1) to Very Good (5)	6.0%	3.6%	Description	Parclo A4 represents most desirable interchange configuration operationally to accommodate future growth, therefore no modifications or expansion of interchange would be anticipated in future.	Interchange can be modified in future to include directional northbound to eastbound on-ramp if warranted based on increased traffic volumes or safety concerns, though additional property and environmental approvals would be required.	Future interchange upgrades or expansion to accommodate future growth (beyond 25-year horizon period) can be completed but would require re-construction of all ramps.	Future interchange upgrades or expansion to accommodate future growth (beyond 25-year horizon period) can be completed but would likely require partial re-construction of roundabout and interchange ramps	Future interchange upgrades or expansion to accommodate future growth (beyond 25-year horizon period) can be completed but would require re-construction of roundabout and interchange ramps
					Measure	Very Good	Good	Poor	Moderate	Poor
					Score ( /5) Weighted Score	5 3.6	4.5 3.2	2 1.4	3 2.2	2 1.4
	Conflicts due to Turning and Weaving Traffic (45%)	High Impacts (1) to Low Impacts (5)	18.0%	10.8%	Description  Measure	Directional movements for all moves to access highway eliminates/minimizes conflict points at ramp terminal intersection and along ramps.  Low	Merge or yield condition required at start of eastbound on- ramp with traffic entering from two directions resulting in increased collision risk. Northbound left-turn including lane change required to enter left-turn lane from Richmond Blvd results in potential weaving concern and further increases potential collision risk.  Moderate	Southbound left-turn increases potential collision risk relative to directional movements.  Low-Moderate	Roundabouts considered to minimize potential conflict	Roundabouts considered to minimize potential conflict points and reduce severity of collisions relative to signalized intersection.
					Score ( /5)	4.5	3	4	5	5
				1	Weighted Score	9.7	6.5	8.6	10.8	10.8
Safety and Geometrics (40%)	Horizontal/Vertical Geometrics and Sight Distance (40%)	Very Poor (1) to Very Good (5)	16.0%	9.6%	Description	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching intersection	Good overall horizontal and vertical geometrics. Sight distance approaching roundabout from southbound County Road 41 (beneath Highway 401) less than desirable	Good overall horizontal and vertical geometrics with no notable sight distance concerns at or approaching roundabout
					Measure Score ( /5)	Very Good 5	Very Good 5	Very Good 5	Good 4	Very Good 5
					Weighted Score	9.6	9.6	9.6	7.7	9.6
	Driver Expectation (e.g. Intuitive directions and signage through interchange / intersection) (15%)	Very Poor (1) to Very Good (5)		3.6%	Description	Alternative 1 configuration considered typical MTO configuration with intuitive directions to enter and exit the highway.	Northbound left-turn to enter eastbound Highway 401 considered slightly less intuitive than Alternative 1 configuration	Northbound left-turn to enter eastbound Highway 401 considered slightly less intuitive than Alternative 1 configuration	Roundabouts at ramp terminal intersections relatively new for MTO freeway facilities, with slightly more complex signage (longer processing time) and less intuitive design	Roundabouts at ramp terminal intersections relatively new for MTO freeway facilities, with slightly more complex signage (longer processing time) and less intuitive design
			6.0%		Measure	Very Good	Good	Good	Moderate	Moderate
					Score ( /5)	5	4	4	3	3
	, , , , ,				Weighted Score	3.6	2.9	2.9	2.2	2.2
			Score for T	ransportation	Category (Out of 5)	4.64	4.01	3.77	3.67	3.80
		Overall Weig	ghted Score for Tr	ansportation C	ategory (Out of 60)	55.68	48.12	45.24	44.04	45.60

Very Low Co No/Lov		or not Decisio	n Relevant	Alternative S-1: Parclo A2	Alternative S-2: Parclo A1 with Northbound Left Turn	Alternative S-3: Diamond	Alternative S-4: Parclo A1 with Roundabout	Alternative S-5: Diamond with Roundabout			
Factor	Indicator	Measure	Weighting By Category	J	Description						
<b>CATEGORY - NAT</b>	URAL ENVIRONM	ENT (15%)									
·	Impacts to fish and fisheries habitat (100%)	High Impacts (1) to Low Impacts (5)	35.0%	5.3%	Description	Moderate potential for impacts to fish and fish habitat associated with additional widened / new Highway 401 structure over Selby / Sucker Creek relative to other alternatives, as required for construction staging and new eastbound on-ramp. These impacts may require DFO review and approvals due to the potential presence of American Eel in the Selby / Sucker Creek.	Low-Moderate potential for impacts to fish and fish habitat associated with the widening of Highway 401 structure over Selby / Sucker Creek required for construction staging and widening of County Rd 41 adjacent to creek. These impacts may require DFO review and approvals due to the potential presence of American Eel in the Selby / Sucker Creek.	associated with the widening of Highway 401 structure over	Low-Moderate potential for impacts to fish and fish habitat associated with the widening of Highway 401 structure over Selby/ Sucker Creek required for construction staging and construction of roundabout along County Rd 41 adjacent to creek. These impacts may require DFO review and approvals due to the potential presence of American Eel in the Selby/ Sucker Creek.	Low-Moderate potential for impacts to fish and fish habitat associated with the widening of Highway 401 structure over Selby / Sucker Creek required for construction staging. These impacts may require DFO review and approvals due to the potential presence of American Eel in the Selby / Sucker Creek.	
					Measure	Moderate	Low-Moderate	Low-Moderate 4	Low-Moderate 3.5	Low-Moderate 4	
					Score ( /5) Weighted Score	3 3.2	3.5	4.2	3.5	4.2	
4	Impacts to terrestrial ecosystems (100%)	High Impacts (1) to Low Impacts (5)	35.0%	5.3%	Description	Low-Moderate potential for impacts to terrestrial ecosystems given the widening and/or new structure over Sucker/Selby Creek which is potential habitat for Snapping Turtle (SAR) although none were observed during field investigations. Other areas of impact include a Mineral Cultural Meadow community and the vegetation around Selby / Sucker Creek. The Mineral Cultural Meadow community is potential habitat for Bobolink and Eastern Meadowlark (SAR) although none were observed during field investigations.	Low-Moderate potential for impacts to terrestrial ecosystems given the widening and/or new structure over Sucker/Selby Creek which is potential habitat for Snapping Turtle (SAR) although none were observed during field investigations. Other areas of impact include a Mineral Cultural Meadow community and the vegetation around Selby / Sucker Creek. The Mineral Cultural Meadow community is potential habitat for Bobblink and Eastern Meadowlark (SAR) although none were observed during field investigations.	Low-Moderate potential for impacts to terrestrial ecosystems given the widening and/or new structure over Sucker/Selby Creek which is potential habitat for Snapping Turtle (SAR) although none were observed during field investigations. Other areas of impact include a Mineral Cultural Meadow community and the vegetation around Selby / Sucker Creek. The Mineral Cultural Meadow community is potential habitat for Bobolink and Eastern Meadowlark (SAR) although none were observed during field investigations.	Low-Moderate potential for impacts to terrestrial ecosystems given the widening and/or new structure over Sucker/Selby Creek which is potential habitat for Snapping Turtle (SAR) although none were observed during field investigations. Other areas of impact include a Mineral Cultural Meadow community and the vegetation around Selby / Sucker Creek. The Mineral Cultural Meadow community is potential habitat for Bobolink and Eastern Meadowlark (SAR) although none were observed during field investigations.	Low-Moderate potential for impacts to terrestrial ecosystems given the widening and/or new structure over Sucker/Selby Creek which is potential habitat for Snapping Turtle (SAR) although none were observed during field investigations. Other areas of impact include a Mineral Cultural Meadow community and the vegetation around Selby / Sucker Creek. The Mineral Cultural Meadow community is potential habitat for Bobolink and Eastern Meadowlark (SAR) although none were observed during field investigations.	
					Measure	Low-Moderate Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts	
					Score ( /5) Weighted Score	4.2	4.5 4.7	4.5	4.5	4.5 4.7	
	Susceptibility to construction activities (100%)	High Impacts (1) to Low Impacts (5)	30.0%	4.5%	Description	Low-Moderate potential for impacts to groundwater resources due to new/widened structure and eastbound on-ramp crossing at Hwy 401/Sucker Creek. This may result in minor floodplain impacts, and Sucker Creek is identified as a groundwater discharge area. This alternative will not directly impact any water wells.  4.7  4.7  4.7  4.7  4.7  4.7  4.7  4					
	(100%)				Measure	Low-Moderate Impacts	Low Impacts	Low Impacts	Low Impacts	Low Impacts	
					Score ( /5) Weighted Score	3.6	4.5 4.1	4.5	4.5 4.1	4.5 4.1	
			Score for Natura	al Environment		3.6 3.65					
		Overall Weighted			Weighted Score Category (Out of 5)	3.65	4.1 4.15	4.1 4.33	4.1	4.1 4.33	
CATECODY, COCC	IO FOON ON AIC FAIL		Score for Natural		Weighted Score		4.1	4.1	4.1	4.1	
CATEGORY - SOC	IO-ECONOMIC EN	Overall Weighted	Score for Natural		Weighted Score Category (Out of 5)	3.65	4.1 4.15	4.1 4.33	4.1	4.1 4.33	
CATEGORY - SOC  Noise (10%)	Impact to noise sensitive	VIRONMENT (10%)	Score for Natural		Weighted Score Category (Out of 5) Category (Out of 15) Description	3.65	4.1 4.15	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	4.1 4.33	
		VIRONMENT (10%)	Score for Natural	Environment C	Weighted Score Category (Out of 5) Category (Out of 15) Description Measure	3.65 10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts	
	Impact to noise sensitive	VIRONMENT (10%)	Score for Natural	Environment C	Weighted Score Category (Out of 5) Category (Out of 15) Description	3.65 10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated	
	Impact to noise sensitive receivers (100%)	High Impacts (1) to Low Impacts (5)  High Impacts (1) to	Score for Natural	Environment C	Weighted Score Category (Out of 5) Category (Out of 15) Description Measure Score ( /5)	3.65 10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5	
Noise (10%)	Impact to noise sensitive receivers (100%)	High Impacts (1) to Low Impacts (5)	Score for Natural	1.0%	Weighted Score Category (Out of 5) Category (Out of 15)  Description  Measure Score ( //5) Weighted Score  Description  Measure	3.65 10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway	
Noise (10%)	Impact to noise sensitive receivers (100%)	High Impacts (1) to Low Impacts (5)  High Impacts (1) to	Score for Natural	1.0%	Weighted Score Category (Out of 5) Sategory (Out of 15)  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5)	3.65 10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5	
Noise (10%)	Impact to noise sensitive receivers (100%)	High Impacts (1) to Low Impacts (5)  High Impacts (1) to	Score for Natural	1.0%	Weighted Score Category (Out of 5) Category (Out of 15)  Description  Measure Score ( //5) Weighted Score  Description  Measure	3.65  10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5. 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.	
Noise (10%)	Impact to noise sensitive receivers (100%)  Impacts to air quality receivers (100%)	High Impacts (1) to Low Impacts (5)  High Impacts (1) to Low Impacts (5)	10.0%	1.0%	Weighted Score  Category (Out of 5)  Sategory (Out of 15)  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5) Weighted Score  Description	3.65  10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.46 ha	4.1 4.15  12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant and east side of County Road 41 south of ramp terminal intersection, although impacts are not anticipated roadings.  0.46 ha	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated	
Noise (10%)	Impact to noise sensitive receivers (100%)  Impacts to air quality receivers (100%)  Area of residential and commercial property	High Impacts (1) to Low Impacts (5)  High Impacts (1) to Low Impacts (5)	10.0%	1.0%	Weighted Score  Category (Out of 5)  Category (Out of 15)  Description  Measure Score (75) Weighted Score  Description  Measure Score (75) Weighted Score  Description  Measure Score (75)  Weighted Score	3.65  10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.	4.1  4.15  12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  Minor property acquisition required from commercial property in southwest quadrant and east side of County Road 41 south of ramp terminal intersection, although impacts are not anticipated to directly impact commercial operations.	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated	4.1  4.15  12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5.  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5.  1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5. 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5. 1.0  No long-term impacts to residential or commercial properties anticipated	
Noise (10%)	Impact to noise sensitive receivers (100%)  Impacts to air quality receivers (100%)  Area of residential and commercial property	High Impacts (1) to Low Impacts (5)  High Impacts (1) to Low Impacts (5)	10.0% 10.0%	1.0%	Weighted Score  Category (Out of 5)  Sategory (Out of 15)  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5) Weighted Score  Description	3.65  10.95  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.46 ha 3.5	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant and east side of County Road 41 south of ramp terminal intersection, although impacts are not anticipated to directly impact commercial operations.  0.46 ha 3.5 3.7  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection which could potentially result in severe collisions with pedestrians and cyclists, and free flow moves can also present a concern to pedestrian and cyclist safety. No conflicts for blike/pedestrian crossings on east side of County Rd 41. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated  0 ha 5 5.3  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection with pedestrians and cyclists. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sithwalfs are resent within study area.	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.09 ha	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated	
Noise (10%)  Air Quality (10%)  Community Effects	Impact to noise sensitive receivers (100%)  Impacts to air quality receivers (100%)  Area of residential and commercial property impacted (75%)  Active Transportation	High Impacts (1) to Low Impacts (5)  High Impacts (1) to Low Impacts (5)  Area (ha)	10.0% 10.0%	1.0% 1.0%	Weighted Score  Category (Out of 5)  Category (Out of 15)  Description  Measure Score (75) Weighted Score  Description  Measure Score (75) Weighted Score  Description  Measure Score (75) Weighted Score	No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.46 ha 3.5 3.7  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists, and elimination of left-turn traffic movements beneficial in terms of reducing potentially severe collisions with pedestrians and cyclists. However, free flow moves can also present a concern to pedestrian and cyclists afety. Lennox & Addington 'Salmon River' County Trail located along County	4.1 4.15  12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5 1.0  Minor property acquisition required from commercial property in southwest quadrant and east side of County Road 41 south of ramp terminal intersection, although impacts are not anticipated to directly impact commercial operations.  0.46 ha 3.5 3.7  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection which could potentially result in severe collisions with pedestrians and cyclists, and free flow moves can also present a concern to pedestrian and cyclist safety. No conflicts for bike/pedestrian crossings on east side of County Rd 41. Lennox & Addington 'Salmon River' County Trail	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated  0 ha 5 5.3  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection with podestrians and cyclists. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sithwalfs are resent within study area.	4.1 4.15 12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.09 ha 4 4.2  Geometrics of roundabout approaches can promote a slowing down of entering traffic to ensure appropriate yielding, although there are a number of free flow moves. Driver familiarity may be a concern to pedestrians and cyclists trying to cross the roundabout. No conflicts for bike/pedestrian crossings on east side of County Rd 41. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated  0 ha 5 5.3  Geometrics of roundabout approaches can promote a slowing down of entering traffic to ensure appropriate yielding, although there are a number of free flow moves. Driver familiarity may be a concern to pedestrians and cyclists trying to cross the roundabout. Lennox & Addington 'Salmon River' County Trail located along County Rd 41,	
Noise (10%)  Air Quality (10%)  Community Effects	Impact to noise sensitive receivers (100%)  Impacts to air quality receivers (100%)  Area of residential and commercial property impacted (75%)  Active Transportation	High Impacts (1) to Low Impacts (5)  High Impacts (1) to Low Impacts (5)  Area (ha)	10.0% 10.0%	1.0% 1.0%	Weighted Score  Category (Out of 5)  Category (Out of 15)  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5) Weighted Score  Description  Measure Score ( /5) Weighted Score  Description  Description  Measure Score ( /5)  Weighted Score	No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.46 ha 3.5 3.7  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists, and elimination of left-turn traffic movements beneficial in terms of reducing potentially severe collisions with pedestrians and cyclists. However, free flow moves can also present a concern to pedestrian and cyclist safety. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	4.1  4.15  12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  Minor property acquisition required from commercial property in southwest quadrant and east side of County Road 41 south of ramp terminal intersection, although impacts are not anticipated to directly impact commercial operations.  0.46 ha  3.5  3.7  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection which could potentially result in severe collisions or present a concern to pedestrian and cyclist safety. No conflicts for bike/pedestrian crossings on east side of County Rd 41. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	4.1 4.33 12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts 5 1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts 5 1.0  No long-term impacts to residential or commercial properties anticipated  0 ha 5 5.3  Ramp terminal intersection is signalized thereby providing safe crossing opportunities for pedestrians and cyclists. However left turning movements are still present at intersection which could potentially result in severe collisions with pedestrians and cyclists. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	4.1  4.15  12.45  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  Minor property acquisition required from commercial property in southwest quadrant, although impacts are not anticipated to directly impact commercial operations.  0.09 ha  4  4.2  Geometrics of roundabout approaches can promote a slowing down of entering traffic to ensure appropriate yielding, although there are a number of free flow moves. Driver familiarity may be a concern to pedestrians and cyclists trying to cross the roundabout. No conflicts for bike/pedestrian crossings on east side of Country Rd 41. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	A.1  4.33  12.98  No long-term impacts to existing noise levels and noise sensitive receivers anticipated  Low Impacts  5  1.0  No long-term impacts to air quality anticipated as Highway 401 capacity changes are not proposed.  Low Impacts  5  1.0  No long-term impacts to residential or commercial properties anticipated  0 ha  5  5.3  Geometrics of roundabout approaches can promote a slowing down of entering traffic to ensure appropriate yielding, although there are a number of free flow moves. Driver familiarity may be a concern to pedestrians and cyclists trying to cross the roundabout. Lennox & Addington 'Salmon River' County Trail located along County Rd 41, though no sidewalks are present within study area.	

Procession   Pro	Torry Good Very Poor Low Complexity No/Low Impacts  Very Good Very Poor High Complexity High Impacts  Indicator not Decision Relevant					n Relevant	Alternative S-1: Parclo A2	Alternative S-2: Parclo A1 with Northbound Left Turn	Alternative S-3: Diamond	Alternative S-4: Parclo A1 with Roundabout	Alternative S-5: Diamond with Roundabout	
An international part   Column   Colu	Factor	Indicator	Measure	Weighting By	Overall	Description		Northbound Eart furn		Roundabout	Roundbout	
Size   Column   Col		contaminated areas		10.0%	1.0%	Description	southwest quadrant of interchange which are considered to have high potential for contamination given the historical or present nature of adjacent properties. However, roadworks are generally limited to within existing MTO right-of-way and	southeast quadrant of interchange which are considered to have high / moderate potential for contamination given the historical or present nature of adjacent properties. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not	southwest quadrant of the interchange which are considered to have high potential for contamination and in the southeast quadrant of interchange which is considered to have high / moderate potential for contamination. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not considered	southwest quadrant of interchange which are considered to have high / moderate potential for contamination given the historical or present nature of adjacent properties.  However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not	southwest quadrant of the interchange which are considered to have high potential for contamination and in the southeast quadrant of interchange which is considered to have high / moderate potential for contamination. However, roadworks are generally limited to within existing MTO right-of-way and extent of impacts therefore not considered	
Control   Cont							'	Low-Moderate Impacts		Low-Moderate Impacts	Low-Moderate Impacts	
CATECORY - CLU   Law   Law   Company   Count of the company   Count of the count								0.8		0.8	0.8	
Page 15   Inches   Page 15   I			Score	for Socio-Economic	Environment	Category (Out of 5)	3.94	4.20	4.20	4.20	4.20	
Page 15   Inches   Page 15   I		0	verall Weighted Score fo	or Socio-Economic E	Environment C	ategory (Out of 10)	7.88	8.05	9.45	8.23	9.10	
Project is read with project (1)   Project of the set of the post (1)   Project of the post (1)   Proj	CATECODY CHIL					g - j ( - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -						
		Archaeological Impact to land with High Impacts (1) to		FO 09/		Description		new / widened crossing of Hwy 401/Sucker/Selby Creek and		new / widened crossing of Hwy 401/Sucker/Selby Creek and	Low-Moderate potential for archaeological impacts given new / widened crossing of Hwy 401/Sucker/Selby Creek	
Description   Processing   Pr	Resources (50%)		Low Impacts (5)	30.0%	2.5%	Measure	Low-Moderate Impacts	Low-Moderate Impacts	Low-Moderate Impacts	Low-Moderate Impacts	Low-Moderate Impacts	
Autorition   Properties   Pro							•	4	4	4	4	
Manage   State   Sta						Weighted Score	2.0	2.0	2.0	2.0	2.0	
1,006    1	•	features and cultural		50.0%	2.5%	Description					No impacts to built heritage features and cultural heritage landscapes anticipated	
Score for Cultural Environment Citylegry (Out of 5)   4.50   4.50   4.50   4.50   4.50   4.50   4.50   4.50   4.50   4.50	Landscapes (50%)							Low Impacts		Low Impacts		
Some for Cultural Environment Category (Out of 5)   4.50		(100%)						2.5	0	2.5	5	
Contraction Control (10%)   Control (10 (10%)   Fig. (1							4.50	4.50	4.50	4.50	4.50	
Contraction Control (10%)   Control (10 (10%)   Fig. (1						Category (Out of 5)	4.50	4.50	4.50	4.50	4.50	
Contraction control incident medialization of County Road as and Sudary/Single Costs to accommodation on a student medialization of County Road as and Sudary/Single Costs to accommodation on a student medialization of County Road as and Sudary/Single Costs to accommodation on on student medialization of County Road as Sudary/Single Costs to accommodation on on student medialization of County Road as and Sudary/Single Costs to accommodation on on student medialization of County Road as and Sudary/Single Costs to accommodation on on student medialization of County Road as and Sudary/Single Costs to accommodation on on student medialization of County Road as and Sudary/Single Costs to accommodation of Sudary Road as and Sudary/Single Costs to accommodation of Sudary Road as and Sudary/Single Costs to accommodation of Sudary Road as a student for												
Cost (70%)   Cos	CATEGORY - COS		•	56.0%	5.6%	Description	and Sucker/Selby Creek structures, new structure over Sucker/Selby Creek to accommodate new eastbound on- ramp, construction of three new ramps, new traffic signal and construction staging requirements (including minor	and Sucker/Selby Creek structures, construction of two new ramps, new traffic signal and construction staging	and Sucker/Selby Creek structures, construction of two new ramps, new traffic signal and construction staging	and Sucker/Selby Creek structures, construction of two new ramps, roundabout at ramp terminal included modified approaches along County Road 41, and construction staging	and Sucker/Selby Creek structures, construction of two new ramps, roundabout at ramp terminal included modified approaches along County Road 41, and construction staging	
Cost (70%)   Formation   Cost (20%)   Formation   Cost (20%)   Formation   F									\$3,500,000		. , ,	
Utilities (20%)  Utilit	Cost (70%)								5 5.6	***	-	
Measure   Low-Moderate   Low-Moder	0031 (1079)		(1) to Low Cost /		1.4%		Due to Highway 401 speed change lane over County Road 41, additional widening of structure would be required should Highway 401 be widened to 6-lanes. Traffic signals have	Due to Highway 401 speed change lane over County Road 41, additional widening of structure would be required should Highway 401 be widened to 6-lanes. Traffic signals have	Potential future widening of Highway 401 to 6-lanes could be accommodated without additional structure width given that no speed change lanes located over County Road 41 structure. Traffic signals have higher long-term	Due to Highway 401 speed change lane over County Road 41, additional widening of structure would be required should Highway 401 be widened to 6-lanes. Roundabouts have	Potential future widening of Highway 401 to 6-lanes could be accommodated without additional structure width given that no speed change lanes located over County Road 41 structure. Roundabouts have lower long-term maintenance	
Utilities (30%)   Utilities (100%)   Utilities (100%)   Utilities (100%)   Utilities (100%)   Utilities (30%)   Utilit							Low-Moderate	Low-Moderate		Low-Moderate	Low	
Utilities (30%)  Uniform the planed utilities (10%)  Uniform to existing and underground Bell along County Road 41 due to construction of new ramps and southbound left-turn lane, including likely displacement (relocation) of one hydro tower due to new eastbound off-ramp  Measure  Moderate Impacts  Noderate Impacts osanitary sewer, watermain and underground Bell along County Road 41 due to construction of new ramps and roundabout, including likely displacement (relocation) of one hydro tower due to new eastbound off-ramp  Noderate Impacts  Noderate Impacts osanitary sewer, watermain and underground Bell along County Road 41 due t							4 1.1	1.1		4 1.1	5 1.4	
Measure   Moderate Impacts   Moderate Impacts   Moderate Impacts   Moderate Impacts   Moderate Impacts   Moderate Impacts   Score (/5)   3   3   2.5   2.5				30.0%	3.0%	-	Potential impacts to sanitary sewer, watermain and underground Bell along County Road 41, including likely displacement (relocation) of one hydro tower due to new	Potential impacts to sanitary sewer, watermain and underground Bell along County Road 41 due to construction of new ramps and northbound left-turn lane, including likely displacement (relocation) of one hydro tower due to new	Potential impacts to sanitary sewer, watermain and underground Bell along County Road 41 due to construction of new ramps and southbound left-turn lane, including likely displacement (relocation) of one hydro tower due to new	underground Bell along County Road 41 due to construction of new ramps and roundabout, including likely displacement	Potential impacts to sanitary sewer, watermain and underground Bell along County Road 41 due to construction of new ramps and roundabout, including likely displacement	
Weighted Score         1.8         1.8         1.8         1.5         1.5           Score for Cost and Constructability Category (Out of 5)         3.45         4.09         4.33         3.59         3.54           Overall Weighted Score for Cost and Constructability Category (Out of 10)         6.90         8.19         8.66         7.19         7.09           Total Weighted Average Score         /5         4.30         4.08         3.99         3.83         3.93		p.dimed damies (100/0)	Low impacts (5)				Moderate Impacts					
Score for Cost and Constructability Category (Out of 5)         3.45         4.09         4.33         3.59         3.54           Overall Weighted Score for Cost and Constructability Category (Out of 10)         6.90         8.19         8.66         7.19         7.09           Total Weighted Average Score         /5         4.30         4.08         3.99         3.83         3.93							3 1.8	1.8	1.8			
Overall Weighted Score for Cost and Constructability Category (Out of 10)         6.90         8.19         8.66         7.19         7.09           Total Weighted Average Score         /5         4.30         4.08         3.99         3.83         3.93		•	Sci	ore for Cost and Co	nstructability							
			Overall Weighted Sco	re for Cost and Con	structability C	ategory (Out of 10)						
Overall Total Score /100 95.01 91.21 90.92 76.40 70.24			To	otal Weighted Av	erage Score	/5	4.30	4.08	3.99	3.83	3.93	
	Overall Total Score /100						85.91	81.31	80.83	76.40	79.26	

#### EVALUATION SUMMARY - COUNTY ROAD 41 INTERCHANGE, SOUTH SIDE

Most Preferred Alternative

Least Preferred Alternative

EVALUATION SUMMARY - COUNTY ROAD 41 INTERCHANGE, SOUTH SIDE							
Cate	gory	Alternative S-1: Parclo A2	Alternative S-2: Parclo A1 with Northbound Left Turn	Alternative S-3: Diamond	Alternative S-4: Parclo A1 with Roundabout	Alternative S-5: Diamond with Roundabout	EVALUATION SUMMARY
Transportation (60% Weight)			•	•	•	•	All alternatives are anticipated to operate well with relatively minor intersection delays and queuing in the short and long-term and have generally good overall geometrics. Alternatives S-2 and S-3 require left-turn movements (additional conflict points) to access Highway 401 increasing potential collision risk relative to directional movements, with the southbound left for trucks to access eastbound HIghway 401 (including from the Flying 'J') further impacting operations and potential weaving concerns with adjacent intersections. Further, the dedicated southbound left-turn lane require dfor Alternative 3 cannot be provided until the County Road 41 structure is replaced in the future. While the roundabout alternatives (S-5 and S-6) eliminate direct left-turns and are anticipated to result in good traffic operations, they are considered less compatible with Long Combination Vehicles (LCV's). In addition, roundabouts at ramp terminal intersections are an unfamiliar configuration for many drivers and require more complex signage (driver perception and processing), potentially increasing collision risk. The roundabouts would be more disruptive to County Road 41 traffic during construction, and would be located adjacent to the signalized intersection at Richmond Blvd (and possibly the north ramp terminal intersection) which is undesirable given the unequal flow/distribution of incoming traffic from traffic signals that may result in less frequent gaps for traffic from off-ramp and temporary reduction in ramp terminal operations. Future replacement of the CR41 structure and/or widening of Highway 401 (anticipated within 20-25 years) can be staged to avoid significant impacts to Highway 401 and interchange operations, though lane reductions along Highway 401 and possible ramp closures will be required for all options. The Alternative S-1 configuration is considered the most desirable from a geometric and safety
		55.7	48.1	45.2	44.0	45.6	perspective overall with directional movements for all maneuvers, and is preferred from a Transportation perspective.
Natural Environm	ent (15% Weight)	•	•	•	•	•	All alternatives require partial widening of the Highway 401 bridge crossing of Sucker/Selby Creek for construction staging purposes, resulting in some potential for impacts to fish and fish habitat and terrestrial ecosystems adjacent to the creek, as well as groundwater resources. Alternative N-1 also requires construction of a bridge crossing of this creek and therefore is associated with slightly higher environmental impacts. As such, Alternatives S-2, S-3, S-4 and S-5 are equally preferred from a Natural Environment perspective.
		11.0	12.5	13.0	12.5	13.0	` `
Socio-Economic Environment (10% Weight)		•	•	•	•	•	Alternatives S-1, S-2 and S-4 require minor property acquisition from a commercial property in the southwest quadrant of the interchange and potentially along County Road 41 (for Alternative S-2), although the impacts are not anticipated to directly impact commercial operations. In terms of Active Transportation, the free-flow movements with the roundabout alternatives (S-4 and S-5) as well as driver unfamiliarity make these options slightly less preferable for pedestrian and cyclist safety. None of the alternatives are anticipated to have any impacts to residential properties, noise sensitive receivers, long-term air quality, or aesthetic impacts to
		7.9	8.1	9.5	8.2	9.1	sensitive viewers. As such, Alternative S-3 is slightly preferred from a Socio-Economic Environment perspective.
Cultural Environment (5% Weight)		•	•	•	•	4.5	All alternatives require partial widening of the Highway 401 bridge crossing of Sucker/Selby Creek for construction staging purposes, resulting in potential to impact archaeological resources at this location. While Alternative S-1 requires additional structure width (new bridge) at the same location, the incremental impacts to archaeological resources associated with the additional width are considered minimal. None of the alternatives are anticipated to impact built heritage features or cultural heritage landscapes. As such, all alternatives are considered equally preferred from a Cultural Environment perspective.
Cost (10% Weight)		4.5	4.5	4.5	4.5	4.5	All alternatives are anticipated to have similar impacts to existing utilities and will require reduction to a single lane in either direction during bridge rehabilitation work along County Road, however no other long-term traffic impacts (lane or ramp closures) are anticipated during construction. To accommodate the speed change lanes over the County Road 41 structure for Alternatives S-1, S-2 and S-4, additional structure width/widening will be required at this structure should Highway 401 be widened to 6-lanes in the future. The new or widened bridge crossing of Sucker/Selby Creek required for Alternative S-1 makes this the most expensive alternative. Alternatives S-2 and S-3 have the lowest construction cost (between 20 and 40% lower than other alternatives) and are therefore preferred from a Cost and
	1	6.9	8.2	8.7	7.2	7.1	Constructability perspective.
	TOTAL SCORE	85.9	81.3	80.8	76.4	79.3	The two roundabout alternatives (S-4 and S-5) have relatively low impacts to the Natural, Socio-Economic and Cultural Environments, and are anticipated to result in good overall traffic operations. However, they are considered less compatible with Long Combination Vehicles (LCV's) and other trucks, are less preferable for
	RANK	1	2	3	5	4	pedestrians and cyclists, have greater construction staging impacts and higher complexity of signage, and would be located adjacent to the signalized intersection at Richmond Boulevard (and possibly the north ramp terminal intersection) which is undesirable given the unequal flow/distribution of incoming traffic from traffic
OVERALL ASSESSMENT	RECOMMENDATION	TECHNICALLY PREFERRED ALTERNATIVE	NOT RECOMMENDED	NOT RECOMMENDED	NOT RECOMMENDED	NOT RECOMMENDED	signals. These options are therefore not preferred.  Alternative S-3 is considered preferred or equally preferred from a Natural, Socio-Economic and Cultural Environment perspectives as well as cost. However, the alternative requires a southbound left-turn movement to access eastbound Highway 401 including for trucks exiting from the Flying 'J' which results in additional delay and increased collision risk. Further, the dedicated southbound left-turn lane cannot be provided until the County Road 41 structure is replaced in the future, increasing operational concerns at this location in the short to mid-term. This alternative is therefore not preferred.  Alternative S-1 is considered the most desirable configuration from a Transportation perspective with directional movements provided for all maneuvers. This alternative requires a new (or widened) bridge over Sucker/Selby Creek for the new on-ramp, increasing impacts to the Natural and Cultural Environment, as well as higher construction and life-cycle / maintenance costs. However, all other alternatives also require widening of the existing structure over the creek for construction and structure and such the increased of the payer transport of the p
							staging purposes, and as such the incremental impacts of the new structure are considered relatively minor. While Alternative S-2 is anticipated to result in good overall traffic operations, it requires a northbound left-turn lane to access the highway and a potential weaving concern / increased collision risk between the ramp terminal and Richmond Blvd intersection. While Alternative S-1 has the highest construction cost of the alternatives and slightly greater impacts, the short and long-term operational and safety benefits of this configuration are considered to outweigh these impacts.  As such, Alternative S-1 (Parclo A2) is the preferred overall south-side interchange alternative.
			• •	•			
Legend	Heightest Ca	itegory Weighting		<b>Lowest</b> Categ	ory Weighting	-	
						1	

## **Appendix F – Public Notification and Correspondence**

Prepared for: Ontario Ministry of Transportation

G.W.P. 4459-04-00

# Notice of Study Commencement January 2016

#### ONTARIO GOVERNMENT NOTICE NOTICE OF STUDY COMMENCEMENT

**Preliminary Design and Class Environmental Assessment Studies** 

Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00) and at Palace Road (G.W.P. 4197-13-00)

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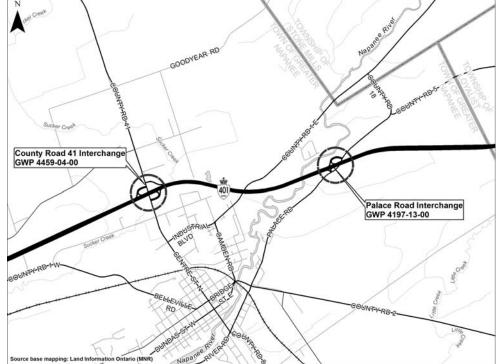
#### THE PROCESS

Both studies will follow the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

Alternatives will be generated and evaluated based on technical and environmental factors and in consultation with public stakeholders, municipalities and government agencies. Two Public Information Centres (PICs) will be held for the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and two PICs will be held for the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00) to provide interested parties with the opportunity to discuss the project and provide input to the Project Team.

A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study which will document:

- The need and justification for the project;
- Existing environmental conditions;
- The generation, assessment and evaluation of alternatives;
- The preferred alternative;
- A summary of potential environmental issues and mitigation measures; and,
- A summary of consultation undertaken throughout the study



Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in this newspaper.

#### **COMMENTS**

To obtain additional information, provide initial comments, or to be placed on the mailing list for either of these studies, please contact the Project Team as follows:

#### **Tina White**

Senior Project Manager Planning and Design Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000

Kingston, ON K7L 5A3 Tel: 613-545-4871 Toll Free: 1-800-267-0295 Fax: 613-540-5106

Email: tina.white@ontario.ca

Tim Sorochinsky, P.Eng. Consultant Project Manager

**AECOM** 4<sup>th</sup> Floor, 30 Leek Crescent Richmond Hill, ON L4B 4N4

Tel: 905-882-3522 Fax: 905-882-4399

E-mail: tim.sorochinsky@aecom.com

#### Fred Leech

Consultant Environmental Planner **AECOM** 201-45 Goderich Road Hamilton, ON L8E 4W8 Tel. 905.578.3040

Fax: 905.578.4129

Email: fred.leech@aecom.com

Comments are being collected to assist MTO in meeting the requirements of the Environmental Assessment Act. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871 Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



January 18, 2016

Fax: 613-540-5106

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Study Commencement

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
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Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify you of project start-up (refer to the enclosed "Notice of Study Commencement") and inquire if your community has an interest in either of these studies. We would also ask that you please confirm who will act as the main contact for your community. This individual's name will be added to our study mailing list, and as such, will be notified of key project milestones. We also welcome the opportunity to meet with you to discuss this project.

As part of the Highway 401 / Palace Road interchange improvements study (G.W.P. 4197-13-00), a Stage 1 Archaeological Assessment will be undertaken to help in our planning process for the examination of alternatives and to help to identify potential impacts. A Stage 1 Archaeological Assessment Report will be prepared to document the results of all background research and fieldwork, and will contain all necessary photographic and cartographic documentation, including recommendations for Stage 2 work, should it be required.

A Stage 1 and 2 Archaeological Assessment was previously completed for the Highway 401 / County Road 41 interchange improvements study (G.W.P. 4459-04-00). As such, the Stage 1 and 2 Archaeological Assessment is not part of this project. These reports are available as reference documents upon request.

The Project Team will also be conducting a natural sciences review of the study area. Background information relating to natural heritage features will be collected and field investigations will be performed within the study area to characterize vegetation communities, fish and fish habitat, as well as wildlife and wildlife habitat. The sensitivity / significance of environmental features identified will be determined, and impact analysis will be performed to identify impact management measures. This work will be documented in various reports.

If you would like to provide comments, or if you require further information regarding this study, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871). In addition, if you are interested in meeting as a result of receiving this letter, please contact the undersigned to arrange a meeting at your earliest convenience.

Thank you for your cooperation and assistance.

Yours truly, Ministry of Transportation

Tina White
Senior Project Manager
tina.white@ontario.ca

cc. L. Skoblenick - Ministry of Transportation, Environmental Planner

T. Sorochinsky
M. Weldon
F. Leech
- AECOM Consultant Project Manager
- AECOM Consultant Deputy Project Manager
- AECOM Senior Environmental Planner

Encl. Notice of Study Commencement



905-882-4401 tel 905-882-4399 fax

January 18, 2016

«Name» «Organization» «Address»

Dear «Greeting»:

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Aboriginal consultation is a key component of the project. The purpose of this letter is to seek your assistance in identifying any Aboriginal Communities who may have an interest in either of these projects, so that we may engage them in constructive consultation. A reply by Friday February



**19, 2016 would be appreciated.** To create a comprehensive Aboriginal consultation program, the following Aboriginal Communities have been identified and will be contacted:

- Aamjiwnaang
- Alderville First Nation
- Aundeck-Omni-Kaning
- Beausoleil
- · Chippewas of Georgina Island
- Chippewas of Kettle and Stony Point
- Chippewas of Nawash First Nation
- Chippewas of Rama First Nation
- Chippewas of the Thames First Nation
- Curve Lake
- Hiawatha First Nation
- M'Chigeeng First Nation
- Mississauga's of Scugog Island First Nation
- Mississaugas of the Credit
- Mohawks of Akwesasne
- Mohawks of the Bay of Quinte
- Metis Nation of Ontario
- Saugeen
- Sheguiandah
- Six Nations of the Grand River
- Walpole Island
- Zhiibaahaasing First Nation

An initial contact letter is also being provided to the Ontario Ministry of Aboriginal Affairs for further review and response.

If you would like to provide comments, or require further information regarding this study, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Thank you for your cooperation and assistance.

Yours truly, **AECOM** 

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager
L. Skoblenick - Ministry of Transportation Environmental Planner

T. Sorochinsky
M. Weldon
- AECOM Project Manager
- AECOM Deputy Project Manager

Encl. Notice of Study Commencement



905-882-4401 tel 905-882-4399 fax

January 18, 2016

«Name» «Organization» «Address»

Dear «Greeting»:

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- Six Nations of the Grand River
- Walpole Island
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An initial contact letter is also being provided to Indigenous and Northern Affairs Canada for further review and response.

If you would like to provide comments, or require further information regarding this study, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Thank you for your cooperation and assistance.

Yours truly, **AECOM** 

Fred Leech

Cc.

Senior Environmental Planner

T. White - Ministry of Transportation Project Manager
L. Skoblenick - Ministry of Transportation Environmental Planner

T. Sorochinsky
M. Weldon

- AECOM Project Manager
- AECOM Deputy Project Manager

Encl. Notice of Study Commencement

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871 Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



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The purpose of this letter is to notify you of the study commencement. The enclosed Notice of Study Commencement will appear in the Napanee Beaver and the Napanee Guide on Thursday January 21, 2016. The enclosed notice will also appear on NapaneeGuide.com.

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Senior Environmental Planner

T. White - Ministry of Transportation Project Manager L. Skoblenick - Ministry of Transportation Environmental Planner

- AECOM Project Manager T. Sorochinsky

M. Weldon - AECOM Deputy Project Manager

Encl. Notice of Study Commencement



905-882-4401 tel 905-882-4399 fax

January 18, 2016

«Name» «Organization» «Address»

Dear «Greeting»:

#### **RE:** Notice of Study Commencement

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

These studies will examine interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or widening of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging (including potential detours on County Road 41 and Palace Road) during construction.

Both studies will follow the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

Alternatives will be generated and evaluated based on technical and environmental factors and in consultation with public stakeholders, municipalities and government agencies. Two Public Information Centres (PICs) will be held the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and two PICs will be held for the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00) to provide interested parties with the opportunity to discuss the project and provide input to the Project Team.

For each study, a Transportation Environmental Study Report (TESR) will be prepared and made available for public review at the completion of the study, which will document: the need and justification for the project; existing environmental conditions; the generation, assessment and evaluation of alternatives; the preferred alternative; a summary of potential environmental issues and mitigation measures; and a summary of consultation undertaken throughout the study.

Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify your organization of the study commencement (refer to the enclosed "Notice of Study Commencement"). On the attached Contact Information Form, please indicate whether your organization has an interest in either of these studies and who will act as



your organization's contact for this project. In order to assist us with our planning process, please also indicate if the above noted project will affect the delivery of your organization's programs or services. A reply by Friday February 19, 2016 would be appreciated.

If you would like to provide comments, or require further information regarding this study, please feel free to contact the undersigned at 905-390-2030 or Fred.Leech@aecom.com.

Thank you for your cooperation and assistance.

Yours truly, AECOM

Fred Leech

Cc.

Senior Environmental Planner

T. White - Ministry of Transportation Project Manager
L. Skoblenick - Ministry of Transportation Environmental Planner

T. Sorochinsky

- AECOM Project Manager

- AECOM Deputy Project Manager

Encl. Notice of Study Commencement



Preliminary Design and Class EA Studies
Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00)
Highway 401 Interchange Improvements at Palace Road (G.W.P. 4197-13-00)

### **Contact Information Form**

1.) Does your organiza project activities and	tion wish to participate I information as these st		ontinue to re	eceive noti	ces of
	ty Rd 41 Interchange (G	. •	Yes	No	
Hwy 401 / Palac	e Rd Interchange (G.W.	.P. 4197-13-00)	Yes	No	
2.) If your organization Project Team's cont		these studies, pleas	e specify w	ho will act	as the
NAME:					
TITLE:					
DEPARTMENT:					
ORGANIZATION:					
MAILING ADDRESS:					
PHONE NUMBER:					
FAX:					
E-MAIL ADDRESS:					
3.) Please indicate if organization's progr	either of the above r ams or services, and/or				
Submitted By:		Your information on file for use during this form by <b>Friday</b>	ng the study	y. Please s	submit
			<b>Fred Leech</b> Environmenta	·	<i>י</i> .

**AECOM** 201-45 Goderich Road Hamilton, ON L8E 4W8 Tel. 905.578.3040

Fax: 905.578.4129 Email: fred.leech@aecom.com

# Public Information Centre #1 July 2016

## ONTARIO GOVERNMENT NOTICE NOTICE OF PUBLIC INFORMATION CENTRE #1

**Preliminary Design and Class Environmental Assessment Studies** 

Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00) and at Palace Road (G.W.P. 4197-13-00)

#### THE PROJECTS

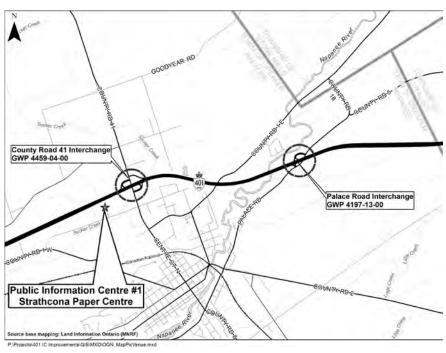
The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

#### THE PROCESS

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study.

#### **PUBLIC INFORMATION CENTRE #1**

The first of two PICs has been arranged for each study to introduce the studies and present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. Members of the public, residents and stakeholders are invited to attend the first PIC as follows:



County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016 4:00 p.m. to 8:00 p.m. Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

#### Palace Road (G.W.P. 4197-13-00)

Thursday July 28, 2016 4:00 p.m. to 8:00 p.m. Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

#### **COMMENTS**

To obtain additional information, provide comments, or to be placed on the mailing list for either of these studies, please contact the Project Team as follows:

#### Tina White

Senior Project Manager Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000 Kingston, ON K7L 5A3

Tel: 613-545-4871, Toll Free: 1-800-267-0295

Fax: 613-540-5106

Email: tina.white@ontario.ca

Tim Sorochinsky, P.Eng.

Consultant Project Manager AECOM 4<sup>th</sup> Floor, 30 Leek Crescent

Richmond Hill, ON L4B 4N4 Tel: 905-882-3522

Fax: 905-882-4399

E-mail: tim.sorochinsky@aecom.com

Fred Leech

Consultant Environmental Planner

AECOM

201-45 Goderich Road Hamilton, ON L8E 4W8

Tel. 905.578.3040 Fax: 905.578.4129

Fax. 905.576.4129

Email: fred.leech@aecom.com

If you have any accessibility requirements in order to participate in these projects, please contact one of the Project Team members listed above.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.





905-882-4401 tel 905-882-4399 fax

July 11, 2016

**External Agency Letter** 

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify you that the first of the two Public Information Centres (PICs) for each project has been scheduled (refer to the enclosed "Notice of Public Information Centre #1). PIC #1 for each study will present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. Your organization is invited to attend the following sessions:

County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016 3:00 p.m. to 4:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

Palace Road (G.W.P. 4197-13-00)

Thursday July 28, 2016 3:00 p.m. to 4:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.



If you would like to provide comments, or require further information regarding these studies, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Thank you for your cooperation and assistance.

Yours truly, AECOM

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager

Encl. Notice of Public Information Centre #1

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871 Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



July 11, 2016

Fax: 613-540-5106

First Nations Community Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify you that the first of the two Public Information Centres (PICs) for each project has been scheduled (refer to the enclosed "Notice of Public Information Centre #1). PIC #1 for each study will present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. Your council and community members are invited to attend the following sessions:

County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016
3:00 p.m. to 4:00 p.m.
Strathcona Paper Centre, Lafarge Banquet Hall
16 McPherson Drive, Greater Napanee

Palace Road (G.W.P. 4197-13-00)

Thursday July 28, 2016 3:00 p.m. to 4:00 p.m. Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

Enclosed is a copy of the PIC notice should you wish to post it for members of your community to view. If you would like to provide comments, or if you require further information regarding these studies, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871). In addition, if you are interested in meeting as a result of receiving this letter, please contact the undersigned to arrange a meeting at your earliest convenience.

Thank you for your cooperation and assistance.

Yours truly, Ministry of Transportation

Tina White
Senior Project Manager
tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky
M. Weldon
F. Leech
AECOM Consultant Project Manager
- AECOM Consultant Deputy Project Manager
- AECOM Senior Environmental Planner

Encl. Notice of Public Information Centre #1

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871

Tel.: 613 545-4871 Fax: 613-540-5106

#### Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



July 7, 2016

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

MP/MPP Letter

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify you that the first of the two Public Information Centres (PICs) for each project has been scheduled. The enclosed Notice of Public Information Centre #1 will appear in the *Napanee Beaver* and the *Napanee Guide* on Thursday July 14, 2016. The enclosed notice will also appear on NapaneeGuide.com.

PIC #1 for each study will present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. You are invited to attend the following sessions:

#### County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016 3:00 p.m. to 4:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

#### Palace Road (G.W.P. 4197-13-00)

Thursday July 28, 2016 3:00 p.m. to 4:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

If you would like to provide comments, or if you require further information regarding these studies, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871).

Thank you for your cooperation and assistance.

Yours truly, Ministry of Transportation

Tina White
Senior Project Manager
tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky
M. Weldon
F. Leech
AECOM Consultant Project Manager
- AECOM Consultant Deputy Project Manager
- AECOM Senior Environmental Planner

Encl. Notice of Public Information Centre #1



905-882-4401 tel 905-882-4399 fax

July 11, 2016

Public Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify you that the first of the two Public Information Centres (PICs) for each project has been scheduled (refer to the enclosed "Notice of Public Information Centre #1). PIC #1 for each study will present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. You are invited to attend the PICs as follows:

County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016 4:00 p.m. to 8:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee Palace Road (G.W.P. 4197-13-00)

Thursday July 28, 2016 4:00 p.m. to 8:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.



If you would like to provide comments, require further information regarding these studies, or have any accessibility requirements in order to participate in these projects, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Thank you for your cooperation and assistance.

Yours truly, AECOM

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky
M. Weldon
- AECOM Project Manager
- AECOM Deputy Project Manager

Encl. Notice of Public Information Centre #1



905-882-4401 tel 905-882-4399 fax

September 22, 2016

Sir/Madam Address Address

Dear Sir/Madam:

RE: Preliminary Design and Class Environmental Assessment Study: Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at County Road 41 (G.W.P. 4459-04-00). The study will examine the interim and long-term interchange operational improvements, replacement and/or rehabilitation of the Highway 401 bridge, pavement rehabilitation, drainage improvements, illumination, and traffic staging during construction. The project is located in the Town of Greater Napanee within the County of Lennox and Addington (see enclosed **Key Plan**).

A Public Information Centre (PIC) was held on July 27, 2016 for the Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00). The PIC provided information on the study area, purpose and scope, details on the timing of the study, an overview of existing conditions, problems and opportunities, the improvement alternatives under consideration and evaluation criteria, and the next steps in the environmental assessment process (see enclosed displays and plans that were presented at the PIC).

Based on the identified problems and opportunities at the County Road 41 interchange, a number of possible interchange improvement alternatives were developed and were presented at the PIC. This long list of interchange alternatives was subjected to a screening-level assessment. This screening led to the identification of a short list of alternatives, which will be evaluated based on various evaluation criteria. The enclosed drawings illustrate the long-list of alternatives that have been considered and summarize the screening-level assessment.

As the various alternatives being considered may require the addition of lanes and the realignment of the existing on and off-ramps, we would like to advise you that your property may be potentially impacted or is in close proximity to one or more of the long-list of interchange alternatives. As such the Project Team would like to encourage you to review the enclosed plans outlining the descriptions of the alternatives and potential property impacts so that we can address any questions and/or comments that you may have.

The next steps for this study are to assess and evaluate the short list of interchang e alternatives alternatives, select a Technically Preferred Alternative and have a second round of public consultation to present to the public the Preliminary Design of the Technically Preferred Alternative. As your name is on the study mailing list, you will continue to receive public notifications on the study including information regarding the next round of consultation. In addition, all property owners impacted by the Technically Preferred Alternative will be notified of the impact in advance of the next round of consultation.

Should you wish to provide comments, or require further information, please feel free to contact the undersigned at 905-747-1783 or michael.weldon@aecom.com. Alternatively, please feel free to contact either the Consultant Senior Project Manager or the MTO Senior Project Manager listed below:

Tim Sorochinsky, P.Eng.

Consultant Senior Project Manager

**AECOM** 

4<sup>th</sup> Floor, 30 Leek Crescent Richmond Hill, ON L4B 4N4

Tel: 905-882-3522 Fax: 905-882-4399

Email: tim.sorochinsky@aecom.com

**Tina White** 

Senior Project Manager

Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000

Kingston, ON K7L 5A3

Tel: 613-545-4871, Toll Free: 1-800-267-0295

Fax: 613-540-5106

Email: tina.white@ontario.ca

This study is being carried out in accordance with the approved planning process for Group 'B' undertakings under the Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000). Upon completion of the study a Transportation Environmental Study Report (TESR) will be prepared and made available for a 30-day public review period. Newspaper notices will be published and letters will be sent to the study mailing list at that time to explain the review process and identify where the TESR can be reviewed.

Comments are being collected to assist MTO in meeting the requirements of the Environmental Assessment Act. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

If you have any accessibility requirements in order to participate in this project, please contact one of the Project Team members listed above.

Thank you for your cooperation and assistance.

Sincerely,

**AECOM** 

Michael Weldon, P.Eng.

30 Leek Crescent, 4th Floor Richmond Hill, ON L4B 4N4

Seeld Wilde

Tel: 905-747-1783

Email: Michael.weldon@aecom.com

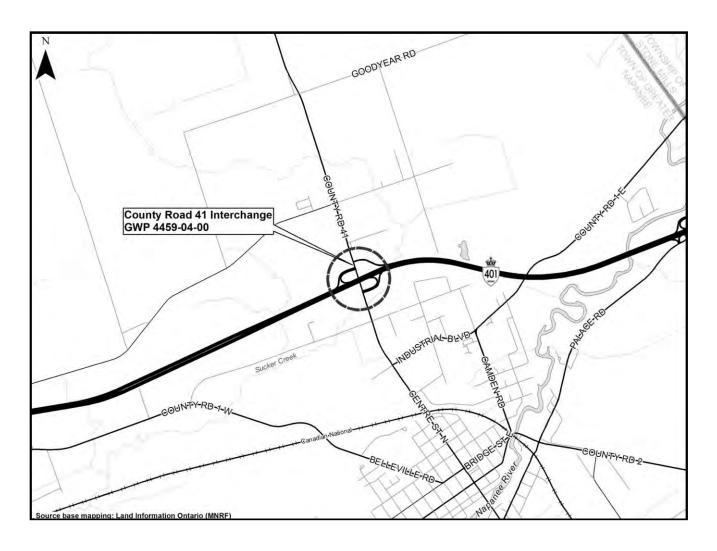
Cc. - Ministry of Transportation Senior Project Manager T White

> E. Pipe - Ministry of Transportation Environmental Planner T. Sorochinsky - AECOM Senior Project Manager F. Leech - AECOM Senior Environmental Planner

S. Schmied - AECOM Environmental Planner

Encl. Notice of PIC, PIC Displays, Interchange Alternative Plans

### Key Plan



# **Permission to Enter Requests**



905-882-4401 tel 905-882-4399 fax

[Insert Date]

**AECOM Reference Number:** 60478166

PROPERTY OWNER ADDRESS

Dear Property Owner,

RE: Request for Permission to Enter Your Property
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at County Road 41 (G.W.P. 4459-04-00). The project is located in the Town of Greater Napanee within the County of Lennox and Addington (see enclosed **Key Plan**).

As part of this study an assessment of natural, social and cultural impacts is being undertaken within the study area. Impact assessments involve the collection of field data and observations within the study limits on lands that are both publically and privately owned to assess the existing conditions and minimize design and construction related conflicts.

In order to proceed with this study, we respectfully request permission to enter your property at [insert property address]. MTO requests that a "Permission to Enter" form be signed by the property owner or representative which will allow us to enter your property during the study for one or more occasions to complete the accepted following work:

- Collection of field data via topographic and environmental surveys and photographs, or similar activities.
- Environmental investigations which will include archaeology test pitting to uncover archaeologically significant objects. The test pitting survey involves digging 30cm by 30cm holes by hand and screening the topsoil to look for artifacts. The soil is screened over tarps so that all soil is retained, and the test pits are backfilled to grade. If sod was present, it is replaced on top so that there is no visible indication of the survey after completion.

We hope to complete the above investigations in late August or early September. A "Permission to Enter" form for your property is included with this letter. Please review the form, sign one copy and retain a copy for your files, and return a scan or photocopy back to the undersigned as soon as possible via email or mail with the attached postage paid envelope.

If you are tenants of the property noted on the attached "Permission to Enter" form, or are not the property owner, please kindly contact the undersigned, and we will arrange to forward this letter and form to the appropriate contact.

This study is being carried out in accordance with the approved planning process for Group 'B' undertakings under the Class Environmental Assessment (Class EA) for Provincial Transportation Facilities (2000). Upon completion of the study a Transportation Environmental Study Report (TESR) will be prepared and made available for a 30-day public review period. Newspaper notices will be published and letters will be sent to the study mailing list at that time to explain the review process and identify where the TESR can be reviewed.

If you require further information about the proposed field work; require assistance in completing the form; or would like to submit your form electronically, please contact the undersigned at 905-747-1783 or michael.weldon@aecom.com. Alternatively, please feel free to contact either the Consultant Senior Project Manager or the MTO Senior Project Manager listed below:

#### Tim Sorochinsky, P.Eng.

Consultant Senior Project Manager AECOM

4<sup>th</sup> Floor, 30 Leek Crescent Richmond Hill, ON L4B 4N4

Tel: 905-882-3522 Fax: 905-882-4399

Email: tim.sorochinsky@aecom.com

#### **Tina White**

Senior Project Manager

Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000

Kingston, ON K7L 5A3

Tel: 613-545-4871, Toll Free: 1-800-267-0295

Fax: 613-540-5106

Email: tina.white@ontario.ca

Comments are being collected to assist MTO in meeting the requirements of the Environmental Assessment Act. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the Freedom of Information and Protection of Privacy Act. With the exception of personal information, all comments will become part of the public record.

Sincerely,

**AECOM Canada Ltd.** 

#### Michael Weldon, P.Eng.

30 Leek Crescent, 4th Floor Richmond Hill, ON L4B 4N4

Tel: 905-747-1783

Email: Michael.weldon@aecom.com

Cc. T. White - Ministry of Transportation Senior Project Manager E. Pipe - Ministry of Transportation Environmental Planner

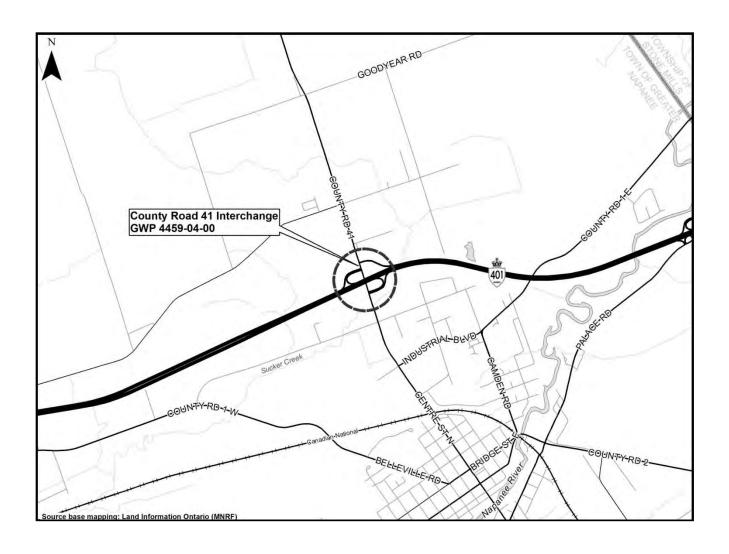
T. Sorochinsky - AECOM Senior Project Manager

- AECOM Senior Environmental Planner F. Leech

S. Schmied - AECOM Environmental Planner

Enclosed: Key Plan, Permission to Enter Form ( 2 copies)

### Key Plan (G.W.P 4459-04-00)





### **PERMISSION TO ENTER**

1.1.1 For Internal Use Only						
W.P. N	W.P. No.:					
Highway No.:						
Dist. N	Dist. No.: Region:					
P-Plan	 ):					

OWNER ADDRESS	PROPERTY LOCATION					
	PROPERTY ROLL NUMBER:					
	LOCATION:					
As owners of:						
Lot/Block:	Concession/RP:					
Town/Township:	Municipality:					
Geographic Township:	Ministry Plan:					
Part(s)/Sketched:	Registration #:					
PIN:	Registration Division:					
Registry Office:						
I/we grant permission to Her Majesty The Queen in Right of Ontario as represented by the Minister of Transportation for the province of Ontario, Her employees, agents, contractors, consultants, etc., to enter my/our property on one or more occasions between the present date and December 31 <sup>st</sup> 2017 (unless otherwise indicated by me in the comments section) for the purpose of carrying out the following work:						
<ul> <li>Visual Observations which may include the collection of field data via topographic and environmental surveys and photographs, or similar activities.</li> </ul>						
<ul> <li>Investigations which may require small test holes dug by hand to uncover archaeologically significant objects or similar activities.</li> </ul>						
The granting of this permission in no way constitutes a release for damages that may be caused be the work, and I/We reserve the right to file a claim for any injury, loss or damage within two years for the day on which the damage becomes evident.						
	nages, and related reasonable legal fees of the arising out of the Minister's use of the land except to sed by the Owner(s)' negligence.					
Please include the following:						
Telephone Number:						
E-mail Address:						
Comments:						
Dated at this	is day of					
III	is day of ,					
Print Name(s) (and position held if corporation)	Print Name(s) (and position held if corporation)					
Signature(s)	Signature(s)					
Witness (where executing party is not a corporation)	Seal or Authority To Bind (if corporation)					



#### **PERMISSION TO ENTER**

1.1.2	.1.2 For Internal Use Only				
W.P. N	lo.:				
Highway No.:					
Dist. N	lo.:	Region:			
P-Plan	n:				

PROPERTY LOCATION PROPERTY ROLL NUMBER:			
LOCATION:			
Concession/RP:			
Municipality:			
Ministry Plan:			
Registration #:			
Registration Division:			
in Right of Ontario as represented by the Minister of apployees, agents, contractors, consultants, etc., to between the present date and December 31 <sup>st</sup> 2017 ts section) for the purpose of carrying out the			
e collection of field data via topographic and or similar activities.			
st holes dug by hand to uncover archaeologically			
tes a release for damages that may be caused by for any injury, loss or damage within two years from			
es, and related reasonable legal fees of the sing out of the Minister's use of the land except to by the Owner(s)' negligence.			
day of ,			
Print Name(s) (and position held if corporation)			
Signature(s)			
1			

Seal or Authority To Bind (if corporation)

Witness (where executing party is not a corporation)

# Public Information Centre #2 November 2017

## ONTARIO GOVERNMENT NOTICE NOTICE OF PUBLIC INFORMATION CENTRE #2

Preliminary Design and Class Environmental Assessment Studies

Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00) and at Palace Road (G.W.P. 4197-13-00)

#### **THE PROJECTS**

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

#### **THE PROCESS**

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. PIC #2 is being held to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, and the Preliminary Design of the preferred alternative at each interchange.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study to document the Recommended Plan, the potential impacts, and the Public Information Centre #2
Selby Community Hall

County Road 41 Interchange
GWP 4459-04-00

Palace Road Interchange
GWP 4197-13-00

Palace Road Interchange
GWP 4197-13-00

recommended mitigation measures to minimize environmental impacts. The TESRs will be made available to the public, other interested parties and external agencies for a 30-day public review period at public review locations in close proximity to the study area. A notice of the TESR review opportunities will be provided.

#### **PUBLIC INFORMATION CENTRE #2**

Members of the public, residents and stakeholders are invited to attend PIC #2 as follows:

Wednesday November 22, 2017 4:00 p.m. to 8:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies. You are encouraged to attend the PIC and provide the Project Team with your views and comments so that they can be considered as the project progresses.

#### **COMMENTS**

To obtain additional information, provide comments, or to be placed on the mailing list for either of these studies, please contact the Project Team as follows:

#### **Tina White**

Senior Project Manager Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000 Kingston, ON K7L 5A3 Tel: 613-545-4871.

Tel: 613-545-4871, Toll Free: 1-800-267-0295

Email: tina.white@ontario.ca

Tim Sorochinsky, P.Eng.

Consultant Project Manager AECOM

4<sup>th</sup> Floor, 30 Leek Crescent Richmond Hill. ON L4B 4N4

Tel: 905-882-3522 Fax: 905-882-4399

E-mail: tim.sorochinsky@aecom.com

#### Fred Leech

Consultant Environmental Planner AFCOM

201-45 Goderich Road Hamilton, ON L8E 4W8 Tel. 905.578.3040 Fax: 905.578.4129

Email: fred.leech@aecom.com

\_\_\_\_\_\_

If you have any accessibility requirements in order to participate in these projects, please contact one of the Project Team members listed above.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.





AECOM
30 Leek Cres., 4<sup>th</sup> Floor
Richmond Hill, ON
L4B 4N4
Canada
www.aecom.com

905-882-4401 tel 905-882-4399 fax

November 1, 2017

**External Agency Letter** 

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #2
Preliminary Design and Class Environmental Assessment Studies:
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00;
Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC #2 is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has been scheduled (refer to the enclosed *Notice of Public Information Centre #2*). The purpose of PIC #2 is to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

Your organization is invited to attend the following session in advance of PIC #2:

November 22, 2017 3:00 p.m. to 4:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies. If you are unable to attend PIC #2 and are interested in these studies, enclosed are two brochures, with further information on each of the two projects that will be presented at PIC #2 for your reference. Please also feel free to contact one of the Project Team members listed on the enclosed *Notice of PIC #2* if you would like to discuss anything further.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, require further information regarding these studies, or have any accessibility requirements in order to participate in these studies, please feel free to contact the undersigned at 905-390-2030 or Fred.Leech@aecom.com.

Thank you for your cooperation and assistance.

Yours truly, **AECOM** 

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871 Fax: 613-540-5106

#### Ministère des Transports

Téléc.: 613 540-5106

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3 Tél.: 613 545-4871



November 1, 2017

Indigenous Community Letter

«Name» «Organization» «Address»

Dear «Greeting»:

**RE: Notice of Public Information Centre #2** 

Preliminary Design and Class Environmental Assessment Studies: Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has been scheduled (refer to the enclosed *Notice of Public Information Centre #2*). The purpose of PIC #2 is to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

A private session for agencies, municipalities and Indigenous Communities is planned in advance of the public session at:

Wednesday November 22, 2017 3:00 p.m. to 4:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

Enclosed is a copy of the *Notice of PIC #2* should you wish to post it for members of your community to view. Also enclosed are two brochures with further information on each of the two projects that will be presented at PIC #2 for your reference.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, if you require further information regarding these studies, or if you have any accessibility requirements to participate in these studies, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871). In addition, if you are interested in meeting as a result of receiving this letter, please contact the undersigned to arrange a meeting at your earliest convenience.

Thank you for your cooperation and assistance.

Yours truly, **Ministry of Transportation** 

# Tina White Senior Project Manager tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky - AECOM Consultant Project Manager

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871

Tel.: 613 545-4871 Fax: 613-540-5106

#### Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



November 1, 2017

MP/MPP Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #2

Preliminary Design and Class Environmental Assessment Studies: Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has been scheduled. The enclosed *Notice of Public Information Centre #2* will appear in the *Napanee Beaver* and the *Napanee Guide* on Thursday November 9, 2017.

The purpose of PIC #2 is to provide the stakeholders and the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

You are invited to attend the following session in advance of PIC #2:

Wednesday November 22, 2017 3:00 p.m. to 4:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

Also enclosed are two brochures with further information on each of the two projects that will be presented at PIC #2 for your reference.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, if you require further information regarding these studies, or if you have any accessibility requirements in order to participate, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871).

Thank you for your cooperation and assistance.

Yours truly,

#### **Ministry of Transportation**

#### **Tina White**

Senior Project Manager tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky - AECOM Consultant Project Manager

M. Weldon - AECOM Consultant Deputy Project Manager

F. Leech - AECOM Senior Environmental Planner

S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure



AECOM
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L4B 4N4
Canada
www.aecom.com

905-882-4401 tel 905-882-4399 fax

November 1, 2017

Public Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #2
Preliminary Design and Class Environmental Assessment Studies:
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00;
Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has now been scheduled (refer to the enclosed *Notice of Public Information Centre* #2). The purpose of PIC #2 is to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

You are invited to attend PIC #2 as follows:

Wednesday November 22, 2017 4:00 p.m. to 8:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

If you are unable to attend PIC #2 and are interested in these studies, enclosed are brochures with further information on each project that will be presented at PIC #2 for your reference. Please also feel free to contact one of the Project Team members listed on the enclosed *Notice of PIC #2*.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, require further information regarding these studies, or have any accessibility requirements in order to participate in these studies, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Thank you for your cooperation and assistance.

Yours truly,

**AECOM** 

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure



AECOM
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Richmond Hill, ON
L4B 4N4
Canada
www.aecom.com

905-882-4401 tel 905-882-4399 fax

November 1, 2017

Impacted Property Owner Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Potential Property Impacts and Public Information Centre #2
Preliminary Design and Class Environmental Assessment Study
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00). This project is located in the Town of Greater Napanee within the County of Lennox and Addington.

This study is following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

We wish to advise you that your property is potentially impacted by the recommended plan (please refer to the enclosed plan) and would like to invite you to meet with us to review the recommended plan and discuss potential impacts to your property with the Project Team. Please contact me by phone at 905-390-2030 or by email at Fred.Leech@aecom.com to discuss the potential impacts and if you would like to arrange a meeting.

We would also like to inform you that Public Information Centre #2 (PIC) has now been scheduled for this project. You are invited to attend PIC #2 as follows:

Wednesday November 22, 2017 4:00 p.m. to 8:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0

PIC #1 was held in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held to provide interested parties with the opportunity to discuss the project and provide input to the Project Team.

We reached out to you in September 2016 regarding potential impacts to your property. PIC #2 will build on the information in that letter; and will provide a summary of the evaluation of alternatives, the Preliminary Design of the preferred alternative at the interchange and the next steps in the study process, which we can also discuss with you if you would like to meet with the Project Team separately.

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the study. This PIC

will be held at the same time and at the same venue as PIC #2 for the *Highway 401 Interchange Improvements at Palace Road (G.W.P. 4197-13-00), Preliminary Design and Class Environmental Assessment Study*, please refer to the enclosed Notice of PIC #2 for further details.

If you are unable to attend PIC #2 and are not able to meet with us, enclosed are two brochures with further information on the two projects for your reference. Please feel free to contact us if you would like to discuss anything further.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for this study and made available for public review at the completion of the study. Notification, advising of the TESR review period, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, require further information regarding this study, or have any accessibility requirements in order to participate in this study, please feel free to contact the undersigned, as also noted above, at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Thank you for your cooperation and assistance.

Yours truly, AECOM

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager
S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Plan of Potential Property Impacts
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure

#### **Proposed Mitigation Measures**

Proposed mitigation measures and recommendations for further work include but are not limited to the following:

- Potential interim lane and road closures during construction will be confirmed and notification will be provided to Emergency Services, and adjacent property and business owners.
- To protect wildlife and wildlife habitat, vegetation removals will not take place during the Migratory Breeding Bird timing window between April 15 and August 15 of any year, trees and shrubs will be maintained where possible, and disturbed areas will be restored with seeding, sodding and landscaping.
- Additional Species at Risk surveys will be undertaken in Detail Design prior to construction.
- To protect fish and fish habitat, work at Sucker Creek will not take place between March 16 and July 14 of any year during the warmwater fisheries timing window.
- Standard noise mitigation measures and municipal noise control by-law requirements will be used during construction.

# How to Contact the Project Team

Tina White Project Manager

Ontario Ministry of Transportation
Eastern Region
1355 John Counter Blvd.,
Postal Bag 4000
Kingston, ON K7L 5A3
Tel: 613-545-4871
Toll Free: 1-800-267-0295

Toll Free: 1-800-267-0295 Email: tina.white@ontario.ca

#### Tim Sorochinsky, P.Eng. Project Manager AECOM

4th Floor, 30 Leek Crescent Richmond Hill, ON L4B 4N4 Tel: 905-882-3522

Fax: 905-882-4399 Email: tim.sorochinsky@aecom.com

# Highway 401 Interchange Improvements at County Road 41

Class Environmental Assessment and Preliminary Design Study

#### November 2017

Ontario Ministry of Transportation G.W.P. 4459-04-00





#### **Next Steps**

- Review and respond to comments received regarding this brochure and make revisions where appropriate to finalize the preliminary design plans.
- Finalize mitigation measures to minimize or avoid potential environmental effects.
- Prepare and file the Transportation
   Environmental Study Report for public and agency review and seek Environmental Assessment clearance.
- Detail Design and Construction to be completed as a future / separate study.

#### **Your Comments**

The Project Team welcomes feedback regarding the recommended plan. Please contact one of the contacts listed above by **December 21, 2017** if you have any questions or comments.

Comments are being collected to provide and obtain information, and to identify concerns in accordance with the *Environmental Assessment Act*. This material will be maintained on file for use during the Project and may be included in study documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

You are encouraged to contact the Project Team members listed above regarding any project-related questions or concerns, including any accessibility requirements you may have in order to participate in this study.



**A**ECOM

#### **Highway 401 and County Road 41 Interchange Improvements**

#### Introduction

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment (EA) Study for improvements to the Highway 401 and County Road 41 interchange, located in the Town of Greater Napanee within the County of Lennox and Addington.

This study is following the approved planning process for a Group 'B' project under the MTO's Class EA for Provincial Transportation Facilities (2000).

#### The Study

- In 2001, MTO completed a Preliminary Design Study to determine short-, mid- and long-term improvements to this interchange, which recommended a full Parclo A4 interchange configuration.
- In 2004, a new westbound off-ramp at County Road 41 was constructed and widening of Sucker / Selby Creek to the north was completed as per recommendations from the 2001 study.
- In early 2016, this study was initiated to review the structural requirements of the interchange, identify interim and long-term improvements to address geometric and operational concerns, and to develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.
- Upon completion of this study, a
   Transportation Environmental Study Report
   (TESR) will be prepared to document the
   recommended plan, potential impacts, and
   recommended mitigation measures to
   minimize impacts. The TESR will be made
   available for a 30-day public review period
   at public review locations in close proximity
   to the study area. A Notice of TESR review
   opportunities will be provided.

#### Study Process

**Planning** 

#### **Preliminary Design**

- Generate and Assess Alternatives (PIC #1: July 2016)
- Evaluate and Select Preferred Alternative
- Develop Preferred Alternative (PIC #2: November 2017)
- Notice of Study Completion and TESR Submission

Detail Design and Construction

Major rehabilitation of the Highway 401 / County Road 41 and Sucker Creek bridges is anticipated to be needed within five years (in addition to minor rehabilitation works currently in progress). Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway.

#### **Generation and Evaluation of Preliminary Design Alternatives**

A "long-List" evaluation of alternatives was presented at Public Information Centre (PIC) #1, which led to the identification of a "short-list" of alternatives for the north and south sides of the interchange.

A weighted-score arithmetic evaluation system was used to compare the short-list of alternatives using the following criteria:

- Transportation (e.g. interchange operations, safety, geometrics; construction staging impacts);
- Environmental (e.g. natural, socio-economic, and cultural); and
- Cost (e.g. capital and life cycle cost, utility impacts).

Out of five north side alternatives and five south side alternatives, Alternatives North (N)-1 (Parclo A2) and South (S)-1 (Parclo A2) were selected as the Technically Preferred Preliminary Design Alternatives.

#### TECHNICALLY PREFERRED PRELIMINARY DESIGN ALTERNATIVE



#### **Evaluation Summary**

- Alternatives N-1 and S-1 have the most desirable configurations from a Transportation perspective.
- These alternatives have the highest construction cost and slightly greater environmental impacts on the south side; however, the short and longterm operational and safety benefits of these configurations are considered to outweigh these impacts.

### Construction Staging and Sequencing

- The short-term construction works at the interchange will include major bridge rehabilitation of the County Road 41 and Sucker Creek bridges. In conjunction with the bridge works, the interchange will be upgraded to the ultimate "Parclo A4" configuration identified as the preferred alternative.
- The long-term recommendations for the interchange include replacement of the Highway 401 / County Road 41 and Sucker Creek bridges.
- Advance notification / signage ramp or lane closures will be provided.
   Potential closures required to complete the construction activities include:
  - Occasional night-time and/or weekend ramp closures and lane closures along Highway 401; and,
- Reduction to a single lane in either direction along County Road 41 to rehabilitate the underside of the bridge.
- The staging strategy will be confirmed during a future Detail Design assignment in advance of the short-term construction, and notification will be provided to adjacent property and business owners at that time.

# Municipal Meetings



#### **Meeting Minutes**

AECOM 30 Leek Cres., 4<sup>th</sup> Floor Richmond Hill, ON L4B 4N4 Canada www.aecom.com Tel 905-882-4401

Fax 905-882-4399

Project	Palace Road Interchar	Hwy 401 Interchange Improvements at County Road 41 Interchange and Palace Road Interchange – PD and EA GWP 4459-04-00 and 4197-13-00, Agreement Number 4015-E-0003				
Subject	Municipal Meeting	Municipal Meeting				
Date	June 9, 2016					
Time	10 – 11:30 am	10 – 11:30 am				
Location	County of Lennox and A	County of Lennox and Addington – County Court House				
Attendees	Tina White	MTO Senior Project Manager				
	Erin Pipe	MTO Environmental				
	Tim Sorochinsky	AECOM Project Manager				
	Michael Weldon	AECOM Assistant Project Manager				
	Steve Roberts	County of Lennox and Addington (L&A)				
	Steve Creighton	Town of Napanee				
Prepared by	Michael Weldon, P.Eng					
Distribution	Meeting attendees	Meeting attendees				
	Jim Klaver (County of L	Jim Klaver (County of Lennox and Addington)				
	Ron Vankoughnet (Tow	Ron Vankoughnet (Town of Napanee)				
	Lori Brake (MTO) `					
	,	Fred Leech, Joanne Wang, Sarah Schmied (AECOM)				

Item Description

**Action By** 

The purpose of this meeting was to provide an overview of the Preliminary Design and Environmental Assessment (EA) studies for the Highway 401/County Road 41 and Highway 401/Palace Road (County Road 5) interchanges. The two interchanges are being reviewed as part of separate EA studies. The following points were discussed:

#### Study Overview and General Comments

- The focus of these studies is to examine interim and long-term interchange operational improvements, and to develop a plan for the rehabilitation or replacement of the existing structures.
- The two studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities. At the completion of the studies, separate Transportation Environmental Study Reports (TESRs) will be prepared and made available for public review.
- The existing structures cannot accommodate the necessary structural rehabilitation or replacement requirements without significant modifications and/or Highway 401 lane or ramp closures.
- The studies will include development of an ultimate plan for the two interchanges. Based on the recommended plan, a staged approach towards implementing the necessary short-term structural improvements will be developed in order to minimize future throwaway and traffic disruption.
- Work completed to date has focused on review of existing conditions, identification of the overall study Problems and Opportunities to be addressed, and development of a "long-list" of interchange alternatives for each study.
- The first Public Information Centre (PIC) for the two studies is anticipated to be held in the coming months, and will include presentation of the above information as well as an initial screening assessment of the "long-list" interchange alternatives.
- · Municipal staff noted they would generally be supportive of roundabouts at

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Item Description Action By

the interchange(s), subject to acceptable traffic operations.

 S. Creighton to review the status/ownership of the old CN Rail bridge over Highway 401, given that the bridge may be used as part of a municipal trail system. S. Creighton

#### County Road 41

The following points were discussed specific to the County Road 41 study:

- Municipal staff noted they are unaware of future expansion/development plans associated with the Flying 'J'.
- Municipal staff noted there are plans for a potential hotel on the north side of Community Road, however they are not aware whether a Traffic Impact Study has been completed. Municipal staff will forward any additional information / studies received on the hotel to MTO/AECOM as it is received.

Town of Napanee / County of L&A

- Municipal staff noted there is insufficient room for standard pedestrian facilities beneath the bridge, and they anticipate some increase in pedestrian demand with construction of the hotel along Community Road.
- County Road 41 is part of the Salmon River cycling trail. S. Roberts noted that their typical cycling facilities include paved shoulders with appropriate signing, and that they would like to see these improvements implemented through the interchange if possible.
- It was noted that cycling improvements on this type of MTO project are generally subject to cost sharing agreements between the municipality and MTO. These requirements/facilities would be confirmed during a future Detail Design stage.
- Town of Napanee water and sewer mains are located on the east side of County Rd 41 beneath the Highway 401 overpass. S. Creighton to forward as-builts for this infrastructure in order that the Project Team can review potential impacts with structural footings.

S. Creighton

- S. Roberts noted that the County's Transportation Master Plan was recently updated, and that the next update will likely be 2024 or beyond.
- Given the long-term planning horizon of the study, it was agreed that the County Road 41 structure requirements should consider long-term municipal requirements. However, S. Roberts noted there are no current plans to widen County Road 41 to 6-lanes.
- S. Roberts noted that the Richmond Street / County Road 41 intersection can be very busy and the County has existing capacity concerns with the intersection. He noted that impacts to this intersection and associated storage requirements should be considered as part of the study / interchange improvements.
- County of Lennox and Addington staff (Jim Klaver) to provide AECOM the
  existing signal timing at the Richmond Street / County Road 41 intersection.
- It was noted that the ability to accommodate Long Combination Vehicles (LCVs) will be considered at the interchange, especially if a permit for LCV's is already in place. Local businesses have expressed an interest in utilizing LCV's at this location.
- AECOM will follow-up with the MTO Goods Movement Office to discuss the status of LCV's at this interchange.

J. Klaver

**AECOM** 

#### Palace Road (County Road 5)

The following points were discussed specific to the Palace Road study:

- It was noted that there is currently only 1 tenant in the Palace Village, although there have been plans for a Wild Wing at the site.
- Municipal staff noted they agree with the list of transportation problems that have been identified at the interchange.
- Municipal staff noted that pedestrian traffic through the interchange is low.
   As such, paved shoulders (that could also accommodate cycling) may be sufficient for pedestrians in lieu of a sidewalk.
- Municipal utilities generally end along Palace Road west of the interchange

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Item Description Action By

(e.g. water and sewer). S. Creighton noted there is no significant reason to extend these utilities to the north, given the limited development north of Highway 401.

- S. Roberts noted that Palace Road through the interchange will likely be repaved by the County within 5 to 10 years.
- It is anticipated that rehabilitation or replacement of the Palace Road structures will be required within 5 to 10 years. It was agreed that future structural works by MTO should be coordinated with the necessary pavement works required by the County.
- Requirements for LCV traffic at the interchange are not anticipated, however this will be discussed with the MTO Goods Movement Office.

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# Highway 401 Interchange Improvements at County Road 41 and Palace Road

Class Environmental Assessment and Preliminary Design Study G.W.P. 4459-04-00 / 4197-13-00

Municipal Meeting #1

June 9, 2016

**AECOM** 





#### **Meeting Agenda**

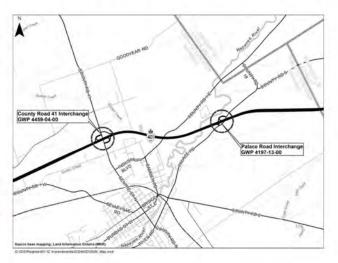
- > Study Area, Purpose and Scope
- Overall Study Process
- Timing of Study Activities
- Overview of Existing Transportation and Environmental Conditions
- Opportunities
- Identification and Assessment of Long List of Alternatives
- Next Steps
- Open Discussion





#### Study Area, Purpose and Scope

- The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies:
  - Improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00)
  - Improvements to the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00)
- The projects are located in the Town of Greater Napanee within the County of Lennox and Addington.
- These studies will examine interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or widening of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging during construction.



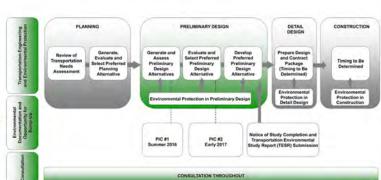
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#### Class EA Process for Group 'B' Projects

- These studies will follow the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).
- Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the project and provide input to the Project Team.
- Separate Transportation Environmental Study Reports (TESRs) will be prepared for each study and made available for public review at the completion of the studies.



#### **AECOM**





#### **Timing of Study Activities**



Schedule subject to change based on study findings and/or input received through consultation

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- County Road 41 Previous Studies
- MTO completed a Preliminary Design Study in 2001 to determine the short-term, mid-term and long-term improvements to the interchange.
  - Recommendation from the 2001 study was to upgrade the interchange to a full Parclo A4 interchange configuration.
- Based on the short-term improvements recommended from the 2001 study, MTO completed the Detail Design and construction of various interchange improvements in 2004, including:
  - Construction of a new interchange ramp for westbound traffic on Highway 401 to go northbound on County Road 41;
  - Widening the Highway 401/Sucker Creek/Selby Creek bridge to the north to accommodate this new interchange ramp;
  - Modifying the old Highway 401 westbound off-ramp for southbound movements only on to County Road 41 (northbound movements accommodated by the new ramp);
  - Replacing the County Road 41 bridge over Sucker Creek, south of Highway 401, with a wider bridge to allow for the widening of County Road 41.



Recommended Plan for County Road 41 Interchange from 2001 Study



Short-Term Improvements Constructed in 2004

#### **AECOM**



# County Road 41 Overview of Existing Environmental Conditions and Land Use

- Selby/Sucker Creek is a warmwater watercourse with a low sensitivity.
- No wetlands or ANSIs are located in the proximity of the interchange.
- The southwest quadrant of the County Road 41 and Sucker Creek structure is zoned "Environmental Protection" in the Town of Greater Napanee's Official Plan.
- The Richmond Industrial Park is located immediately north of Highway 401, on County Road 41.
- A number of businesses operate north and south of Highway 401 and on both east and west sides of County Road 41.
- The Salmon River cycling trail crosses Highway 401 via County Road 41 connecting Napanee, Newburgh, Croydon, Roblin and Selby.



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#### County Road 41 - Overview of Existing Transportation Conditions

#### Structures

- The Highway 401 / County Road 41 overpass was constructed in 1959, and rehabilitated in 1982 and 1987.
- The Highway 401/Sucker Creek/Selby Creek structure was constructed in 1960, rehabilitated in 1987 and 1993, and widened to the north in 2004 to accommodate construction of a new westbound off-ramp to County Road 41.
- Given the age and condition of the structures and the time since the last rehabilitation, a major rehabilitation of the structures is anticipated within the short-term (5 year) planning horizon.
- Based on the current structure configurations, these rehabilitations cannot be completed without lane closures along Highway 401 or temporary removal of the existing eastbound and westbound off-ramp speed change lanes from the structure.
- In addition to the short term rehabilitation requirements of the County Road 41 overpass, full replacement of the structure is anticipated to be required within the 20-25 year planning horizon of the study.

#### Drainage

- Temporary concrete barrier of varying type and size is presently provided along the centerline of Highway 401 through the study area.
- The existing median drainage system is not functioning properly and is in need or upgrade or replacement.



County Road 41 Structure



Highway 401/Sucker Creek/Selby Creek Structure



Median Storm Sewer





#### County Road 41 – Overview of Existing Transportation Conditions

#### **Traffic Operations and Geometrics**

- Existing traffic Level of Service operations at the interchange are generally considered acceptable (overall Level of Service 'C' or better), however left-turning traffic along County Road 41 to Highway 401 results in some queueing and delay to through traffic given the absence of dedicated left-turn lanes.
- Future increases in traffic volumes will lead to increased delay and deterioration in operations (overall Level of Service 'D' or better).
- A number of undesirable geometric elements or collision-prone areas have been identified, including:
  - Sight distance to the eastbound and westbound offramps.
  - Horizontal curvature along four of five interchange ramps.
  - Length of the eastbound on-ramp speed change lane.
  - The absence of dedicated left-turn lanes along County Road 41 for access to Highway 401 (northbound and southbound).



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#### County Road 41 - Opportunities

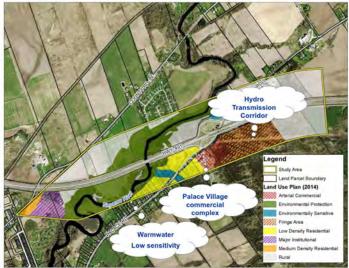
- Based on the identified Problems at the Highway 401 and County Road 41 interchange, the following Opportunities for this study have been identified:
  - Development of a strategy to address the short-term and long-term structural needs at the County Road 41 Overpass and Highway 401/Sucker Creek/Selby Creek is required.
  - ➤ Geometric improvements at the interchange would be expected to reduce collision risks, improve overall safety at the interchange, and provide for improved traffic operations along Highway 401, County Road 41 and at the interchange into the future.
  - The development of an ultimate plan for the County Road 41 interchange would allow for the necessary short-term structural rehabilitation requirements to be implemented efficiently and in a cost effective manner, minimizing future throwaway.
  - ➤ A staged approach towards implementing the ultimate interchange plan can be developed that would allow for construction of interim improvements that both improve traffic operations and safety and facilitate the structural rehabilitation requirements.
  - Upgrades or replacement of the existing Highway 401 median barrier and storm sewer system would address the existing drainage concerns along the corridor.



# Highway 401 Interchange Improvements at Palace Road Palace Road

# Overview of Existing Environmental Conditions and Land Use

- Napanee River is a warmwater watercourse with a low sensitivity.
- No ANSIs are located in the proximity of the interchange.
   Deciduous forests are identified in the northwest and southeast quadrants. Unevaluated wetlands are identified in the proximity of the interchange.
- This interchange provides access to the east end of Greater Napanee and services industrial uses north (e.g. the Strathcona Paper Plant) and south (e.g. Napanee Quarry) of the highway.
- The Palace Village commercial complex is in the southeast quadrant.
- A major hydro transmission corridor is located in the area southeast of the existing interchange.
- The Newburgh cycling route crosses Highway 401 via Palace Road to connect Napanee with the communities of Newburgh and Camden East.



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#### Palace Road - Overview of Existing Transportation Conditions

#### Structures

- The Highway 401 / Palace Road twin overpass structures were originally constructed in 1960 (56 years old as of 2016).
- The twin bridges cross beneath Highway 401 at a high skew angle and each carry two lanes of Highway 401 traffic and one ramp lane.
- The eastbound and westbound structures underwent major rehabilitation in 1983 and 1988, respectively.
- Minor rehabilitation was completed on both structures in 2012, which was limited in scope due to Highway 401 lane restrictions.
- A future major rehabilitation or full replacement of the structures is anticipated within the next 5 to 10 years.
- The existing structures cannot accommodate the necessary structural works without long-term lane closures or staging impacts along Highway 401, partial temporary widening of the structures for staging purposes, and/or temporary removal of the existing eastbound and westbound off-ramp speed change lanes from the structure.



**Westbound Structure** 



East Abutment





#### Palace Road - Overview of Existing Transportation Conditions

#### **Traffic Operations and Geometrics**

- Existing and future traffic Level of Service operations (e.g. vehicle delay and road capacity) at the interchange are generally considered acceptable (overall Level of Service 'A' or 'B').
- > A number of undesirable geometric elements or collision-prone areas have been identified, including:
  - Tight horizontal curvature along all ramps, most notably the two off-ramps from Highway 401;
  - · Short length of speed change lanes for the eastbound off-ramp, eastbound on-ramp and westbound off-ramp;
  - High skew angle of Palace Road through the interchange, which restricts available turning sight distance at the ramp terminal intersections:
  - Vertical grade of Highway 401 through the interchange rises to the east, which slows down acceleration of trucks and cars entering eastbound Highway 401 from Palace Road.



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#### Palace Road - Opportunities

- Based on the identified Problems at the Highway 401 and Palace Road interchange, the following Opportunities for this study have been identified:
  - Development of a strategy to address the structural rehabilitation or replacement needs of the twin Palace Road overpasses is required.
  - Geometric improvements at the interchange would be expected to reduce collision risks, improve overall safety at the interchange, and provide for good overall traffic operations along Highway 401, Palace Road and at the interchange into the future.
  - The development of an ultimate plan for the Palace Road interchange would allow for the necessary structural rehabilitation or replacement works to be implemented efficiently and in a cost effective manner, minimizing future throwaway.
  - A staged approach towards implementing the ultimate interchange plan can be developed that would allow for construction of interim improvements that both improve traffic operations and safety and facilitate the structural requirements.





#### Identification and Screening of Long List of Alternatives

- Based on the identified Problems and Opportunities for each study, a number of possible interchange improvement alternatives are being developed to reflect the ultimate configuration of both interchanges.
- This **long list** of interchange improvement alternatives for each study will be subject to a screening-level qualitative assessment based on various technical criteria such as:
  - · Geometrics and safety
  - Traffic operations
  - · Construction staging impacts
  - · Structural requirements
  - Construction cost
  - · Anticipated environmental and property impacts

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#### Identification and Screening of Long List of Alternatives (continued)

- > Interchange improvement alternatives that will be considered include:
  - County Road 41: various interchange ramp configurations (e.g. Parclo A2, Diamond, Roundabouts) along County Road 41 both north and south of Highway 401.
  - Palace Road: replacement of the Palace Road structures on the existing or new alignment of Palace Road, with various interchange ramp configurations (e.g. Parclo A2, Buttonhook, Diamond, Roundabouts) considered north and south of Highway 401 for both alignment options.
- > The **long list** interchange alternatives and screening assessment of these alternatives will be presented at PIC #1 for each study.





Consultation

The following consultation activities will be undertaken throughout the duration of each study:

- Public notices (Study Commencement; PICs and Study Completion & TESR Submission) in Napanee Beaver and Napanee Guide.
- Two rounds of PICs for each study will be held to present to the public the details of the projects and allow for interaction and dissemination of details on the alternatives and preliminary design. The PICs will be presented as informal drop-in centres.
- Interested stakeholders will be consulted throughout the duration of each project, including:
  - Provincial agencies (e.g. Ministry of the Environment and Climate Change, Ministry of Natural Resources and Forestry, and the Ministry of Tourism, Culture and Sport)
  - > Federal departments (e.g. Indigenous and Northern Affairs Canada, Fisheries and Oceans Canada)
  - Aboriginal Communities
  - Municipal departments (emergency services, engineering, planning) and councils
  - Interest groups (e.g. Quinte Conservation, Limestone District School Board)
  - Private property owners and businesses
- · Filing of a TESR for public and agency review.

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**Next Steps** 

# The following activities will be undertaken for each project following this meeting:

- Continue to document existing conditions.
- Finalize the long list of interchange alternatives, screening assessment and the short list of alternatives to be carried forward.
- Hold PIC #1 (tentatively summer 2016).
- Assess and evaluate the short list of interchange alternatives to select a Technically Preferred Alternative.
- Present the preliminary design of the Technically Preferred Alternative at PIC #2 (anticipated to be held in early 2017).
- Prepare a Transportation Environmental Study Report for public and agency review (anticipated summer 2017).







#### **Meeting Minutes**

AECOM 30 Leek Cres., 4<sup>th</sup> Floor Richmond Hill, ON L4B 4N4 Canada www.aecom.com Tel 905-882-4401 Fax 905-882-4399

Project:	Palace Road Preliminary Design	rchange Improvements at County Road 41 and gn and Class Environmental Assessment and 4197-13-00, Agreement Number 4015-E-0003	
Subject:	Municipal Meeting 2		
Date:	November 22, 201	7	
Time:	1:00 pm – 2:30 pm		
Location:	County of Lennox and Addington – County Court House		
Attendees:	Tina White Erin Pipe	MTO Senior Project Manager MTO Environmental Planner	
	Tim Sorochinsky Michael Weldon Fred Leech Sarah Schmied	AECOM Project Manager AECOM Assistant Project Manager AECOM Senior Environmental Planner AECOM Environmental Planner	
	Steve Creighton Jeff Cuthill Darrel Lott Jim Klaven Stephen Paul	Town of Napanee Town of Napanee County of Lennox and Addington County of Lennox and Addington County of Lennox and Addington	
Prepared by:	Sarah Schmied		
Distribution:	Meeting attendees MTO and AECOM		

#### Item Description Action By

The Project Team met with the municipalities in June 2016. The purpose of this meeting is to present an overview of the project, a summary of the first Public Information Centres(PIC) (July 2016), an update on what the Project Team has been working on since the first PICs and the Preliminary Design of the Technically Preferred Alternative for each interchange. The two interchanges are being reviewed as part of separate Environmental Assessment (EA) studies.

A copy of the presentation slides is attached to these minutes for reference.

The following points were discussed:

#### Consultation Overview

PIC #1 for each study presented an overview of the studies, existing conditions, the long-list of interchange alternatives and the evaluation approach.

Discussions with potentially impacted property owners and other stakeholders has been ongoing throughout the study as required and as requested. Notabale comments have pertained to property acquisition requirements, comments on the existing conditions / concerns and alternatives / recommendations for improvement, and anticipated timing of the construction works.

PIC #2 is being held after this meeting on November 22, 2017 from 4:00 pm to 8:00 pm at Selby Community Hall. An External Agency viewing opportunity is being held at the same venue from 3:00 pm to 4:00 pm. The purpose of the PIC is to provide the public with the opportunity to view and comment on the evaluation of alternatives and the Preliminary Design the Technically Preferred



Item Description Action By

Alternative of each interchange.

#### Generation and Evaluation of Preliminary Design Alternatives

Since the last meeting the "Short-List" of interchange alternatives was evaluated utilizing an "Arithemetic Evaluation" approach. Alternatives were developed and assessed separately for the north and south sides of the two interchanges.

The Arithmetic Evaluation methodology involves assigning relative weightings to each of the evaluation categories and criteria based on their level of importance. Impacts are measured either quantitatively or qualitatively, and then these scores are multiplied by the relative weight to determine an overall score for each alternative.

#### County Road 41 Overview

Major rehabilitation of the Highway 401 and County Road 41 and Sucker Creek bridges is anticipated to be needed within 5 years (in addition to the minor rehabilitation works currently in progress).

Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway.

A number of undesirable geometric elements impacting safety are present.

Based on the evaluation of both the north and south sides of the interchange, the Technically Preferred Preliminary Design Alternatives for the interchange are Alternatives N-1 and S-1 (full Parclo A4):

- Widening of the Highway 401 / Sucker Creek structure to the south required for realigned South-East on-ramp;
- Minor property impacts to commercial property in the southwest quadrant of the interchange;
- New traffic signals at the north ramp terminal intersection;
- Anticipated impacts to two hydro poles west of County Road 41; and,
- Anticipated impacts to sanitary sewer, watermain, and underground Bell on east side of County Road 41.

#### Palace Road Overview

Minor bridge rehabilitation was completed in 2012 (limited in scope due to limitations on Highway 401 lane closures).

Full replacement of the Highway 401 bridges is anticipated to be required within 5 years.

To address the bridge requirements, interchange alternatives on both the existing alignment and realigned Palace Road were considered.

Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost-effective and efficient manner, minimizing future throwaway costs.

A number of undesirable interchange geometric elements impacting safety and operations are present.

Based on the evaluation of both the north and south sides of the interchange, the Technically Preferred Preliminary Design Alternatives for the interchange are Alternatives W-N-2 and W-S-2 (Buttonhooks with Westerly Realignment):

- New Palace Road structure over Highway 401, Palace Road realignment and removal of existing structures;
- Displacement of one (1) residential property north of Highwya 401, and minor property acquisition from two (2) other residential properties;
- Minor residential driveway re-constructions, and closure of north Palace Village driveway;



Item Description Action By

 Anticipated impacts to hydro transmission corridor / towers due to Palace Road realignment / grade raise; and,

• Anticipated impacts to watermain, gas main, overhead / underground Bell and overhead hydro due to Palace Road realignment / grade raise.

#### Next Steps

The following activities will be undertaken for each project following this meeting and PIC #2:

- Review comments received at this meeting and the PIC and respond to any questions;
- Incorporate any revisions where appropriate and finalize the preliminary design plans;
- Finalize mitigation measures to minimize or avoid potential environmental effects;
- Prepare and file the Transportation Environmental Study Report (TESR) for public and agency review;
- Seek Environmental Assessment clearance; and,
- Detail Design and Construction to be completed as a future separate study.

#### Open Discussion

- The County noted that sight-distances along East-bound on Highway 401 are important as the Ontario Provinical Police (OPP) is seeing secondary collisions in winter weather between County Road 41 and Palace Road.
- The Project Team noted there are a few utility impacts associated with the Technically Preferred alternative at County Road 41.
- The Town of Napanee has a watermain that they would like to replace before the construction of the County Road 41 interchange. MTO inquired who the Town's main contact is at MTO and suggested that they speak with Lloyd Pecceco. The Town noted that they prefer that the watermain goes right under the Highway 401 overpass as right now it goes under the embankment. MTO noted that it would need to be reviewed so it is not a structural issue. The Town will speak with MTO Corridor Management.
- The County Road 41 interchange is not currently on MTO's Southern Highways Program (5-year plan) and therefore there is no funding for it currently. After the election funding priorities may change.
- MTO noted that a comment was received regarding a Napanee by-pass; however, if this were to be undertaken it would have to be initiated by the Town or the County. The County noted that any further questions about a by-pass should be referred to Chris Wagar, the County Roads Manager.
- It was noted that there are cost-sharing opportunities if the municipalities want to include sidewalks or multi-use paths as part of these improvements.
- It was noted that if there is an undertaking being completed (or that is recommended) by the Town or County that would require a wider structure, then the municipality should approach MTO about cost-sharing to not preclude the wider structure in their design.
- The Palace Road interchange is currently on MTO's Southern Highways Program and there is funding for it to move forward to construction.
- Utility relocation typically takes place during detail design; however, for Palace Road the utility discussion can start now.
- It was asked if MTO would consider putting closure gates at all ramps.



Item Description Action By

MTO noted that would be considered during detail design.

 MTO noted that with the improvements, MTO typically would change their limits of restricted access to where the new ramps are.



# Highway 401 Interchange Improvements at County Road 41 and Palace Road

Class Environmental Assessment and Preliminary Design Study G.W.P. 4459-04-00 / 4197-13-00

**Municipal Meeting #2** 

November 22, 2017

AECOM 1 Ontario





**Meeting Agenda** 

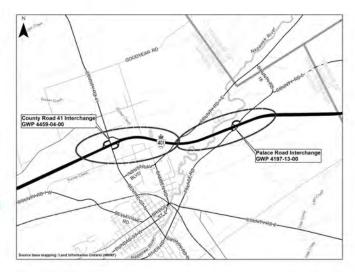
- Study Area and Overview
- Consultation to Date
- Evaluation Approach
- County Road 41 Interchange
  - > Short-List Alternatives and Evaluation
  - > Preliminary Design of the Technically Preferred Alternative
- Palace Road Interchange
  - > Short-List Alternatives and Evaluation
  - Preliminary Design of the Technically Preferred Alternative
- Next Steps
- Open Discussion





#### Study Area, Purpose and Scope

- Two separate Preliminary Design and Class Environmental Assessment Studies:
  - Improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00)
  - Improvements to the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00)
- · The primary focus of each study is to:
  - Review the structural requirements (e.g. major rehabilitation or replacement) at each interchange;
  - Identify interim and long-term interchange improvements to address geometric and operational concerns;
  - Develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.



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#### Consultation

#### Notable consultation to date has included:

- Notice of Commencement (January 2016): public notices placed in Napanee Beaver and Napanee Guide, letters mailed to individuals on the project mailing list, and over 1,500 brochures delivered to adjacent properties;
- Municipal Team Meeting #1 (June 6, 2016);
- PIC #1 (July 27-28, 2016):
  - Overview of the study and existing conditions, long-list interchange alternatives and evaluation;
  - > Public notices placed in area newspapers, letters mailed to individuals on mailing list, and letters with plans sent to property owners potentially impacted by one or more of the long-list interchange alternatives.
- Discussions with potentially impacted property owners and other stakeholders has been ongoing throughout the study as required / requested;
  - Notable comments have pertained to property acquisition requirements, comments on the existing conditions/concerns and alternatives/recommendations for improvement, and anticipated timing of the construction works.

**PIC #2** is being held on November 22, 2017 from 4 pm to 8 pm at Selby Community Hall (External agency viewing time from 3 pm to 4 pm) to provide the public the opportunity to view and comment on the evaluation of alternatives and the Preliminary Design at each interchange;

Public notices placed in area newspapers, letters mailed to individuals on mailing list, over 13,500 brochures
delivered to area residents and businesses with details on both assignments, and individual letters with plans sent
to directly impacted property owners advising of property-specific impacts;

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#### Generation and Evaluation of Preliminary Design Alternatives

The following process has been followed to select the Technically Preferred Preliminary Design Alternatives

- Identify existing "Problems" (e.g. structural requirements and associated construction staging needs, interchange geometric deficiencies) and "Opportunities" to address identified problems;
- Develop and assess "Long-List" of interchange alternatives to reflect ultimate interchange configuration(s), based on factors such as Traffic Operations, Construction Staging, Geometrics, Cost, and Environmental Impacts (Presented at PIC #1).
- Evaluate the remaining "Short-List" of interchange alternatives utilizing an "Arithmetic Evaluation" approach and based on the categories and criteria in the table to the right. (To be presented at PIC #2).
  - Alternatives were developed and assessed separately for the north and south sides of the two interchanges:

#### **Evaluation Categories and Criteria**

#### TRANSPORTATION

Interchange Operations
 Safety and Geometrics

#### ENVIRONMENTAL

- Natural Environment
  - Fish and Fish Habitat
  - Terrestrial Ecosystems
  - o Groundwater
- Socio-Economic Environment
  - io-Economic Envir
  - Air Quality
  - Community Effects
- Waste and Contamination
- **Cultural Environment** 
  - Archaeological Resources
  - Built Heritage Features and Cultural Heritage

#### COST

- Capital Cost
- Utility Impacts
- > The Arithmetic Evaluation methodology involves assigning relative weightings to each of the evaluation categories and criteria based on their level of importance. Impacts are measured either quantitatively or qualitatively, and then these scores are multiplied by the relative weight to determine an overall score for each alternative.

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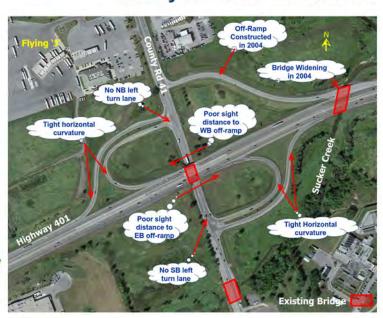
#### Background

- In 2001, MTO completed a Preliminary Design Study to determine the short-term, mid-term and long-term improvements to this interchange which recommended upgrading the interchange to a full Parclo A4 interchange
- In 2004, MTO constructed a new westbound off-ramp at County Road 41 and widened the Hwy 401/Sucker Creek bridge to the north as per the 2001 study recommendations.

#### **Summary of Problems and Opportunities**

- Major rehabilitation of the Hwy 401/CR41 and Sucker Creek bridges is anticipated to be needed within 5 years (in addition to the minor rehabilitation works currently in progress);
- Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway.
- A number of undesirable geometric elements impacting safety and operations are present.

#### County Road 41 - Overview







#### County Road 41 Short-List Alternatives (North Side)

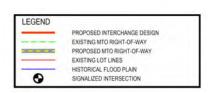












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#### Short-List Evaluation Summary (North Side)

Factor	Alternative N-1 Parclo A2	Alternative N-2 Parclo A1	Alternative N-3 Diamond	Alternative N-5 Parclo A1 with Roundabout	Alternative N-6 Diamond with Roundabout
Transportation		0	•	0	•
Natural Environment	•	•	•	•	•
Socio-Economic Environment	•	•	•	•	•
Cultural Environment	•	•	•	•	•
Cost	•	•	•	•	•
Recommendation	<b>✓</b>	×	×	×	×

		Lege	nd		
Highest Category Weighting	•	•	•	•	Lowest Category Weighting
Most Preferred Alternative	•	•	0	0	Least Preferred Alternative

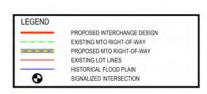
- Alt N-1 has a higher cost than the other alternatives, similar construction staging and utility impacts and is preferred or equally preferred with the other alternatives from a natural, socio-economical and cultural environment perspective.
- However, Alt N-1 is the preferred alternative from a transportation perspective, with no left-turns required (directional movements provided for all maneuvers) and the most desirable interchange operations.
- As such, Alt N-1 (Parclo A2) is the preferred north side interchange alternative.











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## Short-List Evaluation Summary (South Side)

Factor	Alternative S-1 Parclo A2	Alternative S-2 Parclo A1	Alternative S-3 Diamond	Alternative S-4 Parclo A1 with Roundabout	Alternative S-5 Diamond with Roundabout
Transportation		•	0	•	0
Natural Environment	•	•	•	•	•
Socio-Economic Environment			•	•	•
Cultural Environment	•				•
Cost	•	•	•	•	•
Recommendation	1	×	x	×	×

		Lege	nd		
Highest Category Weighting	•	•	•	•	Lowest Category Weighting
Most Preferred Alternative	•	•	0	0	Least Preferred Alternative

- Alt S-1 requires a new or widened bridge over Sucker / Selby Creek, slightly increasing the natural and socioeconomic environment impacts.
- Alt S-1 is the preferred alternative from a transportation perspective, with no left-turns required (directional movements provided for all maneuvers) and the most desirable interchange operations;
- While Alt S-1 has a higher cost than the other alternatives and slightly greater impacts, the short and longterm operational and safety benefits of this configuration are considered to outweigh these impacts.
- · As such, Alt S-1 (Parclo A2) is the preferred south side interchange alternative.



## **Technically Preferred Alternative**

Based on the evaluations of both the north and south sides, the **Technically Preferred Preliminary Design Alternatives** for the interchange are **Alternatives N-1** and **S-1** (full Parclo A4):

- Widening of Hwy 401/Sucker Creek structure to the south required for realigned S-E on-ramp;
- Minor property impacts to commercial property in southwest quadrant of interchange;
- New traffic signals at north ramp terminal intersection;
- Anticipated impacts to two hydro poles west of County Road 41;
- Anticipated impacts to sanitary sewer, watermain, and underground Bell on east side of County Road 41;



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County Road 41 Technically Preferred Alternative





## Palace Road - Overview

- Minor bridge rehabilitation was completed in 2012 (limited in scope due to limitations on Highway 401 lane closures);
- Full replacement of the Hwy 401 Palace Road bridges is anticipated to be required within 5 years;
- To address the bridge requirements, interchange alternatives on both the existing alignment and realigned Palace Road were considered;
- Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway;
- A number of undesirable interchange geometric elements impacting safety and operations are present.





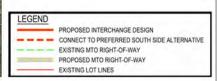


## Short-List Alternatives (North Side)

## **Existing Alignment Alternatives**







## Westerly Realignment Alternatives







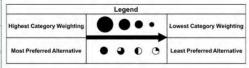
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## Short-List Evaluation Summary (North Side)

	Existing Alignm	ent Alternatives	Westerly Realignment Alternatives				
Factor	Alternative E-N-2 Buttonhook	Alternative E-N-4 Diamond	Alternative W-N-2 Buttonhook	Alternative W-N-4 Diamond	Alternative W-N-5 Diamond with Roundabout		
Transportation	•			•			
Natural Environment	•	•	•	•	•		
Socio-Economic Environment	•	•	•	•	•		
Cultural Environment		•	•	•	•		
Cost	•	•	•	•	•		
Recommendation	×	x	✓	×	×		



- The alternatives on the existing alignment (Alt E-N-2 / E-N-4) require temporary widening of one of the existing Palace Road bridges and require reduction to a single lane of traffic (one combined lane for both directions) controlled by signals along Palace Road during construction.
- Future rehabilitation of these bridges (Highway 401 over Palace Road) would have significantly greater impacts to Highway 401 traffic
  operations including likely lane reductions, whereas future bridge rehabilitations for the westerly realignment alternatives can generally be
  undertaken with minimal impacts to Highway 401 with lower life-cycle costs.
- While Alt W-N-2 (and W-N-4) has greater property impacts, the short and long-term staging benefits associated with constructing the new structure over Highway 401 are considered to outweigh this impact.

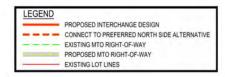
## Highway 401 Interchange Improvements at Palace Road

## Short-List Alternatives (South Side - Existing Alignment)









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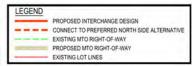
## Short-List Alternatives (South Side - Westerly Realignment)











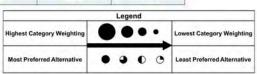


# Highway 401 Interchange Improvements at Palace Road

## Short-List Evaluation Summary (South Side)

	Existin	ng Alignment Alteri	natives	Westerly Realignment Alternatives					
Factor	Alternative E-S-2 Buttonhook	Alternative E-S-4 Diamond	Alternative E-S-7 Parclo B	Alternative W-S-2 Buttonhook	Alternative W-S-4 Diamond	Alternative W-S-5 Diamond with Roundabout	Alternative W-S-7 Parclo B with Roundabout		
Transportation	•				•	•	•		
Natural Environment	•	•	•	•	•	•	•		
Socio-Economic Environment	•	•	•	•	•	•	•		
Cultural Environment	•	•	•	•	•	•	•		
Cost	•	•	•	•	•	•	•		
Recommendation	×	x	x	/	x	x	X		

- Future rehabilitation of the new bridges along the existing alignment would have significant impacts to Highway 401 traffic operations compared to westerly alignment alternatives.
- Although the vertical grade raise of Palace Road with the westerly alternatives impacts the hydro transmission line and various other utilities, the staging and geometric advantages outweigh these impacts.
- Alt W-S-2 (Buttonhook) is considered the preferred interchange alternative as it has the best overall geometrics, while the other westerly alternatives having potential sight distance concerns at the intersection and less desirable or unconventional configurations.



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## **Technically Preferred Alternative**

Based on the evaluations of both the north and south sides, the **Technically Preferred Preliminary Design Alternatives** for the interchange are **Alternatives W-N-2** and **W-S-2** (Buttonhooks with Westerly Realignment):

- New Palace Road structure over Highway 401, Palace Road realignment and removal of existing structures;
- Displacement of 1 residential property north of Highway 401, and minor property acquisition from 2 other residential properties;
- Minor residential driveway re-constructions, and closure of north Palace Village driveway.
- Anticipated impacts to hydro transmission corridor / towers due to Palace Road realignment / grade raise;
- Anticipated impacts to watermain, gas main, overhead / underground Bell, and overhead hydro due to Palace Road realignment / grade raise.



Palace Road Technically Preferred Alternative





## **Next Steps**

## The following activities will be undertaken for each project following this meeting and PIC #2:

- Review comments received at this meeting and the PIC and respond to any questions;
- Incorporate any revisions where appropriate and finalize the preliminary design plans.
- Finalize mitigation measures to minimize or avoid potential environmental effects.
- Prepare and file the Transportation Environmental Study Report for public and agency review.
- Seek Environmental Assessment clearance.
- Detail Design and Construction to be completed as a future / separate study.

## **Consultation Throughout**

(with Aboriginal Communities and all stakeholders – property owners, members of the public, municipalities, interest groups, agencies, etc.)

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## Highway 401 Interchange Improvements at County Road 41 and Palace Road

Class Environmental Assessment and Preliminary Design Study G.W.P. 4459-04-00 / 4197-13-00

> Town of Greater Napanee Council Meeting March 27, 2018

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Hwy 401 Interchange Improvements at County Rd 41 & Palace Rd

**Meeting Agenda** 

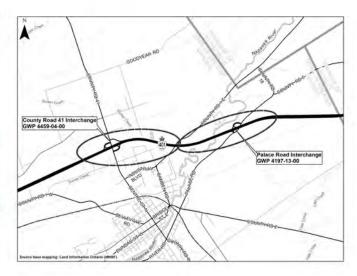
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- Two separate Preliminary Design and Class Environmental Assessment Studies:
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## Consultation

#### Consultation to date has included:

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  - Public notices placed in area newspapers, letters mailed to individuals on mailing list, and letters with plans sent to
    property owners potentially impacted by one or more of the long-list interchange alternatives.
- Municipal Team Meeting #2 (November 22, 2017);
- PIC #2 (November 22, 2017):
  - Evaluation of Alternatives and Preliminary Design at each interchange;
  - Public notices placed in area newspapers, letters mailed to individuals on mailing list, over 13,000 brochures were
    delivered to area residents and businesses with details on both assignments, and individual letters with plans sent to
    directly impacted property owners advising of property-specific impacts.
- Discussions with potentially impacted property owners and other stakeholders have been ongoing throughout the study as required / requested:
  - Notable comments have pertained to property acquisition requirements, indirect property impacts, comments on the
    existing conditions/concerns and alternatives/recommendations for improvement, and anticipated timing of the
    construction works.





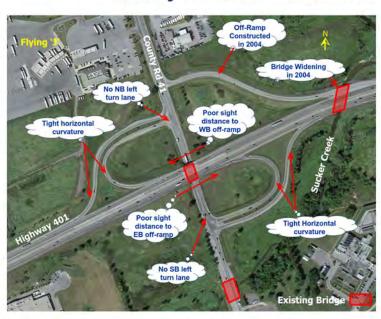
## County Road 41 - Overview

#### Background

- In 2001, MTO completed a Preliminary Design Study to determine the short-term, mid-term and long-term improvements to this interchange which recommended upgrading the interchange to a full Parclo A4 interchange
- In 2004, MTO constructed a new westbound off-ramp at County Road 41 and widened the Hwy 401/Sucker Creek bridge to the north as per the 2001 study recommendations.

## **Summary of Problems and Opportunities**

- Major rehabilitation of the Hwy 401/CR41 and Sucker Creek bridges is anticipated to be needed within 5 years (in addition to the minor rehabilitation works currently in progress);
- Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway.
- A number of undesirable interchange geometric elements impacting safety and operations are present.



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## County Road 41 Short-List Alternatives (North Side)











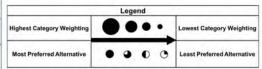


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## Short-List Evaluation Summary (North Side)

Factor	Alternative N-1 Parclo A2	Alternative N-2 Parclo A1	Alternative N-3 Diamond	Alternative N-5 Parclo A1 with Roundabout	Alternative N-6 Diamond with Roundabout
Transportation			•	•	0
Natural Environment	•	•	•	•	•
Socio-Economic Environment	•	•	•	•	•
Cultural Environment	•	•	•	•	•
Cost	•	•	•	•	•
Recommendation	<b>✓</b>	x	x	×	×



- Alt N-1 has a higher cost than the other alternatives, similar construction staging and utility impacts and is
  preferred or equally preferred with the other alternatives from a natural, socio-economical and cultural
  environment perspective.
- However, Alt N-1 is the preferred alternative from a transportation perspective, with no left-turns required (directional movements provided for all maneuvers) and the most desirable interchange operations.
- As such, Alt N-1 (Parclo A2) is the preferred north side interchange alternative.

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## County Road 41 Short-List Alternatives (South Side)

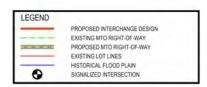












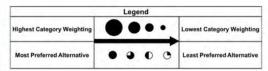
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## Short-List Evaluation Summary (South Side)

Factor	Alternative S-1 Parclo A2	Alternative S-2 Parclo A1	Alternative S-3 Diamond	Alternative S-4 Parclo A1 with Roundabout	Alternative S-5 Diamond with Roundabout
Transportation		•	•	•	0
Natural Environment	•	•	•	•	•
Socio-Economic Environment	•	•	•	•	•
Cultural Environment	•	•		•	•
Cost	•	•	•	•	•
Recommendation	1	×	x	×	×



- Alt S-1 requires a new or widened bridge over Sucker / Selby Creek, slightly increasing the natural and socioeconomic environment impacts.
- Alt S-1 is the preferred alternative from a transportation perspective, with no left-turns required (directional movements provided for all maneuvers) and the most desirable interchange operations.
- While Alt S-1 has a higher cost than the other alternatives and slightly greater impacts, the short and longterm operational and safety benefits of this configuration are considered to outweigh these impacts.
- · As such, Alt S-1 (Parclo A2) is the preferred south side interchange alternative.

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## **Technically Preferred Alternative**

Based on the evaluations of both the north and south sides, the **Technically Preferred Preliminary Design Alternatives** for the interchange are **Alternatives N-1** and **S-1** (full Parclo A4):

- Widening of Hwy 401/Sucker Creek structure to the south required for realigned S-E on-ramp;
- Minor property impacts to commercial property in southwest quadrant of interchange;
- New traffic signals at north ramp terminal intersection;
- Anticipated impacts to two hydro poles west of County Road 41;
- Anticipated impacts to sanitary sewer, watermain, and underground Bell on east side of County Road 41;

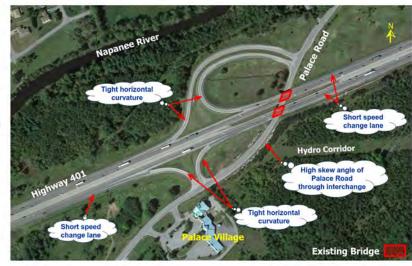






## Palace Road - Overview

- Minor bridge rehabilitation was completed in 2012 (limited in scope due to limitations on Highway 401 lane closures);
- Full replacement of the Hwy 401 Palace Road bridges is anticipated to be required within 5 years;
- To address the bridge requirements, interchange alternatives on both the existing alignment and realigned Palace Road were considered;
- Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway;
- A number of undesirable interchange geometric elements impacting safety and operations are present.



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## Short-List Alternatives (North Side)

### **Existing Alignment Alternatives**







## Westerly Realignment Alternatives



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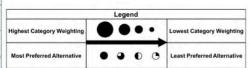
12



# Highway 401 Interchange Improvements at Palace Road

Short-List Evaluation Summary (North Side)

	Existing Alignm	ent Alternatives	Westerl	y Realignment Alte	rnatives	
Factor	Alternative E-N-2 Buttonhook	Alternative E-N-4 Diamond	Alternative W-N-2 Buttonhook	Alternative W-N-4 Diamond	Alternative W-N-5 Diamond with Roundabout	
Transportation	•			•	•	
Natural Environment	•	•	•	•	•	
Socio-Economic Environment	•	•	•	•	•	
Cultural Environment		•	•	•	•	
Cost	•	•	•	•	•	
Recommendation	x	x	<b>√</b>	×	×	



- The alternatives on the existing alignment (Alt E-N-2 / E-N-4) require temporary widening of one of the existing Palace Road bridges and require reduction to a single lane of traffic (one combined lane for both directions) controlled by signals along Palace Road during construction.
- Future rehabilitation of these bridges (Highway 401 over Palace Road) would have significantly greater impacts to Highway 401 traffic
  operations including likely lane reductions, whereas future bridge rehabilitations for the westerly realignment alternatives can generally be
  undertaken with minimal impacts to Highway 401 with lower life-cycle costs.
- While Alt W-N-2 (and W-N-4) has greater property impacts, the short and long-term staging benefits associated with constructing the new structure over Highway 401 are considered to outweigh this impact.

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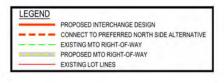


Short-List Alternatives (South Side - Existing Alignment)













## Short-List Alternatives (South Side - Westerly Realignment)









LEGEND

PROPOSED INTERCHANGE DESIGN

CONNECT TO PREFERRED NORTH SIDE ALTERNATIVE
EXISTING MTO RIGHT-OF-WAY
PROPOSED MTO RIGHT-OF-WAY
EXISTING LOT LINES

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## Short-List Evaluation Summary (South Side)

	Existin	ng Alignment Altern	natives	Westerly Realignment Alternatives					
Factor	Alternative E-S-2 Buttonhook	Alternative E-S-4 Diamond	Alternative E-S-7 Parclo B	Alternative W-S-2 Buttonhook	Alternative W-S-4 Diamond	Alternative W-S-5 Diamond with Roundabout	Alternative W-S-7 Parclo B with Roundabout		
Transportation	•	0			•	•	•		
Natural Environment	•	•	•	•	•	•	•		
Socio-Economic Environment	•	•	•	•	•	•	•		
Cultural Environment	•	•	•	•	•	•	•		
Cost	•	•	•	•	•	•	•		
Recommendation	x	x	×	/	x	×	x		

- Future rehabilitation of the new bridges along the existing alignment would have significant impacts to Highway 401 traffic operations compared to westerly alignment alternatives.
- Although the vertical grade raise of Palace Road with the westerly alternatives impacts the hydro transmission line and various other utilities, the staging and geometric advantages outweigh these impacts.

		Lege	nd		
Highest Category Weighting		•	•	•	Lowest Category Weighting
Most Preferred Alternative	•	•	0	o	Least Preferred Alternative

Despite higher socio-economic impacts, Alt W-S-2 (Buttonhook) is considered the preferred interchange alternative as it
has the best overall geometrics and safety conditions, while the other westerly alternatives having potential sight distance
concerns at the intersection and less desirable or unconventional configurations.





## **Technically Preferred Alternative**

Based on the evaluations of both the north and south sides, the **Technically Preferred Preliminary Design Alternatives** for the interchange are **Alternatives W-N-2** and **W-S-2** (Buttonhooks with Westerly Realignment):

- New Palace Road structure over Highway 401, Palace Road realignment and removal of existing structures;
- Displacement of 1 residential property north of Highway 401, and minor property acquisition from 2 other residential properties;
- Minor residential driveway re-constructions, and closure of north Palace Village driveway;
- Anticipated impacts to hydro transmission corridor / towers due to Palace Road realignment / grade raise;
- Anticipated impacts to watermain, gas main, overhead / underground Bell, and overhead hydro due to Palace Road realignment / grade raise.



Palace Road Technically Preferred Alternative

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## Consultation

## Follow-Up Consultation with Impacted Property Owners

- A number of minor refinements were developed to minimize the stakeholder concerns including modifying the off-ramp angle from 90 to 80 degrees, shifting the eastbound off-ramp slightly east, landscaping, driveway realignments, etc.
- A follow-up meeting was held with impacted property owners on the south side of the interchange on March 12, 2018 to discuss these refinements.
- A total of 10 property owners attended the meeting and some of the key concerns expressed at this meeting were regarding the proximity of the eastbound ramp terminal at Palace Road relative to residential properties.
  - Concerns regarding decrease in property value due to proximity of proposed ramps;
  - Concerns regarding safety of the eastbound off-ramp located directly across from residential driveways;
  - Concerns regarding traffic volumes in front of their homes as Palace Road is used as an Emergency Detour Route;
  - Illumination concerns with headlights coming from off-ramp shining into homes at all hours of the night;
  - · Noise concerns for on and off-ramps and engine brakes; and
  - Palace Village owners were concerned with the closure of the second entrance / exit onto and from Palace Road;
- The Ministry is currently working through these issues with the impacted property owners.



## **Next Steps**

## The following activities will be undertaken for each project following this meeting:

- Review comments received at this council meeting and respond to any questions;
- Incorporate any revisions where appropriate and finalize the preliminary design plans.
- Finalize mitigation measures to minimize or avoid potential environmental effects.
- Prepare and file the Transportation Environmental Study Report for public and agency review.
- Seek Environmental Assessment clearance for each study.
- Detail Design and Construction to be completed as future / separate studies.

### **Consultation Throughout**

(with Indigenous Communities and all stakeholders – property owners, members of the public, municipalities, interest groups, agencies, etc.)

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## **Appendix G – Public Information Centre Summary Reports and Displays**

Prepared for: Ontario Ministry of Transportation

G.W.P. 4459-04-00



## Public Information Centre #1 Summary Report

**Highway 401 Interchange Improvements at County Road 41** 

**Preliminary Design and Class Environmental Assessment Study** 

August 2016





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## 1.0 INTRODUCTION

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at County Road 41 (G.W.P. 4459-04-00). The study is examining the interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or rehabilitation of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging during construction. The study is located in the Town of Greater Napanee within the County of Lennox and Addington.

## 2.0 PURPOSE

The purpose of the PIC was to provide an overview of the Highway 401 interchange improvements at County Road 41 and provide information on the study area, purpose and scope, details on the timing of the study, an overview of existing conditions, problems and opportunities, to present the identification and screening of the long list of interchange improvement alternatives, the evaluation approach and criteria of the short list of alternatives and present the next steps in the environmental assessment process. The information presented at the PIC included:

- Study area, purpose and scope;
- Overall study process;
- Timing of study activities;
- Previous studies;
- Overview of existing transportation and environmental conditions;
- Problems and opportunities;
- Identification and screening assessment of the long list of alternatives;
- Evaluation of the short list of alternatives approach and criteria; and,
- Next steps in the study process.

## 3.0 PIC FORMAT, TIME, AND LOCATION

The first PIC was held on Wednesday July 27, 2016 at the following location:

Strathcona Paper Centre, Lafarge Banquet Hall





## 16 McPherson Drive, Napanee, ON K7R 3K6

The PIC was an informal drop-in centre and representatives from the MTO and the Consultant Team were available to answer questions and discuss the study. Members from external government agencies, elected officials and First Nations representatives were invited to attend an advance session between 3:00 p.m. and 4:00 p.m. Members of the public were invited to attend the PIC between 4:00 p.m. and 8:00 p.m.

## 4.0 NOTIFICATION

A Notice of PIC #1 was published in the following local newspapers on July 14, 2016 to inform the public of the PIC:

- Napanee Beaver; and,
- Napanee Guide.

Notification letters advising of the study were also mailed and/or emailed to everyone on the study contact list (60 contacts) on July 11, 2016, which included First Nations communities, Members of Parliament (MPs) and Members of Provincial Parliament (MPPs), external government agencies (federal, provincial, municipal), emergency services, utility services, interest groups, and members of the public. Copies of these notification letters can be found in **Appendix A**.

## 5.0 PROJECT TEAM REPRESENTATIVES

The following representatives from the Project Team including MTO and AECOM were in attendance at the PIC:

- Tina White MTO Project Manager
- Erin Pipe MTO Environmental Planner
- Lori Brake MTO Traffic
- Tim Sorochinsky AECOM Senior Project Manager
- Michael Weldon AECOM Deputy Project Manager
- Fred Leech AECOM Senior Environmental Planner
- Sarah Schmied AECOM Environmental Planner





## 6.0 MATERIALS PRESENTED

The information presented at the PIC included display boards with information on the following around the room:

- Purpose of PIC #1;
- Study area, purpose and scope;
- Overview of the Class EA process for Group 'B' projects;
- Overview of previous studies;
- Timing of study activities;
- Overview of existing environmental conditions;
- Overview of existing transportation conditions;
- Overview of transportation conditions and traffic volumes;
- Opportunities for this study;
- Identification and screening of the long list of alternatives;
- Proposed evaluation approach and criteria for the short list of alternatives;
- Next steps in the study process; and,
- Freedom of Information and Protection of Privacy Act.

Additionally there were roll plans available presenting the long list of interchange alternatives and summaries of the screening assessment of alternatives available at the PIC.

Copies of the PIC displays are available in **Appendix B.** 

## 7.0 ATTENDANCE AND SUMMARY OF COMMENTS

A total of 8 individuals chose to sign the visitors register for the PIC. No members of the media attended. No comment sheets were received at the PIC. The Project Team received most comments verbally at the PIC from municipal and emergency service representatives. Feedback received included the following:

- Concerns regarding difficulties navigating two-lane roundabouts;
- Concerns with long combination vehicles navigating through roundabouts;



## Highway 401 Interchange Improvements at County Road 41 Preliminary Design and Class Environmental Assessment



- Preference for the Parclo A4 style alternatives (N-1 and S-1);
- Comments regarding a possible new Comfort Inn hotel being built adjacent to the Royal Napanee Inn on Community Road, northeast of the Highway 401 / County Road 41 interchange;
- Comments noting that closely spaced signals should be coordinated;
- Emergency Services noted that their station is located to the southeast of the Highway 401 / County Road 41 interchange, and that their primary routes are north through the interchange or to the east; and,
- Emergency Services noted that they did not prefer roundabouts as this design slows their movements and that they preferred the Parclo A4 style interchange.

## **APPENDIX A**

**Notification Materials** 

## ONTARIO GOVERNMENT NOTICE NOTICE OF PUBLIC INFORMATION CENTRE #1

**Preliminary Design and Class Environmental Assessment Studies** 

Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00) and at Palace Road (G.W.P. 4197-13-00)

## THE PROJECTS

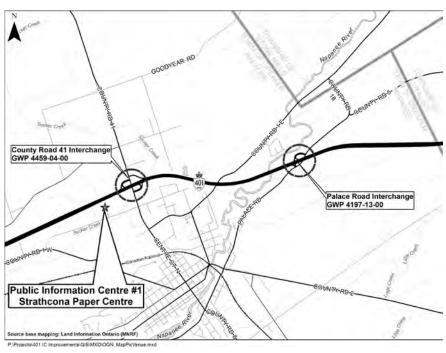
The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

#### THE PROCESS

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study.

## **PUBLIC INFORMATION CENTRE #1**

The first of two PICs has been arranged for each study to introduce the studies and present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. Members of the public, residents and stakeholders are invited to attend the first PIC as follows:



County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016 4:00 p.m. to 8:00 p.m. Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

### Palace Road (G.W.P. 4197-13-00)

Thursday July 28, 2016 4:00 p.m. to 8:00 p.m. Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

#### **COMMENTS**

To obtain additional information, provide comments, or to be placed on the mailing list for either of these studies, please contact the Project Team as follows:

## Tina White

Senior Project Manager Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000 Kingston, ON K7L 5A3

Tel: 613-545-4871, Toll Free: 1-800-267-0295

Fax: 613-540-5106

Email: tina.white@ontario.ca

Tim Sorochinsky, P.Eng.

Consultant Project Manager AECOM 4<sup>th</sup> Floor, 30 Leek Crescent

Richmond Hill, ON L4B 4N4 Tel: 905-882-3522

Fax: 905-882-4399

E-mail: tim.sorochinsky@aecom.com

Fred Leech

Consultant Environmental Planner

AECOM

201-45 Goderich Road Hamilton, ON L8E 4W8

Tel. 905.578.3040 Fax: 905.578.4129

Fax. 905.576.4129

Email: fred.leech@aecom.com

If you have any accessibility requirements in order to participate in these projects, please contact one of the Project Team members listed above.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.





AECOM 30 Leek Cres., 4<sup>th</sup> Floor Richmond Hill, ON L4B 4N4 Canada www.aecom.com 905-882-4401 tel 905-882-4399 fax

July 11, 2016

**External Agency Letter** 

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Two Public Information Centres (PICs) will be held for each study to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team. A Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the times and locations of the PICs and of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

The purpose of this letter is to notify you that the first of the two Public Information Centres (PICs) for each project has been scheduled (refer to the enclosed "Notice of Public Information Centre #1). PIC #1 for each study will present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. Your organization is invited to attend the following sessions:

County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016 3:00 p.m. to 4:00 p.m.

Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee

Palace Road (G.W.P. 4197-13-00)

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The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.



If you would like to provide comments, or require further information regarding these studies, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Thank you for your cooperation and assistance.

Yours truly, AECOM

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager

Encl. Notice of Public Information Centre #1

### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871 Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



July 11, 2016

Fax: 613-540-5106

First Nations Community Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

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County Road 41 (G.W.P. 4459-04-00)

Wednesday July 27, 2016
3:00 p.m. to 4:00 p.m.
Strathcona Paper Centre, Lafarge Banquet Hall
16 McPherson Drive, Greater Napanee

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Thursday July 28, 2016 3:00 p.m. to 4:00 p.m. Strathcona Paper Centre, Lafarge Banquet Hall 16 McPherson Drive, Greater Napanee The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

Enclosed is a copy of the PIC notice should you wish to post it for members of your community to view. If you would like to provide comments, or if you require further information regarding these studies, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871). In addition, if you are interested in meeting as a result of receiving this letter, please contact the undersigned to arrange a meeting at your earliest convenience.

Thank you for your cooperation and assistance.

Yours truly, Ministry of Transportation

Tina White
Senior Project Manager
tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky
M. Weldon
F. Leech
AECOM Consultant Project Manager
- AECOM Consultant Deputy Project Manager
- AECOM Senior Environmental Planner

Encl. Notice of Public Information Centre #1

#### **Ministry of Transportation**

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#### Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



July 7, 2016

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

Preliminary Design and Class Environmental Assessment Studies:

MP/MPP Letter

- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; and
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The purpose of this letter is to notify you that the first of the two Public Information Centres (PICs) for each project has been scheduled. The enclosed Notice of Public Information Centre #1 will appear in the *Napanee Beaver* and the *Napanee Guide* on Thursday July 14, 2016. The enclosed notice will also appear on NapaneeGuide.com.

PIC #1 for each study will present the following for comment: existing conditions, need for improvements, alternatives being considered, criteria proposed to evaluate the alternatives, and next steps. The second PIC for each project will occur early 2017 and will present the evaluation of the alternatives, the Technically Preferred Plan, potential environmental impacts and proposed mitigation measures. You are invited to attend the following sessions:

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Encl. Notice of Public Information Centre #1



AECOM 30 Leek Cres., 4<sup>th</sup> Floor Richmond Hill, ON L4B 4N4 Canada www.aecom.com 905-882-4401 tel 905-882-4399 fax

July 11, 2016

Public Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #1

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Thank you for your cooperation and assistance.

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Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky
M. Weldon
- AECOM Project Manager
- AECOM Deputy Project Manager

Encl. Notice of Public Information Centre #1

## APPENDIX B Copies of PIC Displays



## Welcome to the Public Information Centre #1 for the

# Highway 401 Interchange Improvements at County Road 41

Class Environmental Assessment and Preliminary Design Study G.W.P. 4459-04-00

July 27, 2016

Please Sign In Here





# Purpose of Public Information Centre #1

## The purpose of this Public Information Centre (PIC) is to present and receive feedback on:

- > Study Area, Purpose and Scope
- > Overall Study Process
- Timing of Study Activities
- Previous Studies
- Overview of Existing Transportation and Environmental Conditions
- Problems and Opportunities
- > Identification and Screening Assessment of Long List of Alternatives
- Evaluation of Short List of Alternatives Approach and Criteria
- Next Steps

Your input on each of these and other study issues is important to us!

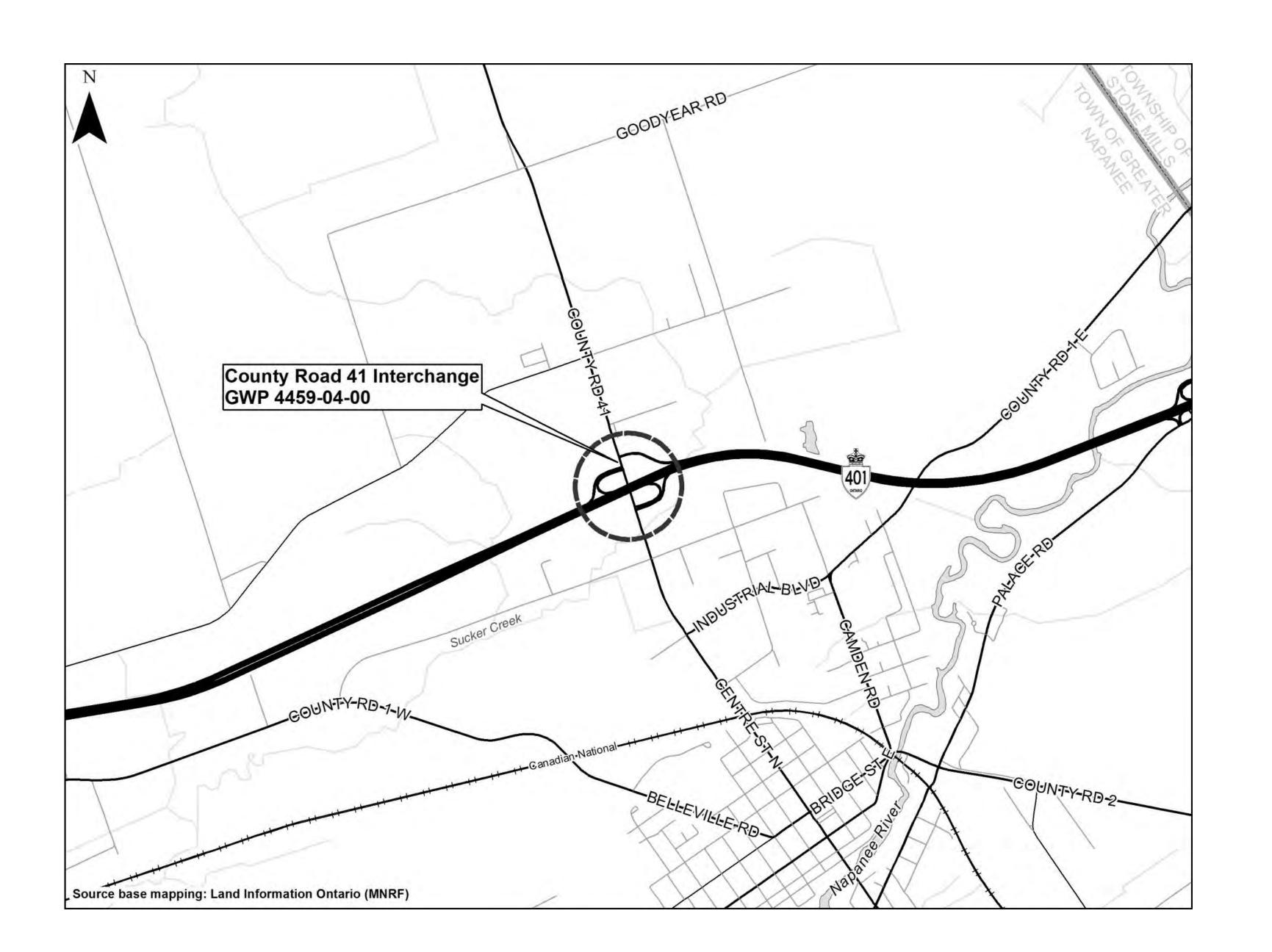






## Study Area, Purpose and Scope

- The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 / County Road 41 interchange.
- The project is located in the Town of Greater Napanee within the County of Lennox and Addington.
- This study will examine interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or rehabilitation of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging during construction.
- Concurrently MTO is undertaking a separate
   Preliminary Design and Class Environmental
   Assessment Study for improvements to the Highway
   401 / Palace Road interchange. Please speak to the
   Project Team for details.



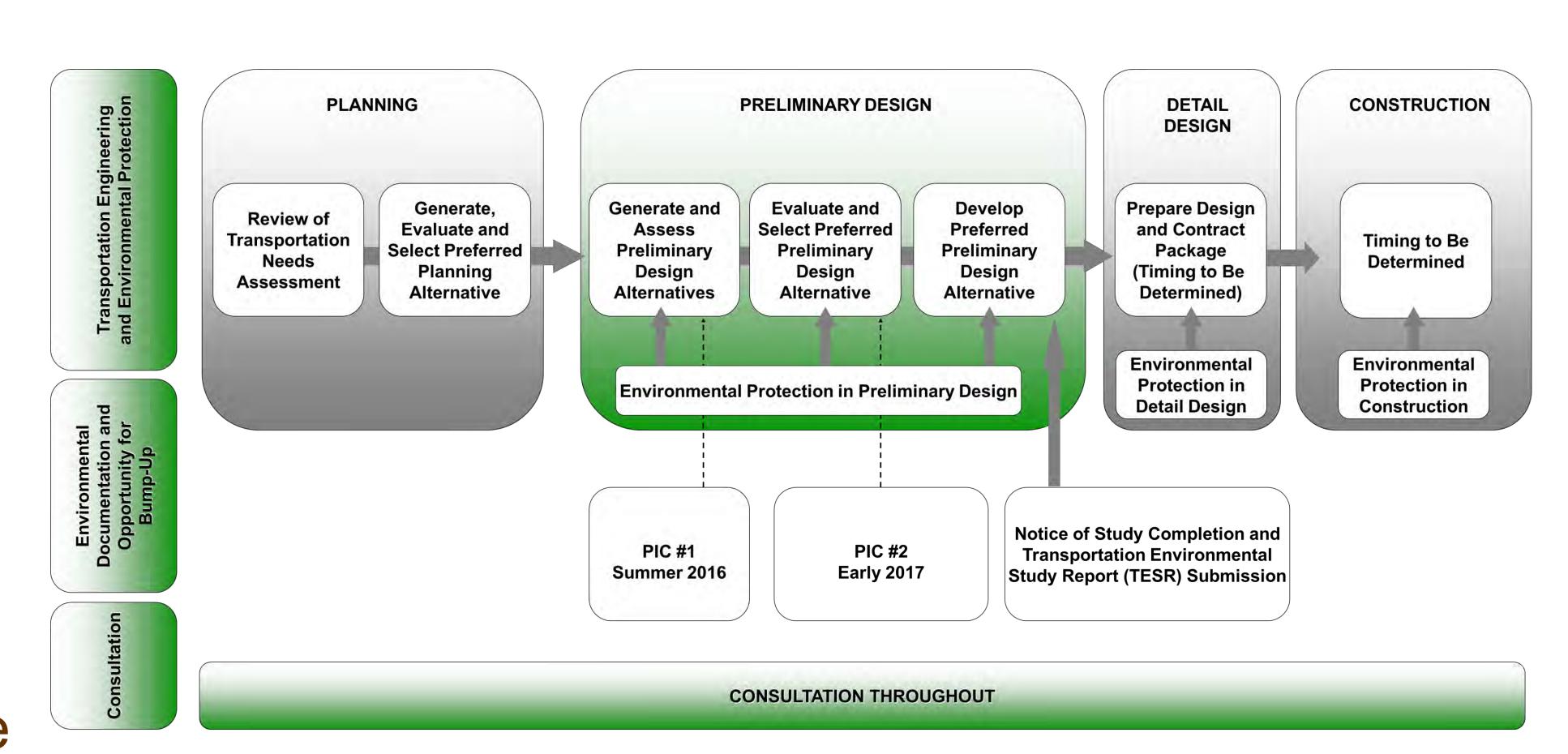






## Class EA Process for Group 'B' Projects

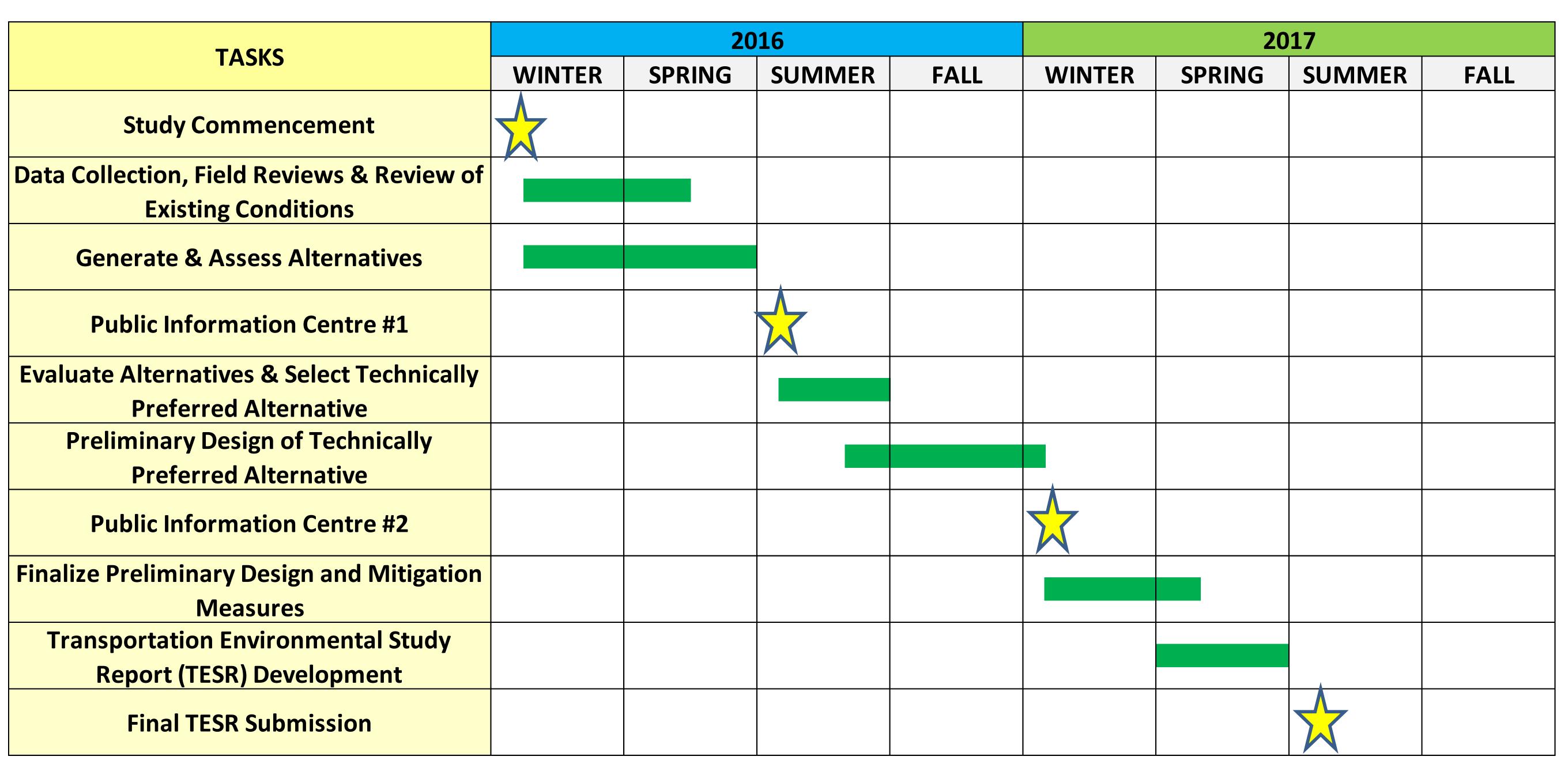
- This study is following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).
- This is the first of two Public Information Centres (PICs) that will be held for the project to provide interested parties with the opportunity to discuss it and provide input to the Project Team.
- A Transportation Environmental Study Report (TESR) will be prepared and made available for public review at the completion of the study.







## Timing of Study Activities



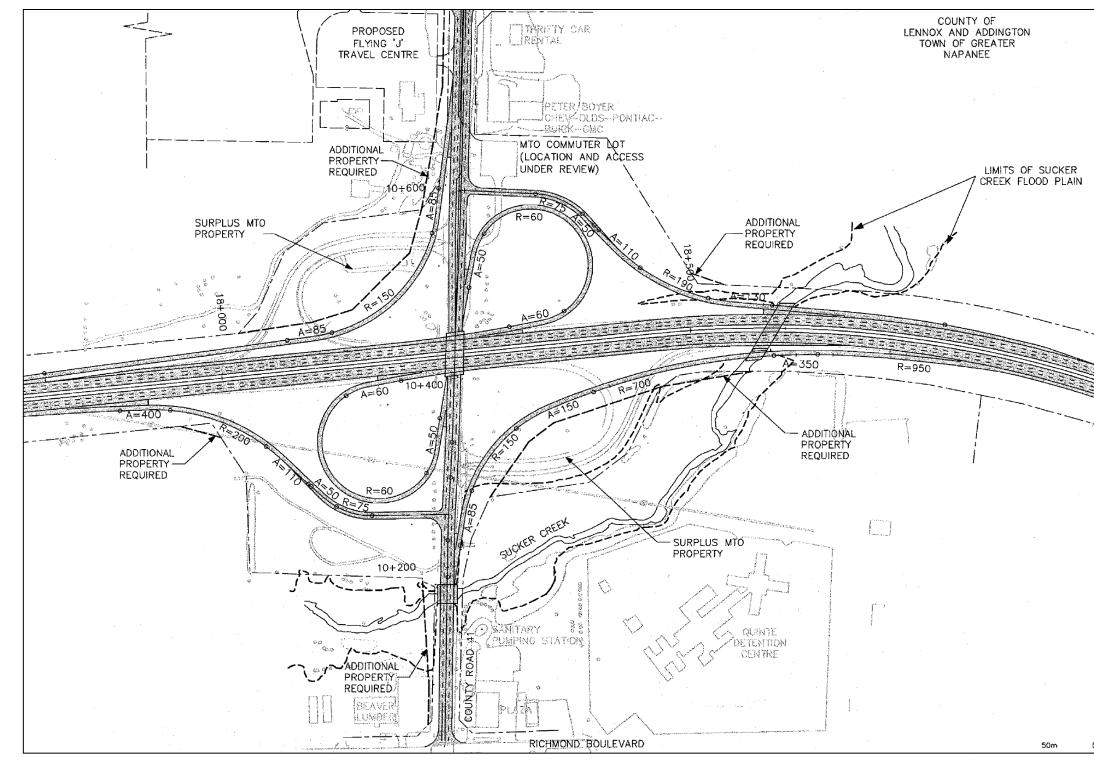
Schedule subject to change based on study findings and/or input received through consultation



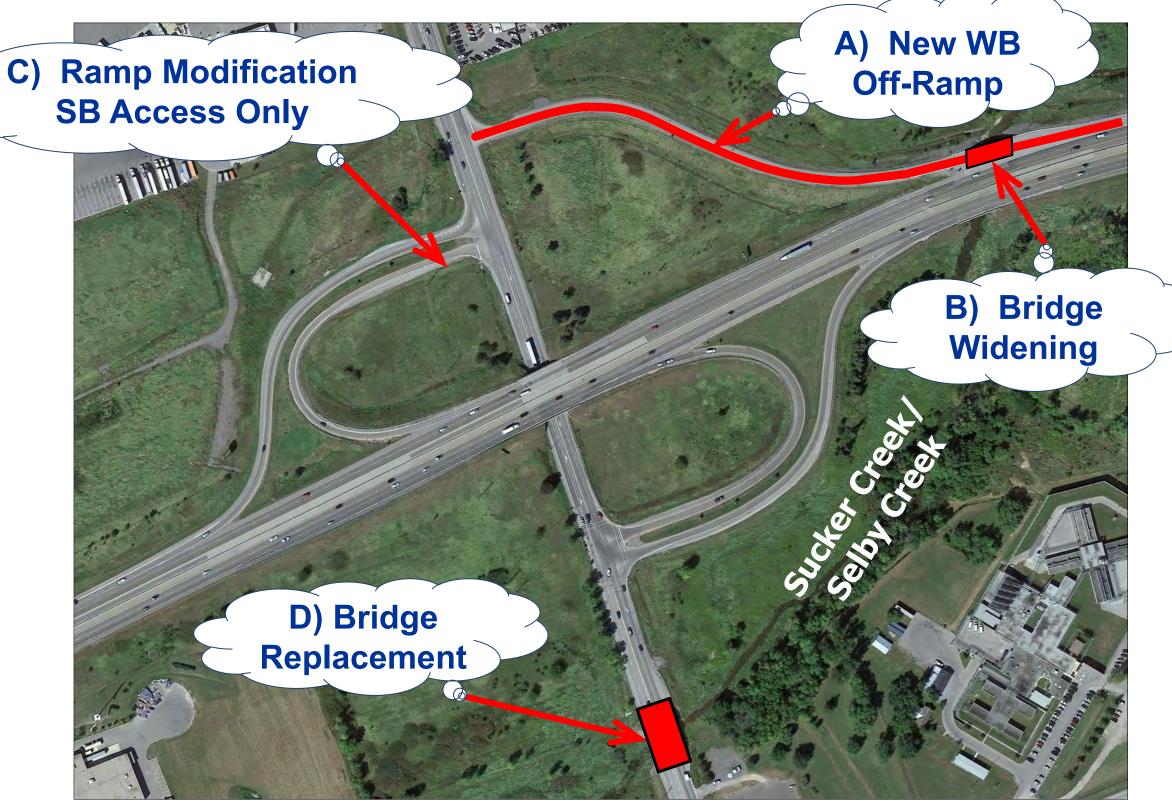


### Previous Studies

- MTO completed a Preliminary Design Study in 2001 to determine the short-term, mid-term and long-term improvements to the interchange.
  - Recommendation from the 2001 study was to upgrade the interchange to a full Parclo A4 interchange configuration.
- Based on the short-term improvements recommended from the 2001 study, MTO completed the Detail Design and construction of various interchange improvements in 2004, including:
  - **A)** Construction of a new interchange ramp for westbound traffic on Highway 401 to go northbound on County Road 41;
  - **B)** Widening the Highway 401/Sucker Creek/Selby Creek bridge to the north to accommodate this new interchange ramp;
  - C) Modifying the old Highway 401 westbound off-ramp for southbound movements only on to County Road 41 (northbound movements accommodated by the new ramp);
  - **D)** Replacing the County Road 41 bridge over Sucker Creek, south of Highway 401, with a wider bridge to allow for the widening of County Road 41.



Recommended Plan for County Road 41 Interchange from 2001 Study



**Short-Term Improvements Constructed in 2004** 

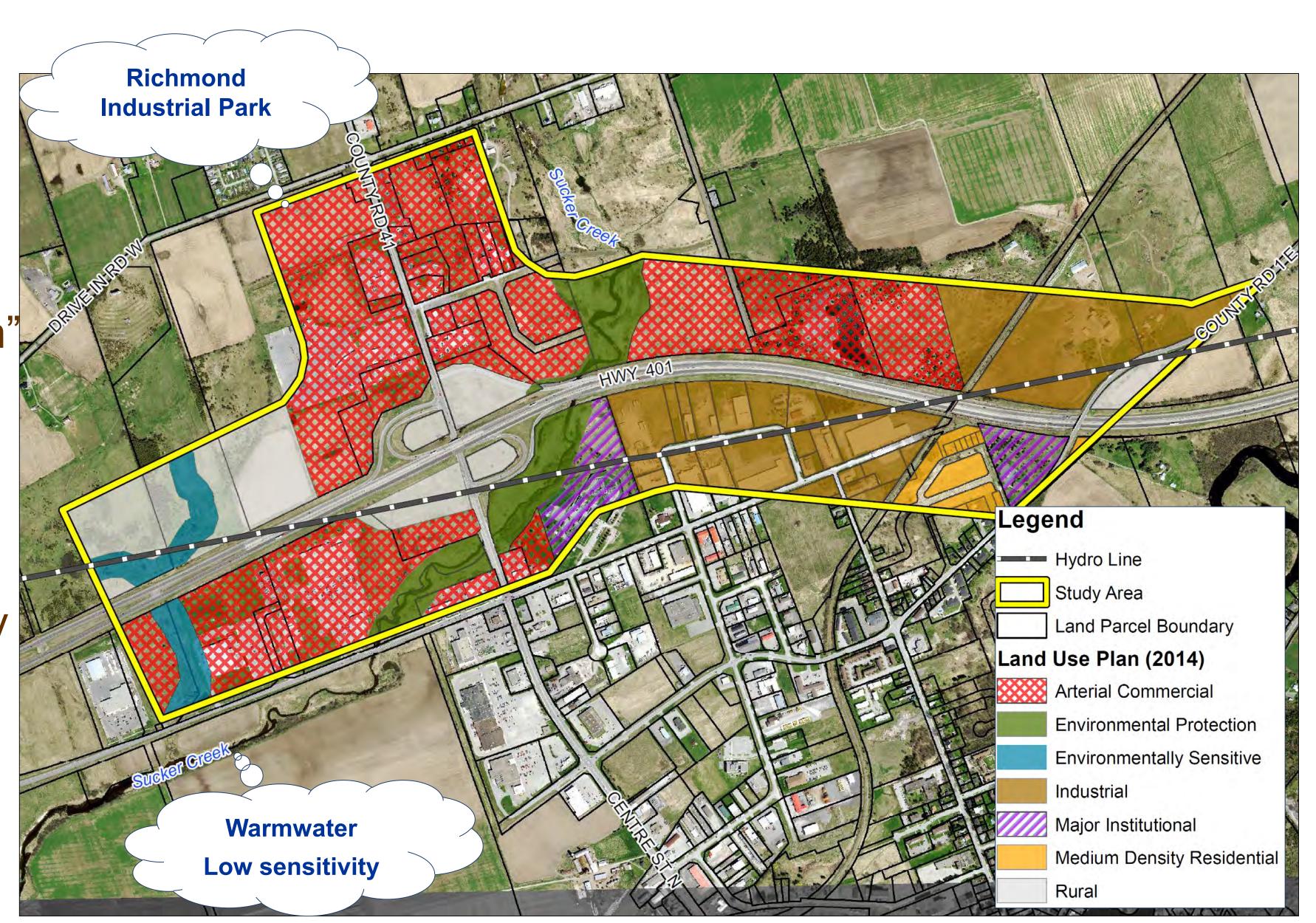






## Overview of Existing Environmental Conditions and Land Use

- Selby/Sucker Creek is a warmwater watercourse with a low sensitivity.
- No wetlands or Areas of Natural and Scientific Interest (ANSIs) are located in the proximity of the interchange.
- The southwest quadrant of the County Road 41 and Sucker Creek bridge is zoned "Environmental Protection" in the Town of Greater Napanee's Official Plan (2014).
- The Richmond Industrial Park is located immediately north of Highway 401, on County Road 41.
- A number of businesses operate north and south of Highway 401 and on both east and west sides of County Road 41.
- The Salmon River cycling trail crosses Highway 401 via County Road 41 connecting Napanee, Newburgh, Croydon, Roblin and Selby.



Source: MTO, MNRF, Town of Greater Napanee

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community











### Highway 401 Interchange Improvements at County Road 41

### Overview of Existing Transportation Conditions

### Bridges

- The Highway 401 / County Road 41 overpass was constructed in 1959, and rehabilitated in 1982 and 1987.
- The Highway 401/Sucker Creek/Selby Creek bridge was constructed in 1960, rehabilitated in 1987 and 1993, and widened to the north in 2004 to accommodate construction of a new westbound off-ramp to County Road 41.
- Given the age and condition of the bridges and the time since the last rehabilitation, a major rehabilitation of the bridges is anticipated within the short-term (5 year) planning horizon.
- Based on the current bridge configurations, these rehabilitations cannot be completed without lane closures along Highway 401 or temporary removal of the existing eastbound and westbound off-ramp speed change lanes from the bridge, impacting existing Hwy 401 and interchange traffic operations.
- In addition to the short term rehabilitation requirements of the County Road 41 overpass, it is anticipated that full replacement of the bridge will be required within the 20-25 year planning horizon of the study.

### Drainage

- Temporary concrete barrier of varying type and size is presently provided along the centerline of Highway 401 west of Napanee River.
- The existing median drainage system is not functioning properly and is in need or upgrade or replacement.



**County Road 41 Bridge** 



Highway 401/Sucker Creek/Selby Creek Bridge



Westbound Highway 401 approaching County Rd 41



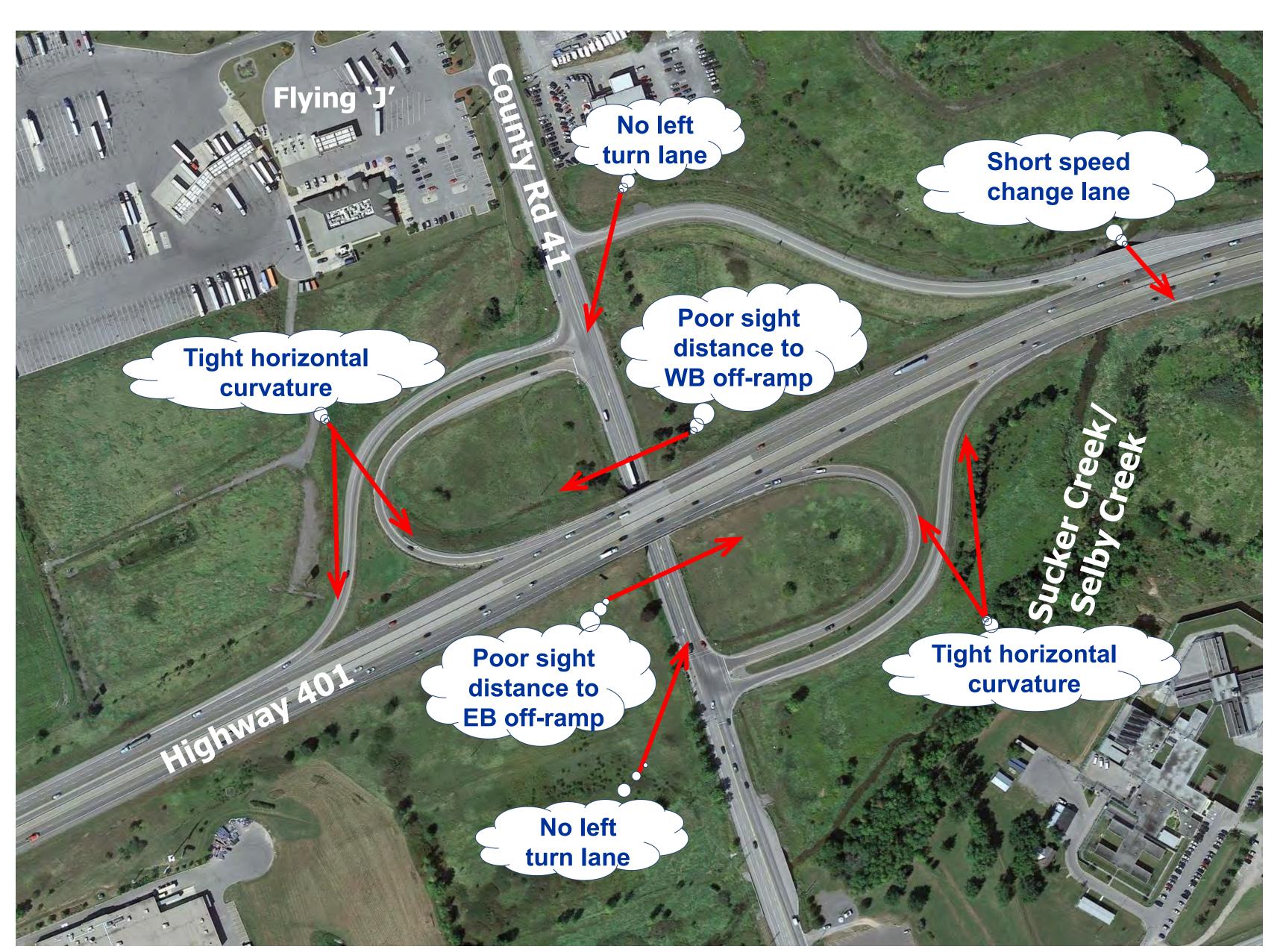




## Overview of Existing Transportation Conditions

### Geometrics

- > A number of undesirable geometric elements or areas of concern have been identified at the interchange, including:
  - Poor sight distance to the eastbound and westbound off-ramps, which leads to late lane-changes and operational concerns for vehicles along Highway 401 approaching the off-ramps;
  - Tight horizontal curvature along four of five interchange ramps, which creates operational concerns along the ramps;
  - Short length of the eastbound on-ramp speed change lane, which causes slow moving traffic from on-ramp to merge with freeway traffic;
  - The absence of dedicated left-turn lanes along County Road 41 for access to Highway 401 (northbound and southbound), which leads to increased delay and traffic to queue in the through-lane.



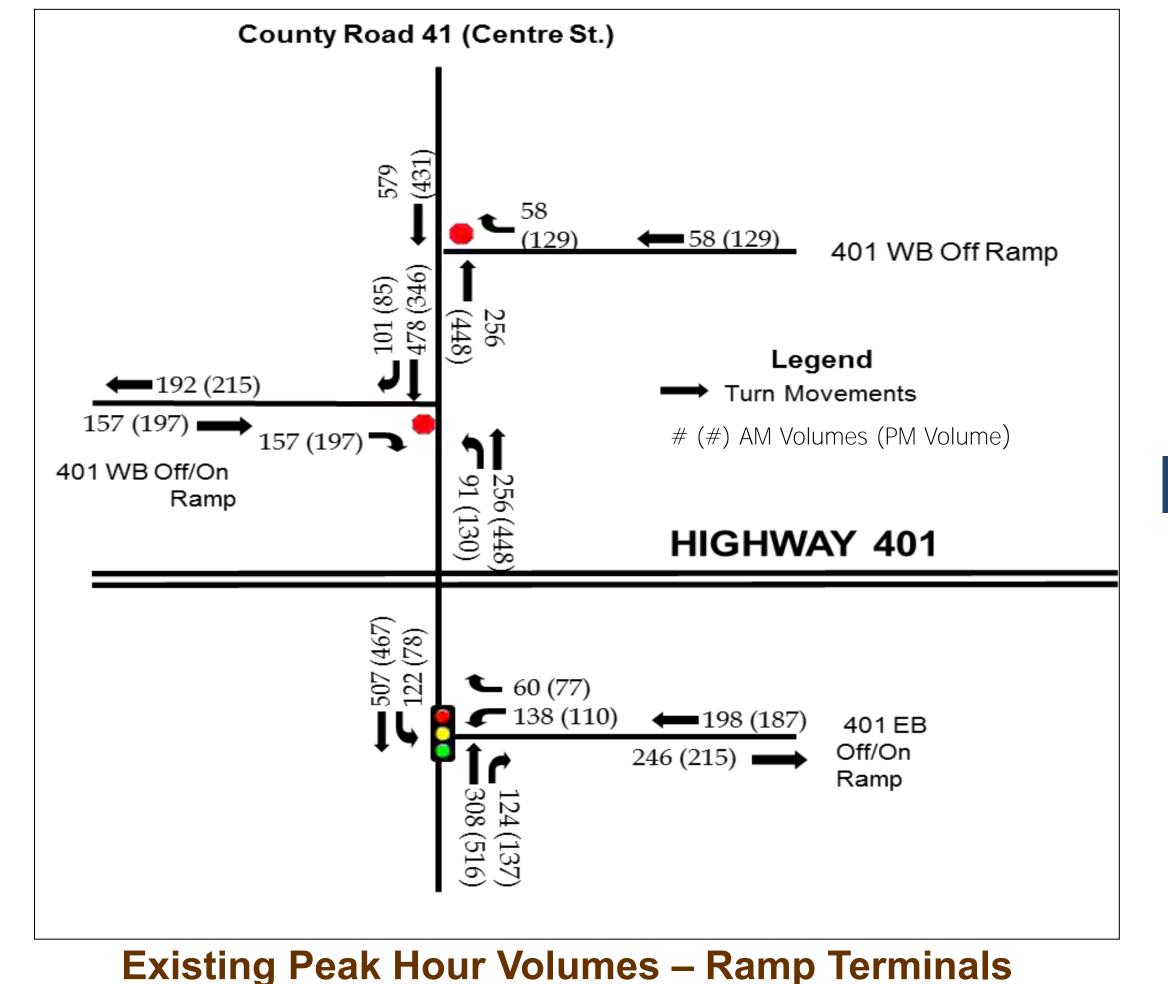


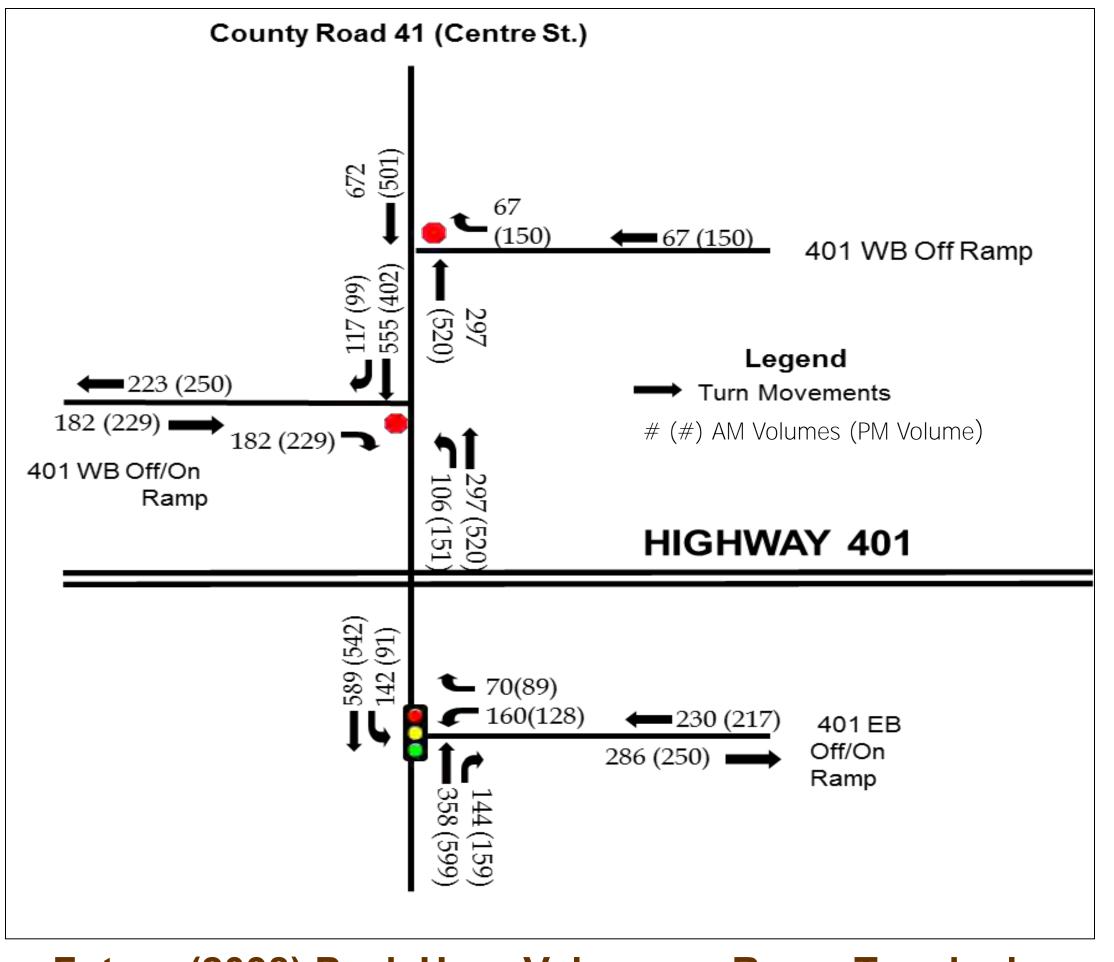




# Traffic Operations Overview of Transportation Conditions and Traffic Volumes

- Level of Service (LOS) is a combined measure of vehicle delay and traffic volume, describing operational conditions within the roadway network, and their perception by motorists and / or passengers.
- Levels of Service 'A' through 'D' typically reflect adequate operations, while LOS 'E' reflects increasing congestion and operations at capacity, and LOS 'F' reflects unstable traffic flows, long delays and, in some cases, severe traffic congestion.
- Existing traffic Level of Service operations at the interchange are generally acceptable (overall Level of Service 'C' or better), however left-turning traffic along County Road 41 to Highway 401 results in some queueing and delay to through traffic given the absence of dedicated left-turn lanes.
- > By 2038 increased traffic volumes will lead to increased delay (overall Level of Service 'D' or better).
- > Future traffic analysis was undertaken utilizing growth rates calculated from historical traffic volumes and growth projections.











### Opportunities

- Based on the identified Problems at the Highway 401 and County Road 41 interchange, the following Opportunities for this study have been identified:
  - ➤ Development of a strategy to address the short-term and long-term structural needs at the County Road 41 Overpass and Highway 401/Sucker Creek/Selby Creek is required.
  - ➤ Geometric improvements such as improved sight distance to off-ramps, increased horizontal curvature at ramps, longer speed change lanes and provision of left-turn lanes along County Road 41 would be expected to address operational concerns and provide for good overall traffic operations at the interchange.
  - The development of an ultimate plan for the County Road 41 interchange would allow for the necessary short-term structural rehabilitation requirements to be implemented efficiently and in a cost effective manner, minimizing future throwaway.
  - A staged approach towards implementing the ultimate interchange plan can be developed that would allow for construction of interim improvements that both improve traffic operations and facilitate the structural rehabilitation requirements.
  - > Upgrading the existing median shoulder would allow future Highway 401 projects to utilize the median for construction staging purposes, while upgrading or replacing the median barrier and storm sewer system would address existing drainage concerns along the corridor.





## Identification and Screening of Long List of Alternatives

- Based on the identified Problems and Opportunities and recommended Alternative to the Undertaking (Improvements to County Road 41 interchange), a number of possible interchange improvement alternatives have been developed to reflect the ultimate configuration;
- This **long list** of interchange improvement alternatives was subjected to a screening-level qualitative assessment based on the following technical criteria:
  - Geometrics and safety
  - Traffic operations
  - Construction staging impacts
  - Structural requirements
  - Construction cost
  - Anticipated environmental and property impacts
- > Alternatives were developed and assessed separately for the north and south sides of the interchange;
- This screening led to the identification of a **short list** of alternatives, which will be evaluated following this PIC based on the criteria on the following slide.

Please refer to the roll plans for the long list interchange alternatives and summary of the screening assessment of alternatives







## Short List of Alternatives – Proposed Evaluation Approach and Criteria

A weighted-score arithmetic evaluation system will be used to compare the **short list** of alternatives. This evaluation methodology involves assigning relative weightings to each of the evaluation categories and criteria based on their level of importance.

Impacts are measured either quantitatively or qualitatively, and then these scores are multiplied by a relative weight for that indicator. The weighted scores for each indicator are then summed to arrive at a total score for each alternative. The alternative that produces the highest total weighted score is preferred as it results in the best balance of benefits and impacts to the natural, socio-economic and cultural environments, as well as transportation and cost considerations.

The table to the right identifies the proposed categories and sample criteria to be used to evaluate the short list of alternatives.

### **Evaluation Category and Sample Criteria**

### **TRANSPORTATION**

- Interchange Operations
- Safety and Geometrics

### **ENVIRONMENTAL**

- Natural Environment
  - Fish and Fish Habitat
  - Terrestrial Ecosystems
  - Groundwater
- Socio-Economic Environment
  - Aesthetics
  - > Noise
  - Community Effects
  - Waste and Contamination
- Cultural Environment
  - Archaeological Resources
  - Built Heritage Features and Cultural Heritage
     Landscapes

### **Cost and Constructability**

- Construction Staging
- Construction Cost
- Utility Impacts













### Highway 401 Interchange Improvements at County Road 41

### Next Step

### The following activities will be undertaken following this PIC:

- > Respond to comments received at this PIC and incorporate them into the study where appropriate.
- Finalize the long list of interchange alternatives, its screening, and the short list of alternatives to be carried forward for evaluation.
- Finalize the proposed criteria and weightings to evaluate the short list of alternatives.
- Assess and evaluate the short list of interchange alternatives to select a Technically Preferred Alternative.
- Present the preliminary design of the Technically Preferred Interchange Alternative at PIC #2, which is anticipated to be held in early 2017.
- Prepare a Transportation Environmental Study Report for public and agency review in summer 2017.

### Thank you for attending.

Please feel free to ask questions and fill out a comment sheet before you leave.

If you have any accessibility requirements in order to participate in this project, please contact one of the Project Team members.

# Consultation Throughout (with First Nation & Métis Communities and all stakeholders –

Communities and all stakeholders – property owners, members of the public, municipalities, interest groups, agencies, etc.)







## Freedom of Information and Protection of Privacy Act

Comments and information regarding this study are being collected to assist the Ministry of Transportation in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation.

Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

You are encouraged to contact members of the Project Team if you have any questions or concerns regarding the above information.





#### **Ontario Ministry of Transportation**

### Public Information Centre #2 Summary Report

Highway 401 Interchange Improvements at County Road 41

#### Prepared by:

AECOM Canada Ltd.
30 Leek Crescent, Floor 4
Richmond Hill, ON L4B 4N4
Canada

T: 905 882 4401 F: 905 882 4399 www.aecom.com Prepared for:

**Ontario Ministry of Transportation** 

**Date:** December 2017 **Project #:** G.W.P. 4459-04-00

#### **Table of Contents**

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#### **Appendices**

Appendix A. Notification Materials
Appendix B. Copies of PIC Displays

#### 1. Introduction

The Ontario Ministry of Transportation (MTO) retained AECOM to undertake a Preliminary Design and Class Environmental Assessment (EA) Study for improvements to the Highway 401 interchange at County Road 41 (G.W.P. 4459-04-00). The study is examining the interim and long-term interchange operational improvements, replacement and/or rehabilitation of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging during construction. The study is located in the Town of Greater Napanee within the County of Lennox and Addington.

The first of two Public Information Centres (PICs) was held on July 27, 2016 at the Strathcona Paper Centre in Greater Napanee, Ontario. A one-hour preview session was held for municipalities, MPs/MPPs, external agencies, and Indigenous communities in advance of the PIC. The first PIC presented and sought input on the following:

- Study area, purpose, and scope;
- Overall process;
- Timing of study activities;
- Previous studies:
- Overview of existing transportation and environmental conditions;
- Problems and opportunities;
- Identification and screening assessment of the long list of alternatives;
- Evaluation of the short list of alternatives approach and criteria; and,
- Next steps in the study process.

#### 2. Purpose

A second PIC (PIC #2) was held on November 22, 2017 at the Selby Community Hall in Selby, Ontario. The purpose of PIC #2 was to present and receive feedback on the following:

- Study background, purpose, scope;
- Summary of PIC #1 (held July 2016);
- Assessment and evaluation of preliminary design alternatives;
- Preliminary design of the Technically Preferred Alternative for the interchange;
- Potential mitigation strategies to minimize environmental / community impacts; and,
- Next steps in the study process.

#### PIC Format, Time, and Location

PIC #2 was held on November 22, 2017 at the following location:

Selby Community Hall 114 Pleasant Drive Selby, ON K0K 2Z0

The PIC was an informal drop-in centre and representatives from the MTO and the Consultant Team were available to answer questions and discuss the study. Members from external government agencies, elected officials and Indigenous community representatives were invited to attend an advance session between 3:00 p.m. and 4:00 p.m. Members of the public were invited to attend the PIC between 4:00 p.m. and 8:00 p.m.

#### 4. Notification

A Notice of PIC #2 was published in the following local newspapers on November 9, 2017 to inform the public of the PIC:

- Napanee Beaver; and,
- Napanee Guide.

In order to reach a larger population in the study area who may not have been familiar with the study, a Project brochure was distributed to properties within a 7 km radius of the study area using Canada Post's Neighbourhood Mail service (6,882 brochures) which included similar information to the PIC displays and Project Team contact information for members of the public to submit comments.

Notification letters advising of the PIC were also mailed and/or emailed to everyone on the study contact list (187 contacts) on November 1, 2017, which included First Nations communities, Members of Parliament (MPs) and Members of Provincial Parliament (MPPs), external government agencies (federal, provincial, municipal), emergency services, utility services, interest groups, and members of the public. Copies of these notification letters can be found in **Appendix A.** 

#### 5. Project Team Representatives

The following representatives from the Project Team including MTO and AECOM were in attendance at the PIC:

- Tina White MTO Project Manager
- Erin Pipe MTO Environmental Planner
- Charlene Leslie MTO Property
- Tim Sorochinsky AECOM Senior Project Manager
- Michael Weldon AECOM Deputy Project Manager
- Fred Leech AECOM Senior Environmental Planner
- Sarah Schmied AECOM Environmental Planner

#### 6. Materials Presented

The information presented at the PIC included display boards with information on the following around the room:

- Purpose of PIC #2;
- Study area, purpose and scope;
- Study process;
- Timing of study activities;
- Study overview and PIC #1;
- Summary of problems and opportunities;
- Generation and evaluation of preliminary design alternatives;
- Overview and summary of the evaluation of the short list of alternatives;
- Conceptual construction staging;
- Other improvements being recommended;
- Proposed mitigation measures and recommendations for further work;
- Next steps in the study process; and,
- Freedom of Information and Protection of Privacy Act.

Additionally there were roll plans available presenting the Technically Preferred Alternative. Copies of the PIC displays are available in **Appendix B.** 

#### 7. Attendance and Summary of Comments

A total of 20 individuals chose to sign the visitors register for the PIC. No members of the media attended. In addition to verbal comments, the Project Team encouraged visitors to express, in

writing, all suggestions, comments or concerns that they had regarding the information presented.

One (1) written comment sheet was received at the PIC and the following verbal comments were provided in person:

- Support for traffic lights at County Road 41;
- Support for the directional on-ramps (northbound to eastbound and southbound to westbound) to be free flow at County Road 41;
- Support from the Ontario Provincial Police (OPP) regarding the redesign of the interchange ramps at County Road 41 as they felt the changes address a number of operational and safety concerns;
- Request from the OPP to consider design enhancements along Highway 401 eastbound and westbound between County Road 41 and Palace Road where they could park a police car either off the shoulder or in the median to monitor traffic;
- Request from the OPP to be involved in the construction staging discussions at the beginning of the Detail Design process and that they be invited to a pre-construction meeting;
- Request from the OPP that the two interchanges (County Road 41 and Palace Road) are not under construction at the same time as they each act as emergency detour routes each other;
- Questions regarding the addition of gates at the ramps for highway closures;
- Request for the addition of a queue warning system along Highway 401 during construction;
- Questions about the EA process;
- Questions about timing of construction;
- Questions about a Napanee bypass on the east side of the Town;
- Questions about the County Official Plan;
- Questions about Council and Municipal staff involvement; and
- Comments about detours during construction putting a stress on Town infrastructure.

Highway 401 Interchange Improvements at County Road 41Error! Reference source not found.

#### **APPENDIX A**

#### **Notification Materials**

#### ONTARIO GOVERNMENT NOTICE NOTICE OF PUBLIC INFORMATION CENTRE #2

Preliminary Design and Class Environmental Assessment Studies

Highway 401 Interchange Improvements at County Road 41 (G.W.P. 4459-04-00) and at Palace Road (G.W.P. 4197-13-00)

#### **THE PROJECTS**

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

#### **THE PROCESS**

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. PIC #2 is being held to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, and the Preliminary Design of the preferred alternative at each interchange.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study to document the Recommended Plan, the potential impacts, and the Public Information Centre #2
Selby Community Hall

County Road 41 Interchange
GWP 4459-04-00

Palace Road Interchange
GWP 4197-13-00

Palace Road Interchange
GWP 4197-13-00

recommended mitigation measures to minimize environmental impacts. The TESRs will be made available to the public, other interested parties and external agencies for a 30-day public review period at public review locations in close proximity to the study area. A notice of the TESR review opportunities will be provided.

#### **PUBLIC INFORMATION CENTRE #2**

Members of the public, residents and stakeholders are invited to attend PIC #2 as follows:

Wednesday November 22, 2017 4:00 p.m. to 8:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies. You are encouraged to attend the PIC and provide the Project Team with your views and comments so that they can be considered as the project progresses.

#### **COMMENTS**

To obtain additional information, provide comments, or to be placed on the mailing list for either of these studies, please contact the Project Team as follows:

#### **Tina White**

Senior Project Manager Ministry of Transportation, Eastern Region 1355 John Counter Boulevard, Postal Bag 4000 Kingston, ON K7L 5A3 Tel: 613-545-4871.

Tel: 613-545-4871, Toll Free: 1-800-267-0295

Email: tina.white@ontario.ca

Tim Sorochinsky, P.Eng.

Consultant Project Manager AECOM

4<sup>th</sup> Floor, 30 Leek Crescent Richmond Hill. ON L4B 4N4

Tel: 905-882-3522 Fax: 905-882-4399

E-mail: tim.sorochinsky@aecom.com

#### Fred Leech

Consultant Environmental Planner AFCOM

201-45 Goderich Road Hamilton, ON L8E 4W8 Tel. 905.578.3040 Fax: 905.578.4129

Email: fred.leech@aecom.com

\_\_\_\_\_\_

If you have any accessibility requirements in order to participate in these projects, please contact one of the Project Team members listed above.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.





AECOM
30 Leek Cres., 4<sup>th</sup> Floor
Richmond Hill, ON
L4B 4N4
Canada
www.aecom.com

905-882-4401 tel 905-882-4399 fax

November 1, 2017

**External Agency Letter** 

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #2
Preliminary Design and Class Environmental Assessment Studies:
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00;
Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC #2 is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has been scheduled (refer to the enclosed *Notice of Public Information Centre #2*). The purpose of PIC #2 is to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

Your organization is invited to attend the following session in advance of PIC #2:

November 22, 2017 3:00 p.m. to 4:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies. If you are unable to attend PIC #2 and are interested in these studies, enclosed are two brochures, with further information on each of the two projects that will be presented at PIC #2 for your reference. Please also feel free to contact one of the Project Team members listed on the enclosed *Notice of PIC #2* if you would like to discuss anything further.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, require further information regarding these studies, or have any accessibility requirements in order to participate in these studies, please feel free to contact the undersigned at 905-390-2030 or Fred.Leech@aecom.com.

Thank you for your cooperation and assistance.

Yours truly, **AECOM** 

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871 Fax: 613-540-5106

#### Ministère des Transports

Téléc.: 613 540-5106

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3 Tél.: 613 545-4871



November 1, 2017

Indigenous Community Letter

«Name» «Organization» «Address»

Dear «Greeting»:

**RE: Notice of Public Information Centre #2** 

Preliminary Design and Class Environmental Assessment Studies: Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has been scheduled (refer to the enclosed *Notice of Public Information Centre #2*). The purpose of PIC #2 is to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

A private session for agencies, municipalities and Indigenous Communities is planned in advance of the public session at:

Wednesday November 22, 2017 3:00 p.m. to 4:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

Enclosed is a copy of the *Notice of PIC #2* should you wish to post it for members of your community to view. Also enclosed are two brochures with further information on each of the two projects that will be presented at PIC #2 for your reference.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, if you require further information regarding these studies, or if you have any accessibility requirements to participate in these studies, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871). In addition, if you are interested in meeting as a result of receiving this letter, please contact the undersigned to arrange a meeting at your earliest convenience.

Thank you for your cooperation and assistance.

Yours truly, **Ministry of Transportation** 

### Tina White Senior Project Manager tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky - AECOM Consultant Project Manager

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure

#### **Ministry of Transportation**

Planning and Design Section 1355 John Counter Boulevard Postal Bag 4000 Kingston, Ontario K7L 5A3 Tel.: 613 545-4871

Tel.: 613 545-4871 Fax: 613-540-5106

#### Ministère des Transports

Section de la planification et de la conception 1355, boulevard John Counter CP/Service de sacs 4000 Kingston (Ontario) K7L 5A3

Tél.: 613 545-4871 Téléc.: 613 540-5106



November 1, 2017

MP/MPP Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #2

Preliminary Design and Class Environmental Assessment Studies: Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00; Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 and Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Both studies are following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000). Public Information Centre (PIC) #1 was held for each study in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held for both studies to provide interested parties with the opportunity to discuss the projects and provide input to the Project Team.

The purpose of this letter is to notify you that the second PIC for each project has been scheduled. The enclosed *Notice of Public Information Centre #2* will appear in the *Napanee Beaver* and the *Napanee Guide* on Thursday November 9, 2017.

The purpose of PIC #2 is to provide the stakeholders and the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

You are invited to attend the following session in advance of PIC #2:

Wednesday November 22, 2017 3:00 p.m. to 4:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0 The public has been invited to attend the PIC between 4:00 p.m. and 8:00 p.m. at the same venue. The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

Also enclosed are two brochures with further information on each of the two projects that will be presented at PIC #2 for your reference.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the availability of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, if you require further information regarding these studies, or if you have any accessibility requirements in order to participate, please feel free to contact the undersigned at 613-545-4871 (toll free: 1-800-267-0295, ext. 4871).

Thank you for your cooperation and assistance.

Yours truly,

#### **Ministry of Transportation**

#### **Tina White**

Senior Project Manager tina.white@ontario.ca

cc. E. Pipe - Ministry of Transportation, Environmental Planner

T. Sorochinsky - AECOM Consultant Project Manager

M. Weldon - AECOM Consultant Deputy Project Manager

F. Leech - AECOM Senior Environmental Planner

S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure



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30 Leek Cres., 4<sup>th</sup> Floor
Richmond Hill, ON
L4B 4N4
Canada
www.aecom.com

905-882-4401 tel 905-882-4399 fax

November 1, 2017

Public Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Public Information Centre #2
Preliminary Design and Class Environmental Assessment Studies:
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00;
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The purpose of this letter is to notify you that the second PIC for each project has now been scheduled (refer to the enclosed *Notice of Public Information Centre* #2). The purpose of PIC #2 is to provide the public with the opportunity to view and provide comments on the evaluation of alternatives, the Preliminary Design of the preferred alternative at each interchange, and the next steps.

You are invited to attend PIC #2 as follows:

Wednesday November 22, 2017 4:00 p.m. to 8:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the studies.

If you are unable to attend PIC #2 and are interested in these studies, enclosed are brochures with further information on each project that will be presented at PIC #2 for your reference. Please also feel free to contact one of the Project Team members listed on the enclosed *Notice of PIC #2*.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for each study and made available for public review at the completion of each study. Notification, advising of the TESRs for review, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, require further information regarding these studies, or have any accessibility requirements in order to participate in these studies, please feel free to contact the undersigned at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Thank you for your cooperation and assistance.

Yours truly,

**AECOM** 

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project ManagerS. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure



AECOM
30 Leek Cres., 4<sup>th</sup> Floor
Richmond Hill, ON
L4B 4N4
Canada
www.aecom.com

905-882-4401 tel 905-882-4399 fax

November 1, 2017

Impacted Property Owner Letter

«Name» «Organization» «Address»

Dear «Greeting»:

RE: Notice of Potential Property Impacts and Public Information Centre #2
Preliminary Design and Class Environmental Assessment Study
Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 and County Road 41 interchange (G.W.P. 4459-04-00). This project is located in the Town of Greater Napanee within the County of Lennox and Addington.

This study is following the approved planning process for a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

We wish to advise you that your property is potentially impacted by the recommended plan (please refer to the enclosed plan) and would like to invite you to meet with us to review the recommended plan and discuss potential impacts to your property with the Project Team. Please contact me by phone at 905-390-2030 or by email at Fred.Leech@aecom.com to discuss the potential impacts and if you would like to arrange a meeting.

We would also like to inform you that Public Information Centre #2 (PIC) has now been scheduled for this project. You are invited to attend PIC #2 as follows:

Wednesday November 22, 2017 4:00 p.m. to 8:00 p.m. Selby Community Hall 114 Pleasant Drive, Selby, ON K0K 2Z0

PIC #1 was held in July 2016 to provide the public with the opportunity to discuss the project and comment on the alternatives that were being considered to address bridge requirements and undesirable interchange elements. A second combined PIC is being held to provide interested parties with the opportunity to discuss the project and provide input to the Project Team.

We reached out to you in September 2016 regarding potential impacts to your property. PIC #2 will build on the information in that letter; and will provide a summary of the evaluation of alternatives, the Preliminary Design of the preferred alternative at the interchange and the next steps in the study process, which we can also discuss with you if you would like to meet with the Project Team separately.

The PIC will be an informal drop-in centre and representatives from the MTO and the Consultant Team will be available to answer questions and discuss the study. This PIC

will be held at the same time and at the same venue as PIC #2 for the *Highway 401 Interchange Improvements at Palace Road (G.W.P. 4197-13-00), Preliminary Design and Class Environmental Assessment Study*, please refer to the enclosed Notice of PIC #2 for further details.

If you are unable to attend PIC #2 and are not able to meet with us, enclosed are two brochures with further information on the two projects for your reference. Please feel free to contact us if you would like to discuss anything further.

Following PIC #2, a Transportation Environmental Study Report (TESR) will be prepared for this study and made available for public review at the completion of the study. Notification, advising of the TESR review period, will be published in local newspapers and mailed to those on the study mailing list.

If you would like to provide comments, require further information regarding this study, or have any accessibility requirements in order to participate in this study, please feel free to contact the undersigned, as also noted above, at 905-390-2030 or <a href="mailto:Fred.Leech@aecom.com">Fred.Leech@aecom.com</a>.

Comments are being collected to assist MTO in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

Thank you for your cooperation and assistance.

Yours truly, AECOM

Fred Leech

Senior Environmental Planner

Cc. T. White - Ministry of Transportation Project Manager

E. Pipe - Ministry of Transportation Environmental Planner

T. Sorochinsky - AECOM Project Manager

M. Weldon - AECOM Deputy Project Manager
S. Schmied - AECOM Environmental Planner

#### Enclosed:

- Notice of Public Information Centre #2
- Plan of Potential Property Impacts
- Highway 401 Interchange Improvements at County Road 41, G.W.P. 4459-04-00 Brochure
- Highway 401 Interchange Improvements at Palace Road, G.W.P. 4197-13-00 Brochure

#### **Proposed Mitigation Measures**

Proposed mitigation measures and recommendations for further work include but are not limited to the following:

- Potential interim lane and road closures during construction will be confirmed and notification will be provided to Emergency Services, and adjacent property and business owners.
- To protect wildlife and wildlife habitat, vegetation removals will not take place during the Migratory Breeding Bird timing window between April 15 and August 15 of any year, trees and shrubs will be maintained where possible, and disturbed areas will be restored with seeding, sodding and landscaping.
- Additional Species at Risk surveys will be undertaken in Detail Design prior to construction.
- To protect fish and fish habitat, work at Sucker Creek will not take place between March 16 and July 14 of any year during the warmwater fisheries timing window.
- Standard noise mitigation measures and municipal noise control by-law requirements will be used during construction.

### How to Contact the Project Team

Tina White Project Manager

Ontario Ministry of Transportation
Eastern Region
1355 John Counter Blvd.,
Postal Bag 4000
Kingston, ON K7L 5A3
Tel: 613-545-4871
Toll Free: 1-800-267-0295

Toll Free: 1-800-267-0295 Email: tina.white@ontario.ca

#### Tim Sorochinsky, P.Eng. Project Manager AECOM

4th Floor, 30 Leek Crescent Richmond Hill, ON L4B 4N4 Tel: 905-882-3522

Fax: 905-882-4399 Email: tim.sorochinsky@aecom.com

# Highway 401 Interchange Improvements at County Road 41

Class Environmental Assessment and Preliminary Design Study

#### November 2017

Ontario Ministry of Transportation G.W.P. 4459-04-00





#### **Next Steps**

- Review and respond to comments received regarding this brochure and make revisions where appropriate to finalize the preliminary design plans.
- Finalize mitigation measures to minimize or avoid potential environmental effects.
- Prepare and file the Transportation
   Environmental Study Report for public and agency review and seek Environmental Assessment clearance.
- Detail Design and Construction to be completed as a future / separate study.

#### **Your Comments**

The Project Team welcomes feedback regarding the recommended plan. Please contact one of the contacts listed above by **December 21, 2017** if you have any questions or comments.

Comments are being collected to provide and obtain information, and to identify concerns in accordance with the *Environmental Assessment Act*. This material will be maintained on file for use during the Project and may be included in study documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

You are encouraged to contact the Project Team members listed above regarding any project-related questions or concerns, including any accessibility requirements you may have in order to participate in this study.



**A**ECOM

#### **Highway 401 and County Road 41 Interchange Improvements**

#### Introduction

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment (EA) Study for improvements to the Highway 401 and County Road 41 interchange, located in the Town of Greater Napanee within the County of Lennox and Addington.

This study is following the approved planning process for a Group 'B' project under the MTO's Class EA for Provincial Transportation Facilities (2000).

#### The Study

- In 2001, MTO completed a Preliminary Design Study to determine short-, mid- and long-term improvements to this interchange, which recommended a full Parclo A4 interchange configuration.
- In 2004, a new westbound off-ramp at County Road 41 was constructed and widening of Sucker / Selby Creek to the north was completed as per recommendations from the 2001 study.
- In early 2016, this study was initiated to review the structural requirements of the interchange, identify interim and long-term improvements to address geometric and operational concerns, and to develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.
- Upon completion of this study, a
   Transportation Environmental Study Report
   (TESR) will be prepared to document the
   recommended plan, potential impacts, and
   recommended mitigation measures to
   minimize impacts. The TESR will be made
   available for a 30-day public review period
   at public review locations in close proximity
   to the study area. A Notice of TESR review
   opportunities will be provided.

#### Study Process

**Planning** 

#### **Preliminary Design**

- Generate and Assess Alternatives (PIC #1: July 2016)
- Evaluate and Select Preferred Alternative
- Develop Preferred Alternative (PIC #2: November 2017)
- Notice of Study Completion and TESR Submission

Detail Design and Construction

Major rehabilitation of the Highway 401 / County Road 41 and Sucker Creek bridges is anticipated to be needed within five years (in addition to minor rehabilitation works currently in progress). Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway.

#### **Generation and Evaluation of Preliminary Design Alternatives**

A "long-List" evaluation of alternatives was presented at Public Information Centre (PIC) #1, which led to the identification of a "short-list" of alternatives for the north and south sides of the interchange.

A weighted-score arithmetic evaluation system was used to compare the short-list of alternatives using the following criteria:

- Transportation (e.g. interchange operations, safety, geometrics; construction staging impacts);
- Environmental (e.g. natural, socio-economic, and cultural); and
- Cost (e.g. capital and life cycle cost, utility impacts).

Out of five north side alternatives and five south side alternatives, Alternatives North (N)-1 (Parclo A2) and South (S)-1 (Parclo A2) were selected as the Technically Preferred Preliminary Design Alternatives.

#### TECHNICALLY PREFERRED PRELIMINARY DESIGN ALTERNATIVE



#### **Evaluation Summary**

- Alternatives N-1 and S-1 have the most desirable configurations from a Transportation perspective.
- These alternatives have the highest construction cost and slightly greater environmental impacts on the south side; however, the short and longterm operational and safety benefits of these configurations are considered to outweigh these impacts.

#### Construction Staging and Sequencing

- The short-term construction works at the interchange will include major bridge rehabilitation of the County Road 41 and Sucker Creek bridges. In conjunction with the bridge works, the interchange will be upgraded to the ultimate "Parclo A4" configuration identified as the preferred alternative.
- The long-term recommendations for the interchange include replacement of the Highway 401 / County Road 41 and Sucker Creek bridges.
- Advance notification / signage ramp or lane closures will be provided.
   Potential closures required to complete the construction activities include:
  - Occasional night-time and/or weekend ramp closures and lane closures along Highway 401; and,
- Reduction to a single lane in either direction along County Road 41 to rehabilitate the underside of the bridge.
- The staging strategy will be confirmed during a future Detail Design assignment in advance of the short-term construction, and notification will be provided to adjacent property and business owners at that time.

Highway 401 Interchange Improvements at County Road 41Error! Reference source not found.

#### **APPENDIX B**

#### **Copies of PIC Displays**



### Welcome to the Public Information Centre #2 for the

## Highway 401 Interchange Improvements at County Road 41

Class Environmental Assessment and Preliminary Design Study G.W.P. 4459-04-00

November 22, 2017

Please Sign In Here





## Purpose of Public Information Centre #2

### The purpose of this Public Information Centre (PIC) is to present and receive feedback on:

- Study Background, Purpose and Scope
- Summary of Public Information Centre #1 (held July 2016)
- Assessment and Evaluation of Preliminary Design Alternatives
- Preliminary Design of the Technically Preferred Alternative
- Potential Mitigation Strategies to Minimize Environmental / Community Impacts
- Next Steps

Your input on each of these and other study issues is important to us!





# Study Area, Purpose and Scope

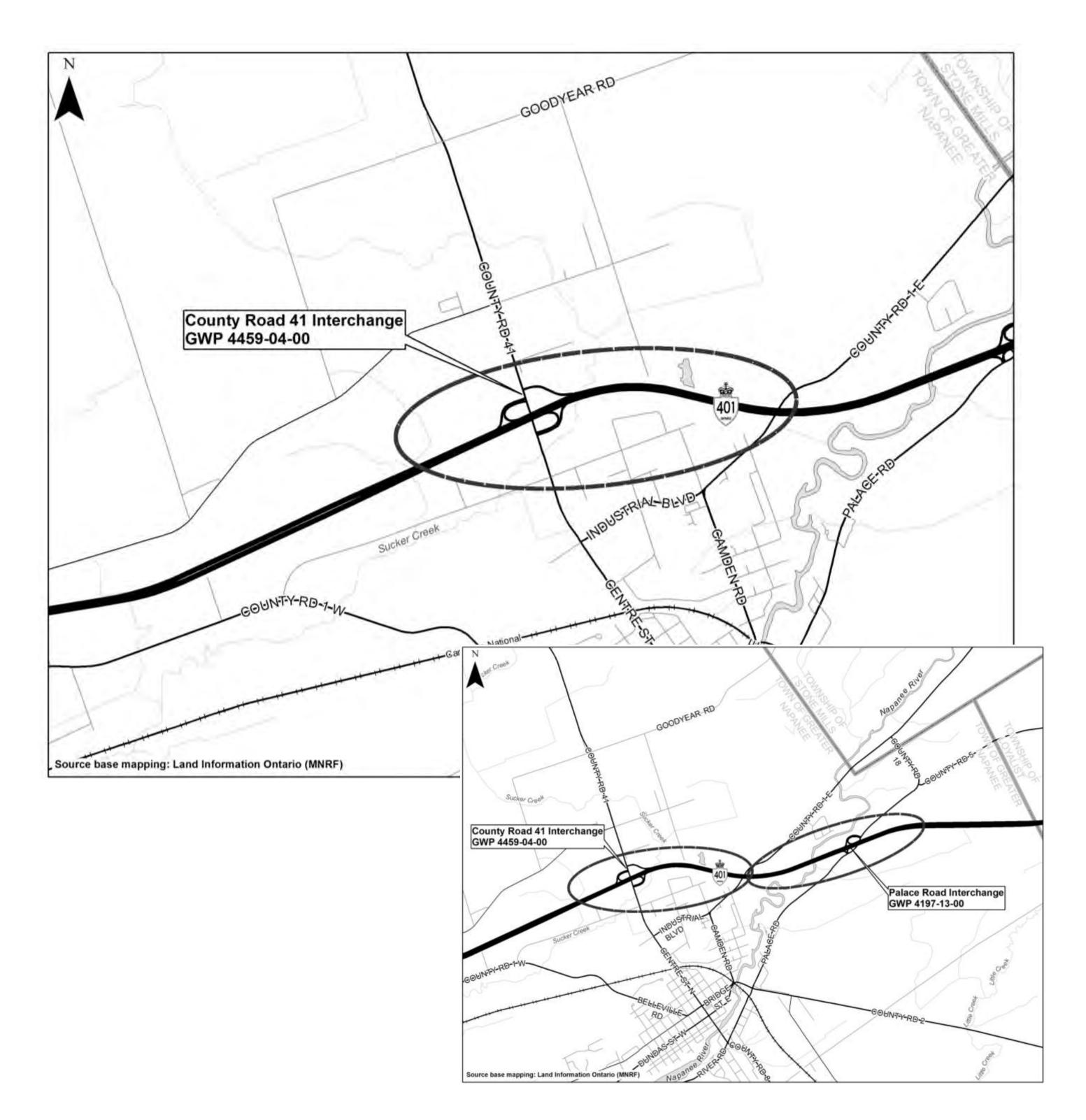
The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 / County Road 41 interchange.

The primary focus of this study is to:

- Review the **structural requirements** (e.g. major rehabilitation or replacement) at this interchange;
- Identify interim and long-term interchange improvements to address geometric and operational concerns;
- Develop a **preliminary design** including a **staging plan** to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.

Concurrently MTO is undertaking a separate Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 / Palace Road interchange.

Display material for the Highway 401 / Palace Road interchange study PIC are presented on the adjacent set of display boards.

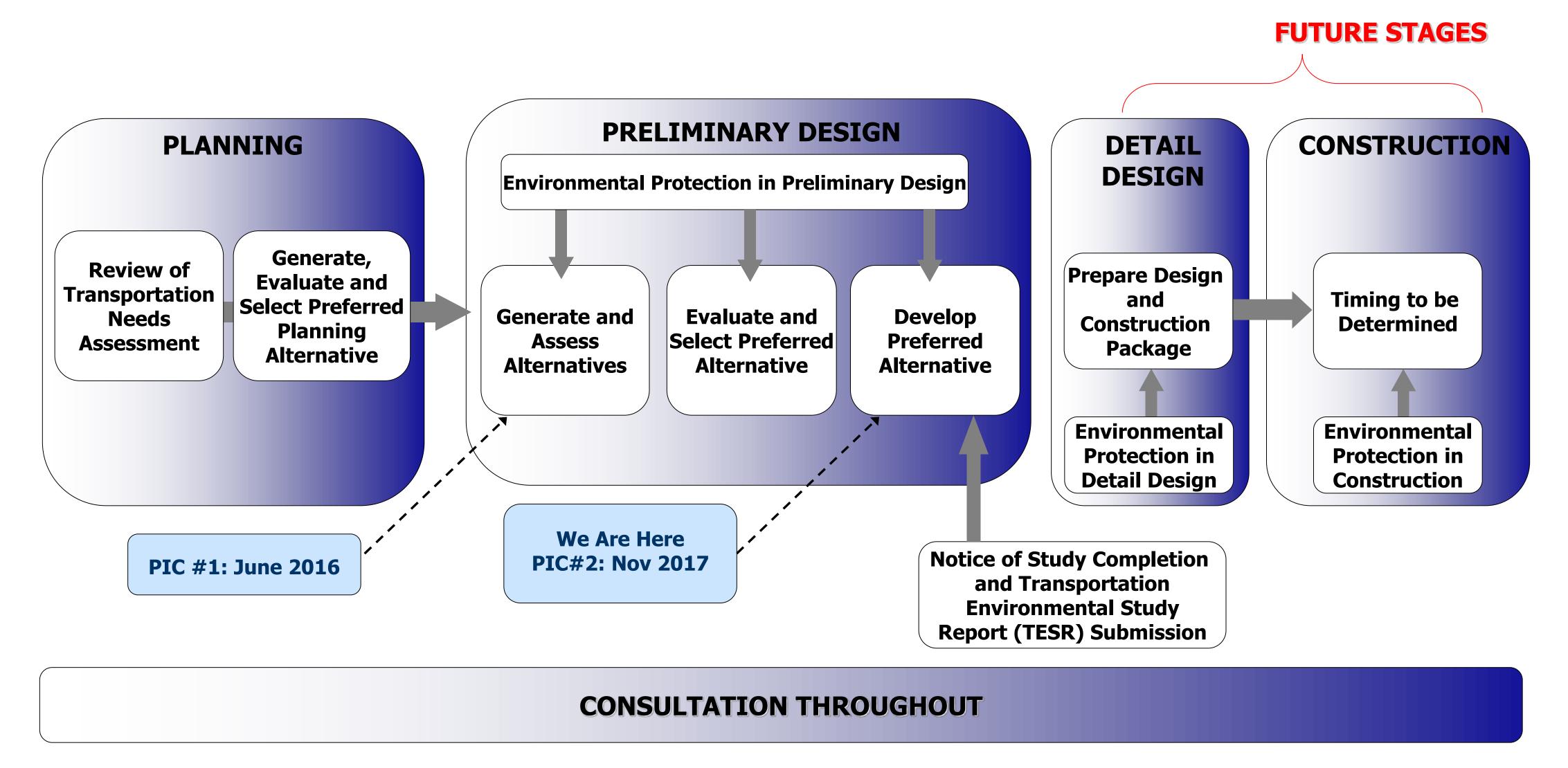








# Study Process



This study is following the requirements of a Group 'B' project under the MTO Class Environmental Assessment for Provincial Transportation Facilities (2000).

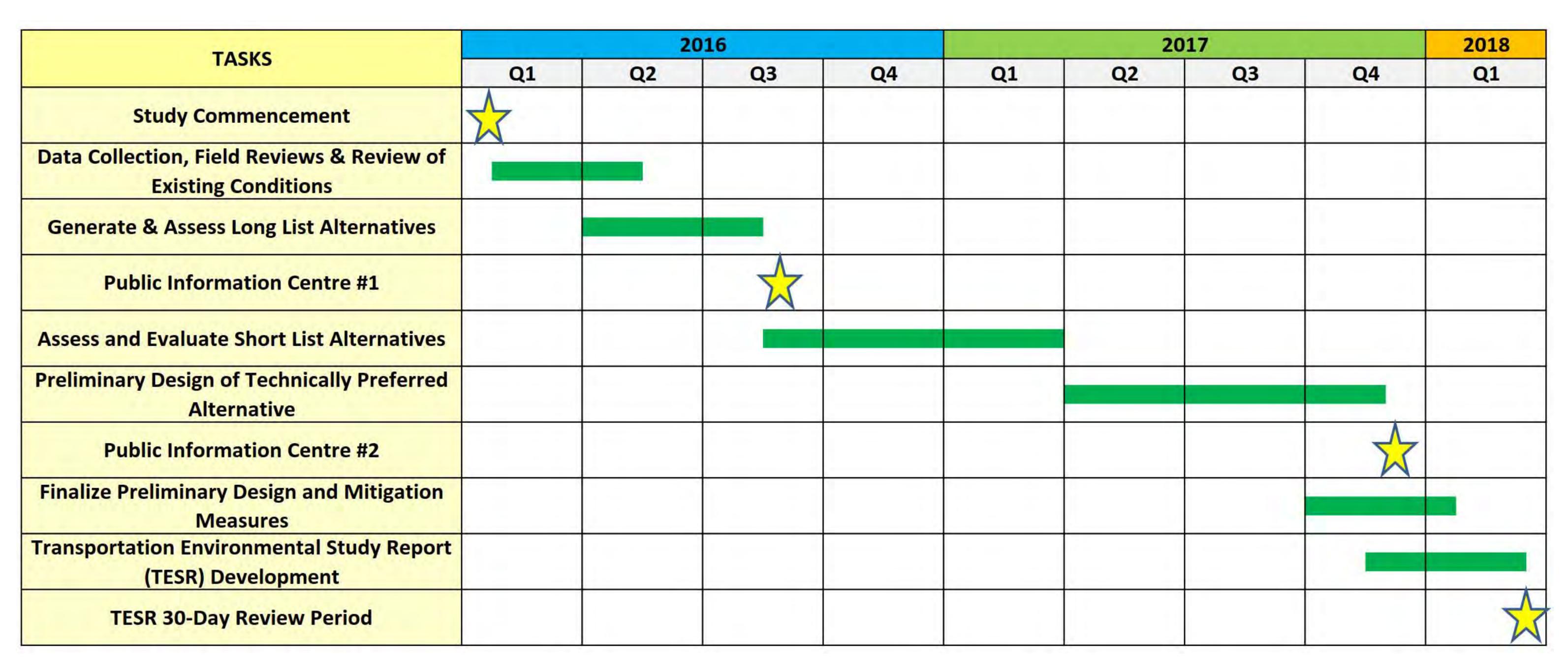
Stakeholder consultation is ongoing, including two rounds of PICs. PIC #2 has been arranged to present the evaluation of alternatives and the Technically Preferred Alternative.

A Transportation Environmental Study Report (TESR) will be prepared and made available for public and agency review for a period of 30 days at the completion of the study.





# Timing of Study Activities



Please note that the schedule is subject to change based on study findings and/or input received through consultation







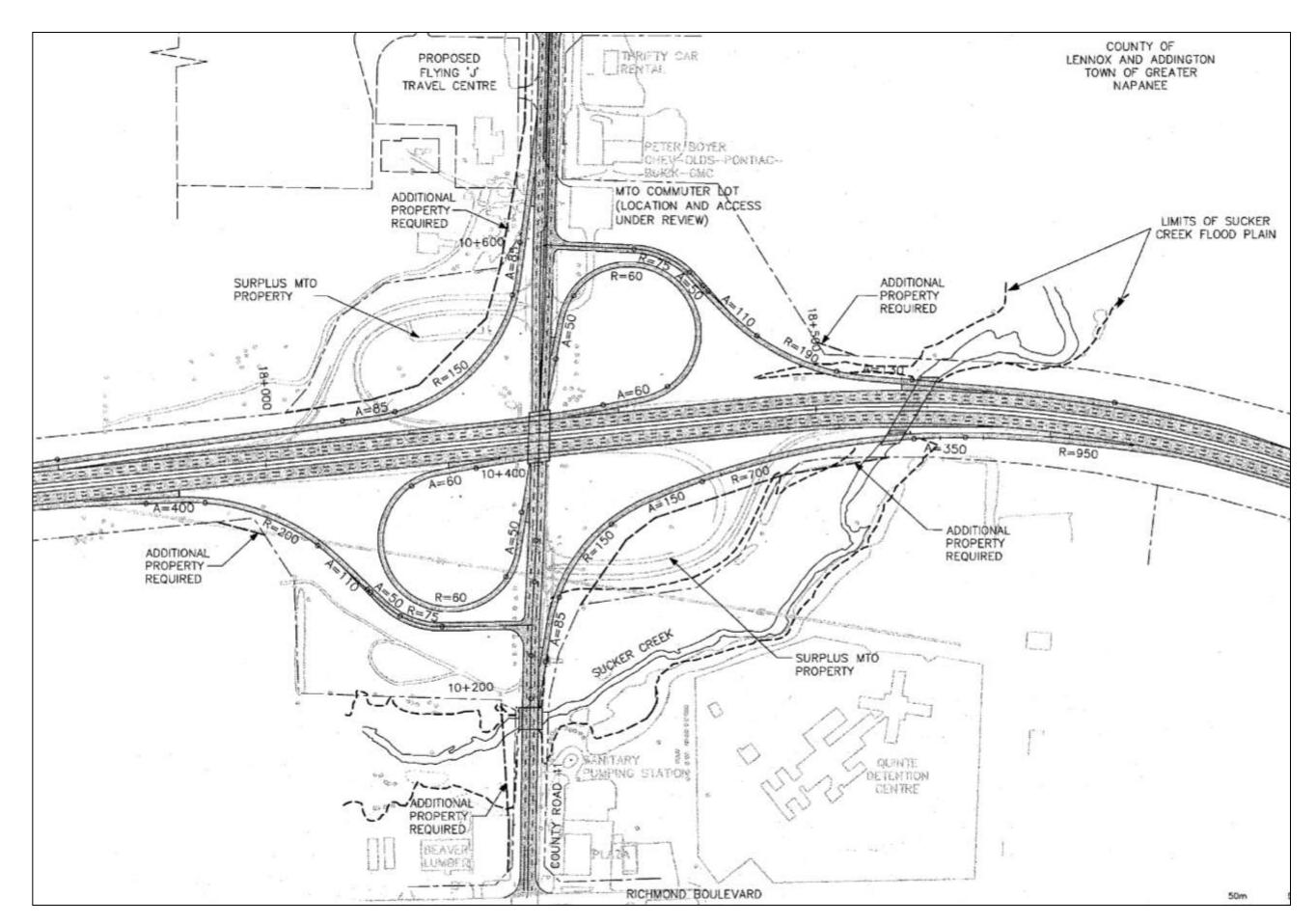
# Study Overview

In 2001 MTO completed a Preliminary Design Study to determine the short-term, mid-term and long-term improvements to this interchange which recommended upgrading the interchange to a full Parclo A4 interchange configuration (refer to adjacent plan).

In 2004, MTO completed the Detail Design and construction of a new westbound off-ramp at County Road 41 and widening of Sucker / Selby Creek to the north as per the recommendations from the 2001 study.

In the winter of 2016, the Class Environmental Assessment and Preliminary Design Study for this interchange was initiated. The first PIC for the Class EA Study was held in July 2016 and presented and sought input on:

- Study background and process
- Existing conditions (environmental, infrastructure, safety and operations)
- Identification and screening assessment for long list alternatives
- Proposed evaluation approach and criteria for short list alternatives



Previously Recommended Plan for County Road 41 Interchange from 2001 Study (full Parclo A4 Interchange Configuration)

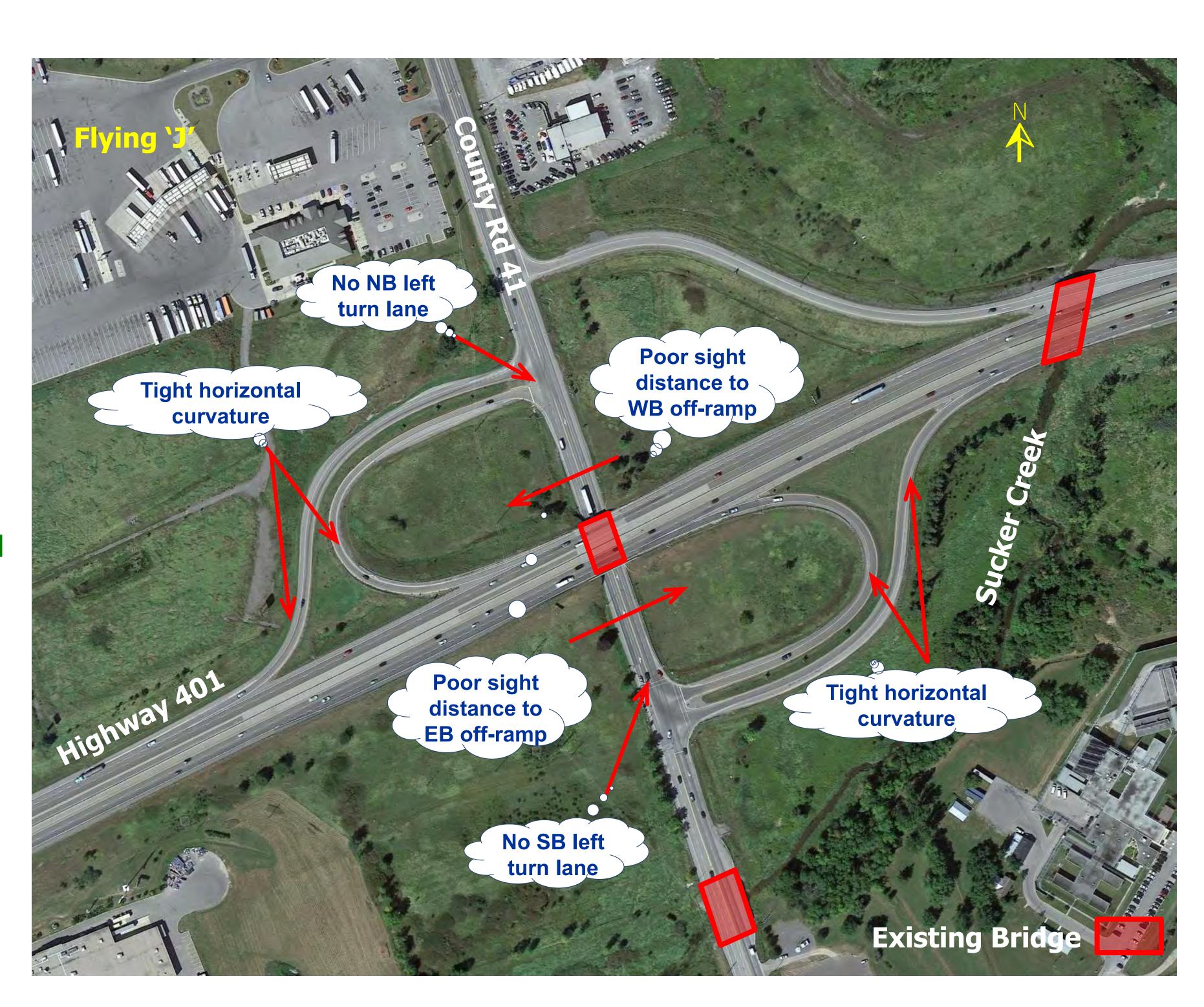
Note: MTO is currently undertaking a minor rehabilitation of the Highway 401 / County Road 41 and Sucker Creek bridges, which includes rehabilitation of the underside of the bridges only (i.e. excludes work to top portions of the bridges along Highway 401). Major rehabilitation requirements including construction staging along Highway 401 are being confirmed as part of the current study.





# Summary of Problems and Opportunities

- Major rehabilitation of the Hwy 401 CR41 and Sucker Creek bridges is anticipated to be needed within 5 years (in addition to the minor rehabilitation works currently in progress);
- Development of an ultimate plan for the interchange is needed to allow the structural work to be staged in a cost effective and efficient manner, minimizing future throwaway.
- Potential issues affecting the structural staging works include:
  - Existing speed change lanes require removal from County Road 41 and Sucker Creek bridges to complete rehabilitation work and maintain two Highway 401 lanes in each direction;
  - Long duration ramp closures are not recommended due to traffic impacts to Town of Greater Napanee;
  - Existing Highway 401 median cannot accommodate traffic during construction without major work due to existing crossfall, pavement condition and median stormsewer.
- A number of undesirable geometric elements impacting safety and operations are present (illustrated on adjacent plan).







# Generation and Evaluation of Preliminary Design Alternatives

The following process has been followed to select the Technically Preferred Preliminary Design Alternative:

- 1. Identify existing "Problems" (e.g. structural requirements and associated construction staging needs, interchange geometric deficiencies) and "Opportunities" to address identified problems (e.g. development of staging approach);
- 2. Develop and assess "Long-List" of interchange alternatives to reflect ultimate interchange configuration(s), based on factors such as Traffic Operations, Construction Staging Impacts, Geometrics, Cost, and Environmental Impacts.
- 3. Evaluate the remaining "short-list" of interchange alternatives, utilizing an arithmetic evaluation approach and the following criteria:
  - Transportation (e.g. interchange operations, safety and geometrics, construction staging impacts);
  - Environmental (e.g. Natural, Socio-Economic and Cultural);
  - Cost (e.g. capital and life cycle cost, utility impacts);

## Alternatives were developed and assessed separately for the north and south sides of the interchange:

- The long list evaluation was presented at PIC #1 which led to the identification of a short list of alternatives;
- Following PIC #1, the short list alternatives were evaluated utilizing an arithmetic evaluation as discussed on the following slides.









## Highway 401 Interchange Improvements at County Road 41

## Overview of Short List Evaluation

A weighted-score arithmetic evaluation system was used to compare the **short list** of alternatives. This evaluation methodology involved assigning relative weightings to each of the evaluation categories and criteria based on their level of importance.

Impacts were measured either quantitatively or qualitatively, and then these scores were multiplied by a relative weight for that indicator. The weighted scores for each indicator were then summed to arrive at a total score for each alternative. The alternative that produced the highest total weighted score is preferred as it results in the best balance of benefits and impacts to the natural, socio-economic and cultural environments, as well as transportation and cost considerations.

The table to the right identifies the categories and criteria that were used to evaluate the short list of alternatives.

## **Evaluation Categories and Criteria**

#### **TRANSPORTATION**

- Interchange Operations
- Safety and Geometrics

#### **ENVIRONMENTAL**

- Natural Environment
  - Fish and Fish Habitat
  - Terrestrial Ecosystems
  - Groundwater
- Socio-Economic Environment
  - Noise
  - Air Quality
  - Community Effects
  - Waste and Contamination
- Cultural Environment
  - Archaeological Resources
  - Built Heritage Features and Cultural Heritage Landscapes

#### COST

- Capital Cost
- **Utility Impacts**

The detailed short-list evaluation is available at the reference table.

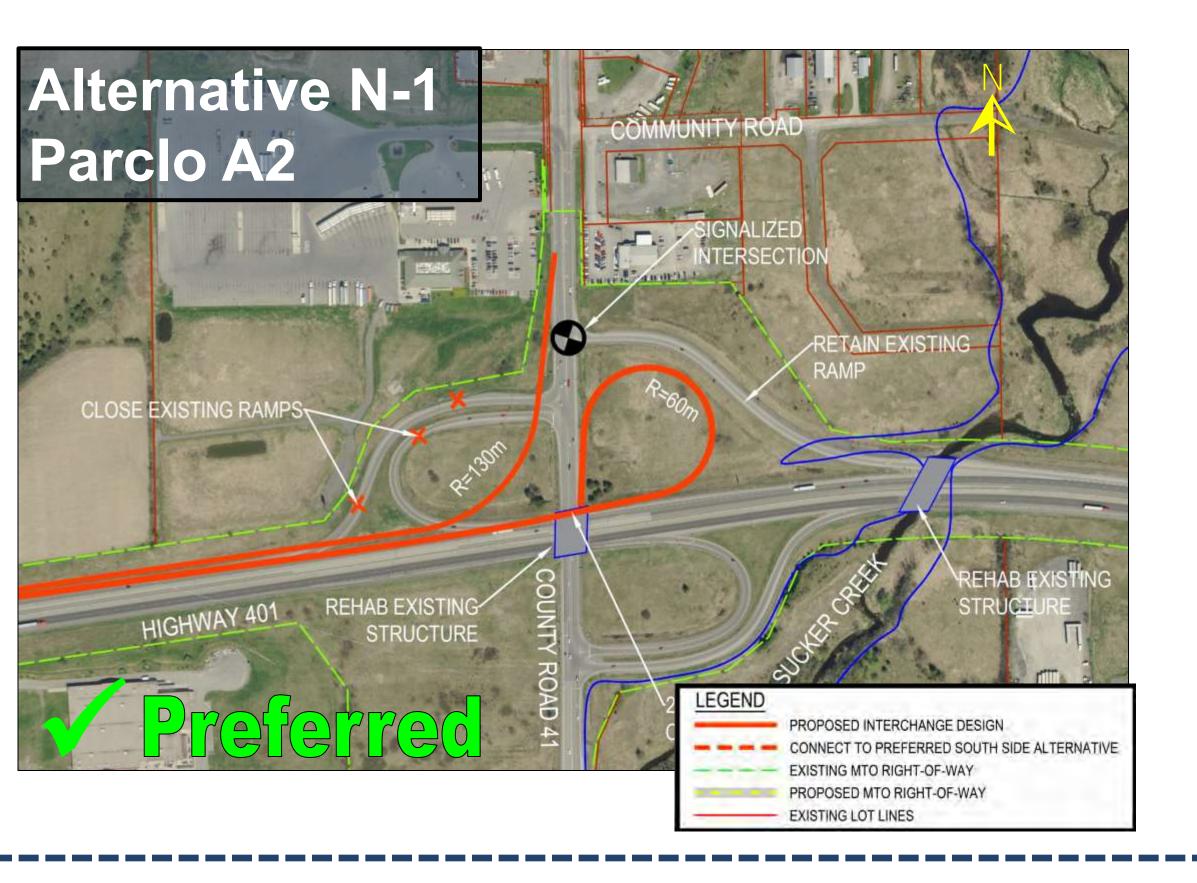






## Highway 401 Interchange Improvements at County Road 41

# Short-List Alternatives (North Side)

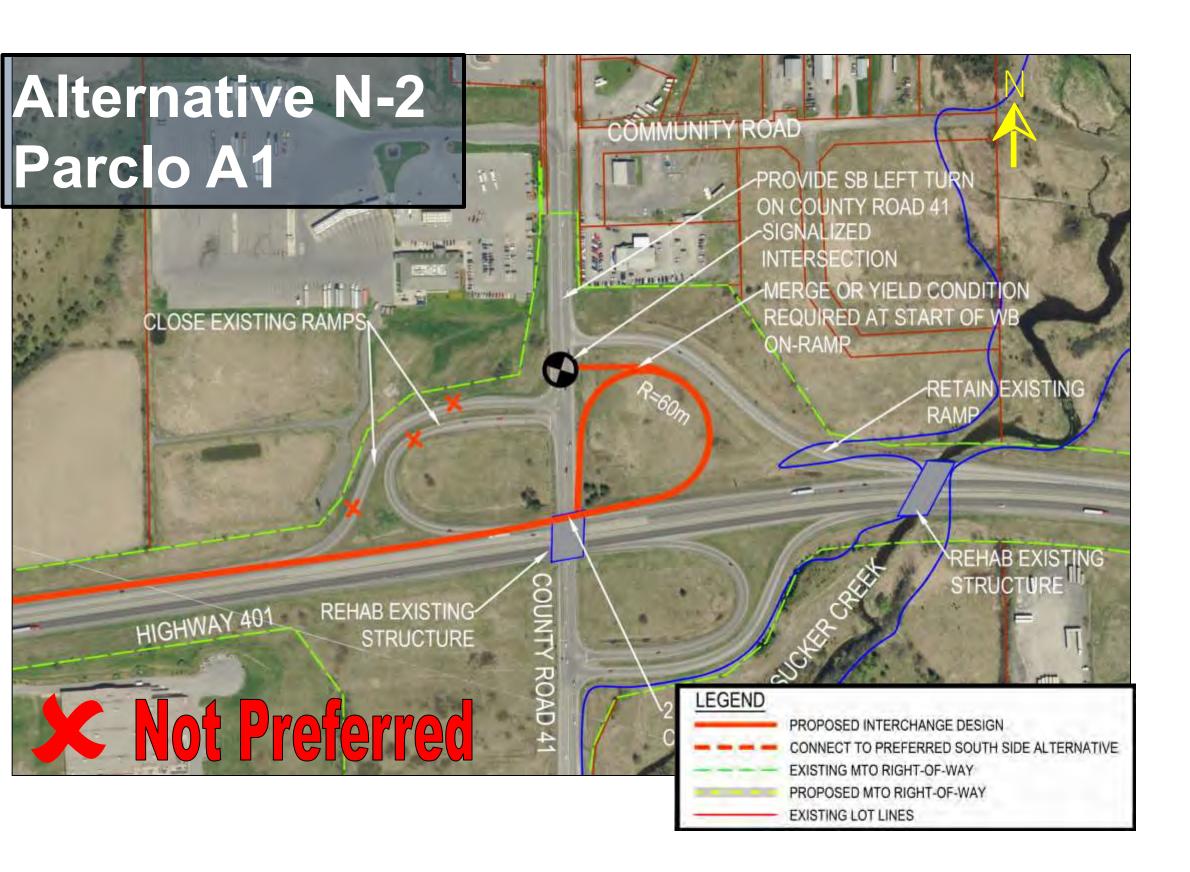


## Alt N-1: Pros

- Provides most desirable overall interchange operations and geometrics (no left-turns required);
- Preferred or equally preferred from natural, socio-economic and cultural environments;

## Alt N-1: Cons

Highest construction cost

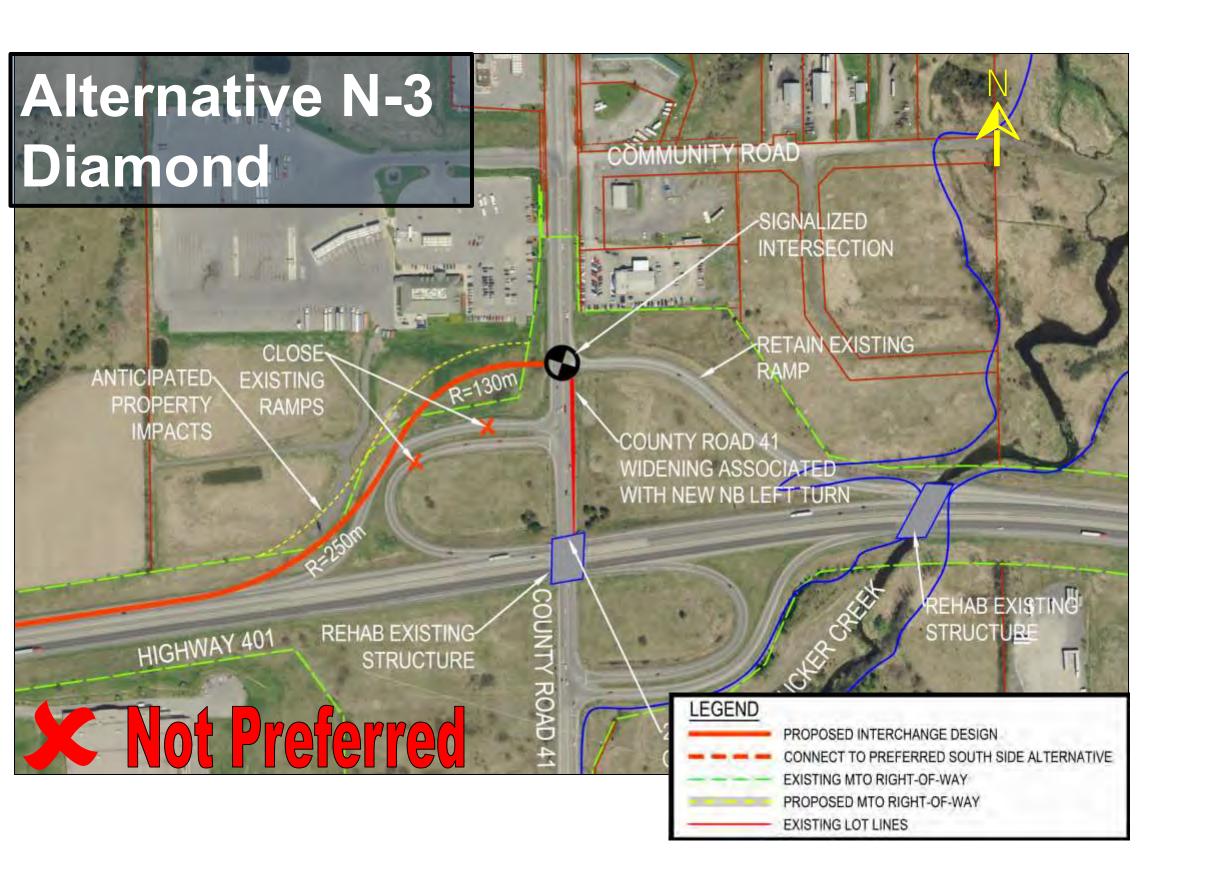


## Alt N-2: Pros

- Preferred or equally preferred from natural, socio-economic and cultural environments;
- Lowest construction cost

## Alt N-2: Cons

 Southbound left-turn required to access Hwy 401 (less desirable interchange operations, potential weaving concern between Flying 'J' and southbound leftturn, increased collision risk)



## Alt N-3: Pros

- Preferred or equally preferred from natural and cultural environments;
- Lowest construction cost

## Alt N-3: Cons

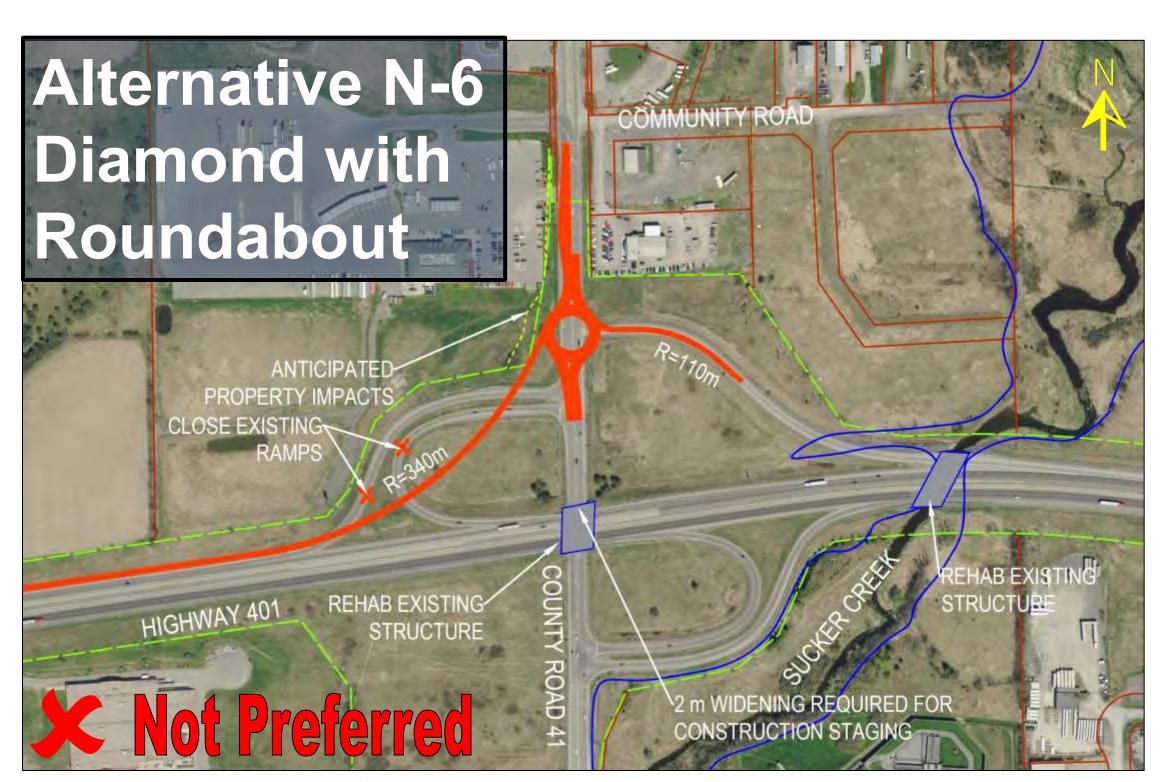
- Northbound left-turn required to access Hwy 401 (less desirable interchange operations and increased collision risk);
- Property requirement from commercial property in northwest quadrant of interchange





# Short-List Alternatives (North Side – continued)



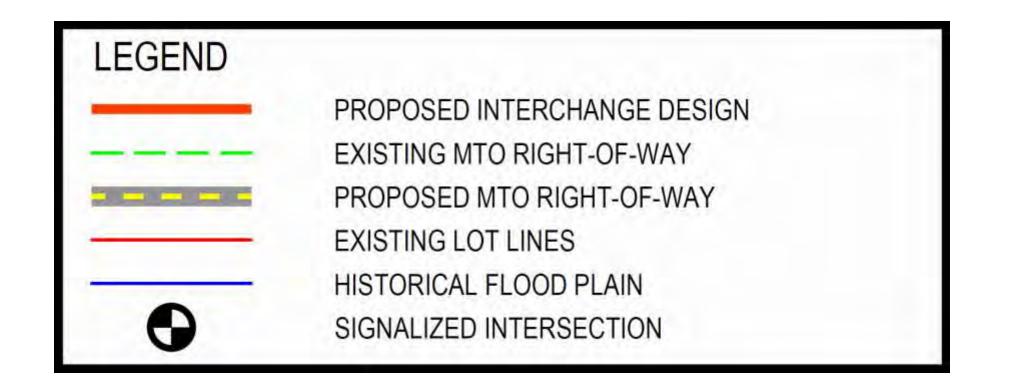


## Alt N-5 and N-6: Pros

Preferred or equally preferred from natural and cultural environments;

## Alt N-5 and N-6: Cons

- Roundabout adjacent to signalized intersection at Community Road not desirable (due to unequal distribution of incoming traffic from traffic signals);
- Greater disruption to County Road 41 traffic during construction;
- Left-turn maneuver required through roundabout less desirable for large trucks (Long Combination Vehicles)
- Greater impacts to existing utilities and higher construction cost than other alternatives
- Roundabouts slightly less desirable than signalized intersections for pedestrians and cyclist safety
- Minor property requirement from commercial property in northwest quadrant of interchange (Alt N-6)









# Short-List Alternatives (North Side)

Factor	Alternative N-1 Parclo A2	Alternative N-1   Alternative N-2   Alternative N-3   Parcle A1   Diamond		Alternative N-4 Parclo A1 with Roundabout	Alternative N-5 Diamond with Roundabout
Transportation					
Natural Environment					
Socio-Economic Environment					
Cultural Environment					
Cost					
Recommendation		<b>X</b>		*	

		Lege	nd		
Highest Category Weighting			•	•	Lowest Category Weighting
Most Preferred Alternative	•	•	0	0	Least Preferred Alternative

- Alt N-1 has a higher cost than the other alternatives, similar construction staging and utility impacts and is
  preferred or equally preferred with the other alternatives from a natural, socio-economical and cultural
  environment perspective.
- However, Alt N-1 is the preferred alternative from a transportation perspective, with no left-turns required (directional movements provided for all maneuvers) and the most desirable interchange operations.
- As such, Alt N-1 (Parclo A2) is the preferred north side interchange alternative.

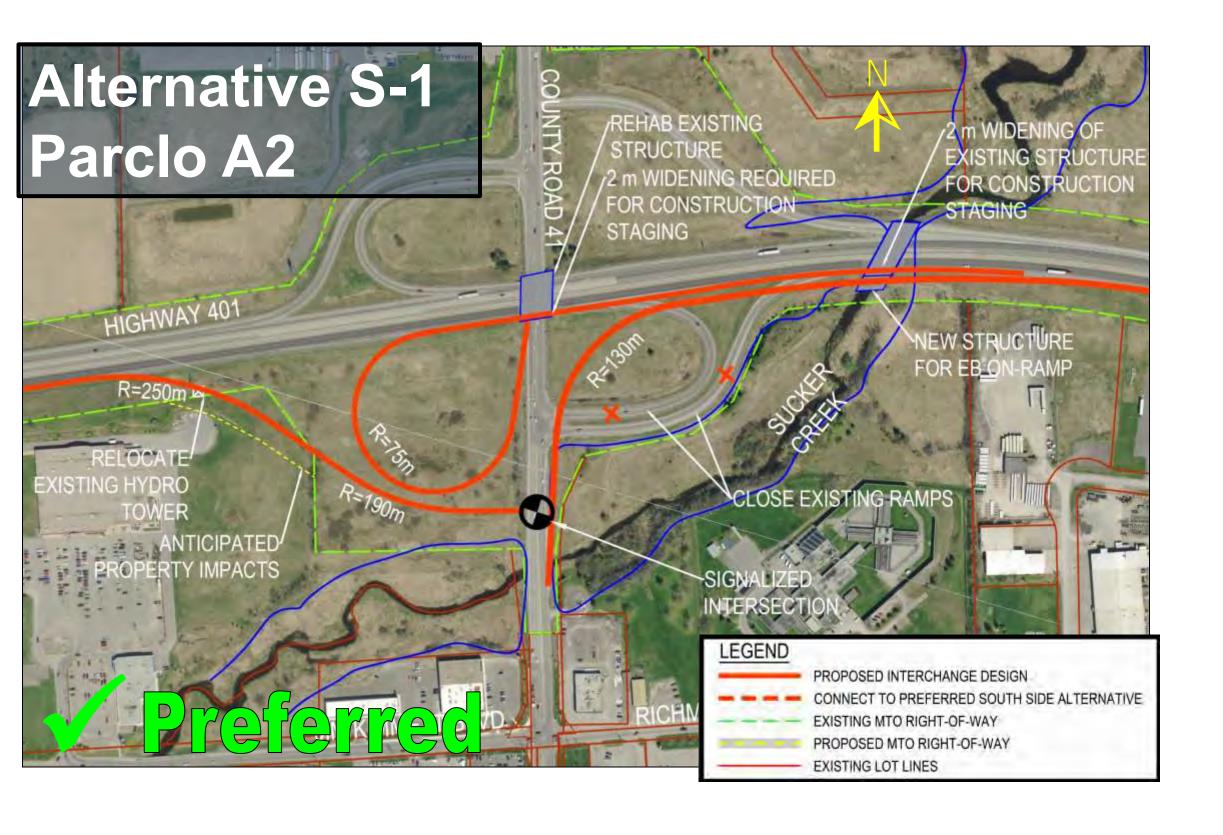






## Highway 401 Interchange Improvements at County Road 41

# **Short-List Alternatives (South Side)**

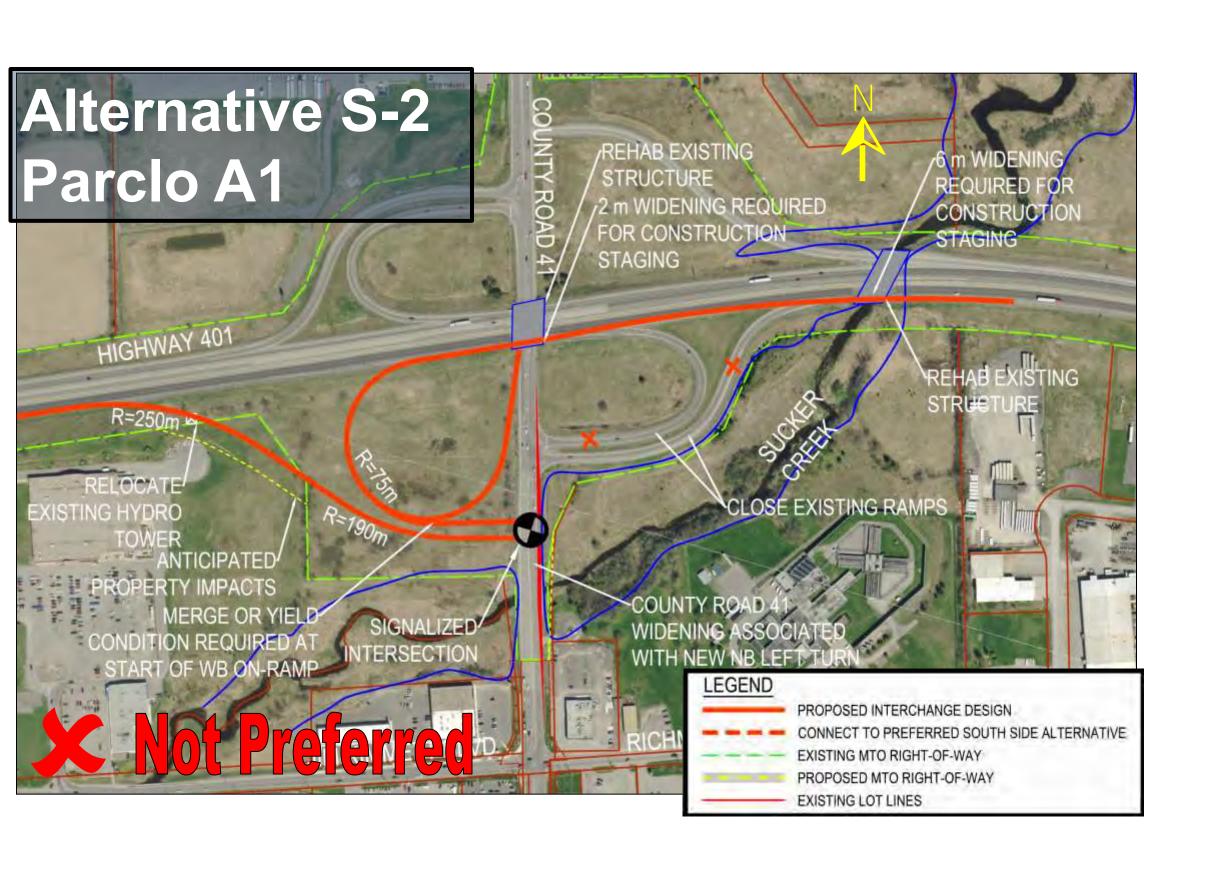


### Alt S-1: Pros

- Provides most desirable overall interchange operations and geometrics (no left-turns required);
- Preferred or equally preferred from natural, socio-economic and cultural environments;

### Alt S-1: Cons

- New or widened bridge required over Sucker Creek (increased environmental impacts)
- Minor property requirement from commercial property in southwest quadrant of interchange
- Highest construction cost

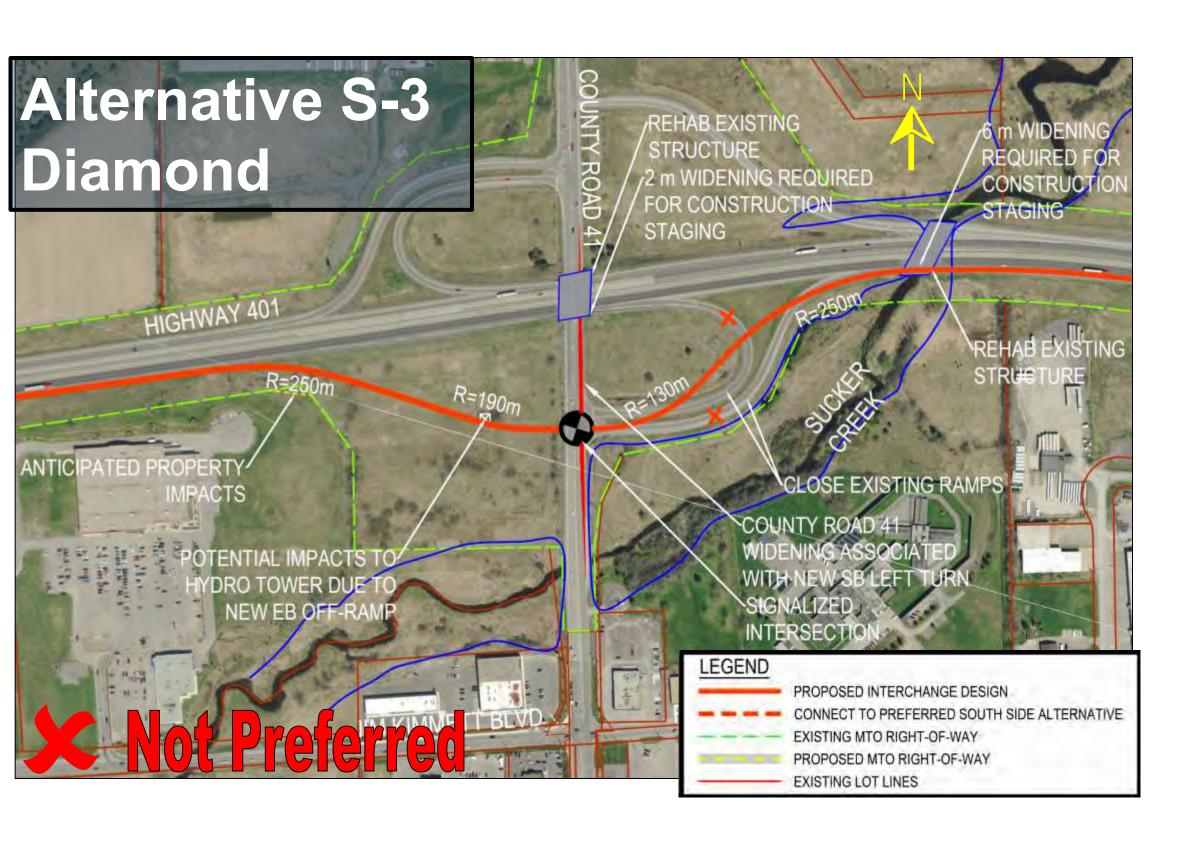


### Alt S-2: Pros

- Preferred or equally preferred from natural and cultural environments;
- Lowest construction cost

### Alt S-2: Cons

- Northbound left-turn required to access Hwy 401 (less desirable interchange operations, increased collision risk)
- Minor property requirement from commercial property in southwest quadrant of interchange



### Alt S-3: Pros

- Preferred or equally preferred from natural, socio-economic and cultural environments;
- Lowest construction cost

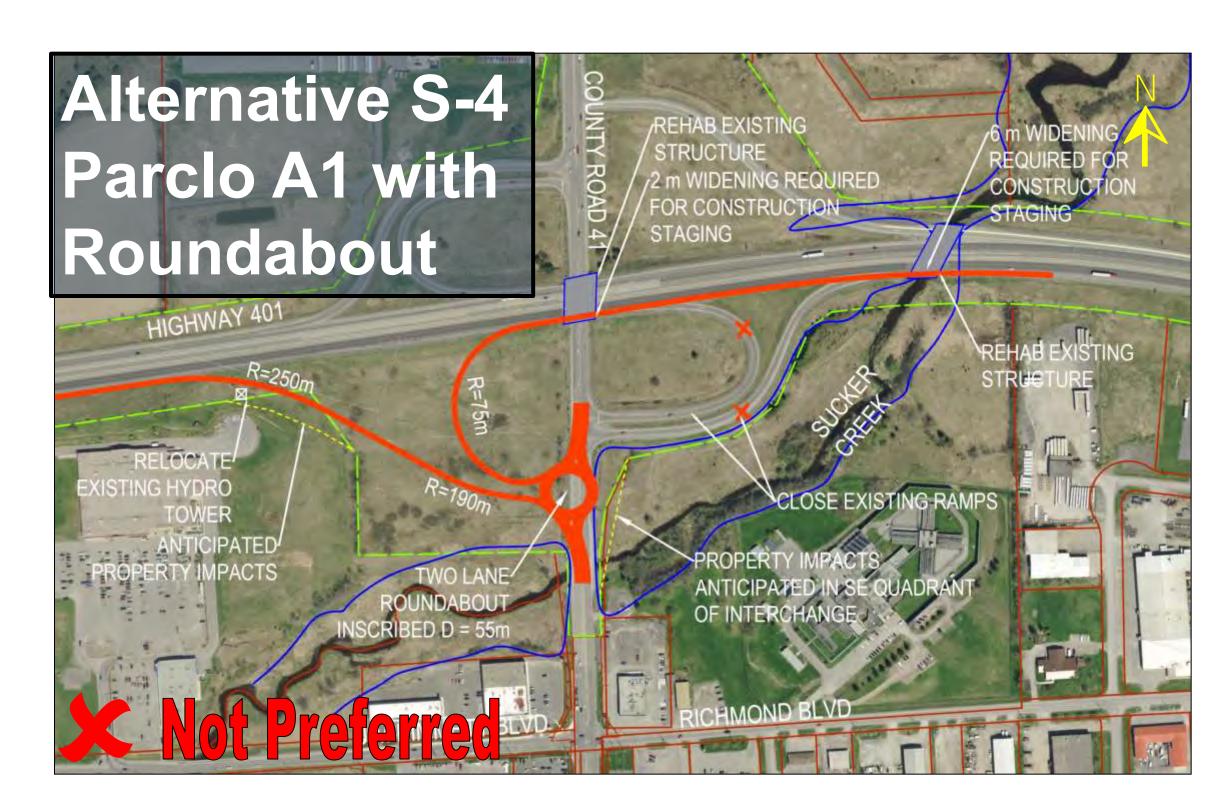
### Alt S-3: Cons

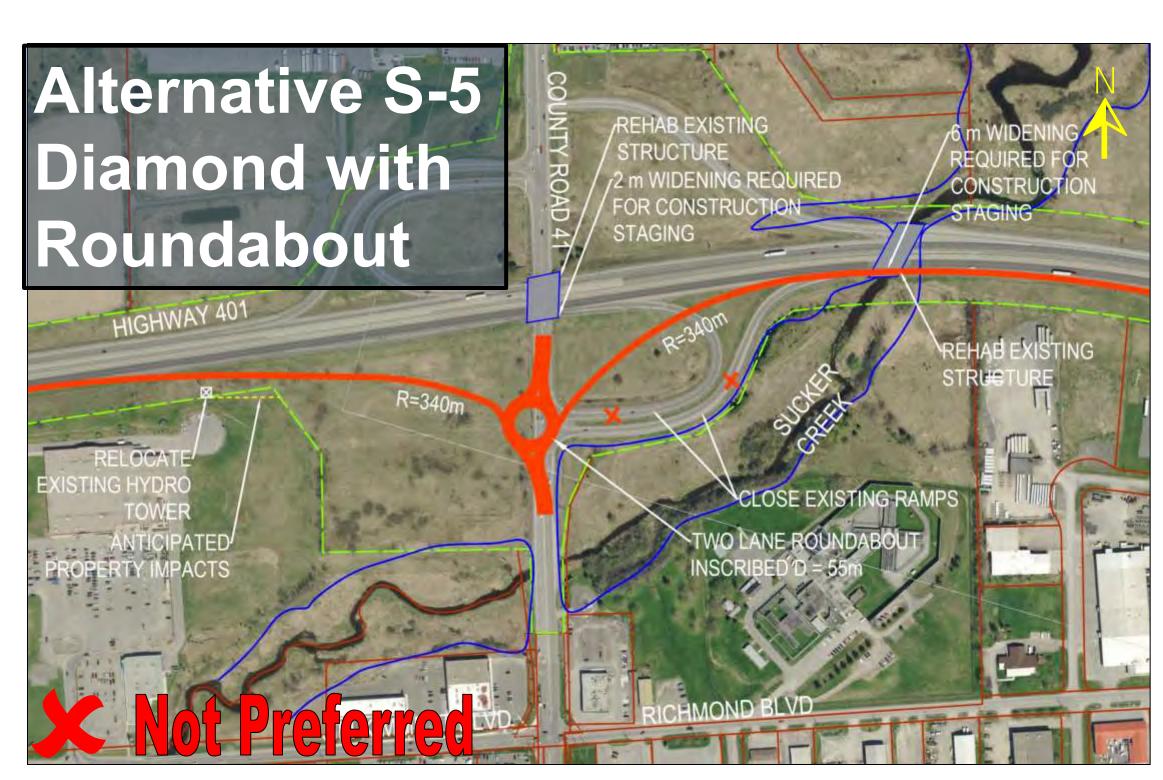
- Southbound left-turn required to access Hwy 401 (less desirable interchange operations and increased collision risk);
- Minor property requirement from commercial property in southwest quadrant of interchange





# Short-List Alternatives (South Side – continued)



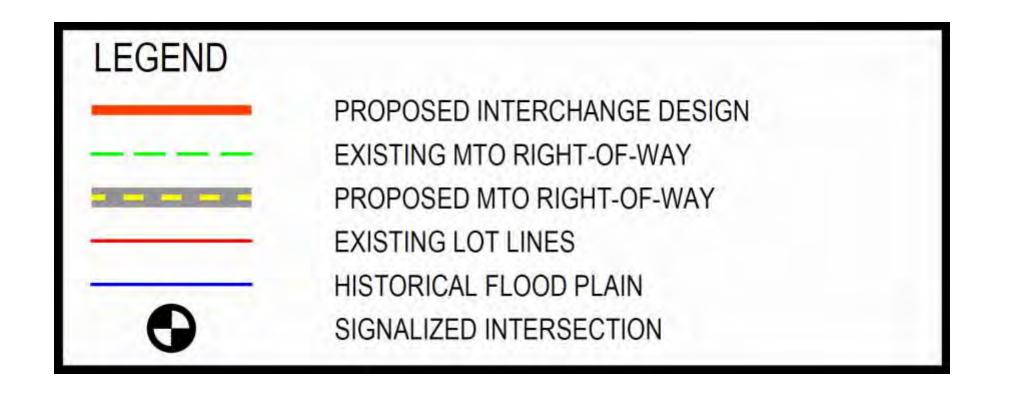


## Alt S-4 and S-5: Pros

Preferred or equally preferred from natural and cultural environments;

## Alt S-4 and S-5: Cons

- Roundabout adjacent to signalized intersection at Richmond Blvd not desirable (due to unequal distribution of incoming traffic from traffic signals);
- Greater disruption to County Road 41 traffic during construction;
- Left-turn maneuver required through roundabout less desirable for large trucks (Long Combination Vehicles)
- Greater impacts to existing utilities and higher construction cost than other alternatives
- Roundabouts slightly less desirable than signalized intersections for pedestrians and cyclist safety
- Minor property requirement from commercial property in southwest quadrant of interchange







# **Short-List Alternatives (South Side)**

Factor	Alternative S-1 Parclo A2	Alternative S-2 Parclo A1	Alternative S-3 Diamond	Alternative S-4 Parclo A1 with Roundabout	Alternative S-5 Diamond with Roundabout	
Transportation						
Natural Environment						
Socio-Economic Environment						
Cultural Environment						
Cost						
Recommendation		X	X	*	X	

		Lege	nd		
Highest Category Weighting			•	•	Lowest Category Weighting
Most Preferred Alternative	•	•	0	0	Least Preferred Alternative

- Alt S-1 requires a new or widened bridge over Sucker / Selby Creek, slightly increasing the natural and socioeconomic environment impacts.
- Alt S-1 is the preferred alternative from a transportation perspective, with no left-turns required (directional movements provided for all maneuvers) and the most desirable interchange operations;
- While Alt S-1 has a higher cost than the other alternatives and slightly greater impacts, the short and long-term operational and safety benefits of this configuration are considered to outweigh these impacts.
- As such, Alt S-1 (Parclo A2) is the preferred south side interchange alternative.





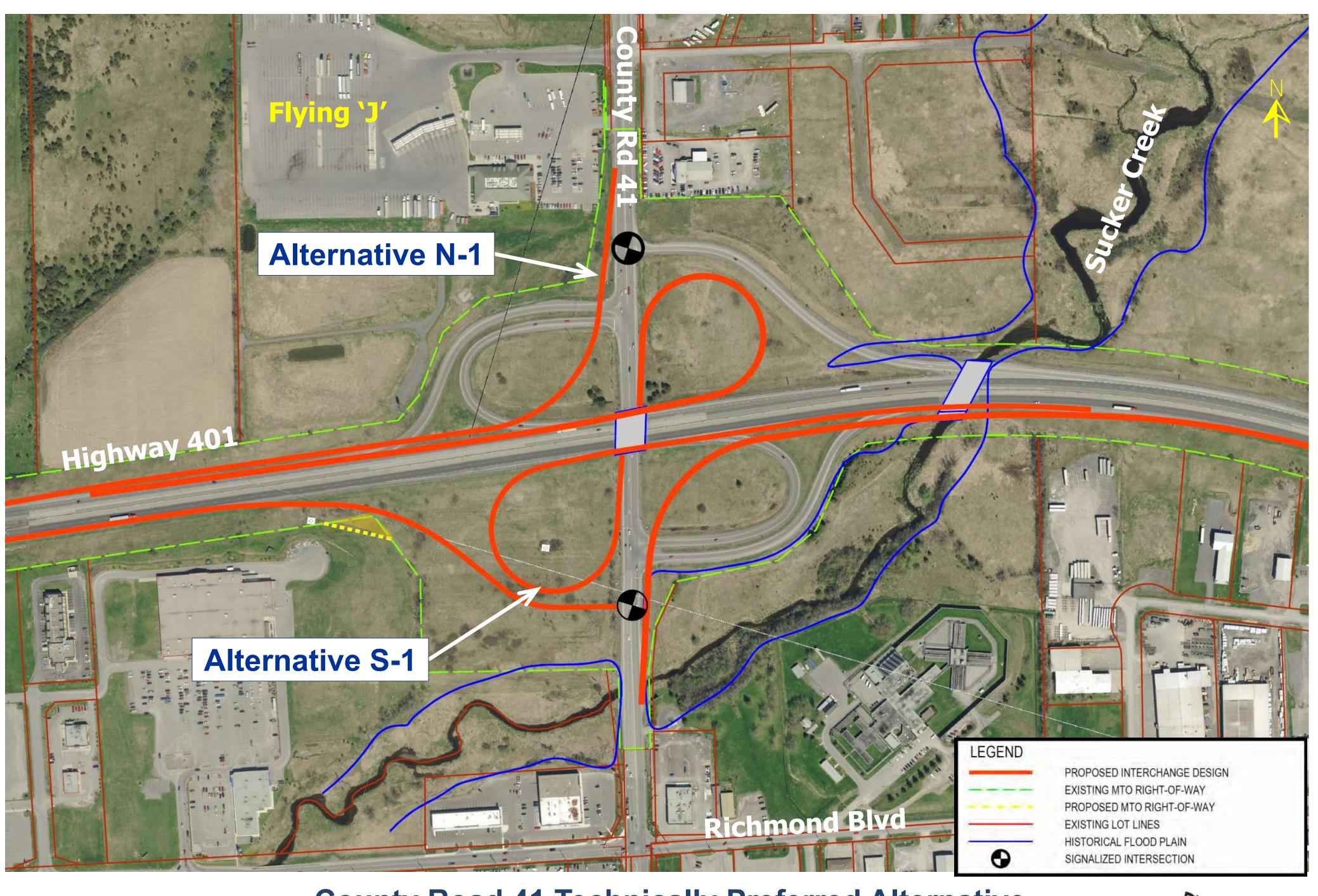


# Summary of Evaluation

Based on the evaluations of both the north and south sides, the **Technically Preferred Preliminary Design Alternatives** for the ultimate interchange are **Alternatives N-1 and S-1 (full Parclo A4)**:

- Most desirable configurations from a Transportation perspective with no left-turns required (directional movements for all maneuvers).
- Highest construction cost and slightly greater Environmental impacts on south side, however the short and long-term operational and safety benefits of these configurations are considered to outweigh these impacts.

Refer to the roll plans for additional details of the Technically Preferred Alternative.







# Construction Staging and Sequencing

• The **short-term** construction works at the interchange will include major bridge <u>rehabilitation</u> of the County Road 41 and Sucker Creek bridges. In conjunction with the bridge works, the interchange will be upgraded to the ultimate "Parclo A4" configuration identified as the preferred alternative.

- The **long-term** recommendations for the interchange include <u>replacement</u> of the Highway 401 / County Road 41 and Sucker Creek bridges.
- Advance notification/signage ramp or lane closures will be provided.
   Potential closures required to complete the construction activities include:
  - Occasional night-time and/or weekend ramp closures and lane closures along Highway 401.
  - Reduction to a single lane in either direction along County Rd 41 to rehabilitate the underside of the bridge.
- The staging strategy will be confirmed during a future Detail Design assignment in advance of the **short-term** construction, and notification will be provided to adjacent property and business owners at that time.
- A conceptual construction staging strategy has been developed to complete the short-term bridge rehabilitation and interchange works, and is summarized on the following slide.

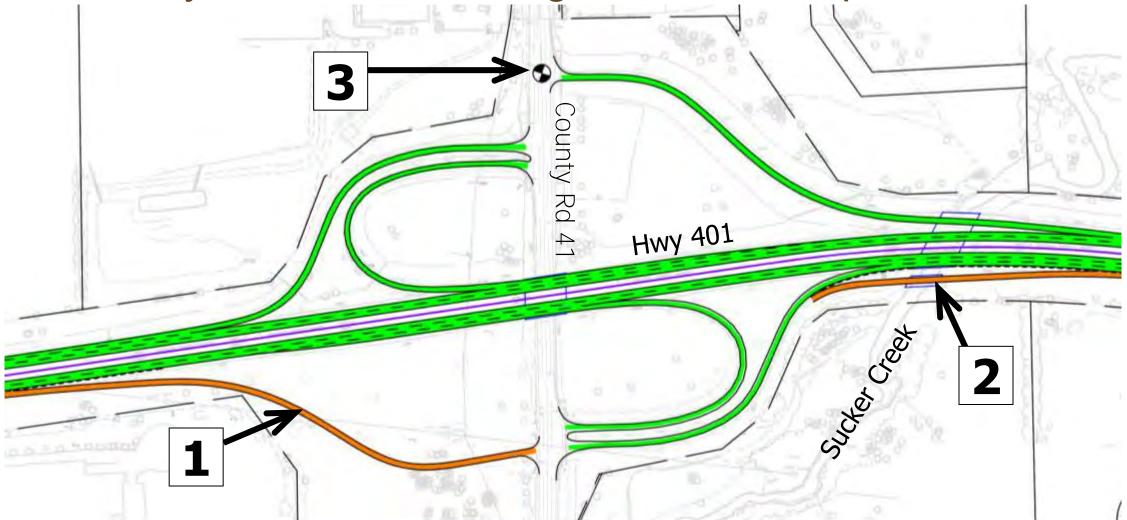






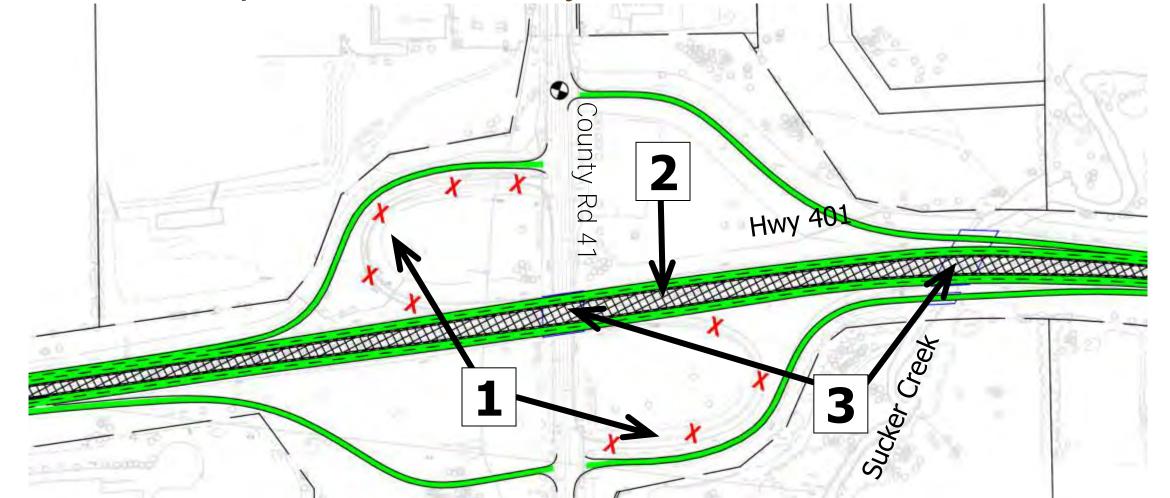
### **Pre-Stage**

- 1. Construct new eastbound off-ramp with temporary connection to existing south ramp terminal;
- 2. Construct new eastbound on-ramp structure over Sucker Creek including modified speed change lane;
- 3. Modify existing north ramp terminal intersection to provide access to southbound County Road 41, including installation of permanent traffic signals.



### Stage 1

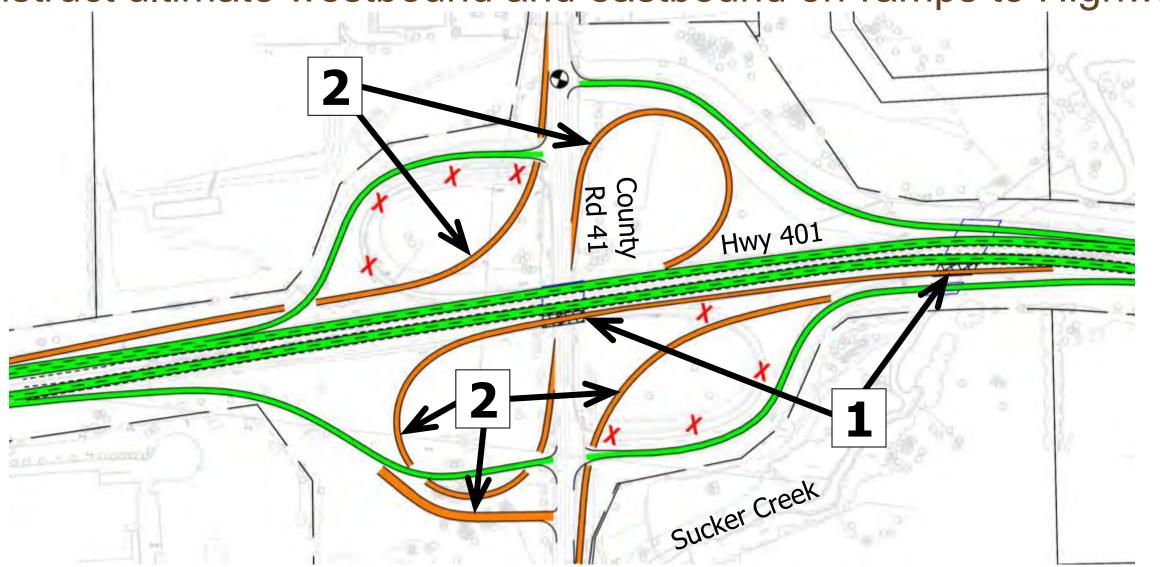
- 1. Permanent closure of existing eastbound off-ramp and westbound to southbound County Road 41 off-ramp;
- 2. Shift Highway 401 traffic to outside and replace / upgrade existing median drainage system;
- 3. Rehabilitate centre portions of County Road 41 and Sucker Creek bridges.



# Conceptual Construction Staging

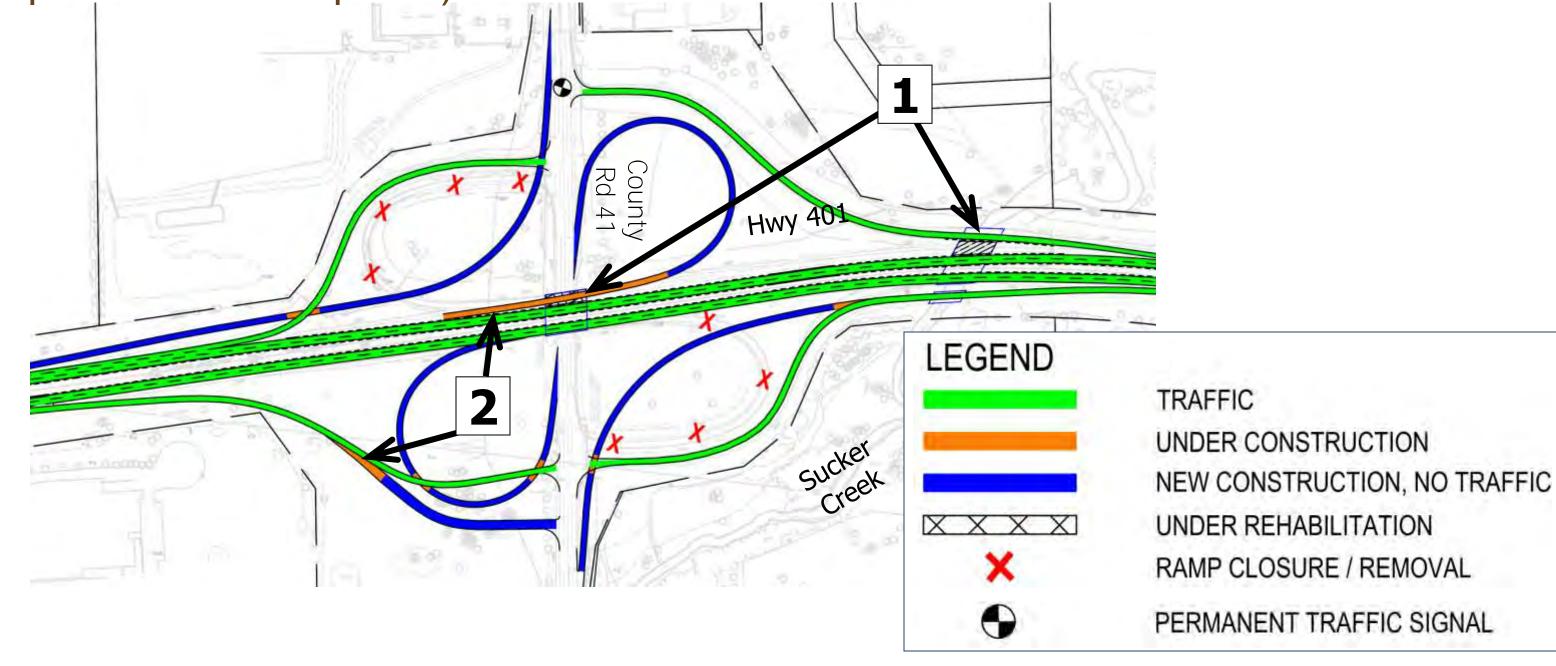
### Stage 2

- 1. Shift Highway 401 eastbound lanes to north and rehabilitate south sides of County Road 41 and Sucker Creek structures;
- 2. Construct ultimate westbound and eastbound on-ramps to Highway 401.



### Stage 3

- 1. Shift Highway 401 lanes to south and rehabilitate north sides of County Road 41 and Sucker Creek structures;
- 2. Complete construction / tie-ins of new ramps (weekend and short-term ramp closures anticipated).











## Highway 401 Interchange Improvements at County Road 41

# Other Improvements

## Drainage

- Drainage concerns have been identified along Highway 401 in the vicinity of County Road 41;
- Temporary concrete median barrier of varying type and size is presently provided between eastbound and westbound Highway 401 traffic within the Study Area;
- The existing median drainage system is not functioning properly and will be replaced as part of the Technically Preferred Plan.

## Illumination and Traffic Signals

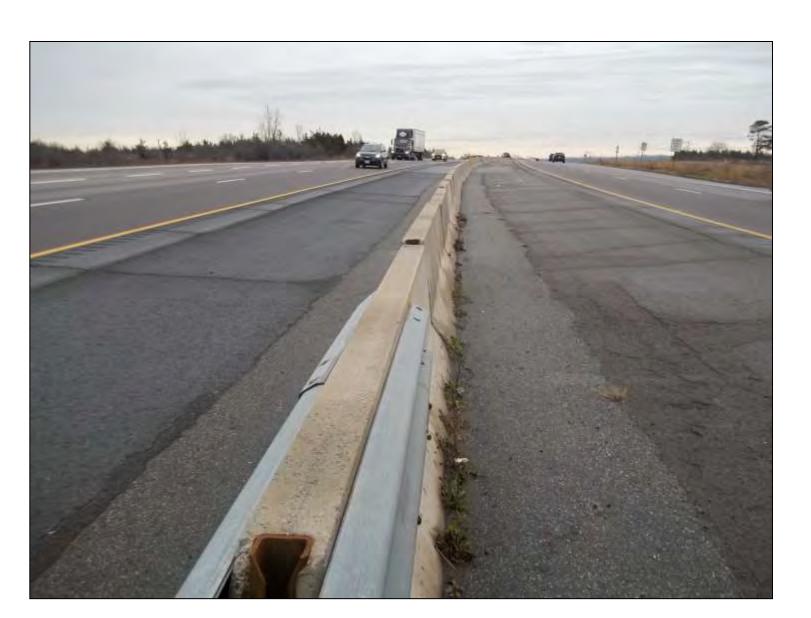
- Modifications or upgrades to existing lighting systems will be provided to accommodate the recommended roadway improvements;
- New traffic signals will be installed at the north ramp terminal intersection. Existing traffic signals at south ramp terminal intersection will be relocated to the new intersection location further to the south.



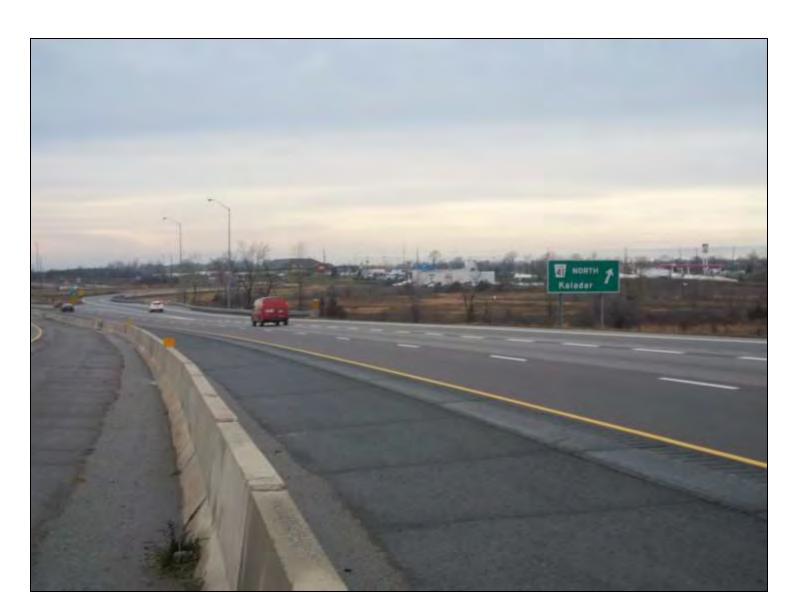
**Existing Lighting at Highway 401 Off-Ramp to County Rd 41** 



**Existing Traffic Signals Along County Rd 41** 



**Existing Highway 401 Median Barrier** 



Westbound Highway 401 approaching County Rd 41







# Proposed Mitigation Measures and Recommendations for Further Work

Factor	Proposed Mitigation & Commitment to Future Work
Terrestrial Environment	<ul> <li>Retain significant trees and shrubs where possible</li> <li>Restore any disturbed areas with seeding, sodding and landscaping</li> <li>Additional species at risk surveys will be undertaken in detail design prior to construction</li> <li>Invasive species management</li> <li>Vegetation removals will not be undertaken during the Migratory Breeding Bird Timing window between April 15 and August 15 of any year in compliance with the Migratory Bird Convention Act</li> </ul>
Fish and Fish Habitat	<ul> <li>Work at Sucker Creek will occur between July 15 and March 15 to comply with the warmwater fisheries timing window</li> <li>Erosion and sediment control measures will be implemented</li> </ul>
Construction Noise	• Employ standard mitigation measures (i.e. mufflers, engine maintenance, etc.) and utilize municipal noise control by-law requirements during construction
Air Quality	• Employ standard mitigation measures and best management practices during construction (i.e. dust suppression, maintenance, etc.)
Groundwater	• Pre-construction well monitoring adjacent to proposed construction areas will be conducted.
Erosion & Sedimentation	<ul> <li>Employ standard mitigation measures and best management practices (i.e. seeding, erosion control blankets, location of stockpiling materials away from watercourses, etc.)</li> <li>Sod and composted topsoil</li> <li>Planting of slopes with shrubs for long term stability</li> </ul>
Archaeological Resources	Clear land of archaeological potential prior to construction
Utilities	All utility impacts will be confirmed and utility relocations will be undertaken as required prior to construction
Out-of-Way Travel	<ul> <li>Potential interim lane closures and road closures during construction will be confirmed and notification will be provided to adjacent property and business owners</li> <li>Emergency Services will be notified of all lane and road closures</li> </ul>







## Next Step

## The following activities will be undertaken following this PIC:

- Review the comments received at this PIC and respond to any questions.
- Incorporate any revisions where appropriate and finalize the preliminary design plans.
- Finalize mitigation measures to minimize or avoid potential environmental effects.
- Prepare and file the Transportation Environmental Study Report for public and agency review.
- Seek Environmental Assessment clearance.
- Detail Design and Construction to be completed as a future / separate study.

## **Consultation Throughout**

(with First Nation & Métis Communities and all stakeholders – property owners, members of the public, municipalities, interest groups, agencies, etc.)



Please feel free to ask questions and fill out a comment sheet before you leave.

If you have any accessibility requirements in order to participate in this project, please contact one of the Project Team members.





# Freedom of Information and Protection of Privacy Act

Comments and information regarding this study are being collected to assist the Ministry of Transportation in meeting the requirements of the *Environmental Assessment Act*. This material will be maintained on file for use during the study and may be included in project documentation.

Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*. With the exception of personal information, all comments will become part of the public record.

You are encouraged to contact members of the Project Team if you have any questions or concerns regarding the above information.



### **Appendix H – Terrestrial Ecosystems Existing Conditions and Impact Assessment Report**

Prepared for: Ontario Ministry of Transportation

G.W.P. 4459-04-00



**Ontario Ministry of Transportation (MTO)** 

## Terrestrial Ecosystems Existing Conditions and Impact Assessment Report

Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00)

#### Prepared by:

AECOM Canada Ltd. 105 Commerce Valley Drive West, 7<sup>th</sup> Floor Markham, ON L3T 7W3 Canada

T: 905.886.7022 F: 905.886.9494 www.aecom.com

**Date:** January, 2019 **Project #:** 60478166

#### **Distribution List**

# Hard	Copies	PDF Required	Association / Company Name		
		✓	Ontario Ministry of Transportation (MTO)		
		✓	AECOM Canada Ltd.		

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- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
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Terrestrial Ecosystems Existing Conditions and Impact Assessment Report Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00)

#### **Appendices**

Appendix A. Agency Correspondence

Appendix B. Photo Log Appendix C. Plant List

Appendix D. Species at Risk Habitat Assessment

#### 1. Introduction

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study (Group 'B' project) for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00). The project is located in the Town of Greater Napanee within the County of Lennox and Addington.

The primary focus of this study is to:

- Review the structural requirements (e.g., major rehabilitation or replacement) at this interchange;
- Identify interim and long-term interchange improvements to address geometric and operational concerns; and
- Develop a preliminary design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.

In 2014 MTO completed a Preliminary Design Study to determine the short-term, mid-term, and long-term improvements to this interchange, which recommended upgrading the interchange to a full Parclo A4 interchange configuration. In 2004, MTO completed the Detail Design and construction of a new westbound off-ramp at County Road 41 and widening of Sucker / Selby Creek to the north as per the recommendations from the 2004 study. It is anticipated that major rehabilitation of the Highway 401 / County Road 41 and Sucker Creek bridges is anticipated to be needed within 5 years.

The development of an ultimate plan for the County Road 41 interchange allows the structural works to be implemented efficiently and in a cost effective manner, minimizing future throwaway.

This project is being conducted in accordance with the approved environmental planning process for Group 'B' projects in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

Concurrently, MTO is undertaking a separate Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at Palace Road.

The Recommended Plan includes the following:

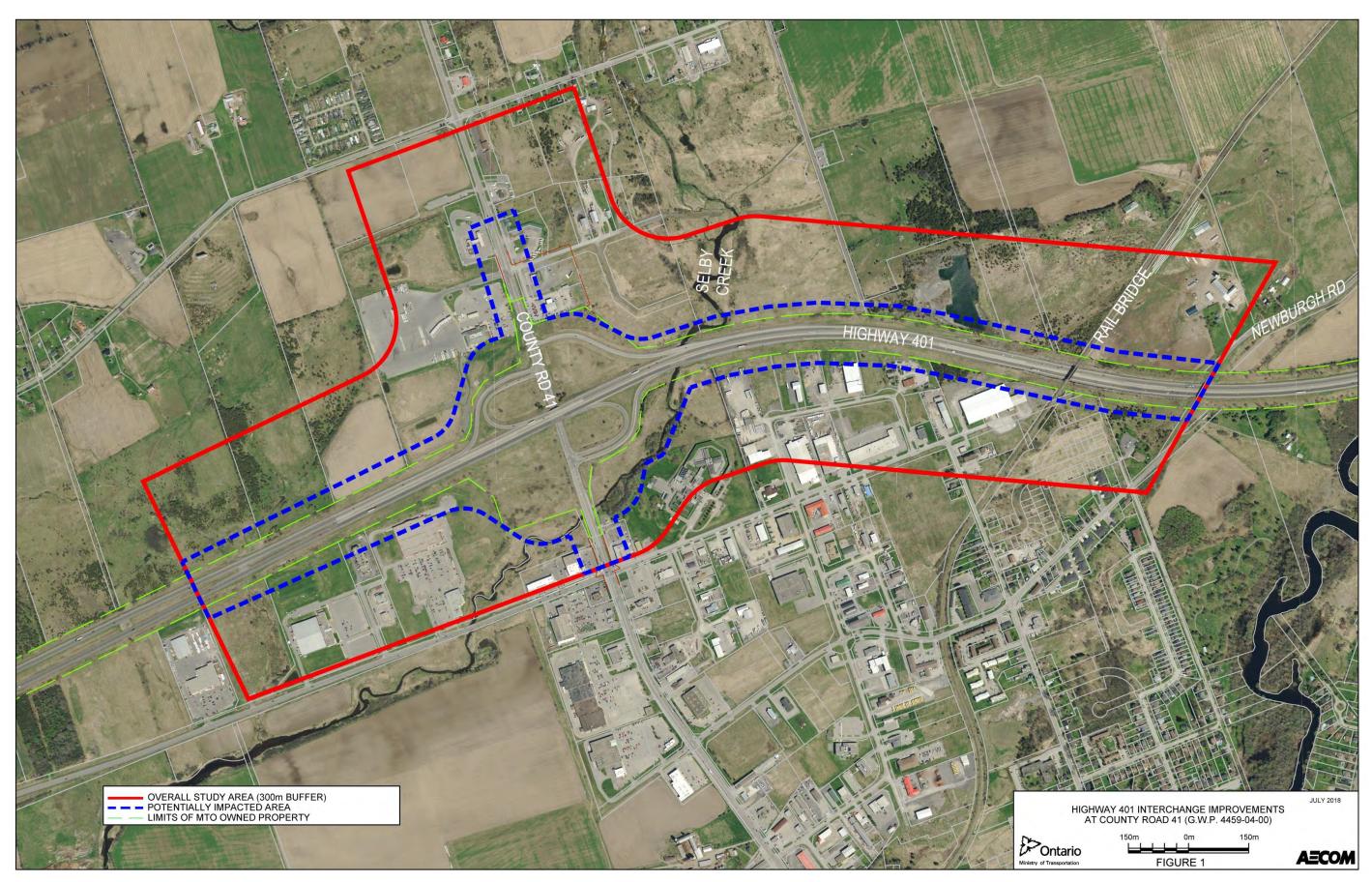
- The short term construction works at the interchange will include major bridge rehabilitation of the County Road 41 and Sucker Creek bridges. In conjunction with the bridge works, the interchange will be upgraded to the ultimate Parclo A4 configuration identified as the preferred alternative.
- The long-term recommendations for the interchange include replacement of the Highway 401 / County Road 41 and Sucker Creek bridges.

The staging strategy will be confirmed during a future Detail Design assignment in advance of the short-term construction.

The Overall Study Area for this project is on average 600 m in width and extends along Highway 401 from 1000 m west of County Road 41 easterly across Sucker Creek to the Newburgh Road underpass. The Potentially Impacted Area includes the right-of-way (ROW) and adjacent lands. In order to be consistent with the area examined for fish and fish habitat (with respect to riparian vegetation canopy and bank vegetation), the Potentially Impacted Area also extends along Sucker Creek 50 m upstream and 200 m downstream of the Highway 401 / MTO ROW.

Figure 1 presents the Overall Study Area and the Potentially Impacted Area considered as part of this report.

Figure 1: Overall Study Area and Potentially Impacted Area



This 'Terrestrial Ecosystems Existing Conditions and Impact Assessment Report' has been prepared in accordance with the *Environmental Reference for Highway Design* (MTO, 2013) to provide a summary of the existing terrestrial ecosystem features within the Overall Study Area based on a review of background information and up-to-date field investigations. This report also provides an assessment of impacts and recommended mitigation measures based on the proposed design.

This project is being conducted in accordance with the approved environmental planning process for Group 'B' projects in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (2000). As such, the Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 Palace Road interchange will also be provided to the MTO as part of this project.

#### 1.1 Project Area and Surrounding Land Use

The Overall Study Area is predominately represented by agricultural fields and urban development. The downtown core of Napanee is located approximately 5 km south on County Road 41. Sucker Creek flows in a southwest direction crossing under Highway 401, east of the interchange, and under County Road 41, south of the interchange.

County Road 41 is a north-south road that is designated as a rural arterial according to the Lennox and Addington Official Plan. County Road 41 originates in Napanee and continues northerly into Renfrew County. The road is under provincial jurisdiction north of Kaladar.

Highway 401 (MacDonald-Cartier Freeway) is an access controlled highway which maintains a four lane cross-section throughout the Overall Study Area. The highway has a posted speed limit of 100 km/hr. The highway connects Napanee to Kingston in the east and Belleville in the west.

#### 2. Environmental Protection Requirements

The following sections outline the legislation, policies and regulations relevant to natural heritage features and functions as they relate to the proposed project.

#### Migratory Bird Convention Act, 1994

The federal Migratory Birds Convention Act 1994 (MBCA) is applied through The Regulations Respecting the Protection of Migratory Birds that states that "[...] no person shall disturb, destroy or take a nest, egg [...] of a migratory bird." This law protects all birds aside from the introduced species European Starling (Sturnus vulgaris), House Sparrow (Passer domesticus), and Rock Pigeon (Columba livia). Disturbance or destruction of migratory birds, nests and eggs during the course of construction and other related activities is referred to as "incidental take" and is prohibited under this Act.

In order to remain in compliance with the *Migratory Bird Convention Act* and *Fish and Wildlife Act*, 1997, it is recommended that any vegetation removal that may be required take place outside of the breeding bird season for this region (April 1<sup>st</sup> to August 31<sup>st</sup>).

In most cases nest searches during the nesting season (April 1<sup>st</sup> to August 31<sup>st</sup>) are not recommended within complex habitats, as the ability to detect nests is largely low while the risk of disturbance to active nests is high. Disturbance increases the risk of nest predation and abandonment by adults. Therefore, nest searches are not recommended unless nests are known to be easily located without disturbing them.

As such, all vegetation clearing is recommended outside of the nesting period (April 1<sup>st</sup> to August 31<sup>st</sup>) to eliminate the need for nest searches and any potential impacts to nesting birds.

#### Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) sets the policy framework for regulating development and use of land and is issued under the authority of the *Planning Act*. The PPS provides direction on provincial matters of interest related to land use planning and development. The revised PPS came into effect on April 30, 2014 and applied to planning decisions made on or after that date. It replaces the Provincial Policy Statement, 2005.

The PPS states that the Province's natural heritage resources, water, agriculture lands, mineral resources, and cultural heritage and archaeological resources provide important environmental, economic and social benefits. The wise use and management of these resources over the long-term is a key provincial interest. Through the PPS, the Province wants to ensure that its resources are managed in a sustainable manner to protect essential ecological processes and public health and safety, minimizing environmental and social impacts to meet long-term needs. MTO considers ("has regard for") the policies of the PPS in undertaking provincial highways planning but is not required to satisfy these policies as they are directed towards land use planning and development.

Section 1.6.6 of the PPS notes that "when planning for corridors and rights-of-ways for significant transportation infrastructure facilities, consideration will be given to the significant resources in Section 2.0: Wise Use and Management of Resources". Section 2.0 of the PPS outlines the significant resources including wetland, woodlands, valleylands and wildlife habitat.

The Natural Heritage Reference Manual (2010) was developed to provide technical guidance for implementing the natural heritage policies of the PPS (2005).

The PPS identifies several types of natural heritage features to be protected:

- 1. Significant habitat of endangered and threatened species
- 2. Significant wetlands in Ecoregions 5E, 6E and 7E1
- 3. Significant coastal wetlands
- 4. Significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E
- 5. Significant woodlands south and east of the Canadian Shield
- 6. Significant valleylands south and east of the Canadian Shield
- 7. Significant wildlife habitat
- 8. Significant areas of natural and scientific interest

#### Endangered Species Act, 2007

Ontario contains over 200 flora and fauna species that are at risk. Species at Risk (SAR) are classified into one of four levels of risk (extirpated, endangered, threatened, special concern) through science-based assessment via the Committee on the Status of Species at Risk in Ontario (CASSARO); classification is based on best-available science and Aboriginal Traditional Knowledge. Species classified as Threatened or Endangered on the Species at Risk in Ontario list are then afforded protection under the *Endangered Species Act (ESA)* (2007).

SAR listed as threatened or endangered under the ESA 2007 are provided both species and habitat protection. It is stated in Sections 9 and 10 of the Act that "no person shall kill, harm, harass, capture or take a living member or shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened."

Protection for SAR and their habitats is provided under the *ESA 2007* by restricting activities that may affect them. Where a proposed activity will impact protected species or habitat, changes to timing, location and methods of the proposed activity should be considered, wherever feasible, to avoid impacts to SAR. Where impacts cannot be avoided or mitigated, a permit process can be entered into. The Ministry of Natural Resources and Forestry (MNRF) may grant a permit, or other authorization, for activities that would otherwise not be allowable under the *Act*. Several permit types are available, depending on the nature of the proposed work and may include conditions for the activity to meet with aid in protection or recovery of the targeted SAR.

Activities which would typically contravene the *ESA 2007* are exempt from the standard permitting process, for certain SAR and their habitat. For the specified species and under certain conditions a Notice of Activity (NOA) form is required to be submitted to the Minister prior to undertaking the activities. In addition to the NOA, a mitigation and compensation plan may also be required. The SAR and SAR habitat eligible under the exemption are identified in *O. Reg. 176/13* along with their species specific mitigation and compensation requirements.

#### 3. Background Information

Prior to field investigations, a background review was completed to obtain information on known natural heritage features and species records within the Overall Study Area. Results of the background information review are discussed as part **Section 4** below. A copy of agency correspondence can be found in **Appendix A**.

Background information was obtained from the following sources:

- Earth Tech Canada Inc. (2004). Transportation Environmental Study Report Highway 401 and County Road 41 Interchange Improvements G.W.P. 31-99-00. Prepared for the Ministry of Transportation Ontario;
- Personal communications with Tim Trustham Planner/Ecologist Quinte Conservation Authority on March 30, 2016.
- Personal communications with Catherine Warren A/District Planner, Peterborough District –MNRF on March 16, 2016;
- MNRF Natural Resources and Values Information System (NRVIS) mapping (2016);
- MNRF Natural Heritage Information Centre (NHIC) Make a Map feature (2016a);
- Atlas of Breeding Birds of Ontario Point Count Records;
- Bat Conservation International (BCI) Species Profiles (2017);
- The Official Plan of the Town of Greater Napanee (2014); and
- Aerial photography.

#### 4. Field Investigations

In order to acquire up-to-date information on the existing terrestrial ecosystems within the Potentially Impacted Area, field investigations were conducted on June 2 and 3 and October 4 and 5, 2016 by AECOM ecologists. Field investigations were completed in accordance with the *Environmental Reference Guide for Highway Design* (2013) to supplement available background information as described in **Section 2** above.

Field investigations were undertaken for the Potentially Impacted Area shown, where access was granted, in **Figure 1**. The majority of this area is highway ROW and MTO-owned land. Aerial interpretation was used to determine the vegetation communities located outside of the ROW. A representative photographic log list is provided in **Appendix B**. Based on aerial interpretation, the Overall Study Area is largely represented by an agricultural and cultural landscape.

Field investigations included the following:

- Vegetation community mapping, including dominant species associations, using the Ecological Land Classification (ELC) system for southern Ontario to Ecosite or Vegetation Type;
- Location of wetland boundaries relevant to the proposed undertaking;
- List of plant species observed;
- List of wildlife species observed, and evidence of wildlife habitat on man-made structures including direct observation and incidental evidence;
- Location and species of any bird nests on, under or in any structure or individual trees likely to be affected by construction;
- Assessment of habitat potential based on wildlife observations and site conditions;
- Location of any species of conservation concern, or Species at Risk or their habitat; and
- Evidence of groundwater upwelling and high groundwater table.

The delineation of vegetation community boundaries for the Potentially Impacted Area was based on field investigations and aerial photograph interpretation. Vegetation communities were classified using the *Ecological Land Classification (ELC) Manual for Southern Ontario* (Lee *et al.*, 1998). Floral species lists were compiled for the Potentially Impacted Area.

Incidental wildlife observations were recorded during all field investigations. Incidental observations noted include species sightings, tracks, scat, as well as any other wildlife activity.

#### 5. Existing Conditions

#### 5.1 Physiography, Geology and Soils

The Overall Study Area is located in Lake Simcoe-Rideau (Ecoregion 6E), which is part of the Mixedwood Plains Ecozone. This Ecoregion extends from Lake Huron in the west to the Ottawa River in the east and is the considered the second most densely populated ecoregion in Ontario. The surface is gently undulating to rolling terrain of ice-laid materials deeply covering bedrock. Mineral materials represent more than 95% of substrates within this ecoregion. Forests within this ecoregion are diverse. Upland sites typically dominated by Sugar Maple (Acer saccharum), American Beech (Fagus grandifolia), White Ash (Fraxinus americana) and Eastern Hemlock (Tsuja canadensis) while lowland forests are often represented by Green Ash (Fraxinus pennsylvanica), Silver Maple (Acer saccharinum), Red Maple (Acer rubrum), Eastern White Cedar (Thuja occidentalis), Yellow Birch (Betula allegheniensis), Balsam Fir (Abies balsamea) and Black Ash (Fraxinus nigra) (Crins et al. 2009).

#### 5.2 Significant Features

#### Areas of Natural and Scientific Interest

An Area of Natural and Scientific Interest (ANSI) is defined as an area of land and/or water containing natural landscapes or features that have been scientifically identified (by the OMNR) as having life science or earth science values related to protection, scientific study or education (MNRF, 2014b). ANSIs are designated as earth science (geological) or life science (biological) depending on the features present (MNRF, 2014b). The background information review of the MNRF Make-a-Map: Natural Heritage Areas Application (MNRF, 2014a), indicated that there are no designated ANSI's located within the 300 m Overall Study Area.

#### Provincially and Locally Significant Wetlands

Wetlands are described as lands that are seasonally or permanently flooded by shallow water, as well as lands where the water table is close to the surface and present an abundance of water that has caused the formation of hydric soil, which supports primarily hydrophytic or water tolerant plants (MNRF, 2013). The MNRF evaluates the significance of wetlands through the Ontario Wetland Evaluation System (OWES). This evaluation system uses a scoring system to assign values to four principal components of the wetland, which are the biological, social, hydrological, and special features. Based on the resulting score of an evaluation, an evaluated wetland can fall into one of two classes: Provincially Significant or Locally Significant (MNRF, 2013). According to the background information review of the MNRF Make-a-Map: Natural Heritage Areas Application (MNRF, 2014a), there are no Provincially or Locally Significant Wetlands located within the Overall Study Area; however, there is an unevaluated wetland located in the southwest portion of the Overall Study Area.

#### Environmental Protection Areas

The Official Plan of the Town of Greater Napanee applies the Environmental Protection designation to ANSIs, Provincially or non-provincially or locally significant wetlands, significant habitat of endangered and threatened species, fish habitat and lands having inherent environmental hazard, such as poor drainage, organic soils, steep slopes karstic conditions or that are subject to flooding and/or erosion. Within the Overall Study Area, Sucker Creek, as well as its riparian area are designated as Environmentally Sensitive and Environmental Protection Areas, respectively, on Schedule C of the Official Plan.

### 5.3 Vegetation

Field investigations focused on the ROW north and south of Highway 401 and included all vegetated areas between the entrance and exit ramps to Highway 401. The majority of the Potentially Impacted Area comprised of Cultural Meadow (CUM1), except for a small portion of Mixed Forest (FOM) south of Sucker Creek, east of County Road 41. ELC mapping for the Potentially Impacted Area is provided in **Figure 2**. A list of vascular plant species recorded is provided in **Appendix C**.

The majority of the Potentially Impacted Area was comprised of Cultural Meadow (CUM1) and appeared to be periodically maintained (i.e., mowed). These areas were dominated by several common grass and meadow species including Reed Canary Grass (*Phalaris arundinacea*), Timothy (*Phleum pratense*), Awnless Brome (*Bromus inermis* ssp. *inermis*), sedges (*Carex* sp.), Goldenrod (*Solidago* sp.), Wild Carrot (*Daucus carota*) and Cow Vetch (*Vicia cracca*). Trees and shrubs included Norway Maple (*Acer platanoides*), Austrian Pine (*Pinus nigra*), Common Buckthorn (*Rhamnus cathartica*), Sweetbriar (*Rosa rubiginosa*), Gray Dogwood (*Cornus racemosa*) and Choke Cherry (*Prunus virginiana*).

A Mixed Forest (FOM) community was found to exist south of Sucker Creek, east of County Road 41 and northeast of urban development. Tree and shrub species noted included White Ash, Austrian Pine, Common Buckthorn and Honeysuckle (*Lonicera* sp.).

As noted above, not all lands within the Potentially Impacted Area could be accessed and, as such, ELC was determined based on aerial interpretation. These lands were predominately represented by agricultural fields, anthropogenic lands (landscaped) and cultural meadow communities, with one small coniferous forest community.

Please refer to Figure 2 for a detailed map of the vegetation communities identified above.

#### 5.4 Wildlife

During field investigations, bird species observed included Common Yellowthroat (*Geothlypis trichas*), Yellow Warbler (*Setophaga petechia*) and Red-winged Blackbird (*Agelaius phoeniceus*). Nest searches were conducted on the Highway 401 overpass structure on County Road 41, with bridge structure at Sucker Creek and vegetation within the Study Area (i.e., where field investigations occurred). No nests were found on these bridges at the time of the 2016 field investigations or within the vegetation within the Study Area (i.e., where field investigations occurred). No other incidental wildlife observations were made during the 2016 field investigations.

The Overall Study Area provides suitable habitat for a variety of wildlife species. Although the existing Highway 401 presents a barrier to wildlife movement, it is likely that structure at Sucker Creek provides some opportunity for wildlife movement north and south of the existing Highway.

According to the Atlas of the Mammals of Ontario (Dobbyn, 1966), a total of 23 common mammal species have been recorded within 10 x 10 km UTM block 18QU40 that encompasses the Overall Study area. **Table 1** provides a summary of these species and their *ESA 2007* status. The Little Brown Bat (*Myotis lucifugus*) identified in this background review is listed as Endangered in Ontario and will be further discussed in **Section 5.5** below.

Figure 2: Ecological Land Classification Mapping

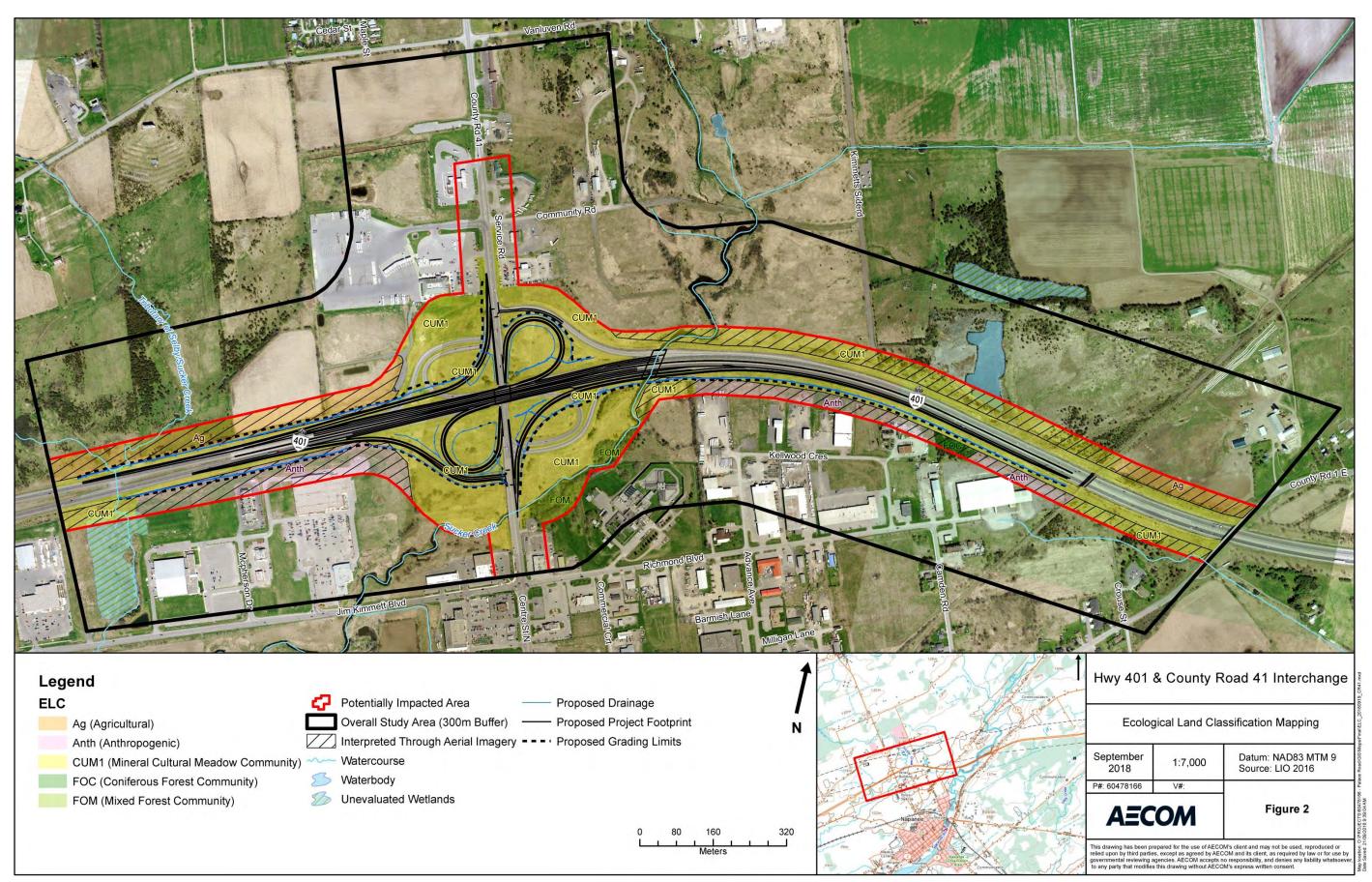


Table 1: Atlas of the Mammals of Ontario Records

Common Name	Scientific Name	ESA Status
Virginia Opossum	Dedelphis virginiana	-
Common Shrew	Sorex cinereus	-
Northern Short-tailed Shew	Blarina brevicauda	-
Star-nosed Mole	Condylura cristata	-
Little Brown Bat	Myotis lucifugus	END
Big Brown Bat	Eptesicus fuscus	-
Eastern Red Bat	Lasiurus borealis	-
Hoary Bat	Lasiurus cinereus	-
Eastern Cottontail	Sylvilagus floridanus	-
Snowshoe Hare	Lepus americanus	-
Eastern Chipmunk	Tamias striatus	-
Woodchuck	Marmota monax	-
Gray Squirrel	Sciurus carolinensis	-
Red Squirrel	Tamiasciurus hudsonicus	-
Northern Flying Squirrel	Glaucomys sabrinus	-
White-footed Mouse	Peromyscus leucopus	-
Deer Mouse	Peromyscus maniculatus	-
Meadow Vole	Microtus pennsylvanicus	-
Muskrat	Ondatra zibethicus	-
Norway Rat	Rattus norvegicus	-
House Mouse	Mus musculus	-
Porcupine	Erethizon dosatum	-
Beaver	Castor Canadensis	-

# 5.5 Species at Risk

There were no Species at Risk observed within the Potentially Impacted Area during the 2016 field investigations; however, based on a review of background information, there is potential for a number of Species at Risk to occur within the Overall Study Area.

As stated in **Section 5.4**, the Little Brown Bat was identified as potentially occurring within the Overall Study Area during background review. It should also be noted that as of 2014, three other bat species were added to the Species at Risk Ontario List including Eastern Small-footed Myotis (*Myotis leibii*), Tri-colored Bat (*Perimyotis subflavus*) and Northern Myotis (*Myotis septentrionalis*). These species may find suitable habitat within the FOM communities in the Potentially Impacted Area.

According to the Ontario Breeding Bird Atlas (hereafter OBBA; BSC, *et al.* 2006), a total of 107 bird species have been recorded within the in 10 x 10 km UTM block 18QU40 that encompasses the Overall Study Area. The OBBA has records of 10 bird Species at Risk, either confirmed or possibly breeding in the Overall Study Area. **Table 2** below provides a summary of these bird species and their *ESA 2007* status.

Table 2: OBBA Bird Species at Risk Records

Common Name	Scientific Name	ESA Status	Habitat Potential
Bank Swallow	Riparia riparia	Threatened	No suitable habitat present
Barn Swallow	Hirundo rustica	Threatened	Foraging habitat present
Bobolink	Dolichonyx oryzivorus	Threatened	Suitable habitat present
Chimney Swift	Chaetura pelagica	Threatened	Foraging habitat present
Common Nighthawk	Chordeiles minor	Special Concern	Suitable habitat present
Eastern Meadowlark	Sturnella magna	Threatened	Suitable habitat present

Common Name	Scientific Name	ESA Status	Habitat Potential
Eastern Wood-Pewee	Contopus virens	Special Concern	Suitable habitat present
Loggerhead Shrike	Lanius Iudovicianus	Endangered	Suitable habitat present
Eastern Whip-poor-will	Caprimulgus vociferous	Threatened	Suitable habitat present
Wood Thrush	Hylocichla mustelina	Special Concern	Suitable habitat present

According to the species range map provided by BCI (2017), the Overall Study Area encompasses the ranges of the four bat species, which are listed as Endangered on the Species at Risk in Ontario List: Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis and Tri-Colored Bat . **Table 3** below provides a summary of these bats SAR and their *ESA 2007* status.

Table 3: Bat Species at Risk with Ranges that Overlap the Study Area

Common Name	Scientific Name	ESA Status	Habitat Potential
Little Brown Myotis	Myotis lucifugus	Endangered	Suitable habitat present
Northern Myotis	Myotis septentrionalis	Endangered	Suitable habitat present
Eastern Small-footed Myotis	Myotis leibii	Endangered	Suitable habitat present
Tri-Colored Bat	Perimyotis subflavus	Endangered	Suitable habitat present

An information request was sent to the MNRF Peterborough District on March 15, 2016 asking for identification of any Species at Risk records within the Overall Study Area. A response from the MNRF was given on March 16, 2016 and indicated the following Species at Risk in **Table 4** as potentially occurring within or in the vicinity the Overall Study Area.

Table 4: MNRF Species at Risk Consultation Results

Common Name	Scientific Name	ESA Status	Habitat Potential
Eastern Musk Turtle	Sternotherus odouratus	Threatened	No suitable habitat present
Four-leaved Milkweed	Asclepias quadrifolia	Endangered	No suitable habitat present
Northern Map Turtle	Graptemys geographica	Special Concern	No suitable habitat present
Ogden's Pondweed	Potamogeton ogdenii	Endangered	No suitable habitat present
Snapping Turtle	Chelydra serpentine	Special Concern	Suitable habitat present

A total of 19 Species at Risk were identified as having potential to occur within or in the vicinity of the Overall Study Area based on the review of background information from the OBBA, the Atlas of the Mammals of Ontario, Bat Conservation International and through consultation with the MNRF. It should be noted that the MNRF had identified the potential for Eastern Milksnake (*Lampropeltis triangulum*) within the Overall Study Area. At the time, Eastern Milksnake was listed as a Species of Special Concern; however, this species was removed from the Species at Risk in Ontario (SARO) list in June 2016.

An assessment was completed to determine the presence of suitable habitat for each Species at Risk identified during background review. This assessment was completed using aerial photo interpretation to delineate habitat communities in the Potentially Impacted Area and was further refined after ELC community delineation during field investigations. **Appendix D** provides a habitat assessment of each of the 19 Species at Risk, including their habitat preferences and assessment of potential occurrence in the Overall Study Area.

**Bank Swallow** (*Riparia riparia*) [source: OBBA records] – This species is listed as Threatened in Ontario. Bank Swallows nest in erodible soils on vertical or near-vertical banks and bluffs in lowland areas that are dominated by rivers, streams, lakes, and oceans (MNRF, 2016b). Through the background information review of the OBBA, Bank Swallow were identified to occur within the OBBA survey square 18QU40 which encompasses the Overall Study

Area. During the field investigations, no vertical faces in silt and sand deposits were identified for nesting along the Napanee River; therefore there is no suitable habitat for the Bank Swallow in the Potentially Impacted Area.

**Barn Swallow** (*Hirundo rustica*) [source: OBBA records] – This species is listed as Threatened in Ontario. Barn Swallows occur in close association with human-made structures, building their cup-shaped mud nests almost exclusively on structures such as open barns, under bridges and in culverts (MNRF, 2016c). Potentially suitable habitat (i.e., bridges) was present within the Potentially Impacted Area. However, visual nest surveys were conducted during field investigations and no nests were observed on any of the structures within the Potentially Impacted Area.

**Bobolink** (*Dolichonyx oryzivorus*) [source: OBBA records] – This species is listed as Threatened in Ontario. Bobolink utilizes large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes (MNRF, 2016d). Bobolink prefers larger grasslands, generally greater than 10 ha in size (McCraken et al. 2013). Cultural Meadow (CUM1) communities represent a large portion of the Potentially Impacted Area, while agricultural land exists within the Potentially Impacted Area. As such, suitable habitat may exist within the Potentially Impacted Area.

Chimney Swift (Chaetura pelagica) [source: OBBA records] – This species is listed as Threatened in Ontario. Chimney Swifts are found in and around urban settlements where they nest and roost in chimneys and other manmade structures (MNRF, 2016e). Based on the results of the habitat assessment there is no suitable habitat for the Chimney Swift in the Potentially Impacted Area and the species is unlikely to occur.

**Common Nighthawk** (*Chordeiles minor*) [source: OBBA records] – This species is listed as Special Concern in Ontario. Common Nighthawk is usually found in open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. The species may also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways but generally prefer natural areas (MNRF 2016f). Suitable habitat may exist within the Potentially Impacted Area.

**Eastern Meadowlark** (*Sturnella magna*) [source: OBBA records] – This species is listed as Threatened in Ontario. Eastern Meadowlark utilizes native grasslands, savannah, old fields, hayfields, lightly grazed pastures, weedy meadows, fields with occasional shrubs. Eastern Meadowlark requires a core habitat of at least 5 ha and can be negatively impacted by habitat fragmentation (COSEWIC, 2011). Cultural Meadow (CUM1) communities were common within the Potentially Impacted Area and may provide suitable habitat

**Eastern Musk Turtle** (*Sternotherus odouratus*) [source: MNRF consultation] – This species is listed as Threatened in Ontario. The Eastern Musk Turtle utilizes ponds, lakes, marshes and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that they burrow into for winter hibernation (MNRF, 2016g). Based on the results of the habitat assessment there is no suitable habitat for the Eastern Musk Turtle in the Potentially Impacted Area and the species is unlikely to occur.

**Eastern Small-footed Myotis** (*Myotis leibii*) [source: Bat Conservation International] – Eastern Small-Footed Myotis roosts in a variety of habitats, including under rocks and bridges and in rock outcrops, caves, mines, and hollow trees. Individuals may change their roosting location daily. Along with other bat species, the Eastern Small-footed Myotis swarming occurs at or near their hibernacula (NatureServe, 2016). This species hibernates in caves and abandoned mines, preferring colder, drier sites and showing strong hibernation site fidelity. This species was recently emergency listed under the *ESA* as it is one of the rarest bats in eastern North America, and was one of the rarest even prior to the introduction of White Nose Syndrome (MNRF, 2016h). Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Eastern Whip-Poor-Will** (*Caprimulgus vociferous*) [source: OBBA records] – This species is listed as Threatened in Ontario. Whip-poor-Will is usually found in areas with a mix of open and forested areas, such as savannahs,

open woodlands or openings in more mature, deciduous, coniferous and mixed forests (MNRF, 2016i). The mixed forest community may provide suitable habitat for this species. Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Eastern Wood-Pewee** (*Contopus virens*) [source: OBBA records] – This species is listed as Special Concern in Ontario. Eastern Wood-Pewee can be found in deciduous, coniferous and mixed forests in eastern North America. Additionally, the size of the forest does not appear to be an important factor in habitat selection as this species has been found in both small fragmented forests and larger forest tracks (MNRF, 2016j). Suitable habitat may be present within the mixed forest community in the Potentially Impacted Area.

**Four-leaved Milkweed** (*Asclepias quadrifolia*) [source: MNRF consultation] – This species is listed as Endangered in Ontario. The Four-leaved Milkweed is found in two types of habitat in Ontario: dry woodlands dominated by Tallgrass prairie herbs, Bur Oak and Shagbark Hickory, and in woodland alvar communities dominated by Red Cedar pasture grasses, cultivated by human activity (MNRF, 2016k). Based on the results of the habitat assessment there is no suitable habitat for the Four-leaved Milkweed in the Potentially Impacted Area and the species is unlikely to occur.

Little Brown Myotis (*Myotis lucifugus*) [source: Atlas of the Mammals of Ontario, Bat Conservation International] — This species is listed as Endangered in Ontario. Little Brown Myotis are typically between four or five centimeters long, with wingspans of 22 to 27 centimeters. Little Brown Myotis are active in two or three hours after sunset, feeding on insects. During the day, Little Brown Myotis roost in trees and buildings, and are known to use attics, abandoned buildings and barns during the summer to raise their young and hibernate in caves or abandoned mines during the winter months (MNRF, 2016l). Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Loggerhead Shrike** (*Lanuis Iudovicianus*) [source: OBBA records] – This species is listed as Endangered in Ontario. The Loggerhead Shrike prefers pasture or grassland habitats with scattered trees and low shrubs. Remaining Loggerhead Shrikes are found in two core grassland habitats, the Carden Plain north of Lindsay, and the Napanee Limestone Plain (MNRF, 2016m). There is low potential habitat for this species to occur within the Potentially Impacted Area.

**Northern Map Turtle** (*Graptemys geographica*) [source: MNRF consultation] – This species is listed as Special Concern in Ontario. Northern map turtle inhabits lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation (MNRF, 2016n). Based on the results of the habitat assessment there is no suitable habitat for the Northern Map Turtle within the Potentially Impacted Area and the species is unlikely to occur.

**Northern Myotis** (*Myotis septentrionalis*) [source: Bat Conservation International] – Northern Myotis is primarily a forest-dwelling species (Owen *et al.*, 2002). It is often associated with old growth mixed or coniferous forests and is known to roost under loose bark or in tree cavities (COSEWIC, 2013; MNRF, 2016o). Unlike other bats, this species rarely roosts in anthropogenic structures (COSEWIC, 2013). Breeding occurs in late summer in maternal colonies, and migration to hibernation sites in caves or mines begins in October (COSEWIC, 2013). This species remains in hibernation until late March or April (MNRF, 2016o). Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Ogden's Pondweed** (*Potamogeton ogdenii*) [source: MNRF consultation] – This species is listed as Endangered in Ontario. Ogden's pondweed is an underwater plant with branching, thread-like stems and is found in clear, slow moving streams, beaver ponds and lakes. In Canada, Ogden's Pondweed was found only in southeastern Ontario at Murphys Point Provincial Park and Davis Lock on the Rideau Canal between 1970 and 1990 (MNRF, 2016p). There is no suitable habitat present within the Potentially Impacted Area.

**Snapping Turtle** (*Chelydra serpentine*) [source: MNRF consultation] – This species is listed as Special Concern in Ontario. The Snapping Turtle utilizes a wide variety of shallow freshwater water habitats including: ponds, sloughs, shallow bays, river edges, slow streams, or areas combining several of these wetland habitats. Individual turtles can also persist in urbanized water bodies, such as golf course ponds and irrigation canals, but it is unlikely that a population could become established in such habitats (MNRF, 2016q). Sucker Creek provides potential habitat for the Snapping Turtle within the Potentially Impacted Area and Snapping Turtle may nest in the gravel or lose soil adjacent to the highway near Sucker Creek.

**Tri-colored Bat** (*Perimyotis subflavus*) [source: Bat Conservation International] – Tri-colored Bat lives in a variety of forested habitats, forming day roosts and maternity colonies in older forests and occasionally in anthropogenic structures. This species is rare and thus has a scattered distribution in southern Ontario. The Tri-colored Bat forages over water and along streams in the forest where it eats flying insects and spiders. At the end of the summer, individual bats swarm to an overwintering location generally underground or near a cave. Similar to Little Brown Myotis and Northern Myotis, mating occurs during swarming behaviour which is typically associated with hibernacula (EC, 2015; Randall and Broders, 2014). Individual overwintering bats typically roost by themselves rather than as part of a group (MNRF, 2016r). Suitable habitat may be present within the forest communities in the Potentially Impacted Area.

**Wood Thrush** (*Hylocichla mustelina*) [source: OBBA records] – This species is listed as Special Concern in Ontario. Wood Thrush can be found in the interior and along the edges of well-developed upland deciduous and mixed forests. To be considered suitable, these forests should have: trees that are greater than 16 m in height, a high variety of deciduous tree species, a moderate sub-canopy and shrub density, shade, a fairly open forest floor, moist soils and decaying leaf litter (MNRF, 2016s). The mixed forest community located south of Sucker Creek east of County Road 41 may provide suitable habitat for this species.

It should be noted that Aquatic SAR, if present within the Study Area shall be addressed in the *Fish and Fish Habitat Impact Assessment Report for the Improvements to Highway 401 Interchange at County Road 41 (GWP. 4459-04-00)* prepared by AECOM (2017).

# 6. Impact Assessment and Mitigation Measures

The proposed works for this project includes the following:

- The short-term construction works at the interchange will include major rehabilitation of the Highway 401 bridge at County Road 41 and the Highway 401 bridge over Sucker Creek bridge, including widening the Highway 401 bridge over Sucker Creek bridge by approximately 13 m to the south within the MTO right-of-way;
- In conjunction with the bridge works, the interchange will be upgraded to the ultimate "Parclo A4" configuration, which will include:
  - Construction of new eastbound off-ramp with temporary connection to existing south ramp terminal for construction staging purposes;
  - Construction of two new eastbound on-ramps including modified speed change lane and associated widening of the Sucker Creek bridge to the south;
  - Construction of two new westbound on-ramps to Highway 401;
  - Modification of the existing north ramp terminal intersection to provide access to southbound
     County Road 41, including installation of permanent traffic signals;
- Permanent closure of existing eastbound off-ramp and westbound to southbound County Road 41 off-ramp;
- Replacement / upgrading of the existing median drainage system; and,
- The long-term construction works are anticipated to include replacement of the County Road 41 bridge.

The outermost grading limits were used to determine the extents of the construction footprint for this project. The construction footprint provided in the preliminary design for the improvements to the Highway 401 Interchange at County Road 41 (GWP 4459-04-00) is smaller in extent than the Potentially Impacted Area Shown in **Figure 2**. The proposed works associated with the project will be confined to the disturbed Cultural Meadow (CUM1) community that makes up the ROW and existing interchange within the construction footprint. The construction footprint crosses Sucker Creek and includes rehabilitation and widening of the Sucker Creek Bridge. Potential impacts associated with the proposed works include loss of vegetation cover through vegetation removal and disturbance to local wildlife through noise. A general discussion of the potential impacts and the mitigation measures recommended is provided in the following sections.

### 6.1 Assessment of Potential Impacts

#### 6.1.1 Potential Impacts to Vegetation Communities and Designated Natural Areas

There are no ANSIs or PSWs present within the construction footprint; therefore no impacts to provincially designated natural areas are anticipated; however, the Sucker Creek Environmentally Sensitive Area and the Sucker Creek Environmental Protection Area, as designated by Schedule C of the Town of Greater Napanee Official Plan occurs within the construction footprint. As such, the Environmentally Sensitive Area and the

Environmental Protection Area are may be impacted by the proposed works. The potential impacts to vegetation communities and designated natural areas are described as follows:

- In order accommodate the proposed works, it is anticipated that a total of up to 11.1 ha of Cultural Meadow (CUM1) may be required to be removed within the construction footprint. The existing Cultural Meadow (CUM1) is considered to be disturbed by anthropogenic influences (i.e., periodic mowing and proximity to Highway 401) and at the time of field investigation was largely dominated by non-native species. No SAR plants were present within the construction disturbance footprint.
- Based on a review of the Town of Greater Napanee Official Plan, portions of the Sucker Creek Environmentally Sensitive Area and the Sucker Creek Environmental Protection Area and their associated riparian areas will be affected by the proposed works.
- Reduction of surface water and groundwater to vegetation communities: Alteration of surface water runoff or groundwater inputs may result in damage or alteration to the vegetation communities.
- Fill, sediment or debris deposition within vegetation communities: During the proposed works, fill, sediment runoff and/or debris from the active construction area may enter vegetation communities and drainage ditches.

Introduction or spread of invasive species: Twenty-seven (27) of the 64 plants (42%) recorded within the Potentially Impacted Area during field investigations are non-native, which includes some highly invasive species such as common reed (*Phragmites australis*) and common buckthorn. A small patch of Common Reed was identified within Study Area on the south of Highway 401, approximately 40 m west of County Road 41 along a fence line north of Sucker Creek. A second small patch of Common Reed was located north of Highway 401, east of County Road 41, within Mineral Cultural Meadow community (CUM1) located north of the 401 exit ramp. Common Reed may be present elsewhere within the Study Area as the species is commonly associated with disturbed habitats such as those found in highway ROWs. The proposed works and movement of construction equipment may perpetuate the spread and establishment of these species.

#### 6.1.2 Potential Impacts to Wildlife

The majority of the lands within the proposed construction footprint consist of a large Cultural Meadow (CUM1) community that is considered disturbed by anthropogenic influences (i.e., periodic mowing and proximity to Highway 401). A small Mixed Forest (FOM) community is also present within the Potentially Impacted Area but outside of the proposed construction footprint. The proposed construction footprint crosses Sucker Creek and portions of the Cultural Meadow (CUM1); therefore, these features will be affected by the construction. The vegetation communities and planted trees present within the Overall Study Area are likely to support breeding birds. The potential impacts to breeding birds as a result of the proposed works are described as follows:

Disturbance/Displacement and Potential Destruction of Breeding Birds and their Active Nests Due to Vegetation Clearing:

Vegetation clearing during the breeding bird season of April 1<sup>st</sup> to August 31<sup>st</sup> could result in the disturbance/displacement of breeding birds and/or destruction of their active nests. The proposed works will result in a loss of some vegetated areas and habitat for some common species; however, the area lost provides only marginal habitat which is disturbed by existing anthropogenic impacts.

Mitigation measures to avoid potential impacts to the wildlife, including breeding birds are provided in **Section 6.2** below.

#### 6.1.3 Potential Impacts to Species at Risk

As described in **Section 5.5** the Overall Study Area was considered to be potentially suitable habitat for a total of 12 SAR, of which the construction footprint may represent habitat for up to four (4) of these including: Barn Swallow, Bobolink, Eastern Meadowlark and Snapping Turtle. As described in **Sections 6.1.1** and **6.1.2**, the Cultural Meadow (CUM1) located within the construction footprint is considered disturbed anthropogenic influences (i.e., periodic mowing and proximity to Highway 401) and is largely dominated by non-native species. Due to the high level of anthropogenic disturbance, these areas are considered poor quality habitat for Bobolink and Eastern Meadowlark and it is unlikely that the species are using this area for breeding. As such, no impacts to these SAR are anticipated as a result of the proposed works. Snapping Turtle are listed as Special Concern and thus do not receive protection under the *ESA 2007*. Nevertheless, specific mitigation measures necessary to protect Snapping Turtle during construction will be provided (Refer to **Section 6.2** below).

Suitable habitat for Barn Swallow may be present within the construction footprint for the improvements to the Highway 401 Interchange at County Road 41 (GWP 4459-04-00) at the County Road 41 and Sucker Creek bridges. The potential impacts to Barn Swallow as a result of the proposed works are described as follows:

#### Disturbance / Displacement or Mortality of SAR:

Barn Swallow may be displaced or disturbed as a result of noise during construction. These potential impacts would result in a contravention of the *ESA 2007*.

#### Habitat Removal:

The rehabilitation, replacement or widening of the bridges may result in the temporary loss of habitat for Barn Swallow.

### **6.2** Mitigation Measures

Proposed mitigation and avoidance measures to address potential impacts on terrestrial features are described below and apply to the proposed improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00).

#### **General**

 To assist in mitigating potential impacts to terrestrial ecosystems, applicable MTO Provisions should be included in contract documents and utilized during construction.

#### Vegetation Communities and Designated Areas

- Vegetation removal for the proposed works should be kept to a minimum and will be limited to the construction disturbance footprint;
- A Landscape Plan should be developed to address removal of woody vegetation using similar native species;
- Areas of herbaceous vegetation disturbed during proposed works should be seeded with a site appropriate MTO approved native seed mix;
- Construction material should be stored within limits of authorized locations and any soil stockpiles should be located in designated areas and protected using suitable sediment fencing only;
- The construction disturbance areas should be clearly delineated in the field to define work limits and prevent accidental intrusion into adjacent vegetation;

#### Wildlife and Species at Risk

- Schedule vegetation removal to occur outside of the breeding bird season of April 1<sup>st</sup> to August 31<sup>st</sup> to avoid disturbance to breeding birds and to avoid destruction of active nests, including any bird SAR. If vegetation removal must occur within this time period, active nest searches may be conducted prior to vegetation removal by a qualified biologist within 'simple habitats' to ensure that no active nests of breeding birds or bird SAR are destroyed, in order to prevent any contravention of the *Migratory Birds Convention Act*, 1994 and / or the ESA 2007;
- In the event a nesting Snapping Turtle is observed, the individual turtle should be permitted to continue nesting and the nest location shall be reported to MTO and MNRF immediately; and,
- Any SAR observations should be reported to MTO and MNRF and protection should be implemented immediately to ensure compliance with the ESA 2007.

### 6.3 Commitments to Work during Detail Design

The following surveys are recommended for completion during the detail design phase of the Project:

- It is recommended that nest surveys be undertaken at all affected structures to confirm if nesting birds, particularly Barn Swallow, are breeding or nesting at or on structures. Findings from these surveys will determine whether or not proposed works on the structure require registration under the ESA 2007.
- During detail design, it is recommended that the precise locations of Common Reed be identified to aid
  in the development of mitigation measure to halt the spread of this invasive species.

#### 6.4 Net Effects

If mitigation measures identified in **Section 6.2** are implemented no net impacts to terrestrial ecosystems are anticipated.

# 7. Summary and Recommendations

Potential effects to the following terrestrial features need to be considered and appropriately minimized or mitigated:

- While no designated natural areas were identified within the Overall Study Area; the Sucker Creek as well as its riparian areas which are designated as Environmental Protection on Schedule C of the Town of Greater Napanee Official Plan are located within the Construction Footprint based on a review of background information and agency correspondence;
- No Barn Swallows were found to be nesting within the structures during the 2016 surveys; however, up-to-date investigations to confirm use of this species should be undertaken during the detail design phase; and,
- Bird species protected under the MBCA 1994 are likely to use the Overall Study Area. Vegetation in the immediate vicinity of the construction disturbance footprint may provide suitable nesting habitat for some of these species. Vegetation clearing should occur outside of the breeding bird season (April 1st to August 31st) in order to minimize impacts to these species. Nest surveys by qualified biologists can be conducted if minor vegetation clearing is required during this period.

It is anticipated that, with the implementation of the mitigation measures prescribed in **Section 6.2** no net effects will result of the improvements to the improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00).

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How Species at Risk are Protected. © Queen's Printer for Ontario 2012-2014. Available on the internet: (http://www.ontario.ca/environment-and-energy/how-species-risk-are-protected)

#### Ontario Ministry of Natural Resources and Forestry (MNRF), 2016:

Natural Resources and Values Information System (NRVIS) mapping. Accessed October 2017.

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Make-a-Map: Natural Heritage Areas Application. Website:

http://www.giscoeapp.lrc.gov.on.ca/Mamnh/Index.html?site=MNR\_NHLUPS\_NaturalHeritage&viewer=NaturalHeritage&locale=en-US. Accessed on June 30, 2016.

#### Ontario Ministry of Natural Resources and Forestry (MNRF), 2016b:

Bank Swallow. Available online at: https://www.ontario.ca/page/bank-swallow. Accessed June 20, 2016.

#### Ontario Ministry of Natural Resources and Forestry (MNRF), 2016c:

Barn Swallow. Available online at: https://www.ontario.ca/page/barn-swallow. Accessed June 20, 2016.

#### Ontario Ministry of Natural Resources and Forestry (MNRF), 2016d:

Bobolink. Available online at: https://www.ontario.ca/page/boblink. Accessed June 20, 2016.

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Chimney Swift. Available online at: https://www.ontario.ca/page/chimney-swift. Accessed June 20, 2016.

#### Ontario Ministry of Natural Resources and Forestry (MNRF), 2016f:

Common Nighthawk. Available online at: https://www.ontario.ca/page/common-nighthawk. Accessed June 20, 2016.

#### Ontario Ministry of Natural Resources and Forestry (MNRF), 2016g:

Musk Turtle. Available online at: https://www.ontario.ca/page/eastern-musk-turtle-stinkpot. Accessed June 20, 2016.

#### Ontario Ministry of Natural Resources and Forestry, 2016h:

Eastern Small-footed Myotis. Ontario Ministry of Natural Resources and Forestry. Accessed July 11, 2017 at: <a href="https://www.ontario.ca/page/eastern-small-footed-myotis">https://www.ontario.ca/page/eastern-small-footed-myotis</a>.

#### Ontario Ministry of Natural Resources and Forestry, 2016i:

Eastern Whip-poor-will. Available online at: https://www.ontario.ca/page/eastern-whip-poor-will. Accessed June 28, 2016.

#### Ontario Ministry of Natural Resources and Forestry, 2016j:

Eastern Wood-Pewee. Available online at: https://www.ontario.ca/page/eastern-wood-pewee. Accessed June 20, 2016.

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Four-leaved Milkweed. Available online at: https://www.ontario.ca/page/four-leaved-milkweed. Accessed June 20, 2016.

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Little Brown Myotis. Available online at: https://www.ontario.ca/page/little-brown-myotis. Accessed December 9, 2016.

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Loggerhead Shrike. Available online at: https://www.ontario.ca/page/loggerhead-shrike. Accessed June 20, 2016.

#### Ontario Ministry of Natural Resources and Forestry, 2016n:

Northern Map Turtle. Available online at: https://www.ontario.ca/page/northern-map-turtle. Accessed June 20, 2016.

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Northern Myotis. Ontario Ministry of Natural Resources and Forestry. Accessed July 11, 2017 at: https://www.ontario.ca/page/northern-myotis.

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Snapping Turtle. Available online at: https://www.ontario.ca/page/snapping-turtle. Accessed June 28, 2016.

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Tri-colored Bat. Ontario Ministry of Natural Resources and Forestry. Accessed July 11, 2017 at: https://www.ontario.ca/page/tri-colored-bat.MNRF, 2017:

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  Wood Thrush. Available online at: https://www.ontario.ca/page/wood-thrush. Accessed June 20, 2016.
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- Randall, J. and H.G. Broders, 2014:

Identification and characterization of swarming sites used by bats in Nova Scotia, Canada. Acta Chiropterologica 16(1): 109-116.



# Appendix A

**Agency Correspondence** 

#### Kime, Heather

From:

Arsenault, Ami

Sent:

March-15-16 12:58 PM

To:

catherine.warren@ontario.ca; elizabeth.spang@ontario.ca

Cc:

Hodges, Nick; Minion, Ashley; Kime, Heather

Subject:

Palace Road MNRF Info Request

Attachments:

2016-03-14-MNRinfoRequest-PalaceRd.pdf; MNRF Fisheries Information Request

Table\_401 Napanee.docx

Hello Ms. Spang and Ms. Warren,

AECOM has been retained by the Ontario Ministry of Transportation (MTO) to undertake the two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington.

Please see the attached information request letter and the fisheries table for data gaps which we require additional information.

If you have any questions, please do not hesitate to contact Ashley Minion (aquatic biologist, 1-905-747-7693, <u>Ashley.minion@aecom.com</u>), or myself at the number below.

Thank you!

Ami

Ami Arsenault, AECOM
Terrestrial Ecologist, Water & Natural Resources, Environment
D +1-905-747-7477
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#### **AECOM**

105 Commerce Valley West Markham, Ontario, Canada T +1-905-886-7022 aecom.com

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March 15, 2016

Elizabeth Spang (District Planner) Catherine Warren (District Planner) Peterborough – District Office 300 Water Street Peterborough, ON K9J 3C7

Dear Ms. Warren and Ms. Spang:

Regarding: Highway 401 Interchange Improvements at County Road 41 Interchange and Palace Road

Interchange - PD and EA

GWP 4459-04-00 and GWP 4197-13-00

Request for Background Data and Fish Community Data for Aquatic and Terrestrial

**Investigations** 

AECOM Canada Limited (AECOM) has been retained by the Ontario Ministry of Transportation (MTO) to undertake the two separate Preliminary Design and Class Environmental Assessment Studies for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00) and the Highway 401 / Palace Road interchange (G.W.P. 4197-13-00). Both projects are located in the Town of Greater Napanee within the County of Lennox and Addington. These studies will examine interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or widening of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, the traffic staging (including potential detours on County Road 41 and Palace Road) during construction. Both areas of improvement are highlighted in the attached map.

Both studies are following the approved environmental planning process for Group 'B' projects in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (2000) with the opportunity for the public to provide input. A Transportation Environmental Study Report will be prepared for each study area and will include the following information:

- Justification for the project
- Existing environmental conditions
- Generation, assessment and evaluation of alternatives
- Preferred alternatives
- Summary of potential environmental issues and mitigation measures
- Summary of consultation undertaken throughout the study

AECOM has undertaken a preliminary review of available background data within the study area, using several available sources including: the MNRF's Make-a-Map: Natural Heritage Areas, Conservation Ontario Species at Risk and DFO Mapping and the Atlas of Breeding Birds of Ontario. No significant woodlands or wetlands were identified within the immediate area. No aquatic species at risk were identified within the study areas.



OBBA Square 18UQ40								
Common Name	Common Name Scientific Name							
Bobolink	Dolichonyx oryzivorus	THR						
Barn Swallow	Hirundo rustica	THR						
Bank Swallow	Riparia riparia	THR						
<b>Common Nighthawk</b>	Chordeiles minor	SC						
Whip-poor-will	Antrostomus vociferus	THR						
<b>Chimney Swift</b>	Chaetura pelagica	THR						
Loggerhead Shrike	Lanius Iudovicianus	END						
Eastern Meadowlark	Sturnella magna	THR						

Additional species at risk or concern were also identified through the Natural Heritage Areas Make-a-Map search. They include Snapping Turtle (*Chelydra serpentina*), Milksnake (*Lampropeltis triangulum*), and Eastern Meadowlark (*Sturnella magna*).

During this preliminary review, AECOM has also identified data gaps for which we require additional information. Please consider this a formal request for the following information with respect to both study areas in the attached map. If you could please review the above listed data, and provide us with any additional information, reports and GIS Data pertaining to:

- Presence of Natural Areas (ESA, PSW, ANSI, Significant Woodlands/Wetlands, Provincial Parks, Conservation Reserves and Wildlife Management Areas);
- Natural Area Reports;
- Rare Species Occurrences (locally and provincially rare);
- ELC Vegetation Community GIS data;
- Regulated Area and Floodline GIS data;
- Natural Heritage System GIS data;
- Municipal Drains and Drain Classification;
- In-water Timing Restrictions;
- Water Quantity/Quality Data;
- Groundwater Discharge Areas;
- Watercourse Names, Thermal and Flow Regimes;
- Thermal and flow regime classification of watercourses GIS data;
- MNRF's Interpretation of Fish Habitat Sensitivity;
- Habitat Information and Location;
- MNRF's Fisheries Management Objectives/plans; Fish and Mussel Records;
- Species at Risk & of Conservation Concern (aquatic);
- Fish Community Records;
- Fisheries Management Designations;
- Fish Habitat Sensitivity;
- Important Angling areas, specifically: Baitfish Harvesting and/or Fish Sanctuaries;
- Aboriginal Fisheries;
- Recovery Strategies; and
- Presence of Critical Habitat



Please also review the MNRF Fisheries Information Request Table attached to this email, outlining additional aquatic information needed.

We understand that not all of the information requested from the list above may be available; however, it would be greatly appreciated if you could please provide a response of what information can be or will be provided.

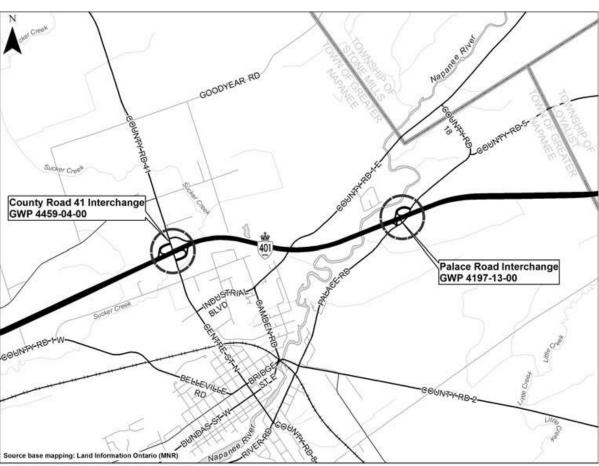
Should you have any questions or require further information, please do not hesitate to contact me as I would be more than glad to provide assistance.

Thank you,

Ami Arsenault

Ani Strouted.

#### **Key Plan**



G:\GIS\Projects\401 IC Improvements\GIS\MXD\OGN\_Map.mxd



#### Kime, Heather

From:

Warren, Catherine (MNRF) < Catherine. Warren@ontario.ca>

Sent:

March-16-16 3:23 PM

To:

Leech, Fred; Arsenault, Ami

Cc: Subject: Hodges, Nick; Minion, Ashley; Kime, Heather

401 Interchanges at Palace Road and County Road 41 MNRF File No: 16-RICH-LNA-

**Attachments:** 

EAE-2138

MNRF Fisheries Information Request Table\_401 Napanee.docx

Hello.

MNRF Peterborough District has received your notice (dated January 18, 2016 and March 15, 2016) regarding the MTO Environmental Assessment for the interchanges of Highway 401 and County Road 41 as well as Palace Road (Richmond and Fredricksburgh), Napanee. We provide the following general information for your consideration:

#### **General: MNR Data and Information**

We would like to inform you that MNRF's natural heritage and natural resources data and information (including wetlands, ANSIs) for the study area can be obtained through the Land Information Ontario Warehouse (LIOW) through the Ministry's Land Information Ontario (LIO) website at: https://www.ontario.ca/environment-and-energy/land-informationontario.

You may also view natural heritage information online (e.g. Provincially Significant Wetlands, ANSIs, Woodlands, NHIC 1 km screening squares) using Natural Heritage Make a Map at: https://www.ontario.ca/environment-and-energy/makenatural-heritage-area-map.

You can also obtain Species at Risk occurrence information on our Natural Heritage Information Centre website: https://www.ontario.ca/environment-and-energy/get-natural-heritage-information. In addition, the official Species at Risk in Ontario (SARO) List can be obtained at: <a href="http://www.e-laws.gov.on.ca/html/regs/english/elaws\_regs\_080230\_e.htm">http://www.e-laws.gov.on.ca/html/regs/english/elaws\_regs\_080230\_e.htm</a>

We recommend that you use the above-noted sources of information during the review of your project proposal.

MNRF may provide additional information and technical advice if details of the proposed location(s) and design(s) of the proposed works are circulated to our office.

#### Wetlands

At County Road 41 the subject area is not adjacent to any wetlands. At Palace Road the subject area is adjacent to unevaluated wetlands. We recommend contacting your local Conservation Authority for more information on approvals that may be required.

ANSIs: There are no ANSIs located near the County Road 41 or the Palace Road interchanges with Highway 401.

#### **Fisheries**

Please see the attached fisheries information table.

\* Please contact Department of Fisheries and Oceans/local Conservation Authority for any approvals that may be required and/or recommendations on any sediment/erosion control measures that may be required to be installed prior/during/after construction.

#### **Species at Risk**

A review of our best available information indicates that there are occurrences of Four-leaved Milkweed (Endangered) and Milksnake (Special Concern) in the immediate area of the sites. Also, there are occurrences of Eastern Meadowlark (Threatened), Lake Sturgeon (Threatened), Barn Swallow (Threatened), Northern Map Turtle (Special Concern), Wood Thrush (Special Concern), Eastern Wood-Pewee (Special Concern), Loggerhead Shrike (Endangered), Snapping Turtle (Special Concern), Bobolink (Threatened), Eastern Musk Turtle (Special Concern), American Eel (Endangered) and Ogden's Pondweed (Endangered) in the general area (5 km) of the proposed activities. Although no other threatened or endangered species or their habitat have been documented in the area of the proposed projects, these features may be present and this list should not be considered complete.

Species listed as endangered or threatened on the Species at Risk in Ontario (SARO) list are protected under the Endangered Species Act, 2007 (ESA). Section 9(1) of the ESA prohibits a person from killing, harming, harassing, capturing or taking a member of a species listed as endangered, threatened or extirpated on the SARO list. Section 10(1) of the ESA prohibits the damage or destruction of habitat of a species listed as endangered or threatened on the SARO list.

Since comprehensive mapping for most Species at Risk is not available a site assessment is recommended, to identify the presence of any Species at Risk and/or their habitat on the subject lands, as a decision should not be made in the absence of such information. The focus of the site assessment can include a review of the information about known occurrences provided by MNRF above along with other information sources such as species distributions and habitat requirements as well as field visits using MNRF approved protocols during the appropriate seasons by a qualified professional. Due to the species that are potentially present at this site, the following recommendations should help prevent adverse impacts:

#### Birds

Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs and/or young. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after July 1 (or as soon as it has been determined that that the young have left the nest). Please note that the breeding bird season in the subject area extends from April 1 to June 30. Therefore, works should commence after June 30 whenever possible.

<u>Specific Barn Swallow Information:</u> Barn Swallow nests may be present under bridges and/or culverts. Therefore, the underside of these structures should be assessed for Barn Swallow nests before proceeding. If there are no nests present (or if nests are present, but not being used at the time of construction), a contravention of the ESA is unlikely. However, if nests are present and being utilized, construction should not begin until after August 15 of any year. Understanding that some projects need to occur before or during nesting season, the bridge should be blocked prior to nesting season (April 15 – August 15) using netting or tarping in order to prevent Barn Swallows from nesting under the bridge (if there is evidence of past nesting activity).

#### Turtles and Snakes

Workers must be vigilant and check work areas for the presence of turtles. If turtles or snakes are encountered, whenever possible, work should be temporarily suspended until the animal is out of harm's way. Workers should report any turtle observations (including photographs and coordinates) to the Peterborough District Office immediately at (705) 755-2001. Please note that the turtle nesting season in the subject area extends from May 15 to Aug 15. Therefore, activities which may cause adverse impacts to a species or habitat (e.g. use of heavy equipment) should commence after Aug 15.

As of July 1, 2013, there are new regulatory provisions provided under the ESA. This regulatory provision allows eligible activities, such as work undertaken to repair, modify, demolish, replace or general maintenance of a structure or the removal of buildings and/or excavation of land, vegetation removal, etc. that is considered to be species at risk habitat to proceed without a permit, provided the proponent register with the Ministry of Natural Resources and Forestry and then follow the specific rules in regulation under the ESA. These rules include, but are not limited to, preparing a mitigation plan and implementing steps to minimize the adverse effects of the activity on the species identified.

Information on the new ESA regulatory provision that come into effect on July 1, 2013 can be found at http://www.ontario.ca/environment-and-energy/natural-resources-approvals..

The amended ESA regulation (O.Reg 242/08) can be found at <a href="http://www.e-laws.gov.on.ca/html/regs/english/elaws\_regs\_080242\_e.htm">http://www.e-laws.gov.on.ca/html/regs/english/elaws\_regs\_080242\_e.htm</a>.

If an impact to a Species at Risk or its habitat cannot be avoided, a person(s) should contact MNRF to discuss options, including applying for an authorization under the ESA. In situations where an activity is not registered with or authorized by the MNRF, a person(s) must comply with the ESA by modifying proposed activities to avoid impacts to Species at Risk and habitat protected under the ESA.

It is highly recommended that landowners and on-site workers familiarize themselves with information found at the following links:

MNRF Species at Risk website: www.ontario.ca/speciesatrisk

During on-site activities, should any species at risk or their habitat be potentially impacted, MNRF should be contacted immediately and operations should be modified to avoid any negative impacts to species at risk or their habitat until further discussions with MNRF can occur regarding opportunities for mitigation. If any species at risk are found, the Peterborough District MNRF office should be contacted at 705-755-2001. If possible, pictures of the species at risk and coordinates for the location where it was observed should be provided to MNRF.

#### Significant Wildlife Habitat

The site may contain significant wildlife habitat which typically must be identified during site-specific investigations. Significant wildlife habitat may include features such as: seasonal concentration areas for wildlife species (e.g. snake hibernaculum), rare vegetation communities (e.g. tallgrass prairie), specialized habitats of wildlife (e.g. turtle nesting and over-wintering areas), habitats of species of conservation concern (e.g. Special Concern species as identified on the Species at Risk in Ontario list) and animal movement corridors (e.g. amphibian movement corridors). We recommend that you contact the local planning authority for potential study requirements for the identification of Significant Wildlife Habitat. In addition, when no information is available, we refer you to the Significant Wildlife Habitat Technical Guide and the recently approved Ecoregion 6E Criterion Schedule for the identification of Significant Wildlife Habitat (January 2015). The Ecoregion Criterion Schedules and newly approved Significant Wildlife Habitat Mitigation Support Tool (MiST) can be downloaded here: <a href="https://www.ontario.ca/search/natural-heritage-planning-resources-municipal-planning">https://www.ontario.ca/search/natural-heritage-planning-resources-municipal-planning</a>

#### **General Information Regarding MNRF approvals:**

#### **Endangered Species Act (ESA)**

Species listed as endangered or threatened on the Species at Risk in Ontario (SARO) List are protected under the *Endangered Species* Act, 2007 (ESA, 2007). Section 9(1) of the ESA, 2007 prohibits a person from killing, harming, harassing, capturing or taking a member of a species listed as endangered, threatened or extirpated on the SARO list. Section 10(1) of the ESA, 2007 prohibits the damage or destruction of habitat of a species listed as endangered or threatened on the SARO list.

Site assessments may be recommended to determine and confirm the presence or absence of a Species at Risk included in the Species at Risk in Ontario (SARO) List. Please note that you may require a permit under the ESA, 2007 from our office, if any Species at Risk or their habitat is found within the study area.

Should any Species at Risk or their habitat be potentially impacted by on site activities, MNRF should be contacted immediately and operations should be modified to avoid any negative impacts to Species at Risk or their habitat until further discussions with MNRF can occur regarding opportunities for mitigation.

If any species at risk is found please contact the Peterborough District Office immediately at 705-755-2001.

NEW ESA Regulations in effect starting July 1, 2013:

MNR may be able to provide species specific survey methodology to assist your review.

#### Fish and Wildlife Conservation Act

Please note that you may require a Scientific Collector's Permit from our office if you will be doing any fish or wildlife sampling, collection, salvage, or relocation within Peterborough District. For more information about Scientific Collector's Permits, please contact Julie Formsma, Acting Fish and Wildlife Technical Specialist at 705-755-3296.

#### Other Approvals

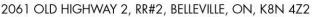
It is the responsibility of the proponent to acquire all other information and necessary approvals from any other municipal, provincial or federal authority under other legislation. We recommend that you contact your local Conservation Authority, Department of Fisheries and Oceans, Ministry of the Environment and Climate Change, Ministry of Tourism, Culture and Sport, etc.

If you have any questions regarding the above comments, don't hesitate to contact me. Please reference the file number in the subject line for any future correspondence.

Sincerely,

#### Catherine

Catherine Warren A/District Planner A/District Planner
Peterborough District
Ontario Ministry of Natural Resources and Forestry
300 Water Street, 1<sup>st</sup> Floor South
Peterborough, ON K9J 8M5
Tel: (705) 755-3294
Fax: (705) 755-3125
Email: catherine.warren@ontario.ca







#### **VIA EMAIL**

January 27, 2016

Tina White Senior Project Manager Planning and Design Ministry of Transportation, Eastern Region 1355 John Counter Boulevard Postal Bag 4000 K7L 5A3 Fred Leech Consultant Environmental Planner AECOM 201-45 Goderich Road Hamilton, ON L8E 4W8

**Re:** Notice of Study Commencement

Preliminary Design and Class Environmental Assessment Studies: Highway 401 Interchange Improvements at County Road 41, and Highway 401 Interchange Improvements at Palace Road (G.W.P. 4459-04-00 and G.W.P. 4197-13-00)

Further to your letter (dated January 18, 2016) regarding the above noted environmental assessment, we would like to offer the following comments:

- 1. Quinte Conservation maintains floodplain mapping for both the Selby/Sucker Creek, which is adjacent to the County Road 41 Interchange; and the Napanee River, which is adjacent to the Palace Road Interchange. Further information regarding flood flows & engineering should be addressed by contacting Christine McClure, Water Resources Manager at this office (613-968-3434 x 130).
- 2. The 'Palace Road Interchange' lies within the Source Water Protection Intake Protection Zone 2 for the Town of Napanee's municipal drinking water intake. There are no significant drinking water threats associated with the alteration of the interchange, however, general concerns include the application of road salt on the roadways as well as spills along the highway within the Intake Protection Zone 2. For further information, please contact Amy Dickens, Risk Management Official/Inspector at this office (613-968-3434 x 132).
- 3. Quinte Conservation does not have any natural heritage reports, mapping or inventories for the study area. Further information regarding natural heritage values should be obtained from the Ministry of Natural Resources and Forestry.
- 4. Quinte Conservation would appreciate a copy of the final Environmental Assessment document for our records.

Should you require any further information regarding this matter, please contact the undersigned.

Sincerely,

Tim Trustham

Planner/Ecologist

Lim Tuesthan

/tt



# Appendix **B**

**Photo Log** 



Photograph 1. ♠
CUM1 facing north, west of County Road 41,
south of Highway 41



Photograph 2. ↑
CUM1 facing south towards Highway 401
exit ramp, east of County Road 41



Photograph 3. ↑
CUM1 facing east towards Sucker Creek, east of County Road 41, south of Highway 401



Photograph 4. ↑
CUM1 facing west from County Road 41,
south of Highway 401



Photograph 5. ↑
Facing north to FOM, east of County Road 41, south of Sucker Creek



Photograph 6. ↑
Facing south to FOM, east of County Road 41
and Sucker Creek

App B\_Terrestrial Photolog-Cr41

Terrestrial Ecosystems Existing Conditions and Impact Assessment Report Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00)



Photograph 7. ↑
Facing east to FOM, east of County Road 41



Photograph 8. ↑
Facing south to FOM, east of County Road 41

App B\_Terrestrial Photolog-Cr41



# Appendix C

**Plant List** 

# **Appendix C. Vascular Plant Species List**

BOTANICAL NA	ME	COMMON NAME	CUM1	FOM	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS	GLOBAL STATUS
PTERIDOPHYTES		FERNS & ALLIES									
Dryopteridaceae		Wood Fern Family									
Onoclea	sensibilis	Sensitive Fern		Α	4	-3		S5			G5
GYMNOSPERMS		CONIFERS									
Cupressaceae		Cedar Family									
Juniperus -	virginiana	Eastern Red Cedar	0		4	3		S5			G5
Thuja	occidentalis	Eastern White Cedar		R	4	-3		S5			G5
Pinaceae	1	Pine Family									
Larix	laricina	Tamarack	R		7	-3		S5			G5
Picea	abies	Norway Spruce	0			5	-1	SE3			G?
Pinus	nigra	Austrian Pine	0	Α		-5	-1	SE2			G?
DICOTYLEDONS	1	DICOTS									
Aceraceae	1	Maple Family									
Acer	negundo	Manitoba Maple	0		0	-2		S5			G5
Acer	platanoides	Norway Maple	Ō			5	-3	SE5			G?
Acer	saccharinum	Silver Maple	R		5	-3		S5			G5
Acer	saccharum	Sugar Maple		0	4	3		S5			G5T?
Anacardiaceae		Sumac or Cashew Family									
Toxicodendron	rydbergii	Western Poison-ivy	0		0	0		S5			G5T
Rhus	hirta	Staghorn Sumac	0		1	5		S5			G5
Apiaceae		Carrot or Parsley Family	<del>-  </del>		·						
Daucus	carota	Wild Carrot	0		1	5	-2	SE5			G?
Pastinaca	sativa	Wild Parsnip	0			5	-3	SE5			G?
Asclepiadaceae	Canva	Milkweed Family	Ť		1		Ť	020			<u></u>
Asclepias	syriaca	Common Milkweed	0		0	5		S5			G5
Asteraceae	- Cyrraea	Composite or Aster Family	<del>-  </del> -		Ť						
Cichorium	intybus	Chicory	0	1		5	-1	SE5			G?
Cirsium	arvense	Canada Thistle	Ö			3	-1	SE5			G?
Erigeron	annuus	Eastern Daisy Fleabane	0		0	1	· ·	S5			G5
Inula	helenium	Elecampane	Ö		Ť	5	-2	SE5			G?
Solidago	canadensis	Canada Goldenrod	Ā		1	3		S5			G5
Taraxacum	officinale	Common Dandelion	0			3	-2	SE5			G5
Balsaminaceae		Touch-me-not Family									
Impatiens	capensis	Spotted Touch-me-not	0		4	-3		S5			G5
Impatiens	glandulifera	Glandular Touch-me-not	Ō		·	-3	-2	SE4			G?
Boraginaceae	<i>g</i>	Borage Family									
Echium	vulgare	Blueweed/common vipersbugloss	0			5	-2	SE5			G?
Caprifoliaceae		Honeysuckle Family					_	920			
Lonicera	species	Honeysuckle Species	0	R							
Viburnum	lentago	Nannyberry	o o	i`	4	-1		S5			G5
Caryophyllaceae	iomago	Pink Family	<del>-  </del> -		· ·						
Silene	vulgaris	Catchfly	0			5	-1	SE5			G?
Cornaceae	valgario	Dogwood Family	<del>-</del>				'	020			<u></u>
Cornus	racemosa	Red Panicled Dogwood/Gray dogwood	0	<del>                                     </del>	2	-2		S5			G5?
Cornus	rugosa	Round-leaved Dogwood	0		6	5	<del>                                     </del>	S5			G5:
Cornus	sericea	Red-osier Dogwood	0		2	-3	<del>                                     </del>	S5			G5
Euphorbiaceae	00/1004	Spurge Family	<del>-   -</del>			-5	<del>                                     </del>	- 55			- 55
Euphorbia	esula	Leafy Spurge	R	1	<del>                                     </del>	5	-2	SE5		1	G5
Fabaceae	could	Pea Family	K			ິນ		J SES			Go
rapaceae	ļ	rea raililly		<u> </u>	ļ		ļ.	ļ		<u> </u>	

App C-CR41-PlantList-20161104

# **Appendix C. Vascular Plant Species List**

BOTANICAL NA	ME	COMMON NAME	CUM1	FOM	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS	GLOBAL STATUS
Melilotus	officinalis	Yellow Sweet-clover	0			3	-1	SE5			G?
Robinia	pseudo-acacia	Black Locust	R			4	-3	SE5			G5
Trifolium	pratense	Red Clover	0			2	-2	SE5			G?
Vicia	cracca	Tufted Vetch	Α			5	-1	SE5			G?
Fagaceae		Beech Family									
Quercus	alba	White Oak	R		6	3		S5			G5
Quercus	macrocarpa	Bur Oak		R	5	1		S5			G5
Quercus	rubra	Red Oak	R		6	3		S5			G5
Nyctaginaceae		Four-O-clock Family						1			
Mirabilis	nyctaginea	Heart-leaved Umbrella-wort	R			5	-1	S4			G5
Oleaceae	ing congress	Olive Family									
Fraxinus	americana	White Ash	0	D	4	3		S5			G5
Syringa	vulgaris	Common Lilac	R	<del>                                     </del>	-	5	-2	SE5			G?
Onagraceae	Vargano	Evening-primrose Family	1					OLO			<del></del>
Oenothera	biennis	Common Evening-primrose	R		0	3		S5			G5
Ranunculaceae	Dietiliis	Buttercup Family	IX	<u> </u>	0	3		33			65
	aanadanaia	Canada Anemone			2	2		S5			G5
Anemone	canadensis		0	<u> </u>	3	-3	0				
Ranunculus	acris	Tall Buttercup	0				-2	SE5			G5
Rhamnaceae	" "	Buckthorn Family						055			
Rhamnus	cathartica	Common Buckthorn	0	Α		3	-3	SE5			G?
Rosaceae		Rose Family						Į			
Fragaria	virginiana	Virginia Strawberry	0		2	1		SU			G5T?
Potentilla	argentea	Silvery Cinquefoil	0			3	-2	SE5			G?
Potentilla	simplex	Old-field Cinquefoil	0		3	4		S5			G5
Prunus	virginiana	Choke Cherry	0		2	1		S5			G5T?
Rosa	rubiginosa	Sweetbrier Rose	0			5	-1	SE4			
Rubus	allegheniensis	Alleghany Blackberry	0		2	2		S5			G5
Salicaceae		Willow Family									
Populus	deltoides ssp. deltoides	Eastern Cottonwood	0	0	4	-1		SU			G5T?
Populus	tremuloides	Trembling Aspen	0	0	2	0		S5			G5
Scrophulariaceae		Figwort Family									
Linaria	vulgaris	Butter-and-eggs	0			5	-1	SE5			G?
Verbascum	thapsus	Common Mullein	0			5	-2	SE5			G?
Tiliaceae	,	Linden Family						1			
Tilia	americana	American Basswood		D	4	3		S5			G5
Ulmaceae		Elm Family									
Ulmus	americana	White Elm	0		3	-2		S5			G5?
Vitaceae	amondana	Grape Family			Ŭ		1				
Parthenocissus	quinquefolia	Five-leaved Virginia-creeper	О		6	1		S4?			G5
Vitis	riparia	Riverbank Grape	0		0	-2		S5			G5
MONOCOTYLEDON		MONOCOTS			0	-2		- 55			00
Cyperaceae	<u>v</u>	Sedge Family		ł				1			
			Δ.	1					1		<b></b>
Carex	species	Sedge species	Α	<u> </u>							<del>                                     </del>
Poaceae	I to a sound a sound to	Grass Family			1			0==	-	1	04057
Bromus	inermis ssp. inermis	Awnless Brome	A		_	5	-3	SE5			G4G5T?
Deschampsia	flexuosa	Common Hairgrass	R		8	5	<b></b>	S5			G5
Phalaris	arundinacea	Reed Canary Grass	D	ļ	0	-4		S5	ļ	ļ	G5
Phleum	pratense	Timothy	D			3	-1	SE5			G?
Phragmites	australis	Common Reed	0		0	-4		S5			G5
Typhaceae		Cattail Family									
Typha	latifolia	Broad-leaved Cattail	0		3	<b>-</b> 5		S5			G5

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# **Appendix C. Vascular Plant Species List**

BOTANICAL NA	AME	COMMON NAME	CUM1	FOM	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS	GLOBAL STATUS
FLORISTIC SUMM	ARY & ASSESSMENT				-						
Species Diversity											
Total Species:		64									
Native Species:		37			57.81%						
Exotic Species		27			42.19%						
S1-S3 Species		0									
S4 Species		1									
S5 Species		34									
Co-efficient of Con	servatism and Floral Quality Index										
Co-efficient of Cons	ervatism (CC) (average)	3.00									
CC 0 to 3	lowest sensitivity	20			54.05%						
CC 4 to 6	moderate sensitivity	15			40.54%						
CC 7 to 8	high sensitivity	2			5.41%						
CC 9 to 10	highest sensitivity	0			0.00%						
Floral Quality Inde	x (FQI)	18.25									
Presence of Weed	y & Invasive Species										
mean weediness	- -	-1.78									
weediness = -1	low potential invasiveness	11			40.74%						
weediness = -2	moderate potential invasiveness	11			40.74%						
weediness = -3	high potential invasiveness	5			18.52%						
Presence of Wetlan	nd Species										
average wetness va		1.70									
upland		20			31.25%						
facultative upland		18			28.13%						
facultative		9			14.06%						
facultative wetland		14			21.88%						
obligate wetland		2			3.13%						

App C-CR41-PlantList-20161104

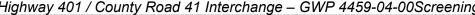


# Appendix D

**Species at Risk Habitat Assessment** 

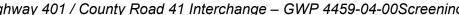


Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	4-00Screening Preferred Habitat <sup>1, 2</sup>	Known Species Range <sup>1, 2</sup>	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species Observed During Field Investigations	Conclusions/Recomm endations
Birds	Bank Swallow Riparia riparia	THR	No Status		Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs.	The bank swallow is found all across southern Ontario, with sparser populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron).	OBBA Square Search 18QU40		No. Field investigations did not result in the observation of the species or appropriate habitat conditions.	No additional surveys recommended.
Birds	Barn Swallow Hirundo rustica	THR	No Status		Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces.  This species can typically be associated with the following ELC communities: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1; containing or adjacent structures that are suitable for nesting.	The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist.	OBBA Square Search 18QU40	Yes. Foraging habitat is present within the cultural meadow communities.	No. Nest surveys were completed under suitable bridges, however there was no evidence of this species.	Suitable habitat may be present within the Construction Footprint. Additional surveys recommended.
					· ·					
Birds	Bobolink <i>Dolichonyx</i> <i>oryzivorus</i>	THR	No Status		Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping.  This species can typically be associated with the following ELC communities: TPO, TPS, CUM1 and MAM2.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists.	OBBA Square Search 18QU40	may exist within	No. This species was not identified during field investigations	Species unlikely to be breeding within the Construction Footprint. No additional surveys recommended.
Birds	Chimney swift Chaetura pelagica		THR Schedule 1	THR	Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests.  Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate.  Foraging habitat for this species can be associated with the following ELC codes: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1,	The Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. It winters in northwestern South America.	OBBA Square Search 18QU40	Yes. Suitable foraging habitat is present within the study area. The cultural meadow community provide foraging habitat.	No. This species was not identified during field investigations	No additional surveys recommended.
Birds	Common Nighthawk Chordeiles minor		THR Schedule 1		Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways, they tend to occupy natural sites.  This species can typically be associated with the following ELC communities: SD, BB, RB, CUM, BO, FOM, FOC and FOD with openings with little vegetation.	The range of the Common Nighthawk spans most of North and Central America. In Canada, the species is found in all provinces and territories except Nunavut. In Ontario, the Common Nighthawk occurs throughout the province except for the coastal regions of James Bay and Hudson Bay. It winters in South America where it is concentrated in Peru, Ecuador and Brazil.	OBBA Square Search 18QU40	Yes. Suitable habitat may exist within the cultural meadow and mixed forest community.	No. This species was not identified during field investigations	No additional surveys recommended.
Birds	Eastern Meadowlark Sturnella magna	THR	No Status		Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches.  This species can typically be associated with the following ELC communities: TPO, TPS, CUM1, CUS, and MAM2 with elevated song perches.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield but it also inhabits the Lake Nipissing, Timiskaming and Lake of the Woods areas.	OBBA Square Search 18QU40	may exist within	No. This species was not identified during field investigations	Species unlikely to be breeding within the Construction Footprint. No additional surveys recommended.



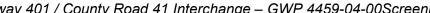


Taxonomy	1 / County Road 41 Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat <sup>1, 2</sup>	Known Species Range <sup>1, 2</sup>	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species Observed During Field Investigations	Conclusions/Recomm endations
Birds	Eastern Whip-poor-will Caprimulgus vociferus	THR	THR Schedule 1	THR	This species can typically be associated with the following ELC communities: <b>TPS</b> , <b>TPW</b> , <b>CUW</b> , <b>FOD</b> , <b>FOC</b> and <b>FOM</b> where open areas are present.	The Eastern Whip-poor-will's breeding range includes two widely separate areas. It breeds throughout much of eastern North America, reaching as far north as southern Canada and also from the southwest United States to Honduras. In Canada, the Whip-poor-will can be found from east-central Saskatchewan to central Nova Scotia and in Ontario they breed as far north as the shore of Lake Superior.  Although Eastern Whip-poor-wills were once widespread throughout the central Great Lakes region of Ontario, their distribution in this area is now fragmented. The Whip-poor-will migrates to Mexico and Central America, where it stays throughout the cold Canadian winter.		Yes. Suitable habitat is present within the mixed forest community.	No. This species was not identified during field investigations	No additional surveys recommended.
Birds	Eastern Wood- Pewee Contopus virens	sc	No Status	SC	not appear to be an important factor in habitat selection as this species has been found in both small fragmented forests and larger	The Eastern Wood-Pewee Breed throughout central and eastern North America from Saskatchewan to Nova Scotia south along the Atlantic Coast to North Florida and the Gulf Coast. <sup>4</sup>		Yes. Suitable habitat is present within the mixed forest an community.	No. This species was not identified during field investigations	No additional surveys recommended.
Birds	Loggerhead Shrike Lanius Iudovicianus	END	END Schedule 1	END	In Ontario, the Loggerhead Shrike prefers pasture or other grasslands with scattered low trees and shrubs. It lives in fields or alvars (areas of exposed bedrock) with short grass, which makes it easier to spot prey. It builds its nest in small trees or shrubs and hunts by waiting patiently in tree branches until it swoops down and attacks its unsuspecting prey – usually large insects, such as grasshoppers. Loggerhead Shrikes also require spiny, multi-branched shrubs where they can impale prey before eating it. Barbed wired fencing can also be used for this.  This species can typically be associated with the following ELC communities: SWT, CUM, CUT, ALO and ALS.	The Loggerhead Shrike currently breeds in central and western North America. Until the 1970s, the Loggerhead Shrike could be found at many locations throughout southern Ontario and other parts of northeastern North America, but it has declined dramatically. Although the occasional bird is still found within the broader former range, most remaining Loggerhead Shrikes are now found in two core grassland habitats - the Carden Plain north of Lindsay, and the Napanee Limestone Plain. Every fall these birds migrate to the southern United States for the winter.	Consultation	Yes. There is potential habitat in the CUM1 community west of County Road 41, south of Highway 401 within the Potentially Impacted Area.	No. This species was not identified during field investigations	No additional surveys recommended.
Birds	Wood Thrush Hylocichla mustelina	SC	No Status	THR	,	The Wood Thrush ranges across central and southern Ontario, southern Quebec, New Brunswick and southern Nova Scotia and the majority of the eastern United States.  It winters in Central American between southern Mexico and Panama. 3	Consultation		No. This species was not identified during field investigations	No additional surveys recommended.





Taxonomy	/ County Road 41 Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat <sup>1, 2</sup>	Known Species Range <sup>1, 2</sup>	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species Observed During Field Investigations	Conclusions/Recomm endations
Mammals	Eastern Small- footed Myotis	END	No Status			The eastern small-footed bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites.	Bat Conservation International	Yes. Suitable habitat is present within the mixed forest community.	No. This species was not identified during field investigations	No additional surveys recommended.
Mammals	Little Brown Myotis Myotis lucifugus	END	END Schedule 1	END	colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas.	The little brown bat is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake. Outside Ontario, this bat is found across Canada (except in Nunavut) and most of the United States.	Mammals of Ontario Atlas, Bat Conservation International	Yes. Suitable habitat is present within the mixed forest community.	No. This species was not identified during field investigations	No additional surveys recommended.
Mammals	Northern (Long- eared) Myotis (Bat) Myotis septentrionalis	END	END Schedule 1	END	These bats hibernate from October or November to March or April, most often in caves or abandoned mines.	The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon.  This bat is found in all Canadian provinces as well as the Yukon and Northwest Territories.	Bat Conservation International	Yes. Suitable habitat is present within the mixed forest community.	No. This species was not identified during field investigations	No additional surveys recommended.
Mammals	Tri-colored Bat Perimyotis subflavus	END	END Schedule 1	END	day roosts and maternity colonies in older forest and occasionally in barns and buildings. In winter, the Tri-colored Bat hibernates	The Tri-colored Bat has a scattered distribution across eastern North America from southern Ontario south to Central America. The species can be found across southern Ontario as far north as Sudbury.	Bat Conservation International	Yes. Suitable habitat is present within the mixed forest community.	No. This species was not identified during field investigations	No additional surveys recommended.
Plants	Four-leaved Milkweed Asclepias quadrifolia	END	No Status	END	bedrock within mature deciduous woodlands and sometimes in forests, thickets or meadows.  In Ontario, it is found in two types of habitat: (1) dry woodlands	In Ontario, there are only two known populations remaining for Four-leaved Milkweed, both in Prince Edward County. Historically, populations have also been recorded from the neighbouring Lennox and Addington County, as well from the Niagara River gorge.	MNRF Peterborough Consultation	No. There is no suitable habitat present.	No. This species was not identified during field investigations	No additional surveys recommended.





Taxonomy	/ County Road 41 Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat <sup>1, 2</sup>	Known Species Range <sup>1, 2</sup>	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species Observed During Field Investigations	Conclusions/Recomm endations
	Ogden's Pondweed Potamogeton ogdenii	END	END Schedule 1	END	which can make identification of this rare plant even more difficult.	In Canada, Ogden's pondweed is found only in southeastern Ontario. It was recorded at Murphys Point Provincial Park and Davis Lock on the Rideau Canal between 1970 and 1990.  A historical sighting of the species was recorded in Hastings County in 1873. It has been recommended that additional surveys are needed to determine whether this species exists at any other sites in Ontario.  Outside of Canada, Ogden's pondweed has been identified in Connecticut, New York,	MNRF Peterborough Consultation	No. There is no suitable habitat	No. This species was not identified during field investigations	No additional surveys recommended.
	Eastern Musk Turtle (Stinkpot) Sternotherus	THR	THR Schedule 1	SC	and muddy bottoms that they burrow into for winter hibernation.	In Canada, the Eastern Musk Turtle is found mostly along the southern edge of the Canadian Shield in Ontario and	MNRF Peterborough Consultation	suitable habitat	No. This species was not identified during field investigations	No additional surveys recommended.
	odoratus				exposed to direct sunlight. Nesting females dig shallow excavations in soil, decaying vegetation and rotting wood or lay eggs in muskrat lodges, on the open ground or in rock crevices.	Quebec. In Ontario, it also occurs at various locations throughout southwestern and eastern Ontario. The limited data available indicate that the stinkpot has disappeared from much of its original range in southwestern Ontario.				
	Northern Map Turtle Graptemys geographica	SC	SC Schedule 1	SC	summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's mollusc prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled.  This species can typically be associated with the following ELC communities: <b>OAO</b> , <b>SA</b> with emergent rocks and fallen trees	The Northern Map Turtle's range extends from the Great Lakes region west to Oklahoma and Kansas, south to Louisiana and east to the Adirondack and Appalachian mountain barrier. There are isolated populations in New Jersey and New York states. In Canada, it is found in southwestern Quebec and southern Ontario. In southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie and Lake Ontario, and along larger rivers including the Thames, Grand and Ottawa.	MNRF Peterborough Consultation		No. This species was not identified during field investigations	No additional surveys recommended.
	Snapping turtle Chelydra serpentina	sc	SC Schedule 1	SC	with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	The Snapping Turtle's range extends from Ecuador to Canada. In Canada this turtle can be found from Saskatchewan to Nova Scotia. It is primarily limited to the southern part of Ontario. The Snapping Turtle's range is contracting.	MNRF Peterborough Consultation	presents potential	No. This species was not identified during field investigations	No additional surveys recommended.
					This species can typically be associated with the following ELC communities: <b>OAO</b> , <b>SA</b> near gravelly or sandy areas.					

# **Appendix I – Fish and Fish Habitat Existing Conditions Report**

Prepared for: Ontario Ministry of Transportation

G.W.P. 4459-04-00



# **Ontario Ministry of Transportation (MTO)**

# Fish and Fish Habitat Existing Conditions—Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00) in the County of Lennox-Addington

#### Prepared by:

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T: 905.886.7022 F: 905.886.9494 www.aecom.com

**Date:** January, 2019 **Project #:** 60318949

# **Distribution List**

# Hard Copies	PDF Required	Association / Company Name
5	✓	Ontario Ministry of Transportation (MTO)
1	✓	AECOM Canada Ltd.

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- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

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AECOM: 2015-04-13

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# **Appendices**

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Appendix C. MNRF Correspondence

# 1. Introduction

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study (Group 'B' project) for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00; **Figure 1**). The project is located in the Town of Greater Napanee within the County of Lennox and Addington.

The primary focus of this study is to:

- Review the structural requirements (e.g., major rehabilitation or replacement) at this interchange;
- Identify interim and long-term interchange improvements to address geometric and operational concerns;
- Develop a Preliminary Design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.

In 2014 MTO completed a Preliminary Design Study to determine the short-term, mid-term, and long-term improvements to this interchange, which recommended upgrading the interchange to a full Parclo A4 interchange configuration. In 2004, MTO completed the Detail Design and construction of a new westbound off-ramp at County Road 41 and widening of Sucker / Selby Creek to the north as per the recommendations from the 2004 study. It is anticipated that major rehabilitation of the Highway 401 / County Road 41 and Sucker Creek bridges is anticipated to be needed within 5 years.

The development of an ultimate plan for the County Road 41 interchange allows the structural works to be implemented efficiently and in a cost effective manner, minimizing future throwaway.

This project is being conducted in accordance with the approved environmental planning process for Group 'B' projects in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

Concurrently, MTO is undertaking a separate Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at Palace Road (**Figure 1**).

The Recommended Plan includes the following:

- The short term construction works at the interchange will include major bridge rehabilitation of the County Road 41 and Sucker Creek bridges. In conjunction with the bridge works, the interchange will be upgraded to the ultimate Parclo A4 configuration identified as the preferred alternative.
- The long-term recommendations for the interchange include replacement of the Highway 401 / County Road 41 and Sucker Creek bridges.

The staging strategy will be confirmed during a future Detail Design assignment in advance of the short-term construction.

The Overall Study Area for this project is 600 m in width, extending along Highway 401 from 100 m west of County Road 41 easterly across Selby/Sucker Creek to the Newburgh Road underpass. In compliance with the MTO *Environmental Guide for Fish and Fish Habitat* (the Guide; 2009), the area of interest extends along Selby/Sucker Creek 50 m

upstream and 200 m downstream of the Highway 401 right-of-way. **Figure 1** shows the Overall Study Area considered as part of this report.

There are two (2) bridges crossing watercourses within the County Road 41 Study Area, one which conveys County Road 41 over Selby/Sucker Creek (hereafter referred to as Sucker Creek) and a second bridge which conveys Highway 401 over Sucker Creek.

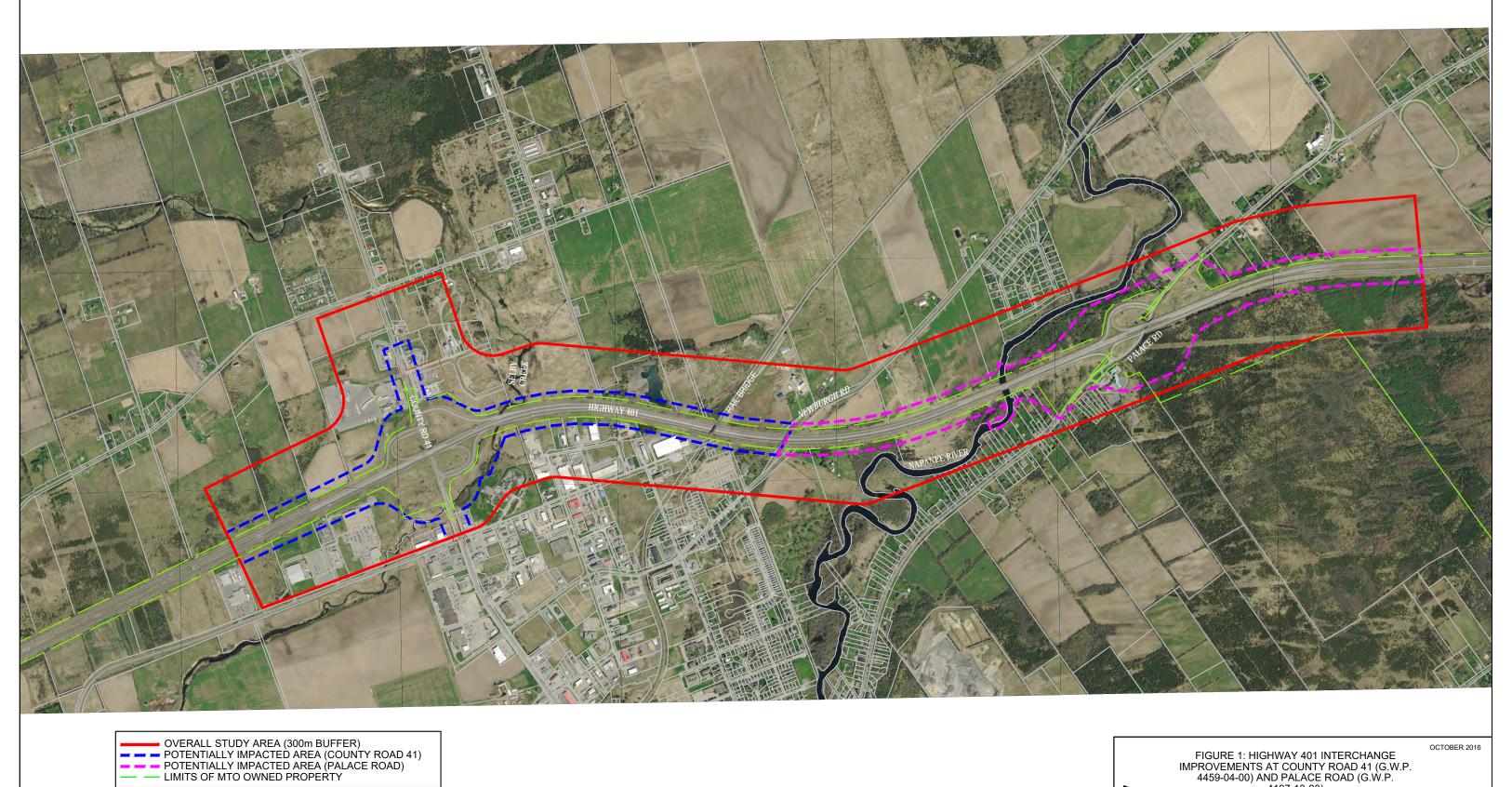
This report provides the Fish and Fish Habitat Existing Conditions documented by AECOM to fulfill the requirements under the MTO/DFO/MNRF Fisheries Protocol for Protecting fish and Fish Habitat on Provincial Transportation Undertakings, Version 3 (the Protocol, 2016).

**Table 1** provides the Universal Transverse Mercator (UTM) co-ordinates for the two structures assessed under the Protocol in this report:

Table 1: Location of Structures (Template 10.1)

Label	Name	Creek Name	Municipality	Easting	Northing
GWP 4459-04-00	County Road 41 Bridge over Sucker Creek	Selby/Sucker Creek*	Greater Napanee	656773	4902910
GWP 4459-04-00	Highway 401 Bridge over Sucker Creek	Sucker Creek	Greater Napanee	656531	4903302

Note: \* Through correspondence with MNRF, Selby Creek was identified as Selby/Sucker Creek



OCTOBER 2016

FIGURE 1: HIGHWAY 401 INTERCHANGE IMPROVEMENTS AT COUNTY ROAD 41 (G.W.P. 4459-04-00) AND PALACE ROAD (G.W.P. 4197-13-00)

250m

0m

250m





# 2. Background and Data Collection

In accordance with Step 2 of the Protocol; 2016, pertinent information on the fish and fish habitat features of the study area were obtained through review of secondary source material from the following sources:

- Ministry of Transportation Eastern Region. (2011) Environmental Screening Document W.P. 98-99-00 & W.P 99-99-00;
- Ontario Ministry of Natural Resources and Forestry (MNRF) Natural Heritage Information Centre Make a Map feature;
- MNRF Online Species at Risk Database and email request for information to MNRF Kingston Office;
- DFO Aquatic Species At Risk Online Mapping and email request for information;
- Ontario Freshwater Fishes Life History on-line database; and,
- Aerial photography;

Sucker Creek is within the jurisdiction of Quinte Conservation. The Overall Study Area does not contain any Provincially Significant Wetlands. Information available from the above noted sources was supplemented by field fish community surveys conducted by AECOM in 2016.

Based on email correspondence from the Kingston MNRF (**Appendix C**), American Eel (listed as Endangered with the Provincial *Endangered Species Act;* ESA) is present in Sucker Creek. The species was not identified on the species list for Sucker Creek which was received from the Peterborough MNRF on March 16, 2016, however; clarification from the Kingston MNRF stated that an MNRF researcher has caught American Eel in the nearby Napanee River and therefore may have the potential to inhabit Napanee River and its connected tributaries. Further, although American Eel are not currently listed as a Species at Risk (SAR) under the federal Species at Risk Act (SARA), it is considered Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and DFO has indicated American Eel is under consideration for listing to Schedule 1 of SARA.

Present science considers the American Eel to consist of a single breeding population in which all individuals travel to the Sargasso Sea in the Atlantic Ocean to spawn. From there, young eels drift with ocean currents and most eventually migrate inland into streams, rivers and lakes.

American Eel begin moving upstream to freshwater habitats when the water temperatures reach 10°C and continue until the temperatures exceed 20°C. In Canada this is typically between late April and early August. However, eels can tolerate a wide range of water temperatures and lotic conditions (DFO, 2013).

Sucker Creek exhibits many of the habitat characteristics that American Eel require. This includes a silty substrate and pools. Further, habitat conditions within the assessed reach contain non-limiting feeding and migratory habitat that is likely conducive to eels, including pools for elvers protection and silt substrate for periods of rest.

Overall, the Sucker Creek watercourse was found to contain fish habitat and is managed as warmwater habitat by the MNRF. Sucker Creek is a permanent warmwater system that supports warmwater and coolwater forage and baitfish. Sucker Creek likely provides spawning habitat for the forage and baitfish at the cobble and riffle areas.

#### 2.1 Field Investigation Methods

On June 3, 2016 AECOM ecologists conducted a Fisheries and Aquatic Habitat assessment to determine the existing conditions of one (1) watercourse, Sucker Creek. The Fisheries and Aquatic Habitat Assessment was completed in accordance with the Guide. Fish community sampling was carried out immediately upstream of the bridge structure at County Road 41 using dip nets. All fish captured were immediately transferred to a bucket of water where they were held until they were identified, enumerated and live released back into the water.

As per Section 3.1.2 of the MTO Environmental Reference for Highway Design (ERD; 2013), for the purposes of investigating the potential impacts of the Project on fish and fish habitat, the study area, for each respective structure, was divided into two (2) zones: the Zone of Detailed Assessment (ZDA), which includes the areas within the MTO right-of-way (ROW), from 0 m to 50 m downstream of the ROW, and from 0 m to 20 m upstream of the ROW and the Zone of General Assessment (ZGA), which included from 50 m to 200 m downstream of the ROW and from 20 m to 50 m upstream of the ROW (of which only a general description of the aquatic environment is documented).

#### Recorded criteria included:

- Surrounding natural features and land uses (i.e., wetland, agriculture, industrial etc.);
- Channel dimensions, channel morphology and bank stability;
- Stream morphology dimensions:
  - Runs typically deep, fast moving water with little to no turbulence of water
  - Riffles shallow, fast moving water typically running over rocks; riffles provide areas of high oxygenated waters
  - Flats low flowing water with a smooth un-agitated surface
  - Pools are described as deep pockets of slow moving water that provide ideal habitat for fish;
- Substrate composition (e.g., clay, silt, sand, gravel, cobble, rock, boulder, muck and detritus);
- Indicators of water clarity, water colour, presence and type of aquatic macrophytes, algal growth and evidence of runoff;
- Potential enhancement opportunities; and,
- Pollution sources (i.e., tile drain discharges, other piped discharges and road runoff).

In-stream cover was documented based on the percentage of cover provided by woody debris, boulders (>256 millimetres (mm) diameter), cobble (256-64 mm diameter), gravel (64-2 mm), aquatic vegetation and undercut banks. In-stream cover was classified as high if there was in-stream coverage between the areas of 76-100%; moderate 31-75%; and low 0-30%. Riparian vegetation canopy cover was provided as a percentage of cover over the site of investigation. Overall canopy cover was classified as: high 61-100%; moderate cover 31-60%; and low cover 0-30%.

A representative photo-log is provided in **Appendix A**. Field notes and sketches to document the site characteristics are provided in **Appendix B**.

# 3. Project Description

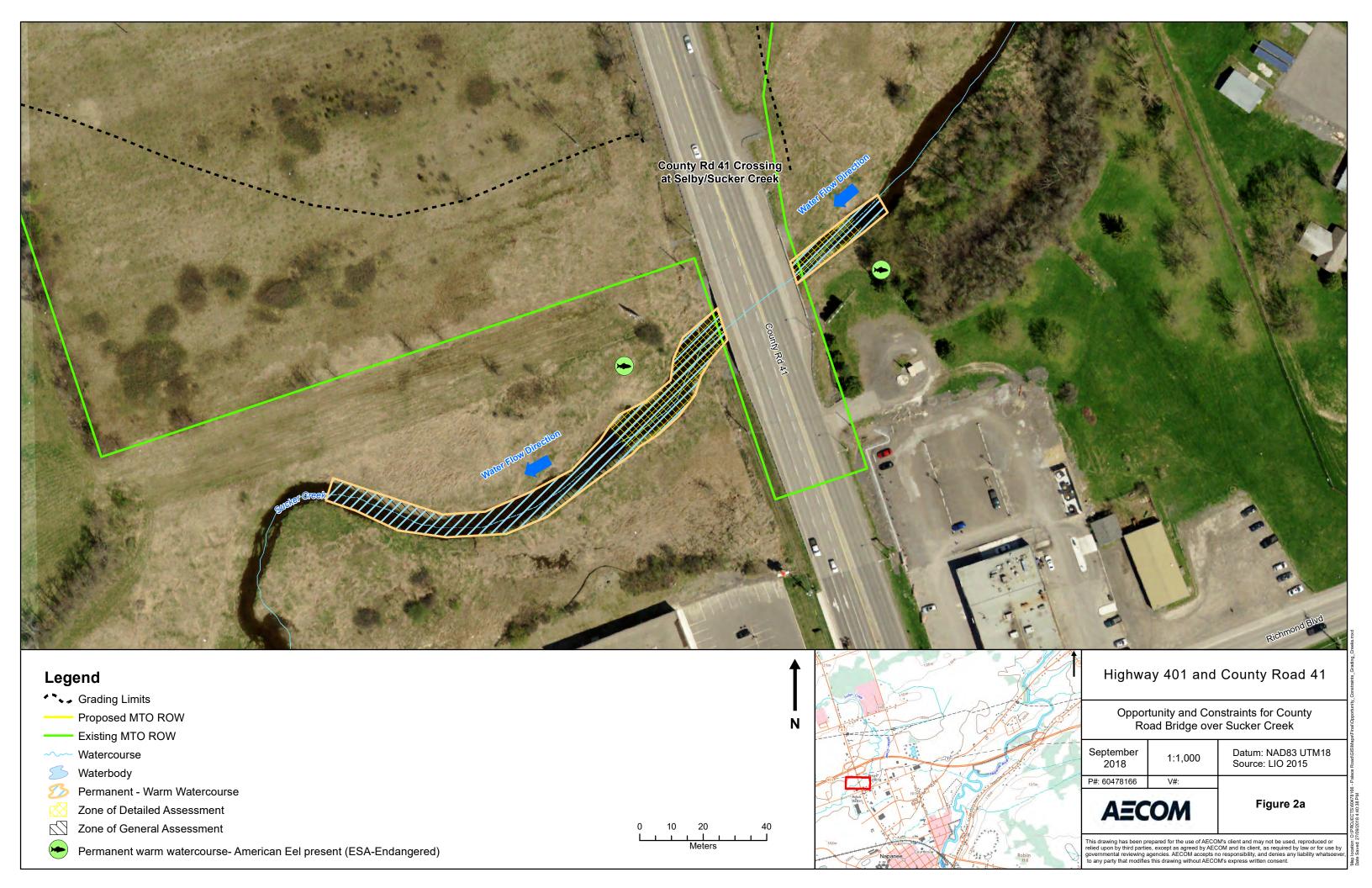
The following subsections provide a description of the existing structures and the proposed works. An opportunity and constraints map for each structure is provided in **Figures 2a and 2b**.

#### 3.1 County Road 41 Bridge over Sucker Creek

The County Road 41 bridge over Sucker Creek is located approximately 240 m south of Highway 401 and is not expected to require works below the High Water Mark (HWM); however, grading activities have the potential to cause indirect effects. Based on Preliminary Design, grading work on the west side of County Road 41 is anticipated to remain outside of the historical floodplain and within the MTO ROW with the exception of a small portion area adjacent to Highway 401 and the commercial plaza. Further, grading on the east side of the bridge is anticipated to be within the historical floodplain north of the creek at the corner of the on and off ramps to County Road 41 (see **Figure 2a**).

#### 3.2 Highway 401 Bridge over Sucker Creek

The Highway 401 bridge over Sucker Creek is being rehabilitated and widened to the south; and is anticipated to require in water works below the HWM. Based on Preliminary Design, the proposed bridge widening to the south at Highway 401 over Sucker Creek will require in water work to allow for construction of a new eastbound on ramp at the County Road 41 interchange. Grading activities are proposed to extend approximately 40 m south from the southern (downstream) edge of the bridge and remain within the MTO ROW along the highway (see **Figure 2b**).





# 4. Field Investigations

In accordance with Step 1 of the Protocol, an assessment of existing fish and fish habitat conditions has been completed as outlined in the following subsections to determine if the project/activity may cause impacts to a commercial, recreational or Aboriginal fishery or to fish that support such a fishery.

#### 4.1 Fish Habitat Assessment

Sucker Creek is a permanently flowing warmwater watercourse with a naturalized channel comprised of mainly pools, riffles, and flats. The structure at Highway 401 is a single-span concrete bridge with exposed banks under the bridge. No fish barriers were observed during the site reconnaissance. A small inlet to the creek was present downstream of the bridge located at County Road 41. The inputs appeared to be from overland flow and drainage from the surrounding area. Also, upstream of the same bridge structure, an outlet was observed though a corrugated steel pipe (CSP) culvert on the south side. This was likely outletting overland flow into the creek from the asphalt lot to the south. The creek was at low flow during the site visit. The substrate varied along the upstream and downstream reaches, however, Sucker Creek is largely bedrock controlled.

#### 4.1.1 Zone of Detailed Assessment

#### 4.1.1.1 Sucker Creek at County Road 41

#### Upstream (extending 20 m upstream of the highway right-of-way)

The riparian zone was approximately 5-10 m wide and dominated by herbaceous and grass species. Beyond this zone was meadow to the northwest and industrial to the south. The reach was dominated by riffles (50%), pools (30%), and flats (20%). The dominant substrate is cobble, rock, and boulders with sand/silt in lesser amounts. Mean wetted width was 12 m and mean wetted depth was 0.12 m. In stream cover was high and consisted of boulders (35%), cobble (75%), undercut banks (35%), woody debris (30%), and vegetation (80%). The instream vegetation accounted for 60%, mainly mosses and Canada waterweed, while the overhanging vegetation accounted for 20%. Depositional islands were observed approximately 15 m upstream from the bridge, consisting of grasses. Riffles were located in this area adjacent to the deposited silt. The banks were observed to be unstable and very silty, also evidenced by the depositional islands. No evidence of groundwater was observed, however, specialized fish habitats (e.g., spawning, feeding, nursery areas), for a warmwater fishery were identified within the study area. Many young of year (YOY) cyprinids were observed within the reach, mainly congregated at the bridge. No barriers to fish passage were observed. Habitat conditions upstream of the bridge were similar to the downstream reach.

#### Downstream (extending 50 m downstream of the highway right-of-way)

Downstream of the bridge the riparian zone was approximately 10-15 m wide and dominated by herbaceous and grass species. Beyond this zone was meadow immediately to the north and meadow/industrial to the south. The reach was dominated by pools (50%), flats (30%), and riffles (20%). Mean wetted width was 14 m and mean wetted depth was 0.10 m. In stream cover was high and consisted of submergent and emergent vegetation including Yellow water lily (*Nuphar lutea*), Canada waterweed (*Elodea canadensis*), and filamentous algae. The substrate consisted of mainly cobble (85%). The substrate became siltier closer to the bridge at County Road 41. The silt was approximately 0.30 m in depth in some areas. Instream vegetation accounted for 75% cover, mainly

mosses and Canada waterweed, while the overhanging vegetation accounted for 5%. Moss and algae was observed on rocks. The banks were grass covered and moderately unstable as the silty areas were eroding or beginning to erode. Many YOY cyprinids were observed throughout the reach. A dead Banded killifish (*Fundulus diaphanous*) was identified mid reach with no obvious signs of trauma. No overhead canopy cover existed, however some small shrubs and trees were present at the inlet of overland flow. No evidence of groundwater was observed, however; some specialized fish habitats (e.g., spawning, feeding, nursery areas) were identified within the study area. No barriers to fish passage were observed.

#### 4.1.1.2 Sucker Creek at Highway 401 Bridge

#### Upstream (extending 20 m upstream of the highway right-of-way)

The riparian zone was approximately 2-3 m wide and dominated by herbaceous and grass species. Beyond this zone was the Highway 401 to the northeast and meadow to the northwest. The reach was dominated by riffles (70%), pools (20%), and flats (10%). The dominant substrate was cobble, rocks, and boulders with sand/silt in lesser amounts. Mean wetted width was between 4 and 8 m, while mean wetted depth was an average of 0.15 m. In stream cover was high and consisted of vegetation (80%), woody debris (15%), undercut banks (5%). The instream vegetation accounted for 50%, mainly mosses and Canada waterweed, while the overhanging vegetation (herbaceous grasses and shrubs) accounted for 20%. Large depositional islands (approximately 6 m long by 2 m wide) were observed approximately 30 m upstream from the bridge, consisting of grasses. Riffles were located in this area adjacent to the deposition silt. The banks were observed to be unstable, consisting of silt, however the banks were of limited height (0.20 m), meaning the floodplain is well connected to the creek. No evidence of groundwater was observed, however, specialized fish habitats for a warmwater fishery (e.g., spawning, feeding, nursery areas) were identified within the study area. Some YOY cyprinids were observed within the reach. No barriers to fish passage were observed. Upstream of the bridge the creek was similar to the downstream reach.

#### Downstream (–extending 50 m downstream of the highway right-of-way)

Downstream of the bridge the riparian zone was approximately 10-15 m wide and dominated by herbaceous and grass species. Beyond this zone was meadow/small mixed forest immediately to the southeast and meadow to the west. The reach is dominated by pools (50%), flats (30%), and riffles (20%). The dominant substrate was silt with some boulders and cobble/gravel present. Mean wetted width was 10 m and mean wetted depth was 0.30 m. In stream cover was high and consisted of submergent and emergent vegetation including Yellow water lily (*Nuphar lutea*), Canada waterweed (*Elodea canadensis*), and a variety of unidentified mosses and filamentous algae, which was observed on rocks. The banks were grass covered and moderately unstable as the silty areas were eroding or beginning to erode. Limited YOY cyprinids were observed in the reach. Limited overhead canopy cover existed in the immediate riparian area; however some small shrubs and trees were present throughout the meadow lands. No evidence of groundwater was observed, however; some specialized fish habitats (e.g., spawning, feeding, nursery areas) were identified within the study area. No barriers to fish passage were observed.

#### 4.1.2 Zone of General Assessment

#### Upstream (extending from 20 m to 30 m upstream of the highway right-of-way)

The upstream habitat is similar to that of the habitat within the detailed zone of assessment. The banks were silty and moderately unstable. The adjacent land uses are highway, retail, and industrial. Overland flow is directed into the creek approximately 100 m upstream from the asphalt area on the property in the southeast quadrant. . Some specialized habitat was observed in the zone of general assessment, including potential feeding and nursery areas within the highly vegetated areas. The mean wetted depth was 0.15 m.

#### <u>Downstream</u> (extending from 50 m – 150 m downstream of the highway right-of-way)

The downstream habitat consists of more riffles and cobble substrate, as the channel narrows to approximately 5 m wetted width in areas. The narrowing of the channel is natural and appeared to have been the reason for the change in morphology and substrate composition (changing to cobble from silt). The adjacent land uses were highway and industrial. A meadow area existed outside of the riparian area where a White-tailed deer was observed. Some specialized habitat (possible spawning areas like riffles) was observed within the downstream zone of general assessment.

The wetted width of the creek increased to approximately 10-15 m in the upper portion of the assessed reach. A large pool, approximately 0.95 m deep, was observed with depositional islands located throughout the creek. Agricultural fields and meadows were located adjacent to the creek further upstream of Highway 401. The substrate was predominantly silt with some boulders.

The downstream habitat consisted of a grassy riparian area, with a narrow channel of approximately 4-5 m in wetted width. Some boulders and woody debris were observed in the channel. Overland flow was directed to a small CSP culvert on the southeast bank likely collecting water from the asphalt parking lots to the southeast. Limited specialized habitat was observed in this reach.

#### 4.1.3 Extended Study Area

The extended Study Area was included to encompass the additional land that extends to Newburgh Road from east of Sucker Creek. The area to the east of Newburgh Road is included in the study area for the *Improvements to the Highway 401 Interchange at Palace Road (G.W.P. 4197-13-00)* which is documented in the *Draft Fish and Fish Habitat Existing Conditions Report (December 2016)*.

#### Northeast of the County Road 41 Interchange

At Sucker Creek there may be inundation in the ditch area, however; rock check dams prevent the connection of any water further along the ditch. No fish habitat is present further east along the ditch, however; a large pond was observed immediately North of Highway 401. The pond is offline and surrounded by upland vegetation. It is unclear if the pond is natural or manmade.

#### Northwest of the County Road 41 Interchange

A 20 m rip rap lined channel is present leading to the creek. Cattails are present in the ditch which may be inundated during periods of increased flow. No fish habitat was observed.

#### Southeast of County Road 41 Interchange

The creek is well connected to the floodplain on the Southeast bank. During high flow there is the potential for inundation along the Highway 401 Southeast interchange. There is no defined channel and no fish habitat beyond the ~75 m of potential inundation.

#### Southwest of County Road 41 Interchange

This area is located immediately north of the Walmart. It includes a manicured lawn and asphalt. No fish habitat is present.

#### 4.2 Fish Community Sampling Results

As indicated in **Section 2.1**, fish community sampling was carried out immediately upstream of the bridge structure at County Road 41. The substrate consisted of mainly cobble with some silt and sand. At this location young-of-the-year (YOY) cyprinids were captured (>100). These fish were too small to be identified; however, they are likely thought to be YOY Bluntnose minnow. Also captured in this location were: two (2) Banded killifish and two (2) Bluntnose minnow (*Pimephales notatus*). Fish collection was carried out immediately upstream of the bridge via dip netting the area where many fish were observed at the time of the site investigation. Since no barriers to fish passage were present under the bridge, the assumption can be made that these species may also be present downstream of the bridge at County Road 41 and as such fish community sampling was limited to visual schooling of fish in the upstream reach.

**Table 2** summarizes the existing fish community assemblage at each location based on Template 10.2 of the MTO Fish Guide.

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#### Table 2: Template 10.2 Summary of Existing Fish and Fish Habitat Conditions

GWP or Project Name	Waterbody	Latitude	Longitude	Flow	Thermal Regime	Fish Habitat	Fish Species Present	Substrate Type	Vegetation	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	Window
Fish and Fish Habitat Impact Assessment- Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00) in the County of Lennox-Addington	Sucker Creek	44.245657	76.948770	Permanent	Warm	Yes	FROM MNRF (2016) Source: Earth Tech Canada INC. (2003) Emerald Shiner, Northern Redbelly Dace, Bluntnose Minnow, Creek Chub, White Sucker, Brown Bullhead, Central Mudminnow and Brook Stickleback Source: Gartner Lee Limited (1999) Northern Redbelly Dace, Bluntnose Minnow, Fathead Minnow, Blacknose Dace, White Sucker, Banded Killifish, Brook Stickleback, Rock Bass and Pumpkinseed Source: AECOM fish collection (2016) Banded Killifish, Bluntnose Minnow	Cobble, boulders with sand and silt	Riparian- herbaceous plants and grass species In-stream- Moss and Canada Waterweed	Unstable, eroding banks, depositional islands from silt/sediment accumulation American Eel present	The assessed reach provides habitat for fish migration, spawning, feeding and rearing however, no limiting important or exceptional habitat was identified.	for American Eel.	In water works are restricted between: - April 1 and June 30 (no in water work allowed) Source: MNRF Peterborough District Office correspondence, dated March 16, 2016.

#### 4.3 Summary of Existing Fish and Fish Habitat

Through the background information review, consultation with MNRF and 2016 fish habitat field investigations, which included fish collection, it was determined that Sucker Creek within the assessed reach provides permanent, direct fish habitat to a mixed warmwater and coolwater forage and baitfish community. Sucker Creek likely provides spawning habitat for the forage and baitfish at the cobble and riffle areas but access to these habitats are non-limiting throughout the assessed reach. Despite the mixed community assemblage, it was confirmed with MNRF that Sucker Creek should be managed as a warmwater habitat.

Based on email correspondence from the Kingston MNRF, American Eel (listed as Endangered with the Provincial *Endangered Species Act*) is present in Sucker Creek. The species was not identified on the species list for Sucker Creek which was received from the Peterborough MNRF on March 16, 2016, however; clarification from the Kingston MNRF stated that an MNRF researcher has caught American Eel in the nearby Napanee River and therefore may have the potential to inhabit Napanee River and its connected tributaries. Further, although American Eel are not currently listed as a SAR under the federal SARA, it is considered Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and DFO has indicated American Eel is under consideration for listing to Schedule 1 of SARA.

Present science considers the American Eel to consist of a single breeding population in which all individuals travel to the Sargasso Sea in the Atlantic Ocean to spawn. From there, young eels drift with ocean currents and most eventually migrate inland into streams, rivers and lakes.

American Eel begin moving upstream to freshwater habitats when the water temperatures reach 10°C and continue until the temperatures exceed 20°C. In Canada this is typically between late April and early August. However, the eels can tolerate a wide range of water temperatures and lotic conditions (DFO, 2013).

Sucker Creek exhibits many of the habitat characteristics that American Eel require. This includes a silty substrate and pools. Further, habitat conditions within the assessed reach contain non-limiting feeding and migratory habitat that is likely conducive to eels, including pools for elvers protection and silt substrate for periods of rest.

# 5. Potential Enhancement Opportunities

Opportunities for potential aquatic habitat enhancement were identified following completion of the site visit. Although Sucker Creek is in a naturalized state, it was noted that the majority of the banks along Sucker Creek were unstable and eroding. Increased bank stabilization by way of native woody plantings installed along the banks may improve bank stability and decrease sources of sedimentation into the creek. Enhancement opportunities will be discussed further in the forthcoming Fish and Fish Habitat Impact Assessment Report.

# 6. Conclusions

The County Road 41 site includes specialized habitat for the resident warmwater forage fish community, including riffles for spawning, cover for nursery areas, and a sufficient supply of feeding areas. According to the Kingston MNRF, American Eel has been caught and identified within Sucker Creek. American Eel may potentially inhabit Sucker Creek, whether it may be as a migration route or longer term, as the habitat present in the creek is considered potentially suitable for the species. As such, a Notice of Activity Registration under the ESA is likely required, however further consultation with the MNRF is recommended to determine appropriate permitting requirements concurrent with the advancement of Detail Design.

The proposed interchange improvements associated with changes to the widening of the Highway 401 bridge and the County Road 41 bridge over Sucker Creek have the potential to impact fish and fish habitat, however; the detailed impacts to fish and fish habitat based on the preferred Preliminary Design alternative has been documented under separate cover in a Fish and Fish Habitat Impact Assessment Report. Findings documented in the Impact Assessment Report should be updated concurrent with the advancement of detailed design.

# 7. Literature Cited

Fisheries and Oceans Canada (DFO), 2013:

Canadian Science Advisory Secretariat Research Document. Recovery Potential Assessment for the American Eel (*Anguilla rostrata*) in eastern Canada: functional description of habitat.

Fisheries and Oceans Canada (DFO). 2015:

Aquatic Species at Risk Mapping

MacGregor, R., J. Casselman, L. Greig, J. Dettmers, W. A. Allen, L. McDermott and T. Haxton, 2013: Recovery Strategy for the American Eel (Anguilla rostrata) in Ontario. Ontario Recovery Strategy Series. Prepared for Ontario Ministry of Natural Resources, Peterborough, Ontario. x + 119 pp.

Ministry of Natural Resources and Forestry (MNRF), 1977:

Fish Collection Records

Ministry of Natural Resources and Forestry (MNRF), 1995:

Fish Collection Records

Ministry of Natural Resources and Forestry (MNRF), 1999:

Fish Collection Records

Ministry of Natural Resources and Forestry (MNRF), 2002:

Fish Collection Records

Ministry of Natural Resources and Forestry (MNRF), 2003:

Fish Collection Records

Ministry of Natural Resources and Forestry (MNRF), 2016:

Personal communications with Management Biologist, Monique Charette on November 8/9/11, 2016

Ministry of Transportation (MTO), 2009:

Environmental Guide for Fish and Fish Habitat



# Appendix A

**Photo Log** 



Photograph 1 ↑
Napanee River at highway 401 bridge, looking from upstream of bridge to downstream right bank- southeast



Photograph 2 ↑
Napanee River highway 401 bridge, looking from upstream of bridge to downstream- south



Photograph 3 ♠
Napanee River right bank, looking from upstream
of bridge to the right bank- southeast



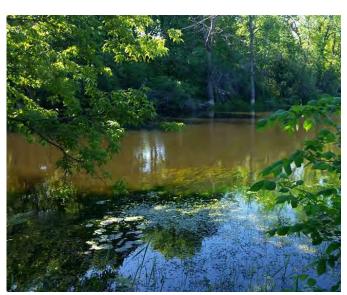
Photograph 4 ↑
Napanee River upstream of bridge looking at the right bank from the left bank, looking southeast



Photograph 5 ↑
Napanee River, upstream of bridge looking at the right bank- southeast



Photograph 6 ↑
Left bank riparian area and park land, looking downstream from upstream of the bridge- west



Photograph 7 ↑
Napanee River, looking downstream from upstream of bridge- southeast



Photograph 8 ↑
Looking downstream at Highway 401
bridge from upstream



Photograph 9 ↑
Napanee River, from downstream looking upstream at bridge



Photograph 10 ♠
Left bank riparian area (area of potential impact),
from downstream looking upstream to the west



Photograph 11 ↑
Inundated channel to the west, looking from downstream of the bridge to the west or left bank



Photograph 12 ↑
Inundated channel to the west, looking from downstream of the bridge to the west or left bank





Photograph 13 ♠
Right bank riparian area (area of potential impact),
from downstream looking upstream to the east



Photograph 14 ↑
Right bank and potentially inundated area
from downstream looking upstream to the east



Photograph 15 ↑
Muck/organic substrate downstream of bridge



Photograph 16 ↑
Muck with fine sand and silt substrate upstream of bridge



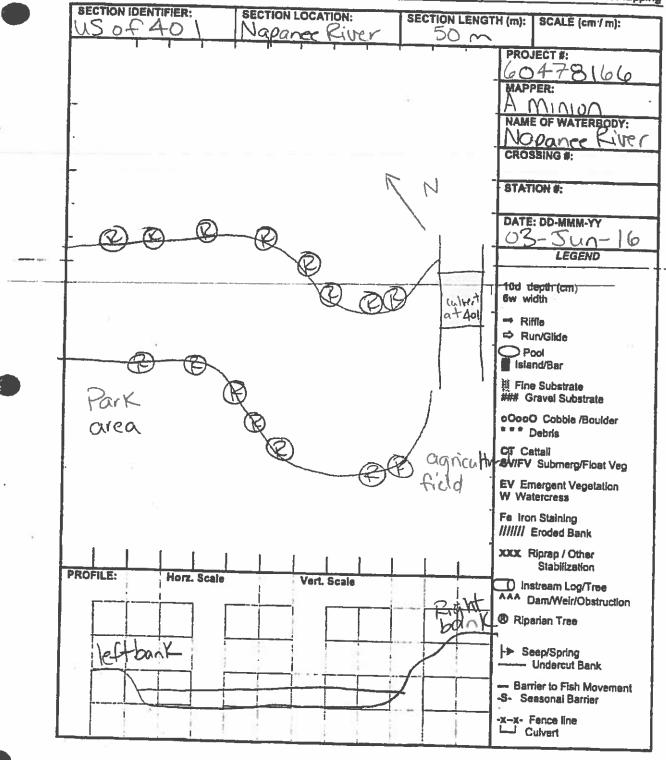
# Appendix **B**

**Field Notes** 

Section 4: Field Investigations
Appendix 4.A: Watercourse Field Record Form

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CHARRAL THEOREMATION PROJECT #: PROJECT DESCRIPTION: DAY: 60A78161 MONTH: YEAR: Is STREAM REALIGNMENT required for this section: O Yes D No O Unknown COLLECTORS: WEATHER CONDITIONS TIME STARTED: TIME FINISHED: t.Min introud AIR TEMP: WATER TEMP: CONDUCTIVITY (µ8/cm): PHOTO NUMBERS AND DESCRIPTIONS: LOCATION NAME OF WATERBODY: DRAINAGE SYSTEM: CROSSING #: STATION #: allance Rive LOCATION OF CROSSING: GPS COORDINATES MTO CHAINAGE: TOWNSHIP: MNR DISTRICT: LAND USE AND POSEUTION residential, highway SOURCES OF POLLUTION: EXISTING STRUCTURE TYPE Bridge O Box CulvertO Open Foot Culvert O CSP O N/A O Other O Describe: SECTION TYPE AND MORPHOLOGY Size (wxh) m2 SECTION IDENTIFIER: SECTION LOCATION: Stream / river Channelized Permanent Intermittent ASSOCIATED WETLAND: **Ephemeral** 6 0 TOTAL SECTION LENGTH (m): CURRENT VELOCITY (m/a): SUB-Run Pool Riffie Flats SECTION(8) Inside culvert Other 0 0 0 0 0 Percentage of area Mean depth wetted (m) Mean width wetted (m) Mean bankfuit width (m) Mean bankfuli depth(m) Substrate Bedreck Boulder Cobble Gravel Send SH Clay Br Muck Detritus Bo Co Gr Sa 81 CI Mu Ð

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October 3, 2016 1255 Vegetation Tolands bridge (0) imited Veretation of brage depths apegras m US of brok = Canada EB(LB) aquetic Vegetation= ODEN Not Vectorion a - 1.10 on deep in downed tree at TOWOK UT Palace Rd 18: 140K N81 0 0 1 wortrate

Thestack I much more organicidant Flows (soing) on Eart Earl Sm DS of bridge depths
WNS = 0.25 m - well connected to
possible habitat (pike spaining)
currently inundated. (only "in well) EB(RB) - 1,7m multiphosonfr WB = 1,4m sandy sitt-mussels bank & topography, a scan DS. Sensitive tern, Street white Com. - grasses (country, astes, catals, Well verteted benks on both Heeper Danks ~ 1:5m. large amount of submergent - Ds of bridge Centre - Dion - arriened · Cattails. Sides. WB(RB). Mylk Substrate with WB = eather!s In impact and Westation Tape grass and Considered - grave of sandwith FB(LB) Substrak is man RB (WB) - Proposed abut ment My in Central of channel! ist mucket mussel Sine Sand & Sil Some muck.

South side - helferent nowbugh & Seyand Penceline is Upland toward Rite in the Rain Ditch JES m has ~ 0,01 m. + has standing water with high ditch has gone South siche hilley on ly patential Ash to hobited of on both siles. No agentic DACK RECOMES MADE ENTERCHEN ditch becomes overgrown both and relie CSP filled with concrete. relie Of cultert observed on catell Throughout most Jeantanto habitati amounts of allac Phraints + cattoils 1 1 1 numbered channel South + Ward Piers abstracts on South side East side Would have no imperent WB= 1.3m Substate - muckt healy veeds + algac onthook to possible spaining grounds during high flags. the Sandys. H as bunks your high ) - Carrenty inindated but not coorded to river - and would likely be in the world. hannel along directine the water graves ORGANIC Smell

contrate culvert to dry channel last charred + Ath become withhed. but area with cattail to North Rite in the Rain North of ditch is a hummouly nighten - Well standing water after stornd events, channel with no water circulty Certain Trays, socialist to KILL - Late in channel provident trenched channel - 50m wotest no obvious defined channel. Dorsible habitest ~ 50 m wish sp would receive overland that North side of 401 Numbergh to rapace. when small (St out let again Twe Halls reception, cattails 1 Aren Co to Newburg, 15 ho 150 retetetion, 005 m of water 1. 100 rely of Meeting Rd the North side of highway Strep bank inonvalately east pended (SP (03 × 0,3) creating With Flow.

5 BARO 100 Rite in the Rain South West of Palace Rd Interhange SouthEast of Palace Rd Internance land vectorial and + burner none.
Tossib, the 6 correction ground bank
to the south to where five is they ditch har catails, no defined chancel Evote to draw overland flow is present No fish not text in this SE sochen. sell cornected to floodplain but not 200m test " 15 an anima ditaline is or well up to mack cut a futher ditaline is mound yoto 4 no water, Ditter speer up to ~ 150m east of Palace Ra I'm Trets. 1 NorthWest of Palace Rd interdence Chagmites along ditch - ATV Fretall No fish habited east of cultret in overland flas evidenced by catherful ditch. ditch likely siports wrotand dry today, appears to consey flurinto NorthWest of Palace Rd Interlange 1.5 x1.5 m cast in place culturt for road drainage. Un today, distalla has cattails but no defined ditch - 0,5 m with 20,25m blag. Catail area alorg Exceline. Overgrain with brome grass Not likely to habitation channel, Or besty flow, forest

in dital but possibly 75m of Duna high flas of storn events there is pokent at the mandet on along 401 SE of intervenge.

No obstruct channel + no catteils South East of CR41 Interlaye from ditch to creek unless vaintight to creek unless vaintight to creek unless vaintight to connected bent of the order of the best connected very of the order - extinction's upland restation + No Fish habitat beyond the possible igland vicetition and entire noth mound dith after 75th east. Selby Creek 18 well commended to t North east of CR41 Interdence At Selby creek inundation starts Mait on South east bonk. No Fish habitet along ditul, but North DE 75m of inundation. dited, drainage culvest and immediately to

-dry, motived ditch, No tish habitat in ditch, Passibly mundated during ripat ind drained at exitlen Northwest of CR41 Interchange Southwest of UR41 Interchange week. rip rap ~ Dom then cather is or water. - Notish hastas - riprap lined channel eading into -ditte is upland vegelation with no Walnut, high Plays. channel



# Appendix C

**MNRF** Correspondence

#### Mirabelli, Maria

From: Charette, Monique (MNRF) < monique.charette@ontario.ca>

Sent: Monday, November 14, 2016 4:15 PM

**To:** Minion, Ashley

**Subject:** RE: Selby Creek/Napanee River

Hi Ashley,

I'm waiting to hear from our F&W Tech. But I did touch base with the researcher and he personally has caught eel near the 401 in the Napanee River (and other sites north on the river) as well as in Sucker Creek (also near the 401). I hope to have an answer for you tomorrow...

From: Minion, Ashley [mailto:Ashley.Minion@aecom.com]

**Sent:** November-08-16 3:26 PM **To:** Charette, Monique (MNRF)

Subject: RE: Selby Creek/Napanee River

Hi Monique,

Thank you for the reply! I hope all is well with you also ☺

What would be the next step then, as the MTO gets closer to detailed design with the bridge/ramp works. If they are working within the water would this project be a C-Permit for certain or something else?

### Thanks, Ashley

Ashley Minion, B.Sc., EPt., RBIT Aquatic Biologist D 905-747-7693 C 647-227-9446 Ashley.Minion@aecom.com

#### **AECOM**

105 Commerce Valley Drive West Markham, Ontario, Canada L3T 7W3 T 905-886-7022 F 905-886-9494 www.aecom.com

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 ${\it Please consider the environment before printing this page}.$ 

From: Charette, Monique (MNRF) [mailto:monique.charette@ontario.ca]

Sent: Tuesday, November 08, 2016 12:38 PM

To: Minion, Ashley

Subject: FW: Selby Creek/Napanee River

Hi Ashley,

Hope all is well with you! It's been a while

Yes it's possible that American Eel are present in the Napanee River. Our researchers found eel in the Napanee River in 2010. Although, not connected to the Napanee River, an eel was also recently observed in Beaver Lake north of Napanee. They have also been observed in the Salmon River. We have no information for Selby Creek (Sucker Creek). So yes they are present in the Napanee and could be potentially found in Selby Creek considering the surrounding watercourses have had eel observations.

I have to step out for the afternoon and will be monitoring emails from offsite location for the next 2 days. Let me know if you need anything else.

#### **Monique Charette**

Ministry of Natural Resources and Forestry Management Biologist Kingston Field Office 51 Heakes Lane Kingston, ON K7M 9B1

Telephone: 613-531-5715

Email: Monique.charette@ontario.ca

From: Simpson, Holly (MNRF)
Sent: November-08-16 11:41 AM
To: Charette, Monique (MNRF)

Subject: FW: Selby Creek/Napanee River

Holly Simpson 705-755-3302

From: Minion, Ashley [mailto:Ashley.Minion@aecom.com]

**Sent:** November-08-16 9:52 AM **To:** Simpson, Holly (MNRF)

Subject: Selby Creek/Napanee River

Hi Holly,

I have attached a location map as per your request. I am trying to determine if it is possible that American eel are present within either Selby Creek or the Napanee River.

Thank you! Ashley

Ashley Minion, B.Sc., EPt., RBIT Aquatic Biologist D 905-747-7693 C 647-227-9446 Ashley.Minion@aecom.com

#### AECOM

105 Commerce Valley Drive West Markham, Ontario, Canada L3T 7W3 T 905-886-7022 F 905-886-9494

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## **TEMPLATE 10.2**

GWP or Project Name	Waterbody	Latitude	Longitude	Flow	Thermal Regime	Fish Habitat	Fish Species Present	Substrate Type	Vegetation	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	In-water Works Timing Window
Description	Name of waterbody and Crossing #/Station			Ephemeral, Intermittent, Permanent	Warm, Cool, Cold	CRA fishery*, supports CRA fishery, not fish habitat	Indicate if the information is from background secondary source data (indicate source) or if obtained through file investigations	E.g. Boulder, cobble, rubble, gravel, sand, muck, etc.	Riparian & In- Stream** species	E.g. Perched culvert, eroding bank, fish passage barrier, undersized CSP	E.g. Ground water upwelling, spawning areas, refugia, migratory routes	Indicate/ describe the species at risk and/ or critical habitat present	Timing window for when in-water work can occur
Improvements to Highway 401 Interchange at Palace Road (GWP 4197-13-00)	Napanee River	44.267639	76.932412	Permanent	Warm	Yes	Source: MNRF (2016) American Eel (captured in 2010)  Source: MNR (1977)  White Perch, Yellow Perch, Brown Bullhead, Northern Pike, Smallmouth Bass, Burbot, Black Crappie, Yellow Bullhead, White Sucker, Rock Bass, Bluegill, Pumpkinseed  Source: Beak Consultants Limited (1995)  Northern Pike, Walleye, Smallmouth Bass, Rock Bass, Pumpkinseed, Fallfish, White Sucker, Yellow Bullhead, Logperch, American Eel, Largemouth Bass, Burbot,  Source: P.Riebel Associates Inc. (1999)  Common Shiner, Mimic Shiner, Bluntnose Minnow  Source: Minnow Environmental Inc. (2002)  Bluntnose Minnow, Brown Bullhead, Yellow Bullhead, Creek Chub, Johnny Darter, Common Shiner, Mimic Shiner, Pumpkinseed, Brook Silverside, Northern Pike, Rock Bass, Yellow Perch, White Sucker  Source: Minnow Environmental Inc. (2005)  Bluntnose Minnow, Fathead Minnow, Golden Shiner, Brown Bullhead, Logperch, Mimic Shiner, Central Mudminnow, Northern Pike, Pumpkinseed, Rock Bass, Brook Silverside, White Sucker, Yellow Perch, Johnny Darter	Detritus with fine sand and silt	Riparian- herbaceous plants and grass species In-stream- Moss, Tape grass, algae, and Canada waterweed	Eroding banks	Potential Pike spawning	Potential habitat for American eel.	Warmwater timing window-March 15 to July 15 (in water work restricted) *To be confirmed by MNRF

Notes: \* CRA Fishery - Commercial, Recreational or Aboriginal Fishery

\*\* In-stream vegetation refers to emergent, submergent and floating aquatic vegetation.

## **Appendix J – Fish and Fish Habitat Impact Assessment Report**

Prepared for: Ontario Ministry of Transportation

G.W.P. 4459-04-00



Ontario Ministry of Transportation (MTO)

## Fish and Fish Habitat Impact Assessment

Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00)

#### Prepared by:

AECOM Canada Ltd. 105 Commerce Valley Drive West, 7<sup>th</sup> Floor Markham, ON L3T 7W3 Canada

T: 905.886.7022 F: 905.886.9494 www.aecom.com

**Date:** February, 2019 **Project #:** 60318949

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- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
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## 1. Introduction

The Ontario Ministry of Transportation (MTO) has retained AECOM to undertake a Preliminary Design and Class Environmental Assessment Study (Group 'B' project) for improvements to the Highway 401 / County Road 41 interchange (G.W.P. 4459-04-00). The project is located in the Town of Greater Napanee within the County of Lennox and Addington.

The primary focus of this study is to:

- Review the structural requirements (e.g. major rehabilitation or replacement) at this interchange;
- Identify interim and long-term interchange improvements to address geometric and operational concerns;
- Develop a Preliminary Design including a staging plan to allow the technically preferred structural works and interchange improvements to be implemented efficiently, minimizing construction costs, traffic disruption and future throwaway.

In 2014 MTO completed a Preliminary Design Study to determine the short-term, mid-term, and long-term improvements to this interchange, which recommended upgrading the interchange to a full Parclo A4 interchange configuration. In 2004, MTO completed the Detail Design and construction of a new westbound off-ramp at County Road 41 and widening of Sucker / Selby Creek to the north as per the recommendations from the 2004 study. It is anticipated that major rehabilitation of the Highway 401 / County Road 41 and Sucker Creek bridges is anticipated to be needed within 5 years.

The development of an ultimate plan for the County Road 41 interchange allows the structural works to be implemented efficiently and in a cost effective manner, minimizing future throwaway.

This project is being conducted in accordance with the approved environmental planning process for Group 'B' projects in accordance with the *Class Environmental Assessment for Provincial Transportation Facilities* (2000).

Concurrently, MTO is undertaking a separate Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at Palace Road.

The Recommended Plan includes the following:

- The short term construction works at the interchange will include major bridge rehabilitation of the County Road 41 and Sucker Creek bridges. In conjunction with the bridge works, the interchange will be upgraded to the ultimate Parclo A4 configuration identified as the preferred alternative.
- The long-term recommendations for the interchange include replacement of the Highway 401 / County Road 41 and Sucker Creek bridges.

The staging strategy will be confirmed during a future Detail Design assignment in advance of the short-term construction.

An assessment of existing fish and fish habitat and terrestrial conditions for the study area associated with this interchange was previously completed and can be found in the following reports:

- Fish and Fish Habitat Existing Conditions—Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00) in the County of Lennox-Addington (AECOM, 2017c).
- Terrestrial Ecology Existing Conditions—Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00) in the County of Lennox-Addington (AECOM, 2017d).

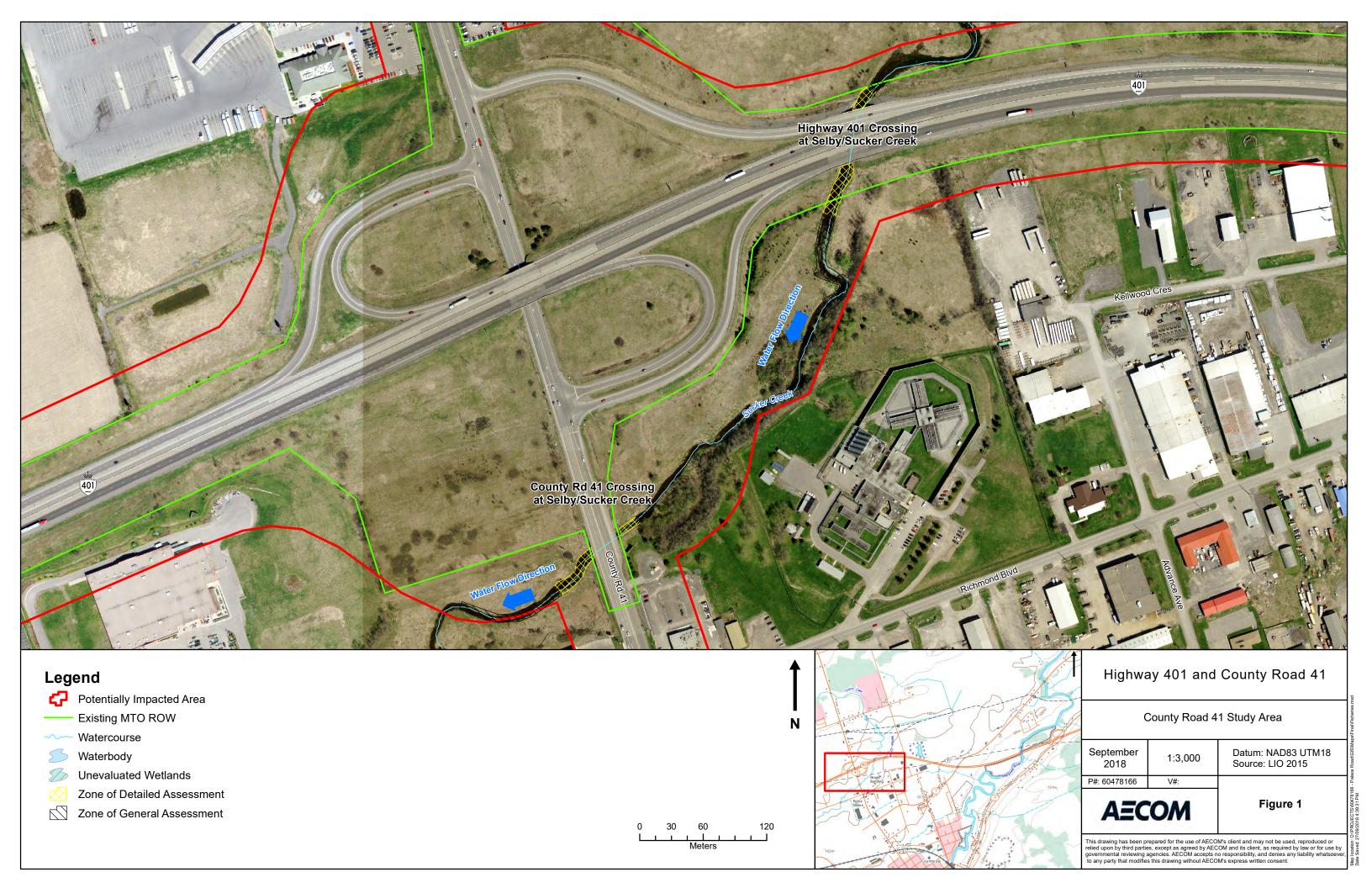
The purpose of this report is to present the results of the impact assessment based on the Preliminary Design of the County Road 41 Interchange (GWP 4459-04-00) technically preferred alternative, identify any potential constraints to proposed activities, and suggest general mitigation to avoid harm to fish and fish habitat to be refined during further stages of design.

The Overall Study Area for this project is 600 m in width, extending along Highway 401 from 100 m west of County Road 41 easterly across Sucker Creek to the Newburgh Road underpass. In compliance with the MTO *Environmental Guide for Fish and Fish Habitat*, the area of interest extends along Sucker Creek 50 m upstream and 200 m downstream of the Highway 401 right-of-way (See **Figure 1**).

There are two (2) bridges crossing watercourses within the County Road 41 Study Area, one which conveys County Road 41 over Selby/Sucker Creek (hereafter referred to as Sucker Creek) and a second bridge which conveys Highway 401 over Sucker Creek.

The County Road 41 bridge over Sucker Creek is located approximately 240 m south of Highway 401 and will not require works below the High Water Mark (HWM). However grading work at this location has the potential to cause indirect effects, and this bridge crossing is therefore discussed further herein.

The Highway 401 bridge over Sucker Creek is being rehabilitated and widened to the south, and will require in water works below the HWM.



## Summary of Existing Fish and Fish Habitat Conditions

A full summary of existing conditions is available in the *Fish and Fish Habitat Existing Conditions–Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00) in the County of Lennox-Addington* (AECOM, 2017a). **Table 1** (Template 10.2) provides a brief synopsis of the fish and fish habitat conditions within Sucker Creek in close proximity to the County Road Interchange.

Through the background information review, consultation with MNRF and 2016 fish habitat field investigations, which included fish collection, it was determined that Sucker Creek within the assessed reach provides permanent, direct fish habitat to a mixed warmwater and coolwater forage and baitfish community. Sucker Creek likely provides spawning habitat for the forage and baitfish at the cobble and riffle areas but access to these habitats are non-limiting throughout the assessed reach. Despite the mixed community assemblage, it was confirmed with MNRF that Sucker Creek should be managed as a warmwater habitat.

## 2.1 Aquatic Species at Risk

Based on email correspondence from the Kingston MNRF (**Appendix C**), American Eel (listed as Endangered with the Provincial *Endangered Species Act*) is present in Sucker Creek. The species was not identified on the species list for Sucker Creek which was received from the Peterborough MNRF on March 16, 2016, however; clarification from the Kingston MNRF stated that an MNRF researcher has caught American Eel in the nearby Napanee River and therefore may have the potential to inhabit Napanee River and its connected tributaries. Further, although American Eel are not currently listed as a Species at Risk (SAR) under the federal Species at Risk Act (SARA), it is considered Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and DFO has indicated American Eel is under consideration for listing to Schedule 1 of SARA.

Present science considers the American Eel to consist of a single breeding population in which all individuals travel to the Sargasso Sea in the Atlantic Ocean to spawn. From there, young eels drift with ocean currents and most eventually migrate inland into streams, rivers and lakes.

Sucker Creek exhibits many of the habitat characteristics that American Eels require. This includes a silty substrate and pools. Further, habitat conditions within the assessed reach contain non-limiting feeding and migratory habitat that is likely conducive to eels, including pools for elvers protection and silt substrate for periods of rest.

American Eels begin moving upstream to freshwater habitats when the water temperatures reach 10°C and continue until the temperatures exceed 20°C. In Canada this is typically between late April and early August. However, the eels can tolerate a wide range of water temperatures and lotic conditions (DFO, 2013).

10

Fish and Fish Habitat Impact Assessment Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00)

Table 1: Template 10.2 Summary of Existing Fish and Fish Habitat Conditions

GWP or Project Name	Waterbody	Latitude	Longitude	Flow	Thermal Regime	Fish Habitat	Fish Species Present	Substrate Type	Vegetation	Constraints and Opportunity	Important, Exceptional Fish Habitat	Species at Risk / Critical Habitat Present	Window
Fish and Fish Habitat Impact Assessment– Improvements to Highway 401 Interchange at County Road 41 (GWP 4459-04-00) in the County of Lennox-Addington	Sucker Creek	44.245657	76.948770	Permanent	Warm	Yes	Source: Earth Tech Canada	Cobble, boulders with sand and silt	Riparian- herbaceous plants and grass species In-stream- Moss and Canada Waterweed	Unstable, eroding banks, depositional islands from silt/sediment accumulation American Eel present	The assessed reach provides habitat for fish migration, spawning, feeding and rearing however, no limiting important or exceptional habitat was identified.	habitat for American Eel.	In water works are restricted between: - April 1 and June 30 (no in water work allowed) Source: MNRF Peterborough District Office correspondence, dated March 16, 2016.

## **Impact Assessment**

The purpose of the Impact Assessment is to assess the potential impacts of the project to fish and fish habitat, and to provide mitigation measures in accordance with the Environmental Reference for Highway Design (MTO, 2013). The following section outlines the impact assessment which was conducted in accordance with the MTO Environmental Guide for Fish and Fish Habitat (the Guide, 2009), and the 2016 pilot protocol entitled MTO/ DFO/ MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 3 (the Protocol; 2016).

#### **Description of Proposed Work** 3.1

The following provides a summary of the activities proposed in or near water identified under the current scope of work. For additional details, the grading limits are presented on the design drawing is shown in Appendix D.

#### 3.1.1 County Road 41 Bridge over Sucker Creek

There is no proposed work within 30 m of Sucker Creek at the County Road 41 bridge over Sucker Creek. The work on the west side of County Road 41 will remain outside of the historical floodplain and within the MTO ROW with the exception of a small portion area adjacent to Highway 401 and the commercial plaza. The grading on the east side of the bridge will be within the historical floodplain north of the creek at the corner of the on and off ramps to County Road 41.

There will be no temporary or permanent materials placed below the high water mark (HWM) of Sucker Creek at this location. Protective erosion and sediment controls shall be used in order to mitigate indirect impacts to habitat features in proximity to grading limits. As proposed work is greater than 30 m from the watercourse and mitigation can prevent sediment from entering the watercourse, in accordance with Step 1 of the Protocol, no further assessment of the proposed activities this location is warranted or presented herein.

#### 3.1.2 Highway 401 Bridge over Sucker Creek

The proposed bridge widening to the south at Highway 401 over Sucker Creek will require in water work to allow for construction of a new eastbound on ramp at the County Road 41 interchange. This will likely require dewatering of the work area at the abutments on the south (downstream) end to drive structural piles and build forms to pour concrete at both the east and west abutments. This will result in the removal of some aquatic habitat and vegetation, particularly herbaceous grasses, however; no limiting important/exceptional habitat was observed in the direct area of impact. Grading activities are proposed to extend approximately 40 m south from the southern (downstream) edge of the bridge and remain within the MTO ROW along the highway.

There will be no temporary or permanent materials placed below the HWM of Sucker Creek at the upstream reach and so protective erosion and sediment controls shall be used in order to protect sensitive habitat features along the grading limits. However; at the downstream reach there is proposed in water work based on the Preliminary Design of the technically preferred alternative. Since Sucker Creek has been identified by the MNRF as American Eel habitat, a Notice of Activity (NOA) under the Endangered Species Act (ESA) is likely required, however further consultation with MNRF is recommended to determine the appropriate permitting requirements as they pertain to ESA.

In accordance with Step 1 of the Protocol, proposed activities at this location have the potential to affect fish and fish habitat and as such, these have been carried forward through Steps 2 (Existing Conditions characterization; completed under separate cover) and 3 of the Protocol (applicability of MTO BMP) as outlined herein.

### 3.2 MTO Routine Works

Project activities were assessed against the list of MTO Routine Works in Table 2 of the MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings – Version 3, 2016. Routine works are those within the MTO ROW, which includes the shoulders and paved area that do not occur within the waterbody and can be mitigated to prevent sediment / debris from entering into an aquatic feature. The following activities proposed as part of the project qualify as MTO Routine Works under the Structural Maintenance category and can be mitigated with the application of Ontario Provincial Specifications and Standards (OPSS) 182:

- Roadway and right of way grading; and,
- Erosion controls.

Provided the appropriate mitigation measures as specified in OPSS 182 are incorporated into the work plan and properly implemented, these activities are likely to avoid causing serious harm to a fishery. No additional legislative requirements, including authorization under the ESA and the Species at Risk Act (SARA, 2002) have been identified for these activities.

Proposed project activities at the Highway 401 bridge (aside from those qualifying as routine works as identified above) will require in-water works and therefore will not qualify as MTO Routine Works.

## 3.3 MTO Best Management Practices

In accordance with Step 3 of the Protocol, MTO Best Management Practices Manual for Fisheries (Version 2.1, June 2016) was consulted to determine if the project/activity can be addressed by MTO Best Management Practice. The MTO Best Management Practices Manual for Fisheries is intended to provide MTO staff, service providers and contractors with the necessary procedures on how to undertake routine activities in a manner that avoids impacts to fish and/or fish habitat.

Proposed works at the Highway 401 bridge over Sucker Creek will require in-water works to facilitate construction of the abutments on the south (downstream) end and to drive structural piles and build forms to pour concrete at both the east and west abutments. Further, Sucker Creek has been identified by the MNRF as American Eel habitat; so a permit through the Endangered Species Act (ESA) granted by the MNRF may be required. Since the potential presence of aquatic SAR is not included in activities covered by MTO BMPs, these BMPs cannot be used for the proposed works at this bridge. However, if during Detail Design it is determined that in-water work can be avoided, the application of BMP s could be revisited.

## 3.4 Potential Impacts

## 3.4.1 Highway 401 Bridge over Sucker Creek

The proposed works as described in **Section 3.1.2** at the Highway 401 Bridge over Sucker Creek are anticipated to require in-water works in the potential presence of American Eel, an aquatic SAR afforded protection provincially under the ESA, which will apply to this project. Works as proposed do not qualify as MTO Routine Works and MTO BMPs under Step 3 of the Protocol do not apply. Proposed works at this location should be carried forward in the fisheries assessment process (Step 4 of the Protocol) and in consultation with MNRF, concurrent with the development of Detail Design. The assessment of impact and potential for residual harm to fish and fish habitat can be best determined with the refinement of Detail Design. The appropriate Project Notification Forms (in accordance with Step 5 of the Protocol) or Request for Review (Step 6 of the Protocol) will be completed contingent on the outcome of the Step 4 fisheries assessment process.

## 4. Mitigation

The potential indirect negative effects to fish and fish habitat that may be caused by the proposed activities at the County Road 41 bridge over Sucker Creek (as described in **Section 3.1.1**) can be negated or avoided by implementing the mitigation and protection measures listed below.

A detailed assessment of impact in accordance with the fisheries assessment process is required for proposed activities at the Highway 401 bridge over Sucker Creek, as described in **Section 3.1.2**. Although mitigation measures presented below are anticipated to be generally applicable for proposed works at this bridge, the efficacy of these mitigation measures to negate or avoid impacts will need to be evaluated through detailed impact assessment in accordance with the fisheries assessment process concurrent with development of the Detail Design.

Preliminary mitigation measures anticipated to be relevant to the proposed undertaking are as follows:

#### **Timing of Work**

- Near water works will be timed to avoid wet and windy conditions, and,
- Time in-water work (if determined to be required) to prevent disruption of vulnerable fish life stages, including eggs and larvae, by adhering to appropriate fisheries timing windows (no in-water work permitted April 1 to June 30)

#### **Erosion and Sediment Control**

- An Erosion and Sediment Control Plan should be developed and implemented and maintained for the site that minimizes risk of sedimentation of the waterbody during all phases of the project;
- Effective erosion and sediment control measures should be installed before starting work to prevent sediment from entering the water body;
- Grading should be carried out in stages and stabilized as soon as possible;
- Grading within 30 m of Sucker Creek should be conducted in the appropriate timing window (listed above), as to avoid impacts to sensitive habitat (potential Northern Pike spawning areas south of the Sucker Creek bridge);
- Measures should be undertaken to contain and stabilize waste material (e.g., dredging spoils, construction waste and materials, uprooted or cut plants, accumulated debris) above the high water mark of nearby waterbodies to prevent re-entry;
- Regular inspection and maintenance of erosion and sediment control measures and structures should occur during the course of construction; and,
- Repairs to erosion and sediment control measures and structures should be completed promptly if damage occurs.

### **Operation of Machinery**

- Activities near water should be conducted such that materials such as paint, primers, blasting abrasives, rust, solvents, degreasers, grout or other chemicals do not enter the watercourse;
- A response plan for spills should be developed before work commences. This plan should be implemented immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit should be maintained on site;

- Machinery should arrive on site in a clean condition and be maintained free of fluid leaks, invasive species and noxious weeds;
- Machinery should be washed, refuelled and serviced and fuel and other materials will be stored in such a way as to prevent any deleterious substances from entering the watercourse;
- Refuelling should be conducted >30 m from the watercourse on a refuelling pad to prevent spills from entering the watercourse;
- Construction materials should be removed from site upon completion of the project; and,
- Clearing of riparian vegetation should be kept to a minimum to avoid disturbance to the riparian vegetation and prevent soil compaction. When practicable, prune or top the vegetation instead of grubbing/uprooting.

#### **Dewatering Activities**

- Although dewatering of surface watercourse is not anticipated, if this requirement is confirmed during Detail Design, a temporary water passage/isolation/containment system should be implemented during construction to isolate the work area from the open area of the watercourse, in order to maintain fish passage and water flow that is both adequate and clean.
- The contractor will be required to retain a qualified fisheries biologist to complete fish salvage activities from the isolated work area, as applicable;
- An appropriate back up pump will be available on-site as a contingency in the event of primary pump failure;
- Where by-pass pumping of flows is required or temporary channel restriction occurs, the contractor will limit the discharge pump velocity and/or partial channel restriction to ensure discharge velocities will not result in localized scouring in the receiving water feature;
- Any water intakes or outlet pipes will be screened to prevent entrainment or impingement of fish;
  - Screens will be located away from natural or artificial structures that may attract fish that are migrating, spawning or in rearing habitat;
  - The screen face will be oriented in the same direction as the flow;
  - Openings in the guides and seals will be less than the opening criteria in order to ensure that it is "fish tight";
  - Screens will be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area;
  - Structural support will be provided to the screen panels to prevent sagging and collapse of the screen;
  - Large cylindrical and box-type screens will have a manifold installed in them to ensure even water velocity distribution across the screen surface;
  - Provisions will be made for the removal, inspection, and cleaning of screens;
  - Regular maintenance and repair of cleaning apparatus, seals, and screens will be carried out in order to prevent debris-fouling and impingement of fish;
- Pumps will be shut down when fish screens are removed for inspection and cleaning.
- Any sediment laden dewatering discharge should be pumped to a filtering system at least 30 m from the watercourse and allowed to settle and/or filter through riparian vegetation before being discharged downstream of the construction area and controls shall be monitored for their effectiveness; and,
- A spill management plan (including materials, instructions regarding their use, education of contract personnel, and emergency contact numbers) will be ensured on site at all times for implementation in event of an accidental spill during construction.

## 5. Determination of Serious Harm

The proposed works as described in **Section 3.1.2** at the Highway 401 bridge over Sucker Creek are anticipated to require in-water works in the potential presence of American Eel, an aquatic SAR afforded protection provincially under the ESA. Since MTO BMPs cannot be applied, proposed works at this location should be carried forward through Step 4 of the fisheries assessment process and in consultation with MNRF. The efficacy of mitigation measures to negate or avoid impacts and the determination of Serious Harm cannot be completed at this time, but will need to be conducted concurrent with development of the Detail Design. The fisheries assessment process will continue in Detail Design when the scope of work has been determined and an impact assessment, including a Pathways of Effects, can be competed with the proper level of detail to determine the likelihood of serious harm and identify mitigation measures to address any residual effects.

## 6. Fish Habitat Enhancement

The results of the preliminary review of potential impacts of the Preliminary Design of the technically preferred alternative for the Highway 401 bridge over Sucker Creek determined that serious harm to a fishery is not anticipated and as such no measures to offset residual effects are proposed at this time.

Fish Habitat Enhancement opportunities may be considered for this bridge concurrent with the MNRF consultation related to potential impacts to American Eel habitat (as may be applicable).

#### 7\_ **Conclusions**

Through the background information review, consultation with MNRF and 2016 fish habitat field investigations it was determined that Sucker Creek within the assessed reach provides permanent, direct fish habitat to a mixed warmwater and coolwater forage and baitfish community. Sucker Creek likely provides spawning habitat for the forage and baitfish at the cobble and riffle areas but access to these habitats are non-limiting throughout the assessed reach. Despite the mixed community assemblage, it was confirmed with MNRF that Sucker Creek should be managed as a warmwater habitat.

Based on a review of the existing fish community data, American Eel was identified as potentially occurring within Sucker Creek. Although suitable habitat for the American Eel is present within Sucker Creek, it is unlikely that proposed work at the County Road 41 bridge over Sucker Creek will result in any negative effects to the species or its habitat.

The proposed work at the County Road 41 bridge over Sucker Creek are anticipated to occur above the HWM and at least 30 m from the nearest watercourse. Protective erosion and sediment controls shall be used in order to mitigate indirect impacts to habitat features in proximity to grading limits. It is expected that proposed works at this location will not result in Serious Harm and Notification to MTO Head Office and to DFO would not be required.

The proposed works at the Highway 401 bridge over Sucker Creek are anticipated to require in-water works in the potential presence of American Eel, an aquatic SAR afforded protection under the ESA. Proposed works at this location should be carried forward in the fisheries assessment process and in consultation with MNRF. The efficacy of mitigation measures to negate or avoid impacts and the determination of Serious Harm cannot be completed at this time, but will need to be conducted concurrent with the refinement of Detail Design.

AECOM Fisheries Biologists certified in the MTO Registry, Appraisal and Qualification System (RAQS) as Fisheries Assessment Specialists have assessed the potential negative impacts of the proposed work and recommended appropriate mitigation measures to lessen these impacts. It was determined that negative impacts to general use aguatic habitat features within the Study Area can be avoided, provided the recommended mitigation and protection measures are appropriately implemented, monitored and maintained, however; a potential loss of SAR habitat is possible. Further consultation with DFO and MNRF will be required at Detail Design phase to understand permitting requirements.

## 8. Literature Cited

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Personal communications with Management Biologist, Monique Charette on November 8/9/11, 2016

Ministry of Transportation (MTO), 2009:

Environmental Guide for Fish and Fish Habitat



# Appendix A

**Photo Log** 

# **Downstream of County Road 41**



Photograph 1 ↑

June 3, 2016 - Selby Creek, from upstream looking downstream- east towards County Road 41 bridge



Photograph 2 ↑

June 3, 2016 - Selby Creek from downstream of County Road
41 bridge, looking northeast- upstream



Photograph 3 ↑

June 3, 2016 - Selby Creek from downstream of County Road
41 bridge, looking east- upstream



Photograph 4 ↑
June 3, 2016 - Selby Creek from upstream looking downstream towards County Road 41 bridge



Photograph 5 ♠
June 3, 2016 - Eroding/undercut banks downstream of County
Road 41 bridge- looking upstream- right bank



Photograph 6 ↑
June 3, 2016 - Canada waterweed in Selby Creek,
downstream of County Road 41 bridge



Photograph 7 ↑

June 3, 2016 - County Road 41 bridge from downstream looking upstream – east



Photograph 8 ↑

June 3, 2016 - Selby Creek at County Road 41 bridge from immediately upstream of bridge, looking south – right bank



Photograph 9 ↑

June 3, 2016 - Selby Creek from immediately upstream of
County Road 41, looking upstream – east



Photograph 10 ♠
June 3, 2016 - Selby Creek from upstream of County Road
41, looking upstream – east



Photograph 11 ↑

June 3, 2016 - Selby Creek from immediately upstream of
County Road 41, looking upstream – east



Photograph 12 ↑

June 3, 2016 - Selby Creek from upstream of County Road
41, looking upstream – east



Photograph 13 ↑
June 3, 2016 - Selby Creek riffles from upstream
of County Road 41, looking upstream – east



Photograph 14 ↑
June 3, 2016 - Selby Creek riffles from upstream
of County Road 41, looking upstream – east



Photograph 15 ↑
June 3, 2016 - Selby Creek riffles and depositional islands from upstream of County Road 41, looking upstream – east



Photograph 16 ↑

June 3, 2016 - Drainage outlet to Selby Creek from upstream of County Road 41, looking southeast – right bank

# **Upstream of Highway 401**



Photograph 13 ↑
June 3, 2016 - Selby Creek from immediately upstream of highway 401 bridge, looking upstream – northeast



Photograph 14 ↑
June 3, 2016 - Area of impact upstream of the
Highway 401 bridge, looking east – right bank



Photograph 15 ↑
June 3, 2016 - Selby Creek under Highway 401
bridge, looking downstream – southeast



Photograph 16 ↑
June 3, 2016 - Selby Creek from immediately
upstream of Highway 401 bridge, looking upstream
– northeast – right bank



Photograph 15 ↑
June 3, 2016 - Selby Creek substrate/submerged vegetation upstream of highway 401 bridge



Photograph 16 ↑
June 3, 2016 - Selby Creek depositional islands from upstream up Highway 401 bridge, looking upstream- east



Photograph 17 ↑
June 3, 2016 - Selby Creek from upstream looking downstream at Highway 401 bridge- southwest



Photograph 18 ↑
June 3, 2016 - Large deep pool from the upstream of Highway 401 bridge in the zone of general assessment, looking upstream- north



Photograph 19 ↑
June 3, 2016 - Selby Creek from
downstream of Highway 401 bridge looking
upstream at Highway 401 bridge



Photograph 20 ↑
June 3, 2016 - Area of impact from immediately upstream of Highway 401 bridge, looking immediately upstream of bridge at left bank



Photograph 21 ↑
June 3, 2016 - Small outlet to the creek was present downstream of the bridge at the right bank, looking from downstream



# Appendix **B**

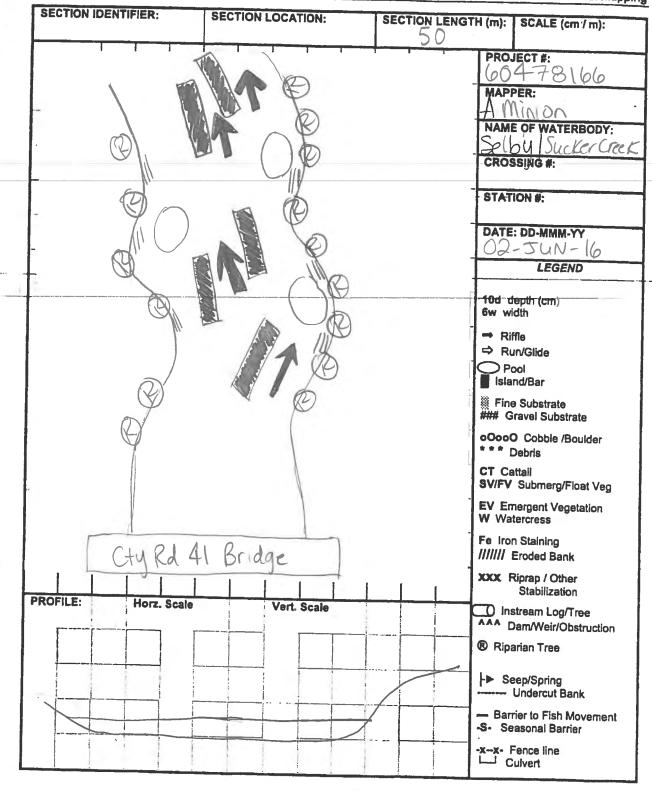
**Field Notes** 

Appendix 4.A: Watercourse Field Record Form

wetted (m)  Mean bankfull width (m)  Mean bankfull depth(m)  Substrate  Bedrock Br	Boulder So	Cobi		Grav Gr		Sand Sa	SI		Clay	7	1	2 $85$ $r > 80$ Detritus
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wetted (m) Mean bankfuil width (m) Mean bankfuil depth(m)											1	2
wetted (m) Mean bankfull width (m) Mean											1	2
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Mean depth								<del>-</del>			^	1.3
Percentage of area			30	)	5		2		0	+		
SUB- SECTION(S	) Run		Pool O			iffle O	Fla	1	Inside cul	vert		Other
						C	URRENT \	/ELOCITY	(m/s):			
TOTAL PEO	TION LENGT	0		-	0			0				
TYPE: St	ream / river	Channe	lized	d Permanent Int			termittent Ephemeral AS			SOCIATED WETLAND:		
SECTION ID	ENTIFIER:	)		BECTIC Include o	ON LOC	ATION: map)						
SECTION TY	YPE AND MO	RPHOLO							Size (w x	h) m <sup>2</sup>		
Other O De	escribe:								USF U			N/A O
Bridg			k Culvert	0	One	en Foot Cu	Ivert O		CSP O			
high	TRUCTURE		tone	estro	<b>k</b>		inot					
Indus			^		Λ	SO	JRCES OF	POLLU	TON:			
LAND USE	Lenn (		4dd	inort	700	TO THE	ואופוע יי	" K	ingsto	<u> </u>		
TOWNSHIP		490	290		1	3	R DISTRIC		1			-
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LOCATION	OF CROSSI	NG: N	orth	of	De	tenti	on G	entre				7.
Selby Sucker Crack STATION #:												
LOCATION	WATERBOD'	٧.	DDAI	1405.4								
PHOTO NU	IMBERS AN	DESCR	IPTION	3:								
AIR TEMP	99	° C		WA	TER TE	MP:			CONDUC	TIVITY		1 — —
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O Yes	ORS:	No		Unkno								
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The state of the s	the court of		1									

BANK STABILITY	-								
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Left Upstream	m Bank	0		0		10 · 10			0
Right Upstres	m Bank	0		0		1			0
навітат							ala Mara	los Mossasti	don Man
COVER b	dercut anks	Boulders 35	7-5	Instream Overhan	(90)	Orga debr	is Instre	am (60)	None
SHORE COVER		100 – 90 %	90	60%	60- 30°	6	30 - 1%		None
(% stream shaded)	):	0	b		0		0		0
VEGETATION TYPE (%):		Submerge 45	ent		Floating	16.0	Emerge 4-C		None
Predomini Spec		MADIT:					rsetai	1/9rass	<u> </u>
MIGRATORY OBSTRUCTIONS:	Non			Seaso	onal	gardine Transference copy, a conference copy, and	Perm	inent	
POTENTIAL CRITICAL HABITAT LIMITING:	Spar	wning oly o	nriffle	Evide	nce of Ground	water	Other		-
	CEMEN	T OPPORTUNIT	HES-						
POTENTIAL ENHAN									
COMMENTS				20/		1/00	1	10.15	70001
COMMENTS Immedia the Creek high with r here + se at island (overland riftles n 0.12 r rocks, er	north one si, deflet de	ranges vie tree deposition lots o position to bride ent gra	ban foral 1 f jur erk al ist sees,	N+S rescto enile mear lands Lots	are ven sites fish, ou aders t anth	nero Mai land tlet oward n wid nopo 9	ded of ship colds. Ship colds through the toric	de/soladed + (Sf light cutter most	ck sul riffle at south mair depth scove
			O Yes		r of pages				
Additional Notes A	pharine.	*/ /	- /		10	401			of Champion

bridge, natural sheen towards 401 water shows unclear inputs DS from outfall from the south. - Black Sand Mussel shell found.



\*

O Yes

AIR TEMP:

SUB-

SECTION(S)

Percentage

of area Mean depth wetted (m) Mean width wetted (m) Mean bankful! width (m) Mean bankfull depth(m) Substrate

Bedrock

Br

Boulder

80

Cobble

Co

Gravel

Gr

Sand

Sa

Silt

SI

Clay

CI

Muck

Mu

Detritus

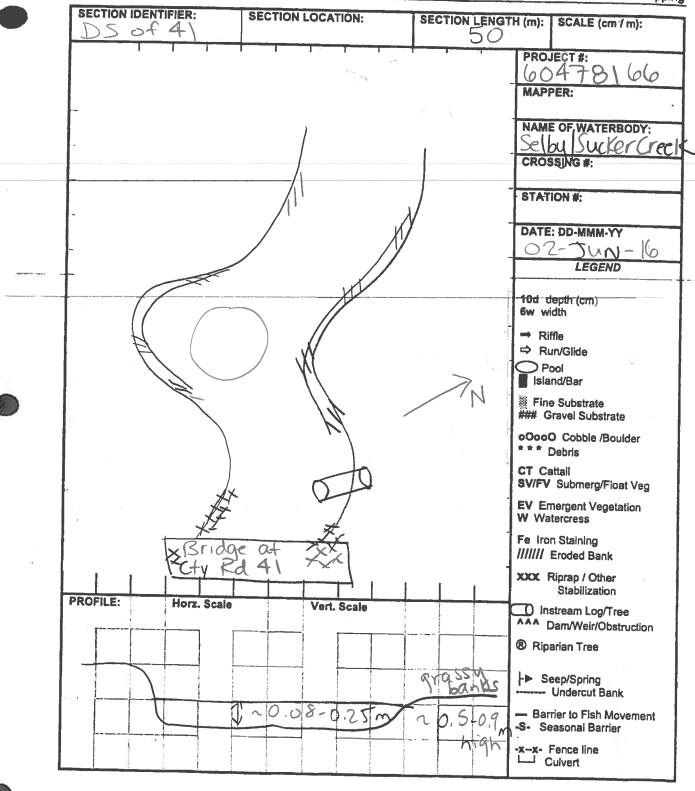
D

Section 4: Field Investigations Appendix 4.A: Watercourse Field Record Form GENERAL INFORMATION PROJECT#; PROJECT DESCRIPTION: DAY: 00478166 MONTH: YEAR:  $\bigcirc$ is STREAM REALIGNMENT required for this section: O No O Unknown COLLECTORS: WEATHER CONDITIONS: TIME STARTED: TIME FINISHED: Overcast, light drake A. Mi 1145 1400 CONDUCTIVITY (µS/cm): PHOTO NUMBERS AND DESCRIPTIONS: LOCATION NAME OF WATERBODY: DRAINAGE SYSTEM: CROSSING #: STATION #: Selbul Sucker Creck LOCATION OF CROSSING: DS of 4 GPS COORDINATES: 656935 MTO CHAINAGE: TOWNSHIP: 1 MNR DISTRICT: ennox & Addinaton LAND USE AND POLLUTION SURROUNDING LAND USE: highway industrial forested Sources of Pollution: Road Salt, Industry inputs Coverland **EXISTING STRUCTURE TYPE** Bridge & **Box CulvertO** Open Foot Culvert () CSP O N/A O Other O Describe: Size (w x h) m2 SECTION TYPE AND MORPHOLOGY SECTION IDENTIFIER: SECTION LOCATION: West of Cty Re (Include on habitat map) NUrth of Kimmel Stream / river Channelized Permanent ASSOCIATED WETLAND: Intermittent Ephemera! 0 TOTAL SECTION LENGTH (m): CURRENT VELOCITY (m/s): Run **Pool** Riffle Flats Inside culvert Other 0 b 8 0 50 20 30

> over bedrock Co>61>50>5!

				24 1 .4.1.11.	-A-141-	1.1-	nstable
	Stable	Slig	htly Unstable	Moderately Un	stable	Ur	
Left Upstream B				0			0
Right Upstream B	ank O		0	0			0
ABITAT N-STREAM Underco COVER banks (% surface area):	•		Woody Debris 3	debris		lar Macroph am (75	$Q \mid I$
area): 50			Overhanging (5)			anging (	5)
SHORE COVER	100 - 90 %	90 – 60	0% 60-	30%	30 – 1%		None
% stream shaded):	0	0	- Florida	6	0		O
EGETATION TYPE	Submero		Floating 5		Emerger 3		None
(%): Predominant	milfoll						"
Species	Canadah	attimeno			Perma	inent	
IGRATORY BSTRUCTIONS:	None		Seasonal		rema		
OTENTIAL CRITICAL HABITAT	Spawning Potential	in riffl	Evidence of Gro	undwater	Other		
	MENT OPPORTUNI	HES					
- Possibli	y some	incree	sed plan	ing o'	7 +	he	
- Possibli liparia.	y some orea very n	increcto in atural	crease 1	ring of	tabi	he lizati	37,
- Possibli liparia. -Otherwsa	y some area wery n	increcto in atural	crease l	ring of some	tabi	he lizati	37,
Creekis a pools of flo consolidate some boulde Lots of lily (Nyther on rocks.	a naturalists. Approved Substrates the consultation of the consult	red cho ( 0.08. ate (be per ge at + l ushes ( re gras	annel (6- -0.12 m We drock) with to more sil emercent grasses, h is covere of fish of	12m) wide the mainly ty as it to construct (milfingly) and the street of the served	mos- cobb sets c mos- mos- mos-	th m tya 1050 1050 1010 1010 1010 1010 1010	ostly well of avel water to loring water
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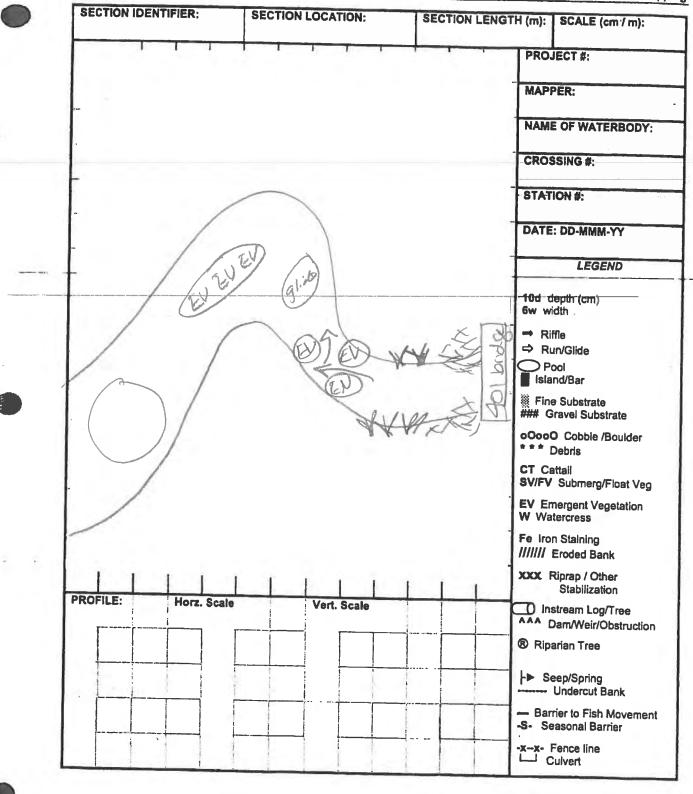
1 9000



Appendix 4.A: Watercourse Field Record Form

bankfull depth(m) iubstrate		Cobble	Gravel	Sand			Br)		r>51
depth(m)									
	0			,				0	.75
bankfull width (m) Mean								12.	.0
Mean							· · · · · · · · · · · · · · · · · · ·	6.	
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orcentag of area	ge	2	0 :	70	10			<b>†</b>	
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	CTION LENGT	TH (m):		C	URRENT VEL	OCITY (m/s)	):		
	6	0	Permane		)	phemeral O	{	ATED WET	TLAND:
	IDENTIFIER:	Channelized	SECTION L	bitat map)					
CTION	Describe: TYPE AND MO	DRPHOLOGY				Size	(w x h) m	12	
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	PRDINATES:	65677	3 490	29/0 MT	O CHAINAGE		-		
LS	of 4	NG:							
selb	4/Suck	er Creek	UNAGE SYS	TEM:	CROSSING	#: 8	TATION #	:	
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IR TEM	P: OD D		WATER	-	nered	435 COI	NDUCTIVI	TY (µS/cn	115
OLLEC	TORS:		WEATHER C	ONDITIONS:	TIME	STARTED:		TIME EI	NISHED:
Yes	AM REALIGNA	beriuper TMEN	for this secti O Unknown	on:					
-	14781	60 th	GDL AM	401	DAY:	MONTH:		EAR: 2	-016

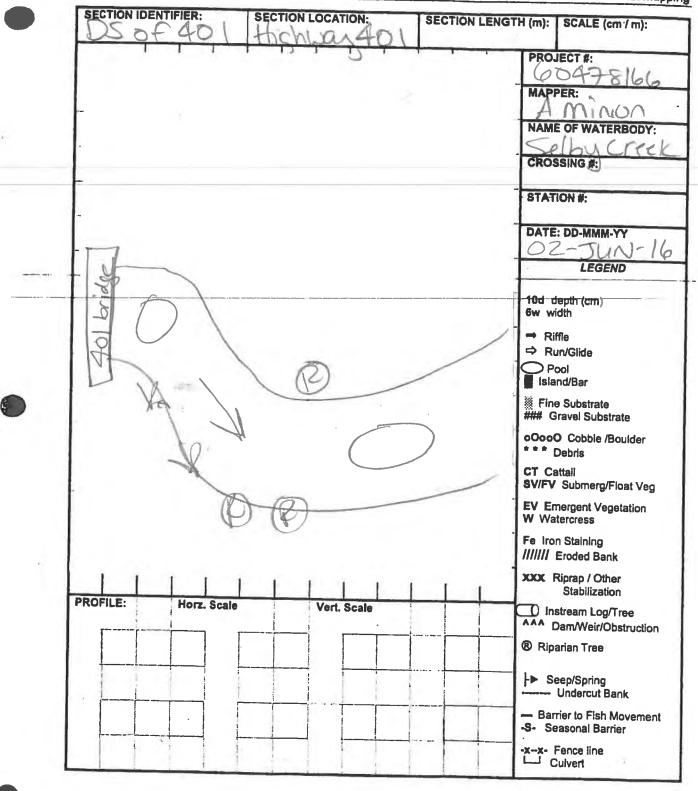
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(% stream sha			0		)	O	P-1		Ő		1	
VEGETATION (%):	TYPE	al	Submerge 4a·C	ent		Floating		20150	Emergen	91955	] '	ione
Predo	ominant	(				A track delates difference on Arms on the Con-		d deviles allita y de dis.		,		
MIGRATORY	Species	None			Seas	onal .		and the second s	Perma	nent		
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Marra 401.	10 h	JH + F	ndep low : 3 h o.	bsen	na 1 176,	() (a. 1 15 ,	<i>a.</i> ;					
1013	OF											



Appendix 4.A: Watercourse Field Record Form

DOC ICO	AL INFORMA	TOUR DE LA CONTRACTION DE LA C								
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AIR TEMI	P: 20	) 0 0		WATER	TEMP:			ONDUCTIV	ITY (µS/cr	n):
PHOTO N	NUMBERS AN	D DESCRI	PTIONS:							
LOCATIO	)N									
	WATERBOD	10	DRAIN	AGE SYST	EM:	CROSSING	#:	STATION #		
OCATIO	N OF CROSS	- Dimen		<del></del>						
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							~=av11V			-
XISTING	STRUCTURE	TYPE	Marin .			Avenye				
Brid	ige40	Вох	CulvertC		Open Foot C	ulvert O	CSI	P 0		N/A O
ther O	Describe:	-								IN U
ECTION	TYPE AND MO	ORPHOLO		a may	Ranke	100	S	iize (w x h) n	12	
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	6	0			it Intern	nittent E	phemeral O	ASSOCI	ATED WE	TLAND:
		0		Permanen	intern	_	0		ATED WE	FLAND:
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	17	Stable	Slig	htly Unstable	Moderate	ly Unstable	Un	stable	
Left Up	stream Ba	ink O		10		0		0	
Right Up	estream Ba	ink O		0		6		0	
ABITAT			A STATE OF						
N-STREAM COVER (% surface area):	Underce banks		60	Woody Debris 3 Instream 20 Overhanging 10	deb	iris Instrea	anging 4	}	
SHORE CO		100 – 90 % O	90 – 60 O	9% 60	- 30% O	30 – 1% O		None O	
VEGETATION (%):	N TYPE	Submerge	ent	Floating		Emergen	nt	None	
IIGRATORY BSTRUCTION	Species	lone	400	Seasonal	AND	Perma	inent		
OTENTIAL		Spawning		Evidence of Gro	undwater	Other	milion		
RITICAL HAE IMITING:	BITAT	Possi	b C	10	0				
Nativ	NHANGEM - Pla	ant opportuni	to 5	tabiliza	ban	KS.			
Nativ	e ple	ant opportuni	mes \$ 50	tabiliza	banı	es.			
Nativ	e pla	antings	to 5				S.B	gnK:	
Native Comments Lots	e pla	moss a	to so	tabiliza tabiliza tundera anapy. a wateri luate b	d on ut m	rock	s. B elyun in co	anks as tale	



GENERAL INFORMAT	ION .		Salat.						, V
PROJECT #: 604	78166 PRO	JECT DESCR	IPTION:	DAY	<sup>(‡</sup> 03	MONT	H: 06	YEAR	2016
COLLECTORS:	Minion					STARTED:		TIME FI	NISHED:
WEATHER SU	n+cloud				SUR	FACE COND	ITIONS (I	fapplica	able):
CONDITIONS:				Calm		Rippled	Rippled V		Rough
GENERAL LOCATION						September 2			<b>网络东西河 智慧</b>
NAME OF WATERBOD				LOCATIO	ON OF S	STATION:			
Selby	Sucker	reck							
township:		200		MNR DIS		KIN	asta		
SÁMPLING LOCATION				CHA					4.1 至
LOCATION:	LENGTH (m)	AIR TEMP. (°C)		oH ,		SOLVED EN (mg/L)	TEMP		CONDUCTIVITY (µS/cm)
Upstream		22	-				16	,	
Downstream		22							
Culvert / Hwy ROW		22							•
WATER COLOUR:	Colourless	Yellow/brown		BI	Blue/green		Turbid		Other
GEAR			1. 1. S.						
ELECTROFISHER:									
Length (m):		Settings:				Secon	ds:		
NETS and TRAPS:									
MINNOW TRAP:	#	DIP NET	)		T	RAP NET			
SEINE:		GILL			0	THER spe	cify	A .	
HAULS		Period Of T	ime (24 h	our clock	:):				
(#):		Set	Set			Clear			
LENGTH		Time			time	time DEPTH OF CAPTUR			
(m):		MESH SIZE				1		TUKE:	
		Smallest (c					nm (w): iw (w):		
SAMPLE COLLECTION			117.			WIBAIII	an (m).		
FISH KEPT?		F BAGS				PRESERVA	TIVE:		
Yes (No)			Formalir	1	Froze	n	Alcohol		Other
COMMENTS:					- sig 3 σ σ σ σ				
electrofisher	unable	100	pera	te-r	niss	ing an	ode l	rand	ie
electrofisher used dy	onet -	many 2 Bd	un Indeo	know Ki	lli-C	sh (1	Phrim	as	
	- 6	4Blun	tnos	2 Mil	700h				
Additional Notes Appe	nded? No Y	es numbé	er of page	s					

CAPTUR	EINFORMATION				1000
PROJE	ECT NO.: 60478166	STATION	10.:		
NO.	SCIENTIFIC NAME / COMMON NAME	PHYSIC	AL CONDITION	TOP PRED	
		# fish with blackspot	# fish with lesions, tumours, maturity etc.	Length (mm) F= total fork or L = total length	AGE CLASS YOY / Adult
	Banded Killifish	Ø	Ø		adult
	Banded Killifish.	Ø	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		adult
2	Blunthose Minnows	Ø	Ø		adult
	many unidentified YOY Cyprinids	Ø	Ø		YOY
	o cyprinids				
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Oct-06

Page 4 of 16



# Appendix C

**MNRF** Correspondence

From: Charette, Monique (MNRF)

To: Minion, Ashley

Subject: RE: Selby Creek/Napanee River

**Date:** Monday, November 14, 2016 4:14:45 PM

#### Hi Ashley,

I'm waiting to hear from our F&W Tech. But I did touch base with the researcher and he personally has caught eel near the 401 in the Napanee River (and other sites north on the river) as well as in Sucker Creek (also near the 401). I hope to have an answer for you tomorrow...

From: Minion, Ashley [mailto:Ashley.Minion@aecom.com]

**Sent:** November-08-16 3:26 PM **To:** Charette, Monique (MNRF)

Subject: RE: Selby Creek/Napanee River

Hi Monique,

Thank you for the reply! I hope all is well with you also ☺

What would be the next step then, as the MTO gets closer to detailed design with the bridge/ramp works. If they are working within the water would this project be a C-Permit for certain or something else?

Thanks, Ashlev

Ashley Minion, B.Sc., EPt., RBIT

Aquatic Biologist
D 905-747-7693
C 647-227-9446
Ashley.Minion@aecom.com

#### **AECOM**

105 Commerce Valley Drive West Markham, Ontario, Canada L3T 7W3 T 905-886-7022 F 905-886-9494

www.aecom.com

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Please consider the environment before printing this page.

From: Charette, Monique (MNRF) [mailto:monique.charette@ontario.ca]

Sent: Tuesday, November 08, 2016 12:38 PM

To: Minion, Ashley

Subject: FW: Selby Creek/Napanee River

Hi Ashley,

#### Hope all is well with you! It's been a while☺

Yes it's possible that American Eel are present in the Napanee River. Our researchers found eel in the Napanee River in 2010. Although, not connected to the Napanee River, an eel was also recently observed in Beaver Lake north of Napanee. They have also been observed in the Salmon River. We have no information for Selby Creek (Sucker Creek). So yes they are present in the Napanee and could be potentially found in Selby Creek considering the surrounding watercourses have had eel observations.

I have to step out for the afternoon and will be monitoring emails from offsite location for the next 2 days. Let me know if you need anything else.

#### **Monique Charette**

Ministry of Natural Resources and Forestry Management Biologist Kingston Field Office 51 Heakes Lane Kingston, ON K7M 9B1

Telephone: 613-531-5715

Email: Monique.charette@ontario.ca

From: Simpson, Holly (MNRF)
Sent: November-08-16 11:41 AM
To: Charette, Monique (MNRF)

Subject: FW: Selby Creek/Napanee River

Holly Simpson

705-755-3302

From: Minion, Ashley [mailto:Ashley.Minion@aecom.com]

**Sent:** November-08-16 9:52 AM **To:** Simpson, Holly (MNRF)

Subject: Selby Creek/Napanee River

Hi Holly,

I have attached a location map as per your request. I am trying to determine if it is possible that American eel are present within either Selby Creek or the Napanee River.

Thank you!

#### Ashley

Ashley Minion, B.Sc., EPt., RBIT

Aquatic Biologist
D 905-747-7693
C 647-227-9446
Ashley.Minion@aecom.com

#### **AECOM**

105 Commerce Valley Drive West Markham, Ontario, Canada L3T 7W3 T 905-886-7022 F 905-886-9494

www.aecom.com

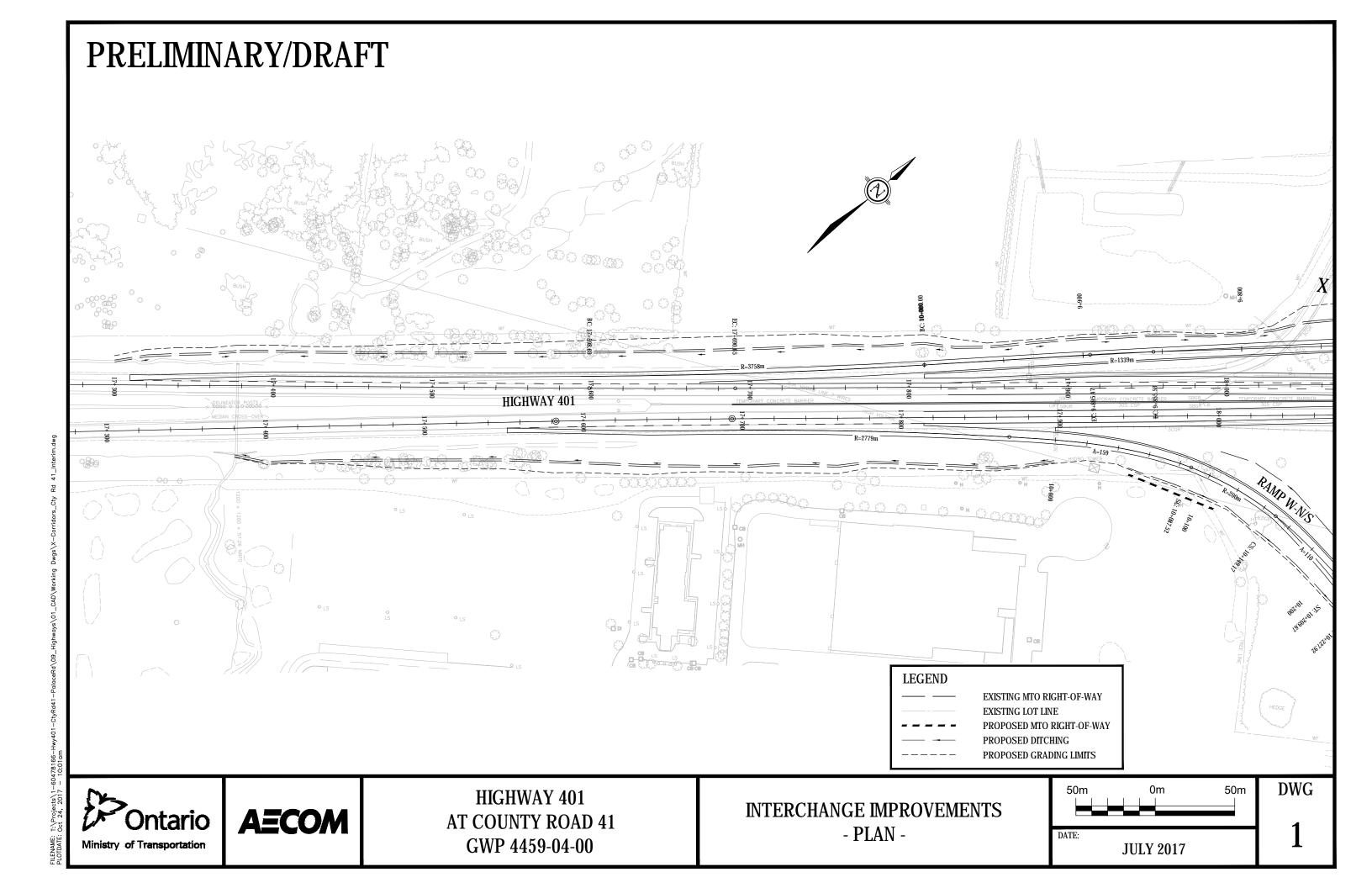
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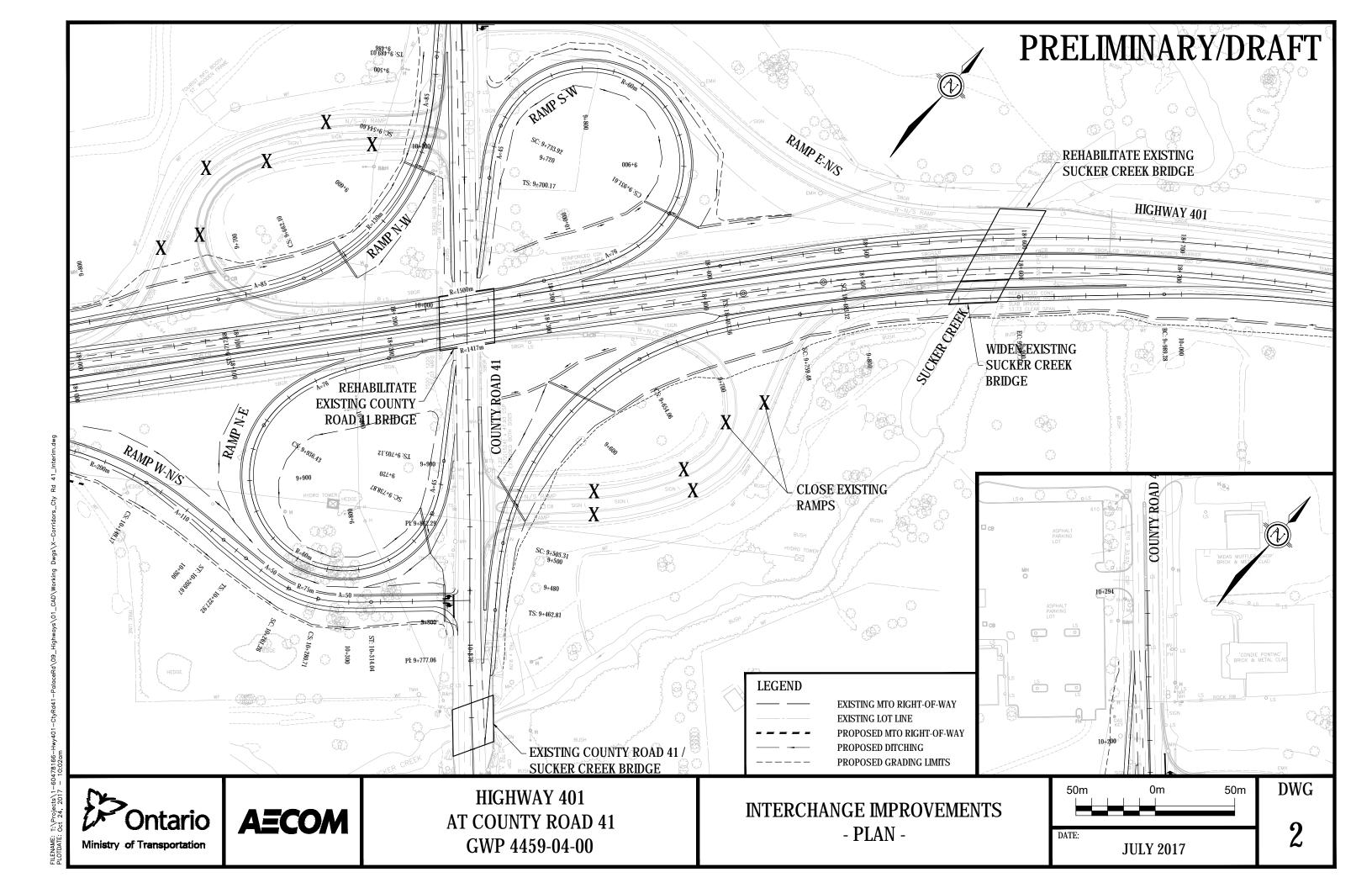
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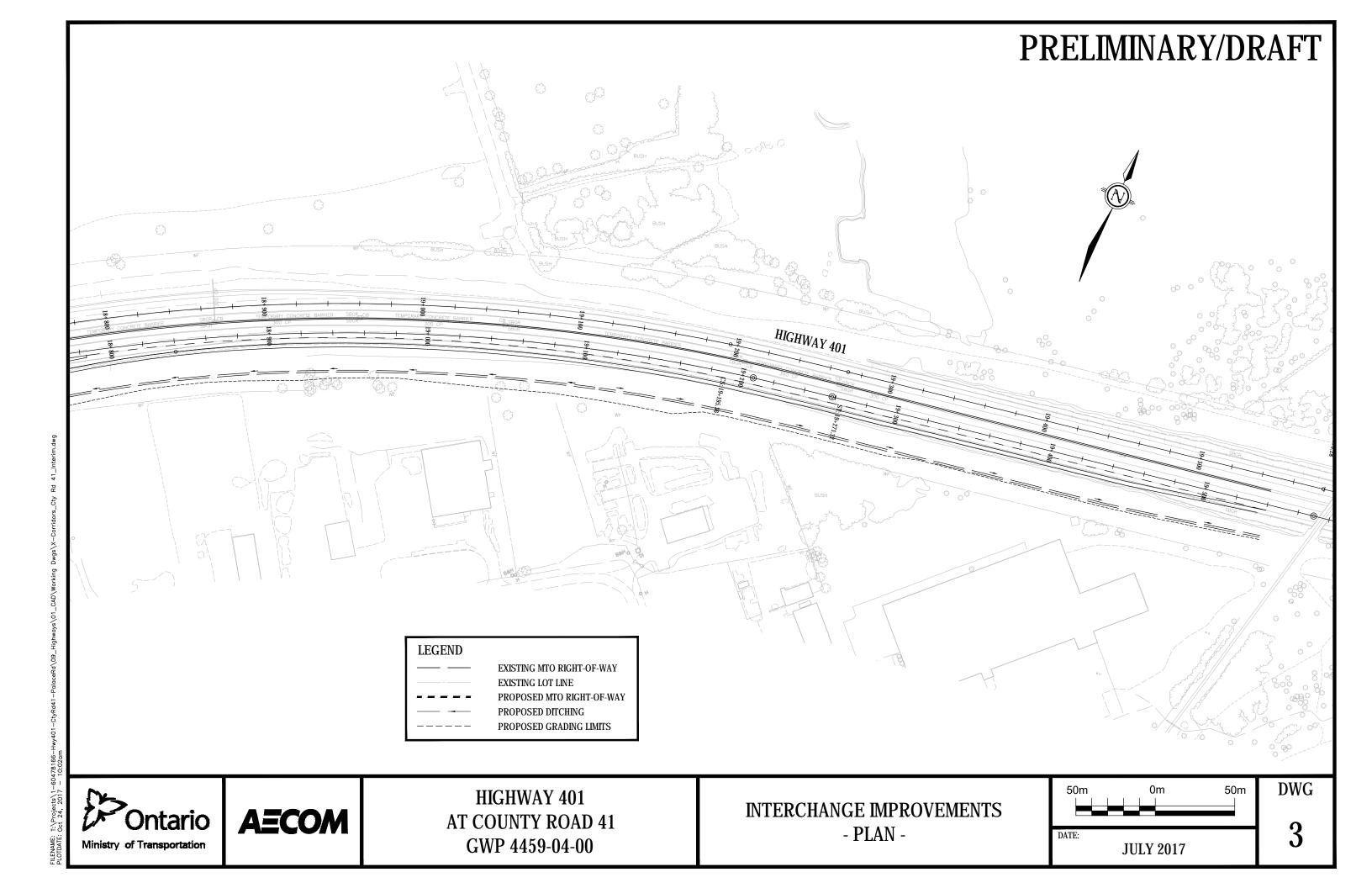


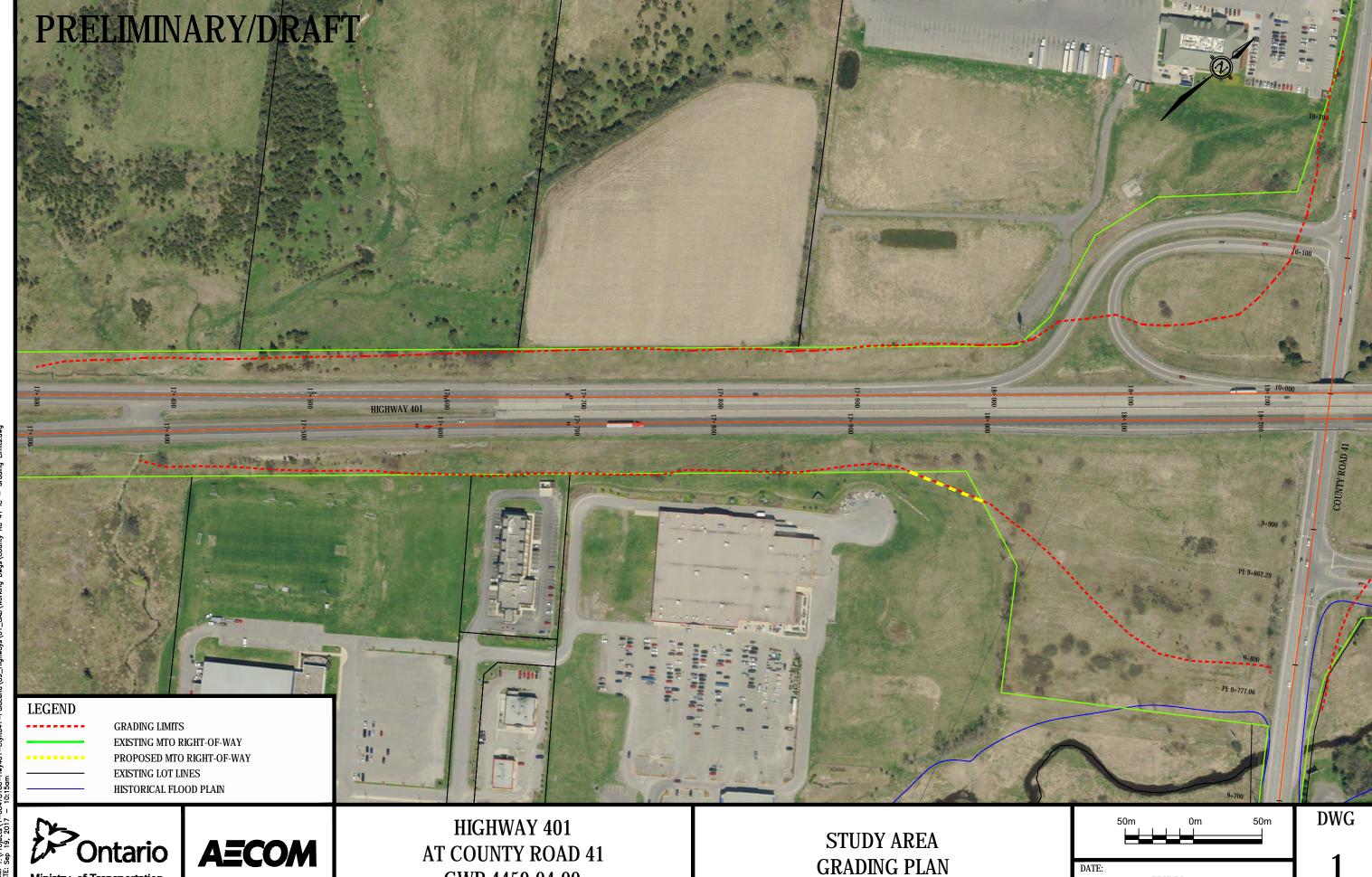
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**Design Drawing and Grading Limits** 







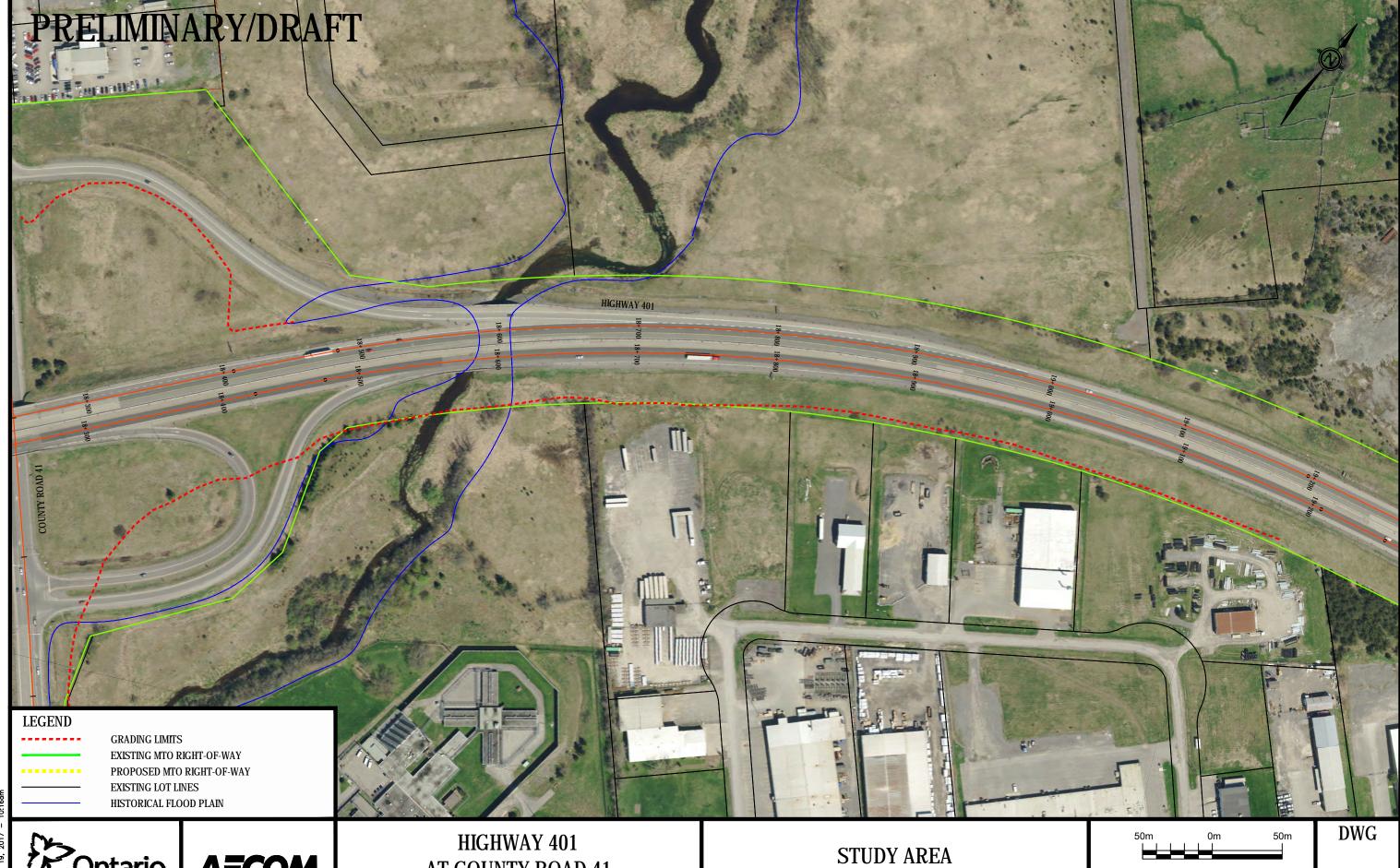


GWP 4459-04-00

DATE:

**JULY 2017** 

Ministry of Transportation



**GRADING PLAN** 

DATE:

**JULY 2017** 

**AECOM** 

AT COUNTY ROAD 41

GWP 4459-04-00

Ontario

Ministry of Transportation

# **Appendix K – Groundwater Assessment Report**

Prepared for: Ontario Ministry of Transportation

G.W.P. 4459-04-00



**Ontario Ministry of Transportation (MTO)** 

# Groundwater Assessment - Preliminary Design and Class Environmental Assessment Study Highway 401 Interchange Improvements at County Road 41 (G.W.P 4459-04-00), Town of Greater Napanee, ON

#### Prepared by:

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December, 2016 Project Number: 60478166

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# **Executive Summary**

AECOM Canada Ltd. (AECOM) was retained by the Ontario Ministry of Transportation (MTO) to complete a groundwater assessment in support of a Preliminary Design (PD) and Class Environmental Assessment (EA) Study (the Study) for improvements to the Highway 401/County Road 41 interchange (Contract G.W.P 4459-04-00) in the Town of Greater Napanee, County of Lennox and Addington, Ontario. The study will examine interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or widening of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging (including potential detours on County Road 41) during construction.

The study area includes Highway 401 and County Road 41 interchange and the Highway 401 corridor easterly from the interchange to Newburgh Road.

The objective of this groundwater study was to evaluate the local hydrogeological conditions within the study area, to verify potential impacts from highway construction activities to the local hydrogeology, and to recommend measures that could mitigate those potential impacts.

A summary of the hydrogeological conditions within the study area is as follows:

### Geology and Hydrogeology

The study area is situated within a limestone terrane with thin or no soil coverage. The quaternary deposits consist of glaciolacustrine deposits of silt and clay (basin and quiet water deposit) on top of limestone bedrock. Modern alluvial deposits of clay, silt, sand and gravel are observed along the Sucker Creek valley. The majority of the limestone terrane exhibits shallow soil cover, while glacial till deposits of silt and clay present along the stream valleys could be deep in some areas.

Based on the Ministry of the Environment and Climate Change (MOECC) well records and overburden deposit thickness map generated as part of the *Approved Assessment Report* for Quinte Source Protection Region (SPR) (July 2014) (the July 2014 Quinte SPR Assessment Report), the thickness of the overburden deposits ranged from 0 m (bedrock exposed at the groundwater surface) to approximately 19.8 m below ground surface within the study area.

There are two major bedrock aquifer systems in the vicinity of the study area: the shallow limestone aquifer and the deep Precambrian aquifer. According to the July 2014 Quinte SPR Assessment Report, the yield from the bedrock aquifers is typically low to moderate and considered adequate for meeting most domestic and agricultural needs.

The quality of supply from the aquifers is normally good with fresh water reported on well records. However, the water is often hard and in some areas natural water quality problems such as mineralization, gas and sulphur may be experienced (the July 2014 Quinte SPR Assessment Report). These natural water quality problems are typically encountered when wells are drilled deep (i.e., depths greater than 30 metres in limestone bedrock) or in areas of groundwater discharge.

Potable water in Napanee is municipally supplied with water obtained from Lake Ontario. The study area is located at the northern end of Napanee and based on the MOECC well records, there are a large number of private wells present within the study area. All existing water wells within the study area are bedrock wells, with the majority of them drawing water from the limestone aquifer.

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#### Groundwater Flow

The study area is situated within a limestone terrane and the limestone aquifer is the predominant aquifer for potable water supplies in the vicinity of the study area. The local movement of groundwater in the limestone aquifer is typically a reflection of surface topography with groundwater flowing from areas of high elevations to low. Based on the MOECC well records, the static groundwater level in the existing water wells ranged from approximately 0.3 m to 12.6 m below ground surface within the study area. The water table elevation in the limestone aquifer is generally within 5 m below ground surface (bgs). Based on the water table elevation map covering the Greater Napanee (the July 2014 Quinte SPR Assessment Report), the regional groundwater flow direction consists of different components, including to the southeast, south and southwest towards the Napanee River and the Bay of Quinte.

#### Groundwater Recharge and Discharge Conditions

According to the Tier 1 Water Budget Report (Quinte Conservation, April 14, 2009) completed as part of the July 2014 Quinte SPR Assessment Report, the annual recharge rates for the limestone aquifer were calculated in the order of 81 to 109 mm with an average of 93 mm. The average annual recharge rate of the Precambrian (granite) aquifer was approximately 50 mm. The groundwater recharge in the vicinity of the study area is considered medium and according to the Significant Groundwater Recharge Areas (SGRAs) mapped as part of the July 2014 Quinte SPR Assessment Report, there are no significant SGRAs present within the study area.

Within the study area, groundwater discharge likely occurs along Sucker Creek, its tributaries and associated wetlands, and a former gravel pit which is currently filled with water (north side of Highway 401 and west of the abandoned railway).

### Areas of Shallow Groundwater Table and Potential Dewatering

Shallow groundwater table conditions (generally within 5 m bgs) are present throughout the study area. At the time of preparing this report, the recommended plan for the interchange improvement work has not been finalized and details regarding the design are not available. Depending on the actual scope of the interchange improvement work and excavation depth, dewatering may be required given the shallow groundwater conditions.

If during the detail design stage, it is determined that dewatering is required (i.e., construction is anticipated to go below the groundwater table), the dewatering activities will have to be registered as "prescribed activities" on the Environmental Activity and Sector Registry (EASR) if the amount of water taken exceeds 50 m³/day and is below 400 m³/day. A Category 3 Permit to Take Water (PTTW) must be obtained from the MOECC if the amount of water taken exceeds 400 m³/day during the dewatering activities.

It should be noted that the areas of high water table have been identified based on a well record review, topographic mapping and visual observations. A more accurate EASR or PTTW evaluation should be conducted as the detail design progresses. Geotechnical investigation/design reports and detail design drawings for the project will be reviewed to confirm the geological/hydrogeological conditions (stratigraphy, groundwater level, thickness and hydraulic conductivity of the overburden aquifer) in the areas where deep excavations are required.

### **Groundwater Vulnerability**

The study area is situated within a limestone terrane with thin or no soil coverage. The overburden thickness along the valleys could be thick and has a maximum thickness of 18.4 m within the study area based on the MOECC well records. The limestone bedrock aquifer is the dominant aquifer which is used for domestic and commercial water supply within the study area. This aquifer is most susceptible to potential sources of surface contamination where

bedrock outcrops at the surface or where the overburden deposit is thin. The rate of groundwater and contaminant transmission depends on the amount of fractured zones and/or dissolution of the bedrock.

Given the fact that shallow soil/bedrock and shallow groundwater table conditions (generally within 5 m bgs) are present throughout the study area and the presence of private water wells, the groundwater susceptibility within the study area is rated as having a high potential for contamination.

### Surface Water Intake Protection Zones

According to the July 2014 Quinte SPR Assessment Report, a piece of land along Sucker Creek and its tributaries have been classified as Intake Protection Zone 3 for the Deseronto Intake. In addition, a portion of the study area at the eastern end (Highway 401 and south of Highway 401, to the east Kimmetts Side Road) is located within the surface water Intake Protection Zone (IPZ) 2 for the Napanee Intake.

#### Potential Water Well Impacts

There are no municipal water supply wells or associated wellhead protection areas (WHPAs) located within the study area or in the vicinity. A total of 25 existing private water wells were identified within the study area by the MOECC well records. Thirteen wells are used for domestic (i.e., used by private residential homes), while twelve wells are used for commercial purposes. All wells are drilled wells with well depths ranging from 3.4 to 82.6 m bgs, and a casing diameter of 15.2 cm.

The static water levels for the existing water wells range from 0.3 m bgs (well ID 3702019) to 9.4 m bgs (well ID 3702030). The wells draw water from two bedrock aquifers: the shallow limestone aquifer and the deeper Precambrian (granite) aquifer. The groundwater level in the limestone aquifer is generally within 5 m bgs. Shallow groundwater conditions are present throughout the study area, especially in the areas close to surface water bodies and wetlands.

Depending on the construction design and excavation depths, which are not available at the current stage of the project, dewatering may be required if the road or bridge/culvert constructions go below the groundwater table. If deep excavations or permanent service installations below the water table are to be carried out in the areas where existing water wells exist, potential impacts to groundwater in the shallow wells may occur.

### Potential Impacts to Local Groundwater

The potential impacts from the interchange improvement work to the local groundwater system may include, but are not limited to, the following:

- Changes to recharge/discharge regimes resulting from the disturbance of the ground surface, ground clearing, compaction, road cuttings, placement of fill and the potential addition of impervious road surface;
- Dewatering impacts (if dewatering is required) that include a reduction in groundwater level and/or reduced flow to the nearby water wells and groundwater dependent water bodies;
- Potential spills of hydrocarbons and other chemicals used during construction activities could impact the groundwater aquifer and groundwater-dependent water bodies;
- Application of commercial fertilizers during seeding activities to re-establish vegetative cover; and
- The use of salt for road de-icing in winter seasons during future highway operations.

The shallow groundwater levels in this area are high, generally with 5 m below ground surface. It is anticipated that excavations will be required during construction which have the potential for groundwater interference therefore an

Environmental Activity Sector Registry (EASR) / Permit to Take Water (PTTW) will likely be required. Further analysis will be undertaken once further details are known during the Detail Design stage to confirm and support the need for an EASR / PTTW for these works.

### Recommended Mitigation Measures

The following mitigation measures are recommended to manage the potential impacts:

- Limit the depth of excavation and minimize the needs for dewatering during construction;
- If dewatering is required during the future interchange improvement work:
  - Dewatering activities should be conducted in accordance with the control procedures as specified in the Ontario Provincial Standard Specification (OPSS) 518 Construction Specification for Control of Water from Dewatering Operations.
  - As per Ontario Regulation 387/04 (water taking regulation) and Ontario Regulation 63/16 (water taking registration regulation), the dewatering activities will need to be registered as "prescribed activities" on the EASR, if the amount of water taking exceeds 50 m³/day and is below 400 m³/day. A Category 3 Permit to Take Water (PTTW) must be obtained from the Ministry of the Environment and Climate Change (MOECC) if the amount of water taken exceeds 400 m³/day.
  - A pre-construction door-to-door water well survey is recommended to confirm the presence or absence of existing water wells in the vicinity (within 500 m radius) of the future dewatering locations, if required, and document the baseline conditions (both quality and quantity) of these wells. A water well monitoring program shall be developed and implemented during and after the dewatering activities, if deemed necessary. In addition, any water wells to be removed during the interchange improvement activities will have to be decommissioned properly as per the Ontario Wells Regulation (R.R.O. 1990, Reg. 903).
- Minimize disturbance to existing vegetation and grassed slopes where re-grading is required (disturbed areas should be re-vegetated as quickly as possible after completion of construction activities);
- Prepare and implement a stormwater management plan to protect the quality of surface runoff that may infiltrate groundwater resources;
- Minimize groundwater recharge impacts in the area by directing the surface runoff to roadside ditches and improve ditch conditions;
- Prepare and implement a spill prevention and control management plan as per the Source Protection Plan for the Quinte Source Protection Region (September 2014) (the Plan) policies and MTO's best management practices;
- Minimize commercial fertilizer usage and runoff by following the MTO prescribed best management practices and Ontario Provincial Standard Specification (OPSS 0804); and,
- Minimize salt usage and runoff during road de-icing applications by following the Plan polices and best practices consistent with those used across North America and employ the latest winter maintenance technologies.

This Executive Summary is not intended to be a "stand-alone" document, but a summary of our findings as described in the following report. It is intended to be used in conjunction with the scope of services and limitations described therein.

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# 1. Introduction

AECOM Canada Ltd. (AECOM) was retained by the Ontario Ministry of Transportation (MTO) to complete a groundwater assessment in support of a Preliminary Design (PD) and Class Environmental Assessment (EA) Study (the Study) for improvements to the Highway 401/County Road 41 interchange (Contract G.W.P 4459-04-00) in the Town of Greater Napanee, County of Lennox and Addington, Ontario. The Study will examine interim and long-term interchange operational improvements, median improvements on Highway 401, replacement and/or widening of the Highway 401 bridges, pavement rehabilitation, drainage improvements, traffic signals, illumination, and traffic staging (including potential detours on County Road 41) during construction.

# 1.1 Objective

The objective of this groundwater study was to:

- Evaluate the local hydrogeological conditions within the study area;
- Identify potential impacts from the interchange improvement work to the local hydrogeology of the study area;
- Identify existing and potential drinking water threats within the study area and potential impacts from the interchange improvement work to the drinking water wells located within the study area; and
- Recommend measures that could mitigate the identified potential impacts.

# 1.2 Scope of Work

The scope of work for this study follows MTO's *Environmental Reference for Highway Design* (ERD), *Environmental Standards and Practice User Guide, Section 6 Groundwater*, dated December 2006 (the *Guide*). The purpose of the *Guide* is to provide guidance to managing the typical hydrogeological impacts faced in transportation design projects with respect to groundwater.

The scope of work undertaken for this study includes the following tasks:

#### 1. Records Review

- Review of physiographic, geological and hydrogeological maps and reports to identify the general topography, geology and hydrogeology within the study area in an effort to understand the general condition and dynamics of groundwater;
- Review of the MOECC Water Well Records to obtain any relevant information on the construction of wells, depth to bedrock, static groundwater level, geological/hydrogeological units and ground surface elevation;
- Review of official plans, watershed plans and studies from local municipalities and conservation authorities; and
- Review of source water protection assessment reports and source protection plans developed by Source Protection Committees.

### 2. Study Area Reconnaissance

 Site inspection to observe existing local hydrogeological conditions, where visible from the public right-of-way.

### 3. Reporting

 Compilation of a report consisting of interpretation and assessment of collected data, evaluation of potential road construction impacts to the local groundwater aquifer systems, and recommendations of measures to mitigate those potential impacts.

# 2. Study Area Description

### 2.1 Location

The study area is located in the Town of Greater Napanee, County of Lennox and Addington, Ontario. The study area location is presented in **Figure 1**.

# 2.2 Study Area Limits and Current Land Use

The groundwater assessment study area includes Highway 401 and County Road 41 interchange and the Highway 401 corridor easterly from the interchange to Newburgh Road. The study area limits are shown in **Figure 1**.

The land use within the study area is a mixture of rural and urban areas including residential, institutional, commercial, and industrial developments along with agricultural lands and green spaces. Commercial, industrial, and/or institutional land uses are mainly observed south of the Highway 401 with a focus in the southeast quadrant of the Highway 401 and County Road 41 intersection. On the north side of Highway 401 is mainly rural with residential and commercial properties along the roadways.

Based on the Official Plan of the Town of Greater Napanee (May 2014), the land use within the study area includes "Arterial Commercial", "Industrial", "Rural", "Major Institutional", "Medium Density Residential", and "Environmental Protection" and "Environmental Sensitive" areas. Agricultural fields were observed within the northwest quadrant of the interchange during the site visit.

The natural features and built environment of the study area is presented in **Figure 2**. The study area existing land uses, as obtained from the Town of Greater Nappanee's official plan, are presented in **Figure 3**.

# 3. Physical Settings

# 3.1 Physiography, Topography and Drainage

According to the Physiography of Southern Ontario (Chapman and Putnam, 1984) and "Map 2226-Physiography of South Central Southern Ontario" (Ontario Ministry of Natural Resources (OMNR), 1972), the study area is located within the Napanee Plain physiographic region. The study area is dominated by bare limestone terrain and bedrock-drift complex topography. Bedrock ridges are exposed at the ground surface intermixed with valleys and low-lying depressions. While the majority of the limestone terrane exhibits shallow soil cover of only a few inches, glacial till deposits present along the stream valley could be deep (up to 60 m) in some areas (the July 2014 Quinte Source Protection Region Assessment Report).

According to the topographic map for the area (http://atlas.gc.ca/site/english/toporama/, accessed May 18, 2016) and site observations, the topography in the vicinity of the study area is undulating in nature, with a general downward slope from the northwest to the southeast. The elevations of the study area ranged from approximately 95 m above mean sea level (amsl) at the eastern end, to greater than 110 m amsl at the northern end in the vicinity of County Road 41 and Vanluven Road. Limestone (with interbeded shale) bedrock ridges are exposed at the ground surface intermixed with valleys and low-lying depressions.

The study area is located within the Napanee River Watershed. The Napanee River Watershed has a drainage area of 800 square kilometres and originated on the Canadian Shield, descending 172 metres through the Limestone Terrane to the Bay of Quinte. Sucker Creek crosses the study area in a northeast-southwest orientation from the southwest, southeast and northeast quadrants of the Highway 401 and County Road 41 intersection. The Napanee River is located approximately 300 m southeast of the study area. Both the Sucker Creek and Napanee River drain southwesterly to the Bay of Quinte, which is located on the Lake Ontario.

Based on the groundwater elevation table map covering the Greater Napanee area, created as part of the of the *Approved Assessment Report* for the Quinte Source Protection Region (SPR) (July 2014) (the July 2014 Quinte SPR Assessment Report), the regional groundwater flow direction consists of different components, including to the southeast, south and southwest towards the Napanee River and the Bay of Quinte. Locally, surface water runoff and shallow groundwater flow is influenced by ground surface topography, flowing from elevated areas to low lying areas and surface water bodies.

# 3.2 Geology

# 3.2.1 Quaternary and Bedrock Geology

According to the "Quaternary Geology of Ontario, Southern Sheet" (Ontario Geological Survey, Map 2556, Scale 1:1,000,000), the quaternary deposit within the majority of the study area consists of glaciolacustrine deposits of silt and clay (basin and quiet water deposit) on top of limestone bedrock. Modern alluvial deposits of clay, silt, sand and gravel are observed along the Sucker Creek valley. This information is consistent with those available from the MOECC well records.

According to the "Bedrock Geology of Ontario, Southern Sheet" (Ontario Geological Survey's, Ministry of Northern Development and Mines, Map 2544) and available well records, underlying the overburden deposits within the study area is the Upper Ordovician aged limestone of the Simcoe Group. Minor shale is present within the upper

layer of the limestone bedrock. Bedrock exposure at the ground surface is mapped at the western and eastern portions of the study area along the Highway 401 corridor, and along the Sucker Creek in the northeastern quadrant of the Highway 401 and County Road 41 intersection. During the site visit, bedrock was observed exposed at the ground surface in the vicinity of a former gravel pit in the eastern portion of the study area immediately north of Highway 401. Sucker Creek is observed flowing over a limestone bed in the vicinity of Vanluven Road.

As discussed in the earlier sections, the study area is situated within a limestone terrane. The majority of the limestone terrane exhibits shallow soil cover (a few inches), while glacial till deposits present along the stream valleys could be deep (up to 60 m) in some areas (Assessment Report, Quinte SPR, July 2014). Based on the MOECC well records and overburden deposit thickness map generated as part of the July 2014 Quinte SPR Assessment Report, the thickness of the overburden deposits ranged from 0 m (bedrock exposed at the groundwater surface) to approximately 19.8 m below ground surface within the study area.

# 4. Hydrogeology

# 4.1 Overburden and Bedrock Aquifers

As discussed earlier, the study area is situated within a limestone terrane with thin or no soil coverage. Based on the aquifer information provided in the July 2014 Quinte SPR Assessment Report for Quinte Source Protection Authority (SPA), the majority of wells (approximately 95 percent) in the region obtain supply from fractured bedrock aquifers. The remaining 5 percent obtain supply from overburden aquifers comprising of sand and gravel where the soil is of sufficient thickness. There are two major bedrock aquifer systems in Greater Napanee area: the shallow limestone aquifer and the deep Precambrian aquifer. Yield from the Quinte Source Protection Region aquifers is typically low to moderate and considered adequate for meeting most domestic and agricultural needs.

The quality of supply from the aquifers is normally good with fresh water reported on well records. However the water is often hard and in some areas natural water quality problems such as mineralization, gas and sulphur may be experienced (the July 2014 Quinte SPR Assessment Report). These natural water quality problems are typically encountered when wells are drilled deep (i.e., depths greater than 30 metres in limestone bedrock) or in areas of groundwater discharge.

Potable water in Napanee is municipally supplied with water obtained from Lake Ontario. The study area is located at the northern end of Napanee and based on the MOECC well records, there are a large number of private wells present within the study area. All existing water wells within the study area are bedrocks wells, with the majority of them drawing water from the limestone aquifer.

### 4.2 Water Table Elevations and Groundwater Flow

Groundwater flow is controlled by the permeability and porosity of the soil / rock material and by the existing hydraulic gradients. In general, shallow groundwater flow within the overburden deposits is associated with the surface topography and conveyed to topographic lows, wetlands, and surface watercourses. The deeper aquifer systems, including bedrock aquifer, tend to be more uniform and are less influenced by topographic variations. Vertically, groundwater flow in the shallow aquifer will travel downwards towards the deeper aquifer system.

Variations to the flow direction will change depending on proximity to surface watercourses and subsurface geology.

As discussed earlier, there are two major bedrock aquifer systems in Greater Napanee area: the shallow limestone aquifer and the deep Precambrian aquifer. The limestone aquifer is the predominant aquifer for potable water supplies in the vicinity of the study area. The movement of groundwater in the limestone aquifer is typically a reflection of surface topography with groundwater flowing from areas of high elevations to low. Based on the MOECC well records, the static groundwater level in the existing water wells ranges from approximately 0.3 m to 12.6 m below ground surface within the study area, which reflects the water table elevations in both the shallow and deep bedrock aquifers. The water table elevation in the limestone aquifer is generally within 5 m below ground surface (bgs). Based on the water table elevation map covering the Greater Napanee (the July 2014 Quinte SPR Assessment Report), the regional groundwater flow direction consists of different components, including to the southeast, south and southwest towards the Napanee River and the Bay of Quinte.

# 4.3 Groundwater Recharge and Discharge Conditions

Recharge areas are characterized by permeable soils exposed at the ground surface, such as sand or gravel which allows rain water to seep easily into the ground to recharge the underlying aquifer. A recharge area is considered significant when it helps maintain the water level in an aquifer that supplies a community with drinking water, or supplies groundwater recharge to a cold water ecosystem that is dependent on this recharge to maintain its ecological function (MOECC, 2007).

According to the Tier 1 Water Budget Report (Quinte Conservation, April 14, 2009) completed as part of the July 2014 Quinte SPR Assessment Report, the annual recharge rates for the limestone aquifer were calculated in the order of 81 to 109 mm with an average of 93 mm. The average annual recharge rate of the Precambrian (granite) aquifer was approximately 50 mm. The groundwater recharge in the vicinity of the study area is considered medium and according to the Significant Groundwater Recharge Areas (SGRAs) mapped as part of the July 2014 Quinte SPR Assessment Report, there are no significant SGRAs present within the study area.

Groundwater discharges from the groundwater system to the surface as springs, seeps or upwellings and groundwater discharge occurs along surface water bodies, streams and wetlands. Within the study area, groundwater discharge likely occurs along Sucker Creek, its tributaries and associated wetlands, and a former gravel pit which is currently filled with water (north side of Highway 401 and west of the abandoned railway). A copy of the SGRA map from the July 2014 Quinte SPR Assessment Report is attached in **Appendix A** of this report.

# 4.4 Groundwater Vulnerability to Contamination

Aquifer vulnerability is a measure of how easy and how fast contamination at the ground surface reaches the underlying production aquifers. The degree of groundwater vulnerability largely depends on the presence or absence of permeable surficial materials, the depth to the water table and location relative to surface water features and water wells. Generally, aquifer vulnerability is higher in areas characterized as having a shallow aquifer system and overlain by permeable surficial soil deposits.

Within the study area, the limestone bedrock aquifer is the dominant aquifer in use for domestic and commercial water supply. This aquifer is most susceptible to potential sources of surface contamination where bedrock outcrops at the surface or where the overburden deposit is thin. The rate of groundwater and contaminant transmission depends on the amount of fractured zones of the bedrock.

Given the fact that shallow soil/bedrock and shallow groundwater table conditions (generally within 5 m bgs) are present throughout the study area, the groundwater vulnerability within the study area is rated as having a high potential for contamination (**Figure 6**).

This is consistent with the highly vulnerable aquifers (HVAs) mapped as part of the July 2014 Quinte SPR Assessment Report. A copy of the HVA map, as obtained from the July 2014 Quinte SPR Assessment Report, is provided in **Appendix B**.

# 4.5 Water Well Records Review and Groundwater Usage

According to the MOECC well records, there are 25 existing water supply wells identified within the study area. The locations of the existing water wells are presented in **Figure 2**. The primary water use for 13 wells is domestic (i.e., used by private homes), and for the remaining is commercial. There are no municipal wells identified within the study area.

All existing water wells are bedrock wells with well depths ranging from 3.4 to 82.6 m bgs. Among the 25 existing water wells, there are 7 shallow wells with well depths less than 15 m bgs. Depths to bedrock ranged from 0 (i.e., bedrock exposed at the ground surface) to 19.8 m bgs. All existing water wells identified by the MOECC well records appear drilled with a casing diameter of 15.24 cm. The static water levels for the water wells ranged from 0.3 m bgs (well ID 3702019) to 9.4 m bgs (well ID 3702030).

Based on the well records, the recommended pumping rates for the existing water wells ranged from approximately 0.004 Litre/Second (L/s) (1 gallon/minute (GPM)) to 0.09 L/s (25 GPM). There are no high yield wells (yield a rate of more than 60 L/s), as defined by the Ontario Well Regulation (Regulation 903 as amended under the *Ontario Water Resources Act* R.R.O. 1990).

The study area is located within the Town of Greater Napanee and potable water in the town is municipally supplied with water obtained from Lake Ontario. The study area consists of both rural (north of Highway 401) and urban (south of highway 401) areas. Both dug and drilled wells were observed on the residential properties along Vanluven Road, implying groundwater somehow is being used by the private home owners within the study area.

A summary of the MOECC well records for the existing drinking water wells is provided in **Table 1**.

### 4.6 Permit to Take Water Records

Water taking from aquifers, especially large volume and long term water taking, can potentially impact the quantity and quality of groundwater by lowering the groundwater tables and changing the flow patterns and flow rates. Under *Section 34 of the Ontario Water Resources Act* and *Ontario Regulation 63/16*, the MOECC requires groundwater or surface water users who are taking volumes of water greater than 50,000 L/day to register as "prescribed activities" on the Environmental Activity and Sector Registry (EASR) or obtain a Category 3 Permit to Take Water (PTTW).

A review of the MOECC PTTW database (accessed on May 30, 2016) indicates that there are no active PTTWs within the study area.

It should be noted the MOECC PTTW database is updated irregularly based on the active permits issued by the Permit to Take Water Program. Therefore, the number of active permits within the study area, especially the short term permits for construction purposes, may vary day by day. It is recommended that the MOECC PTTW database be reviewed at the detail design and/or construction time to obtain the most up-to-date data within the study area.

# 4.7 Municipal Wells and Wellhead Protection Areas

According to the MOECC well records discussed in the previous section and the wellhead protection areas delineated as part of the July 2014 Quinte SPR Assessment Report, there are no municipal water supply wells and/or their associated wellhead protection areas (WHPAs) located within or adjacent to the study area. The closest municipal well is located approximately 33 km southwest of the study area in the community of Peats Point.

### 4.8 Surface Water Intakes

Surface Water Intake Protection Zones are areas of land and water delineated around the end of the municipal intake pipes. These zones are typically determined by the amount of time it would take for a spilled material to reach the water intake. Up to three zones may be established around an intake. The nearest to the intake is Zone 1 and extending out sequentially are Zones 2 and 3. Each zone provides opportunity for the source protection committee or municipality to apply different levels of protective measures on activities planned or existing within the zone.

According to the July 2014 Quinte SPR Assessment Report, a piece of land along Sucker Creek and its tributaries have been classified as Intake Protection Zone 3 for the Deseronto Intake. In addition, a portion of the study area at the eastern end (Highway 401 and south of Highway 401, to the east Kimmetts Side Road) is located within the surface water Intake Protection Zone (IPZ) 2 for the Napanee Intake.

A copy of the IPZ maps for the above referenced IPZs, as obtained from the July 2014 Quinte SPR Assessment Report, is provided in **Appendix C**.

# 5. Contaminant Inventory Review

The land use within the study area is a mixture of rural and urban areas including residential, institutional, commercial, and industrial developments along with agricultural lands and green spaces. Commercial, industrial, and/or institutional land uses are mainly observed south of the Highway 401 with a focus in the southeast quadrant of the Highway 401 and County Road 41 intersection. The lands on the north side of Highway 401 are mainly rural with residential and commercial properties along the roadways. In addition, "Environmental Sensitive" and "Environmental Protection" areas are present within the study area as per the Official Plan of the Town of Greater Napanee (May 2014).

A Contamination Overview Study (COS) has been completed by AECOM for the study area in parallel with this Groundwater Assessment and the findings of the COS are documented in a draft report dated November 2016. A team of contaminant specialists from AECOM has reviewed available data (i.e., land use, environmental databases, aerial photographs and fire insurance plans) and conducted a drive-by windshield survey to analyze and identify known/or potential contaminated sites. The draft COS report had identified 22 parcels with a "high" potential for environmental contamination, as well as 35 parcels with a "medium" potential for environmental contamination. In addition, 8 significant spill locations were also identified within the study area by the draft COS report.

Details regarding the parcels that were rated for "high" and/or "medium" potentials, as well as the significant spill locations, can be found in the AECOM draft COS report (November 2016).

# 6. Drinking Water Source Protection

# 6.1 Background

The study area is located within the Quinte SPR. The Quinte Source Protection Authority (SPA), together with the Town of Greater Napanee, are identified as having important roles in implementing the Source Protection Plan ( for the Quinte SPR in the vicinity of the study area, and have been regular active participants in the *Class Environmental Assessment* consultation process throughout the development of this project. The key objectives of the Source Protection Plan are outlined within the *Clean Water Act* and require existing and future drinking water sources within the source protection area be protected. Key objectives also include ensuring that, for areas identified within the July 2014 Quinte SPR Assessment Report as areas where an activity is or would be a significant drinking water threat; the activity never becomes or ceases to be a significant drinking water threat.

# 6.2 Threats to Drinking Water

Threat to drinking water assessment has been completed for Quinte SPR for HVAs, SGRAs and WHPAs by the Quinte SPA (July 2014). There are no municipal water supply wells or their associated wellhead protection areas (WHPAs) located within the study area. Therefore, the proposed interchange rehabilitation work will not pose a significant drinking water threat from a WHPA perspective.

According to the July 2014 Quinte SPR Assessment Report and Source Protection Plan (September 2014) (the *Plan*) for the Quinte SPR, the aquifers underlying the study area has been classified as HVAs. There are no Significant Groundwater Recharge Areas (SGRAs) located within the study area limit.

There are no significant drinking water threats identified within the HVAs within the Quinte SPR. Three potential project relevant activities are listed in *the Plan* as Prescribed Drinking Water Threats for HVAs: the handling and storage of fuel, the application of road salt, and the application of commercial fertilizer to land. These three project relevant activities are considered low risk threats to the HVAs.

In addition, some areas within the study area are located within the surface water intake protection zones (i.e. Napanee IPZ-2 and/or Deseronto IPZ-3A). The vulnerability score for the Napanee Intake IPZ-2 has been rated 8.1 (highly vulnerable) and three significant threats have been identified in these areas including biosolid spreading, application of pesticide on crops and livestock grazing. None of the three circumstances are project relevant activities in terms of the interchange rehabilitation work. The vulnerability score has been classified as 7.2 (highly vulnerable) for the Deseronto IPZ-3A and there are no significant threats identified for the Deseronto IPZ-3.

The same three potential project relevant activities, as discussed above for HVAs, are listed in *the Plan* as Prescribed Drinking Water Threats in the Napanee IPZ-2 and Deseronto IPZ-3A. These activities are considered as having a moderate risk.

The *Plan* provides the following prescriptive policies for the three project relevant activities in HVAs or IPZs (i.e. Napanee IPZ-2 and Deseronto IPZ-3A) within the study area:

- Policy 12-1-E & F: Salt Management Plan for Significant, Moderate, and Low Threats Related to Application of Road Salt
- Policy 12-2-E & F: Salt Management Plan for Application of Road Salt

 Policy 15-2-E & F: Management of Existing and Future Handling and Storage of Fuel (above grade storage tanks greater than 250 and less than 2,500 litres) – Moderate Drinking Water Threat

Details regarding the prescriptive polices can be found in *the Plan*. These policies should be followed on salt management and fuel handling and storage during the interchange rehabilitation work and the long term maintenance of highway operations.

In addition, MTO will follow and apply the current MTO best management practices to minimize threats from these activities by way of adherence to the ministry plans and policies, the use of special contract provisions, and contract oversight and monitoring.

### 6.2.1 Handling and Storage of Fuel

Several constituent compounds of fuels are listed by the *Plan* as chemicals of concern. The contractor will be handling fuels for refuelling mobile and stationary equipment during interchange improvement construction time. The contract will contain provisions and operational constraints to minimize the risk of spills as per *the Plan* (September 2014) and ministry polices and best management practices. Spill containment and clean-up kits will be required on site. A spill action plan will be in place to ensure any spills are reported and handled appropriately and as required by legislation.

### 6.2.2 Application of Road Salt

The chemicals of concern for road salt are listed as sodium and chloride. The application of road salt is considered a moderate risk threat in Napanee IPZ-2 and Deseronto IPZ-3A, and a low risk threat in the HVAs within the study area, where road salt is applied to highways and may result in a release to groundwater or surface water. The *Plan* identifies circumstances where the risk score increases slightly but the overall vulnerability score remains the same at 6 (low risk threat). Risk scores increase in the circumstance where the percent impervious area in an HVA increases.

MTO is committed to keeping Ontario's highways as safe as possible during winter weather conditions. The ministry and its contractors monitor weather and road conditions so they can respond to winter storm events in a quick and efficient manner. Contractors are required to meet *the Plan* polices and the Ministry's maintenance standards which have been developed based on extensive experience, and are consistent with the best practices of highway authorities in North America. Clearing winter roads to bare pavement usually requires a combination of plowing and salting operations. The purpose of the salt is to break the bond between the snow and the pavement surface, in order to allow the snow to be removed by snow plows. In order to ensure the continued safety of highways, and the health of our environment, MTO have developed guidelines for the responsible and appropriate use of road salt in winter maintenance operations.

MTO's Salt Management Plan ensures that salt is used efficiently and effectively. For example, all salt spreading trucks are required to be equipped with electronic spreading controls to reduce waste and maximize the effectiveness of the materials used.

Anti-icing is a road maintenance strategy that is employed before a winter storm event to prevent snow and ice from bonding to the pavement surface. This is accomplished through the use of liquid salt solutions. These liquids are also added to road salt, to help it stick to the road and activate more quickly. This reduces the quantity of salt required and minimizes the impact on the environment. The contractor responsible for this highway interchange utilizes this salt reduction strategy.

### 6.2.3 Application of Commercial Fertilizer

Nitrogen is listed in the *Plan* as the chemical of concern in commercial fertilizer. The circumstance is that fertilizer is applied to land and may result in a release to groundwater or surface water. The *Plan* identifies circumstances where the risk score increases where the percent of managed land (i.e., areas where there may be application of agricultural source material, commercial fertilizer, or non-agricultural source material) in an HVA is greater than 80% and as Nutrient units per acre of managed land increase. Based on the managed land in HVAs mapped as part of the July 2014 Quinte SPR Assessment Report, the percent of managed land within the study area is 41% and the managed land activities are rated as Low Risk Threats. Therefore, no seeding activities will pose a significant threat to the drinking water system within the study area.

As part of the construction project, there will be exposed earth surfaces which will require seeding to re-establish the vegetative cover. *The Plan* does not provide prescriptive policies for the use of commercial fertilizer for the HVAs or IPZs within the study area. MTO prescribes the use of commercial fertilizer containing nitrogen where cover is to be re-established on earth surfaces through seeding. Nitrogen application rates and soil surface conditions are prescribed in the contract by Ontario Provincial Standard Specification (OPSS 0804) such that the risk of runoff is minimized.

# 7. Study Area Reconnaissance

A site visit was carried out on April 21, 2016 by Chloe Zhang and Hannah Roberts of AECOM. The weather condition at the time of the site visit was sunny, with an approximate temperature of 17°C. The site visit included a visual drive-by windshield survey of the study area and surrounding lands.

The driving route included the accessible public roadways within the study area. It should be noted that the driveby inspection did not include any property specific inspections. AECOM's observation and evaluation of the study area was limited to features and conditions that were readily visible from publically accessible roadways.

The study area is a mixture of rural and urban areas. Commercial, industrial, and/or institutional land uses are mainly observed south of the Highway 401 with a focus in the southeast quadrant of the Highway 401 and County Road 41 intersection. On the north side of Highway 401 is mainly rural with residential and commercial properties along the roadways.

The topography of the study area is undulating, with a general downward slope from the northwest to the southeast. A soil mound, measuring approximately 50 m by 100 m in size, was observed within the southwest quadrant of the Highway 401 and County Road 41 intersection, on the east side of the Walmart plaza. The soil mound is approximately 2 to 3 m elevated compared to the surrounding areas and covered with grass. Whether the mound is natural or man-raised could not be confirmed.

Sucker Creek crosses the study area in a northeast-southwest orientation from the southwest, southeast and northeast quadrants of the Highway 401 and County Road 41 intersection. Swampy areas or wetlands associated with Sucker Creek and its tributaries were observed along the streams. A pond, a former gravel pit with standing water, was observed on the north side of Highway 401 and west of the abandoned rail track. The pond is situated within the limestone bedrock and limestone was observed exposed at the ground surface in the vicinity of the pond. Bedrock exposure was also observed along the bed/bank of Sucker Creek in the northeast quadrant of Highway 401 and County Road 41.

Groundwater supply wells (both dug and drilled) were observed on some of the residential properties along Vanluven Road within and in close vicinity of the study area.

# 8. Preliminary Assessment of Potential Groundwater Impacts

# 8.1 Temporary and Permanent Construction Impacts

### 8.1.1 Potential Impacts to Groundwater Recharge and Discharge

The following equation represents the natural water balance:

Precipitation = Evapotranspiration + Recharge + Runoff

Where, Evapotranspiration is the sum of evaporation and plant transpiration.

The most significant difference associated with water balance during highway construction is the removal of vegetation and the installation of the impervious surface (i.e., concrete and/or asphalt roadway surface). Impervious surfaces prevent infiltration of the surface runoff water into the soils and the removal of vegetation eliminates the plant transpiration from the evapotranspiration component of the natural water balance, and therefore these practices result in increased surface water runoff and a decrease in water infiltration into the subsurface. Consequently, this will affect groundwater recharge/discharge and possibly the environmental groundwater quality in the shallow aquifer system. In addition, compaction during road bed preparation prior to road surfacing activities will reduce the void space in the soil, and therefore result in reduced groundwater recharge to the overburden and bedrock aquifers systems. Obstruction to groundwater recharge will have the greatest impact in elevated areas where permeable deposits such as sand and gravel are removed, compacted, or paved over.

Based on the nature of this interchange improvement project, there may be a minor increase in the pavement surfaces to accommodate traffic staging. Increase of impermeable surface and road compaction will potentially reduce the amount of surface runoff penetrating into the ground. Groundwater recharge loss due to impermeable surfaces and road compaction will be mitigated by directing the surface runoff to roadside ditches where additional recharge can be anticipated.

Obstruction to groundwater discharge may occur if paving or compaction takes place adjacent to surface water bodies and seepage zones. However, paving compaction can also increase surface water runoff to nearby watercourses.

Therefore, significant impacts from the surface paving to the groundwater recharge and discharge in the area are not anticipated.

### 8.1.2 Construction below Water Table and Dewatering

Cuts and excavations which intercept the water table have the potential to capture and redirect groundwater flow in the shallow aquifer system. Excavations below the water table in the areas where fine-textured soil is present releases limited quantity of groundwater and most of the water would be retained in the soil, and removed with the soil. In these areas, seepage into excavations would be minimal and dewatering might not be needed. More significant impacts would occur to saturated permeable deposits, where dewatering may be required. Construction under the water table and the consequent dewatering activities can result in a temporary or permanent change of groundwater level, groundwater flow patterns and possibly the groundwater quality of the underlying aquifer and water wells in surrounding areas. Embankments, foundations, footings, abutments and piers constructed for bridges and culverts constructed to convey streams across the roadways can obstruct and hence alter the flow of groundwater (base flow) to surface water courses.

As discussed earlier, shallow groundwater table conditions (generally within 5 m bgs) are present throughout the study area. At the time of preparing this report, the recommended plan for the interchange improvement work has not been finalized and details regarding the design are not available. Depending on the actual scope of the interchange improvement work and excavation depths, dewatering may be required given the shallow groundwater conditions.

If during the detail design stage, it is determined that dewatering is required (i.e., construction is anicipated to go below the groundwater table), the dewatering activities will have to be registered as "prescribed activities" on the EASR if the amount of water taken exceeds 50 m<sup>3</sup>/day and is below 400 m<sup>3</sup>/day. A category 3 PTTW must be obtained from the MOECC if the amount of water taken exceeds 400 m<sup>3</sup>/day during the dewatering activities.

It should be noted that the areas of high water table have been identified based on a well record review, topographic mapping and visual observations. A more accurate EASR or PTTW evaluation should be conducted as the detail design progresses. Geotechnical investigation/design reports and detail design drawings for the project will be reviewed to confirm the geological/hydrogeological conditions (stratigraphy, groundwater level, thickness and hydraulic conductivity of the overburden aquifer) in the areas where deep excavations are required.

### 8.2 Likelihood of Release of Contaminants

### 8.2.1 Fuel Spills

There is a potential of accidental spill / release of fuels during road construction work. Spills onto fine-textured soils (i.e., clay and silt) have a higher potential to impact the surface water quality due to surface runoff. Spills onto more permeable soils, directly onto the bedrock or bedrock with thin soil cover, have more potential to impact the groundwater systems due to faster infiltration. Spills occurring in the wetland areas or where the water table is at or near the ground surface have the most potential to impact the groundwater quality.

The presence of the limestone terrane with no or thin soil cover, shallow groundwater table, Sucker Creek and its associated wetlands within the study area, increases the potential for accidental fuel spills to impact the underlying limestone aquifer. Mitigation measures regarding potential spills are discussed in detail in *Section 6.2.1 Handing and Storage of Fuels* of this report.

### 8.2.2 Road De-icing

Concentrations of sodium and chloride will increase in the runoff along roadside ditches and through roadside infiltration as a result of road de-icing, and therefore affect the underlying groundwater system. Chloride at high

concentrations (> 250 mg/L) may produce an impact on the taste of water, while elevated concentrations of sodium may be of concern to persons suffering from hypertension or other medical conditions.

The presence of the limestone terrane with no or thin soil cover and shallow groundwater table, Napanee River and its associated wetlands within the study area increases the level of impacts from road-de-icing to the underlying groundwater system. Due to the wide application of de-icing salt along highways and the mobility of road salt constituents, complete mitigation of road salt impacts is difficult. Specific attention should be paid to salt application management within the study area, i.e. road salt application within the right-of-way should be at the minimum levels allowed within the context of MTO's standard road salt application procedures and the Quinte Source Water Protection Plan policies. Other general mitigation measures for salt application are provided in Section 6.2.2 Application of Road Salt of this report.

### 8.2.3 Commercial Fertilizer

As part of the construction, there will be exposed earth surfaces which will require seeding to re-establish vegetative cover. Nitrogen is listed as the chemical of concern in commercial fertilizer. The circumstance is that when fertilizer is applied to the land, it may result in a release of nitrogen to groundwater or surface water.

Mitigation measures regarding nitrogen release from the application of commercial fertilizers are discussed in detail in *Section 6.2.3 Application of Commercial Fertilizer* of this report.

# 9. Potential Water Well Impacts

As discussed earlier, there are no municipal wells located within the study area or in the vicinity. A total of 25 existing private water wells were identified within the study area by the MOECC well records. Thirteen wells are used for domestic (i.e., used by private residential homes), while twelve wells are used for commercial purposes. All wells are drilled wells with depths ranging from 3.4 to 82.6 m bgs, and a casing diameter of 15.2 cm.

The static water levels for the existing water wells ranged from 0.3 m bgs (well ID 3702019) to 9.4 m bgs (well ID 3702030). The wells draw water from two bedrock aquifers: the shallow limestone aquifer and the deeper Precambrian (granite) aquifer. The groundwater level in the limestone aquifer is generally within 5 m bgs. Shallow groundwater conditions are present throughout the study area, especially in the areas close to surface water bodies and wetlands.

Depending on the construction design and excavation depths, which are not available at the current stage of the project, dewatering may be required if the road or bridge/culvert constructions go below the groundwater table. If deep excavations or permanent service installations below the water table are to be carried out in the areas where existing water wells exist, potential impacts to groundwater in the shallow wells may occur.

# 10. Conclusions and Recommendations

Based on the data collected to date, shallow soil/bedrock and groundwater conditions (generally within 5 m bgs) are present throughout the study area. The groundwater vulnerability within the study area is rated as having a high potential for contamination. In addition, IPZs 2 and 3 are also present within the study area, which are considered as highly vulnerable areas.

The potential impacts from the interchange improvement work to the local groundwater system include, but are not limited to, the following:

- Changes to recharge/discharge regimes resulting from the disturbance of the ground surface, ground clearing, compaction, road cuttings, placement of fill and the potential addition of impervious road surface;
- Dewatering impacts (if dewatering is required) that include a reduction in groundwater level and/or reduced flow to the nearby water wells and groundwater dependent water bodies;
- Potential spills of hydrocarbons and other chemicals used during construction activities that could impact the groundwater aquifer and groundwater-dependent water bodies;
- Application of commercial fertilizers during seeding activities to re-establish vegetative cover; and
- The use of salt for road de-icing in winter seasons during future highway operations.

The shallow groundwater levels in this area are high, generally with 5 m below ground surface. It is anticipated that excavations will be required during construction which have the potential for groundwater interference therefore an Environmental Activity Sector Registry (EASR) / Permit to Take Water (PTTW) will likely be required. Further analysis will be undertaken once further details are known during the Detail Design stage to confirm and support the need for an EASR / PTTW for these works.

The following mitigation measures are recommended to manage the potential impacts:

- Limit the depth of excavation and minimize the needs for dewatering during construction;
- If dewatering is required during the future interchange improvement work:
  - Dewatering activities should be conducted in accordance with the control procedures as specified in the Ontario Provincial Standard Specification (OPSS) 518 Construction Specification for Control of Water from Dewatering Operations.
  - As per Ontario Regulation 387/04 (water taking regulation) and Ontario Regulation 63/16 (water taking registration regulation), the dewatering activities will need to be registered as "prescribed activities" on the EASR, if the amount of water taking exceeds 50 m³/day and is below 400 m³/day. A Category 3 Permit to Take Water (PTTW) must be obtained from the Ministry of the Environment and Climate Change (MOECC) if the amount of water taken exceeds 400 m³/day.
  - A pre-construction door-to-door water well survey is recommended to confirm the presence or absence of existing water wells in the vicinity (within 500 m radius) of the future dewatering locations, if required, and document the baseline conditions (both quality and quantity) of these wells. A water well monitoring program shall be developed and implemented during and after the dewatering activities, if deemed necessary. In addition, any water wells to be removed during the

interchange improvement activities will have to be decommissioned properly as per the Ontario Wells Regulation (R.R.O. 1990, Reg. 903).

- Minimize disturbance to existing vegetation and grassed slopes where re-grading is required (disturbed areas should be re-vegetated as quickly as possible after completion of construction activities);
- Prepare and implement a stormwater management plan to protect the quality of surface runoff that may infiltrate groundwater resources;
- Minimize groundwater recharge impacts in the area by directing the surface runoff to roadside ditches and improve ditch conditions;
- Prepare and implement a spill prevention and control management plan as per the Plan policies and MTO's best management practices;
- Minimize commercial fertilizer usage and runoff by following the MTO prescribed best management practices and Ontario Provincial Standard Specification (OPSS 0804), and,
- Minimize salt usage and runoff during road de-icing applications by following the Plan polices and best practices consistent with those used across North America and employ the latest winter maintenance technologies.

# 11. Limiting Conditions

The conclusions presented in this report are opinions based on our review and interpretation of available geological/hydrogeological information and documentation as noted in this report and our visual observations during a drive-by windshield survey on April 21, 2016.

Services have been performed in a manner consistent with the level of care and skill ordinarily exercised by members of our profession. No other warranties are expressed or implied.

This report is intended to be used in its entirety. No excerpts should be taken to be representative of the findings of this assessment. The report is for the sole use and benefit of the MTO and may not be relied upon by any other person or entity without the prior written consent of MTO and AECOM. Any such consent given by AECOM shall be deemed to be and shall be subject to the terms and conditions of the Proposal, including without limitation, the warranty, liability and indemnity terms thereof, and any person given such consent (the "Grantee") shall be deemed to have agreed to such terms and conditions by its use and reliance on the Reports.

It should be recognized that this study is intended only as an initial groundwater study of the hydrogeological conditions within the study area and was not intended to be a comprehensive hydrogeological investigation. Therefore, the conclusions provided are not necessarily inclusive of all the possible conditions. Given the limitation of the scope of work of this study, the availabilities of geological/hydrogeological information and the nature of the drive-by windshield survey, exploratory borings, soil and/or groundwater sampling or analytical testing were not undertaken, it is possible that currently unrecognized subsurface geological and hydrogeological conditions might exist within the study area.

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Approved Quinte Region Source Protection Plan, September 2014, effective January 1, 2015.

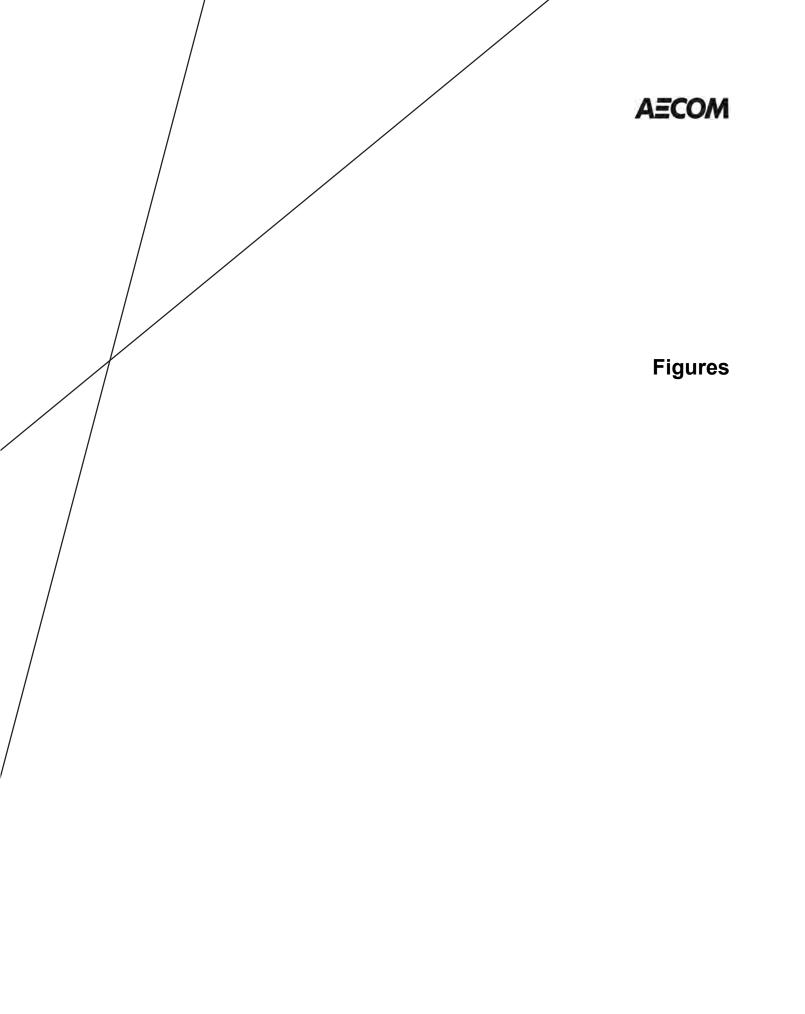
#### Town of Greater Napanee:

The Town of Greater Napnaee Official Plan, May 2014.

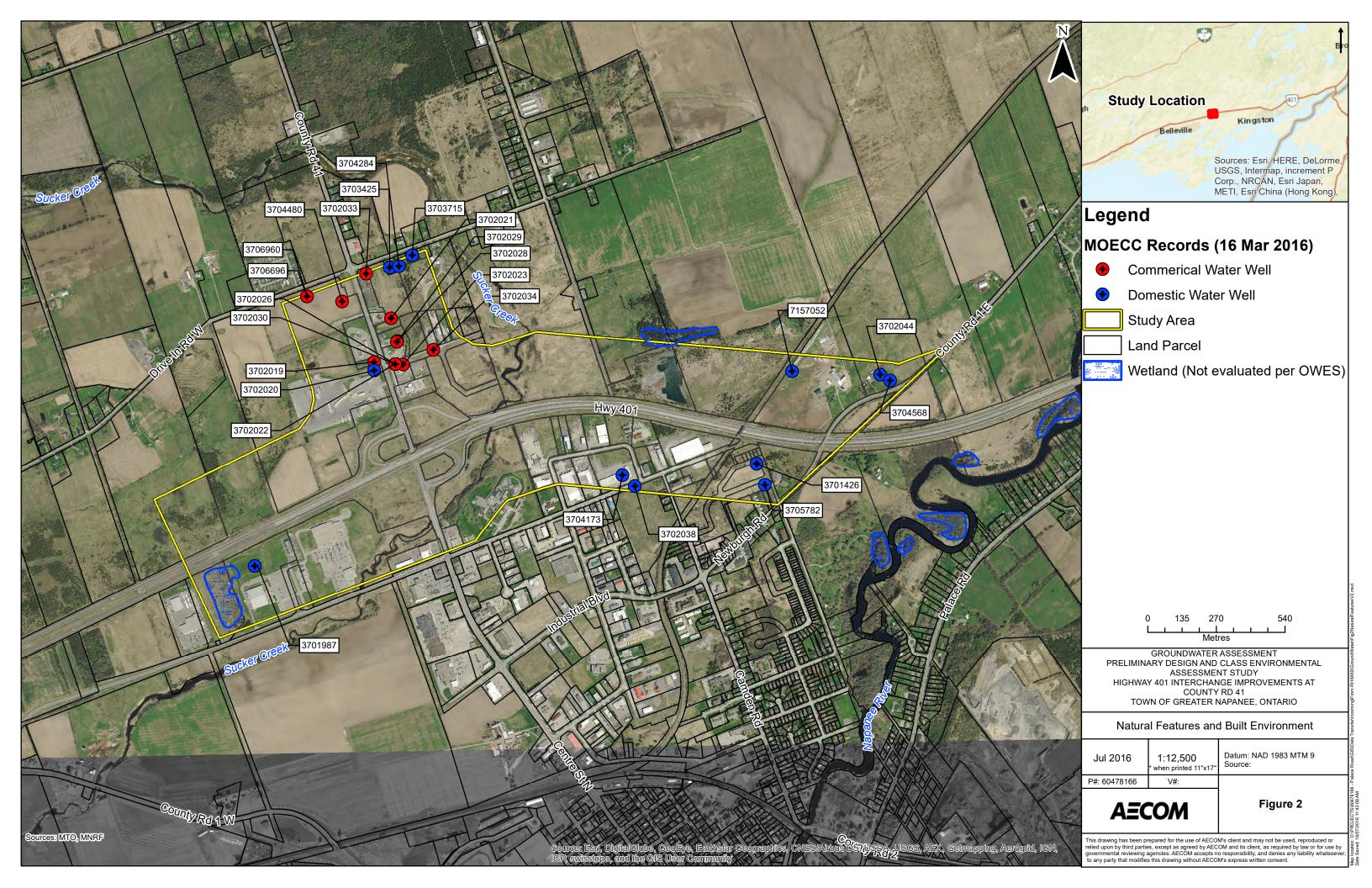
(https://www.google.com/?gws\_rd=ssl#q=town+of+greater+napanee+official+plan)

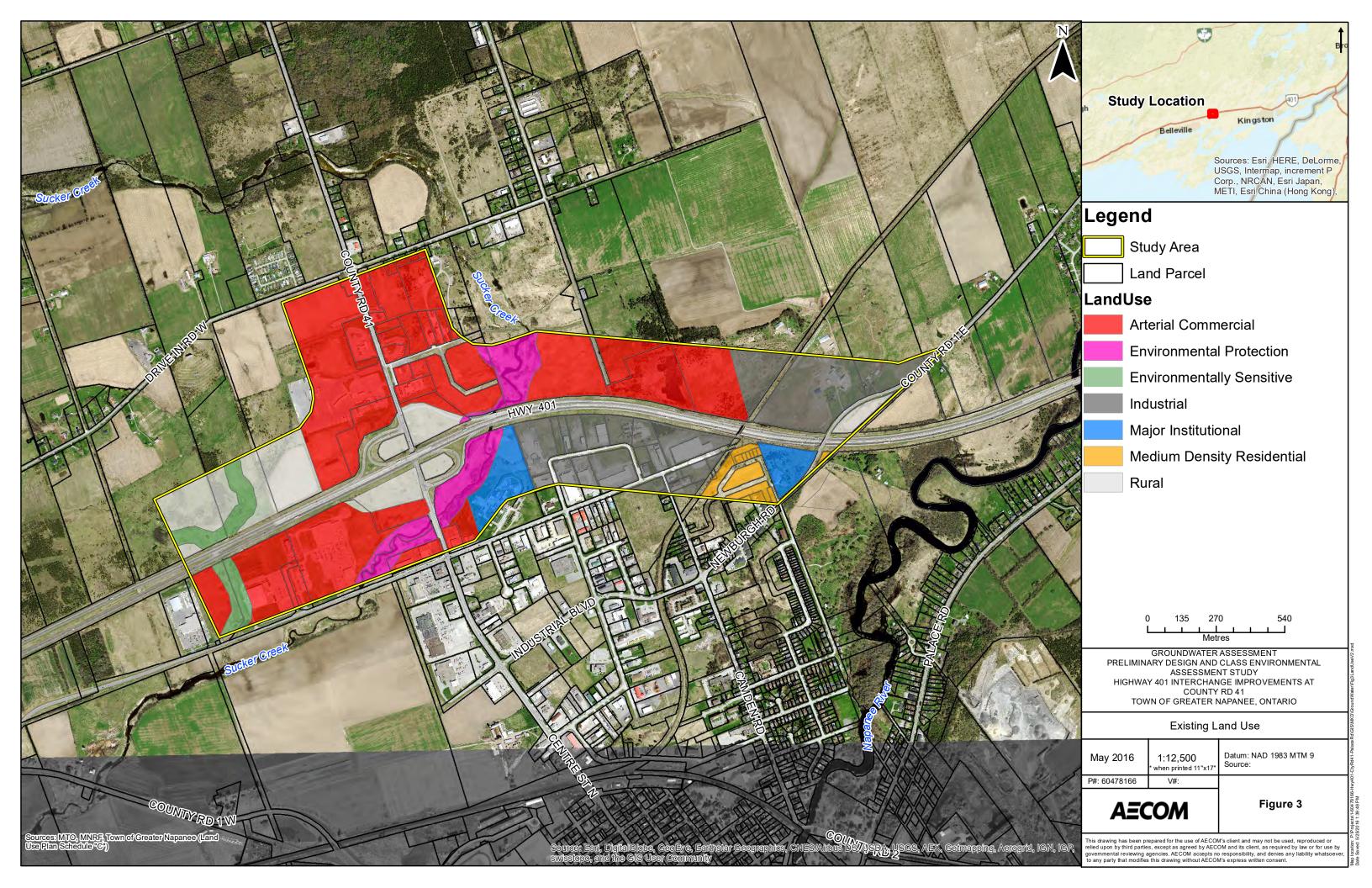
### Town of Greater Napanee:

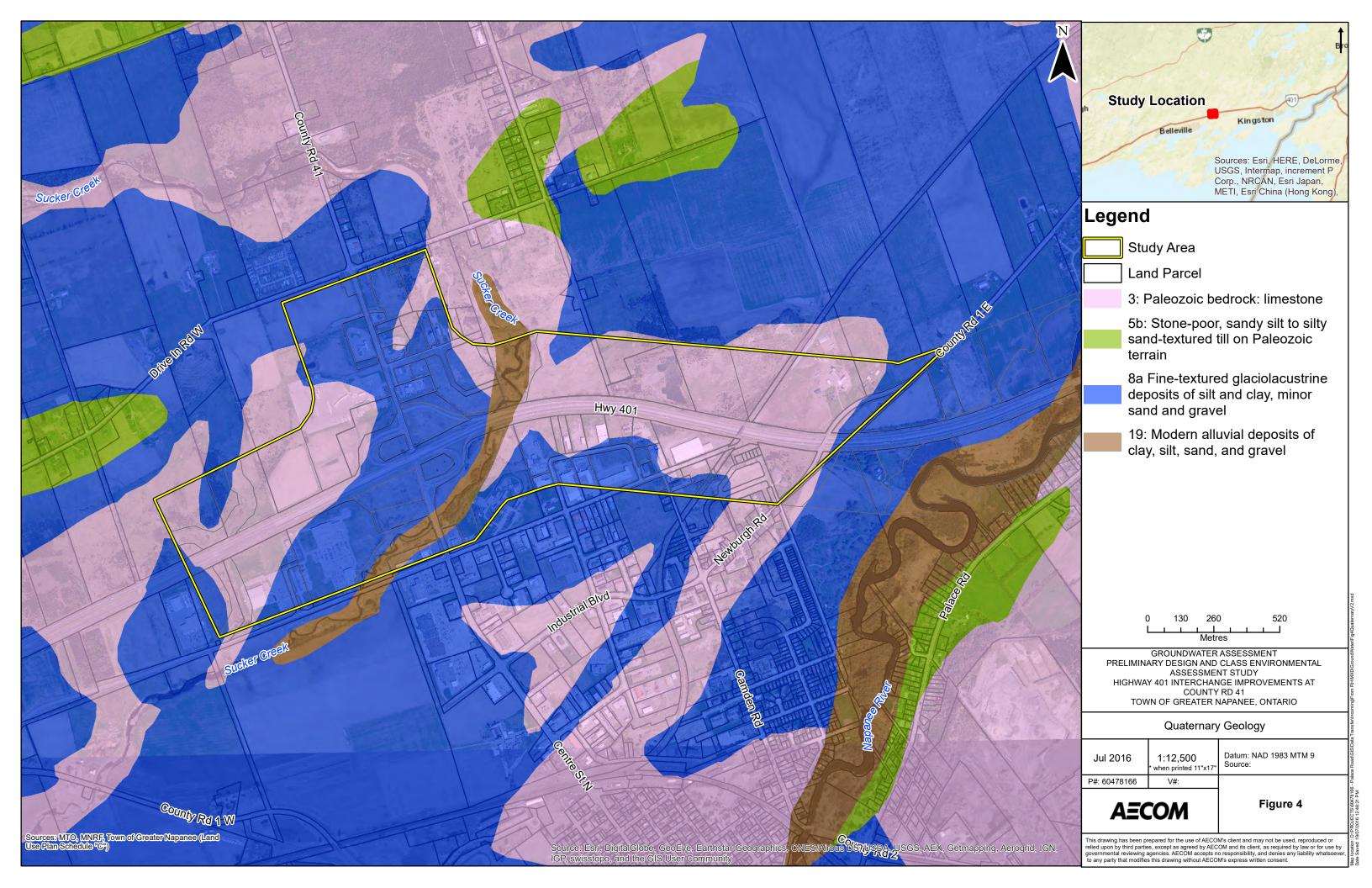
Drinking Water Quality Management System, Operational Plan for A.L. Dafoe DWS & Sandhurst Shores DWS, revised February 17, 2016.



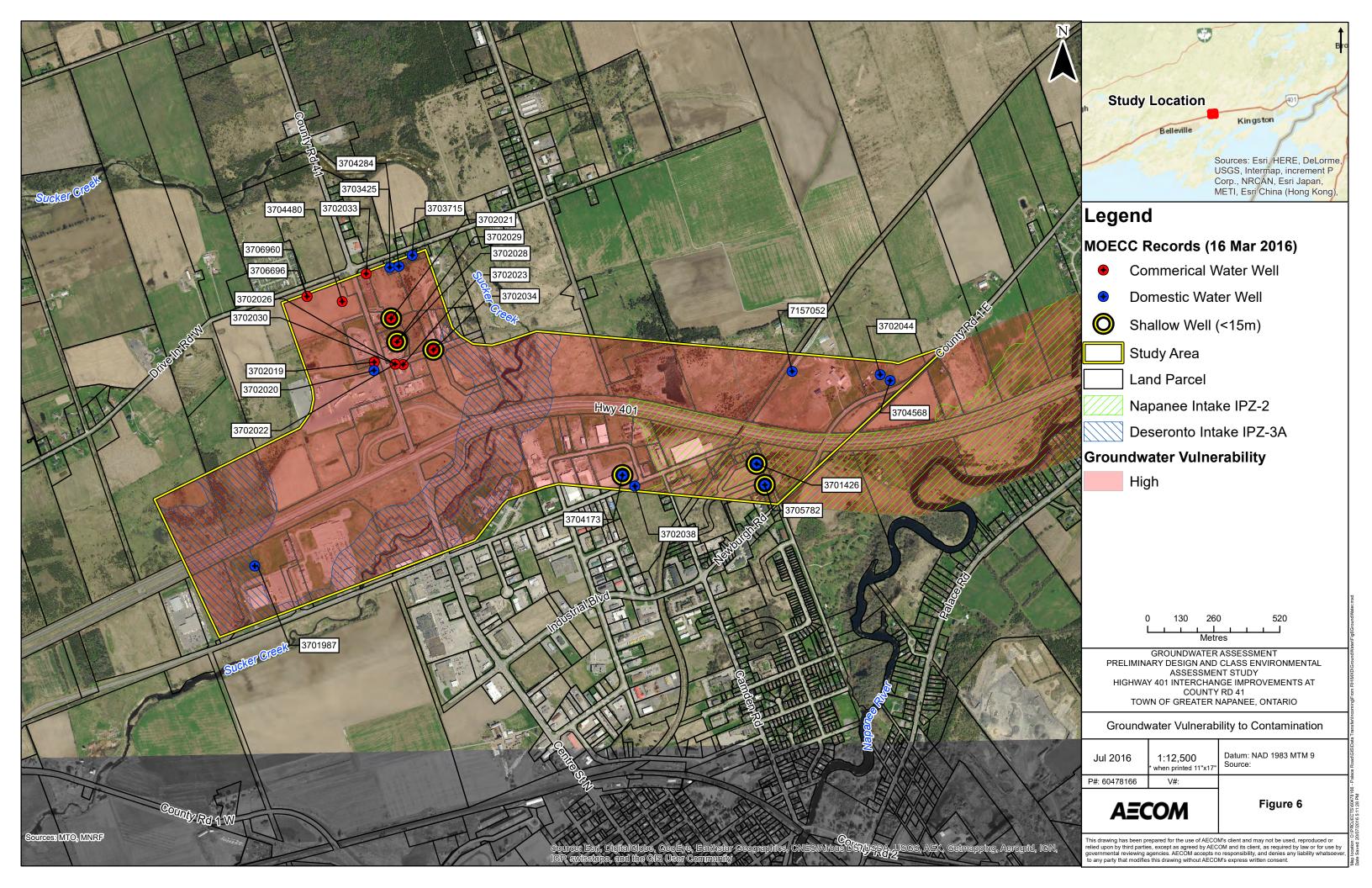












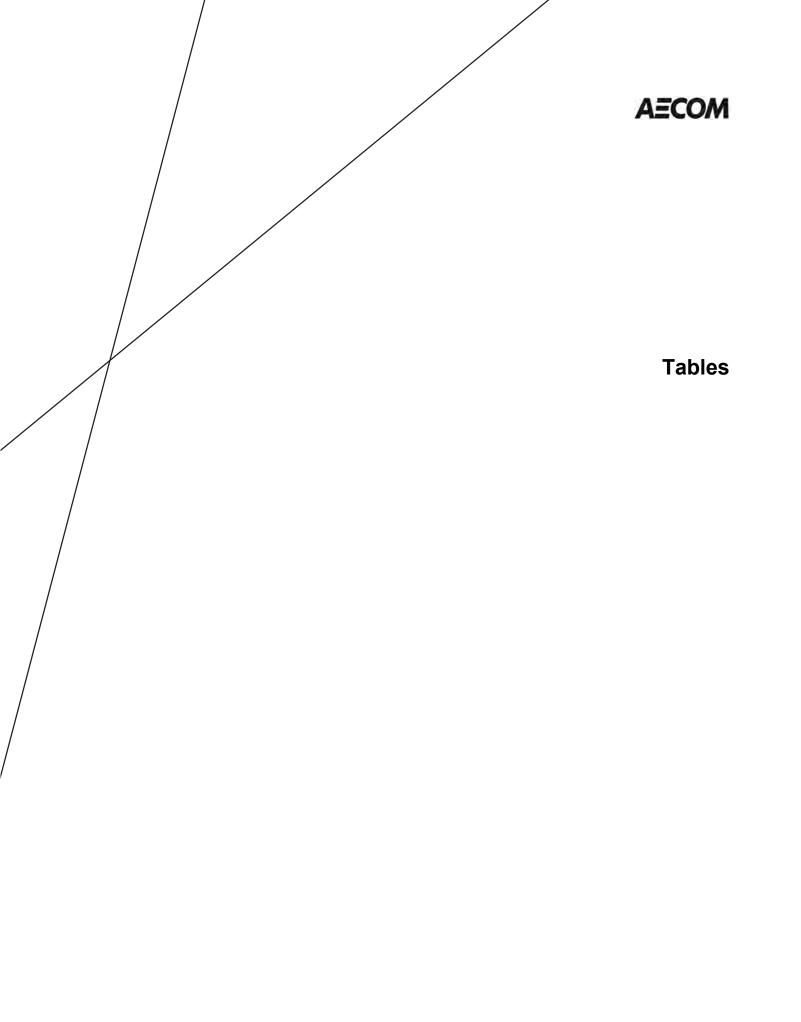


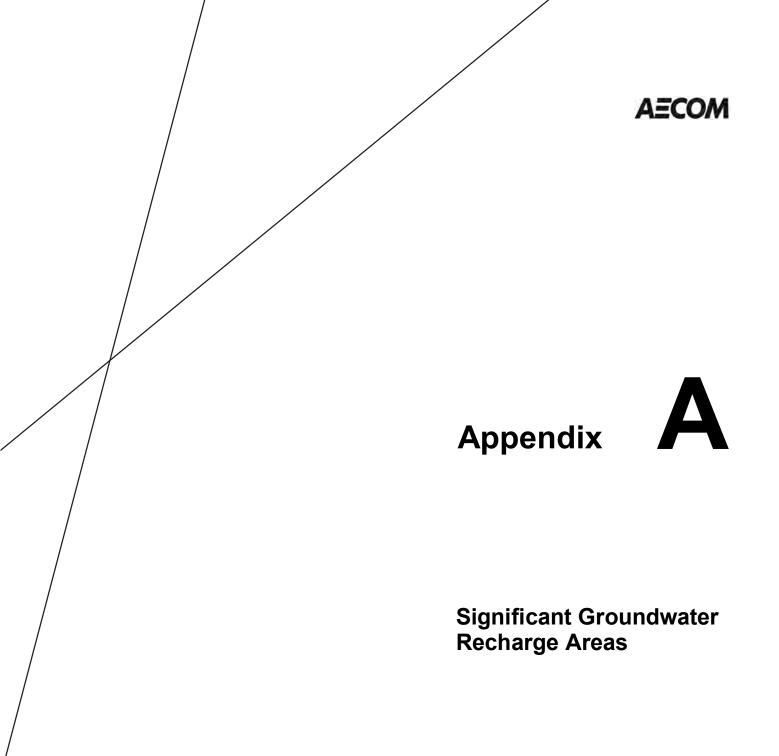
Table 1: Summary of MOECC Well Information
Groundwater Assessment
Preliminary Design and Class Environmental Assessment Study
Highway 401 Interchange Improvements at County Road 41, Town of Greater Napanee, Ontario

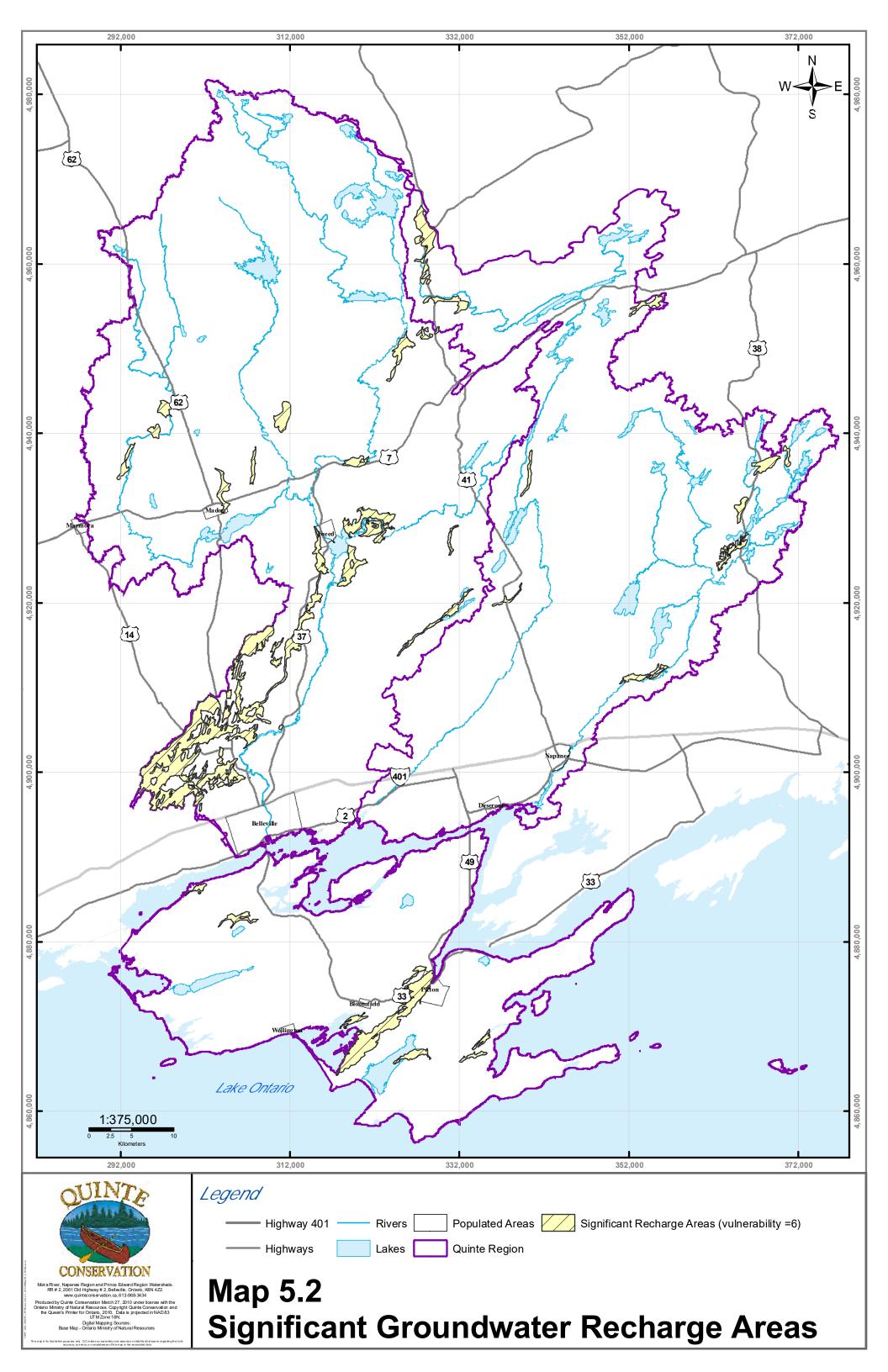
AECOM Project Number: 60478166

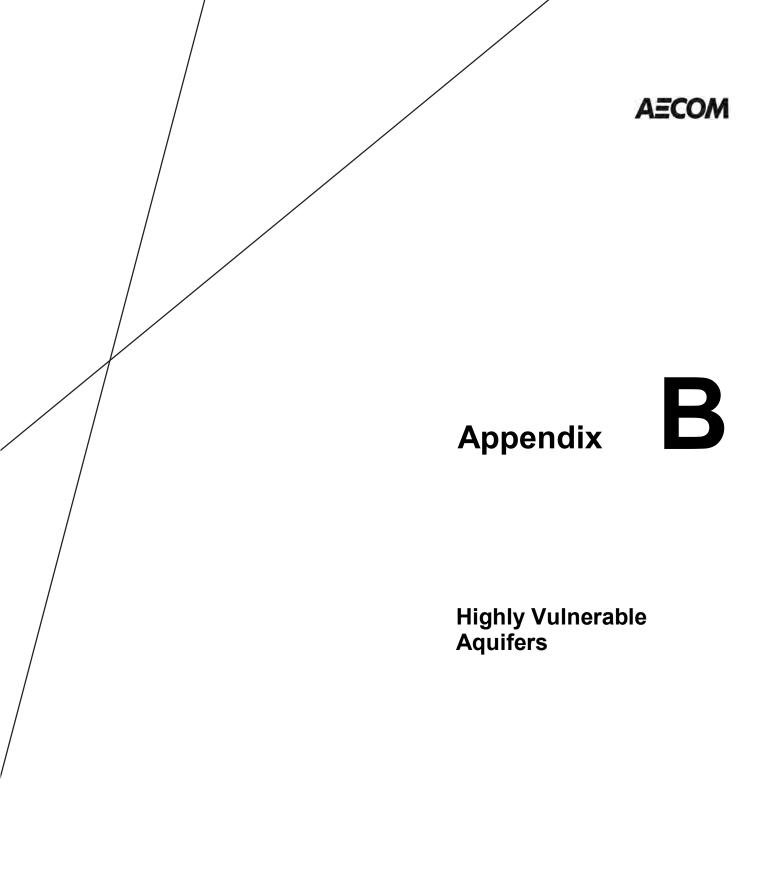
MOECC	Elevation	Easting (NAD83,	Northing (NAD83,		Primary			Well Depth (m	Casing Diameter	Static Level (m	Recommended Pump
Well ID	(mASL)	Zone 18)	Zone 18)	Well Type	Water Use	Water Kind	Construction Date	bgs)	(cm)	bgs)	Rate (gpm)
3701426	98.19	344498	4903104	Bedrock	Domestic	FRESH	8/13/1960	12.2	15.2	4.6	5
3701987	98.81	342517	4902738	Bedrock	Domestic	SULPHUR	9/11/1962	20.1	15.2	7.6	2
3702019	104.99	343002	4903532	Bedrock	Commercial	SALTY	5/22/1964	82.6	15.2	0.3	25
3702020	104.47	343000	4903498	Bedrock	Domestic	FRESH	7/4/1961	24.4	15.2	3.7	1
3702021	105.57	343071	4903702	Bedrock	Commercial	FRESH	6/4/1960	12.8	15.2	3.0	15
3702022	104.34	343083	4903523	Bedrock	Commercial	FRESH	6/8/1960	19.8	15.2	4.6	NA
3702023	103.62	343115	4903520	Bedrock	Commercial	SULPHUR	6/17/1960	18.3	15.2	4.6	NA
3702026	104.32	343084	4903523	Bedrock	Commercial	FRESH	9/5/1960	18.3	15.2	6.1	NA
3702028	104.34	343094	4903612	Bedrock	Commercial	FRESH	5/20/1961	12.2	15.2	3.0	8
3702029	104.34	343093	4903610	Bedrock	Commercial	SULPHUR	8/1/1963	14.6	15.2	4.6	NA
3702030	104.32	343084	4903523	Bedrock	Commercial	FRESH	9/24/1960	39.6	15.2	9.1	NA
3702033	108.70	342976	4903880	Bedrock	Commercial	FRESH	3/20/1964	41.1	15.2	6.1	NA
3702034	99.21	343235	4903576	Bedrock	Commercial	SULPHUR	1/11/1965	7.3	15.2	1.8	5
3702038	103.01	344018	4903026	Bedrock	Domestic	FRESH	2/28/1958	15.8	15.2	5.5	NA
3702044	98.52	344991	4903446	Bedrock	Domestic	FRESH	4/16/1957	22.9	15.2	4.9	NA
3703425	108.59	343070	4903902	Bedrock	Domestic	FRESH	6/20/1972	38.1	15.2	4.3	5
3703715	108.44	343159	4903949	Bedrock	Domestic	FRESH	10/8/1973	33.5	15.2	4.9	5
3704173	103.72	343970	4903070	Bedrock	Domestic	FRESH	9/21/1974	13.1	15.2	1.8	25
3704284	108.29	343106	4903906	Bedrock	Domestic	FRESH	8/30/1974	65.8	15.2	6.1	NA
3704480	107.29	342880	4903772	Bedrock	Commercial	FRESH	11/4/1975	32.9	15.2	3.7	4
3704568	96.38	345030	4903422	Bedrock	Domestic	FRESH	5/23/1975	35.7	15.2	3.0	2
3705782	99.00	344529	4903021	Bedrock	Domestic	FRESH	3/31/1981	12.2	15.2	3.0	2
3706696	108.82	342742	4903795	Bedrock	Domestic	NA	7/10/1987	29.0	15.2	8.5	2
3706960	108.82	342742	4903795	Bedrock	Commercial	SULPHUR	3/8/1988	19.2	15.2	6.1	4
7157052	NA	344645	4903465	NA	Domestic	Untested	12/22/2010	18.3	15.2	6.0	20

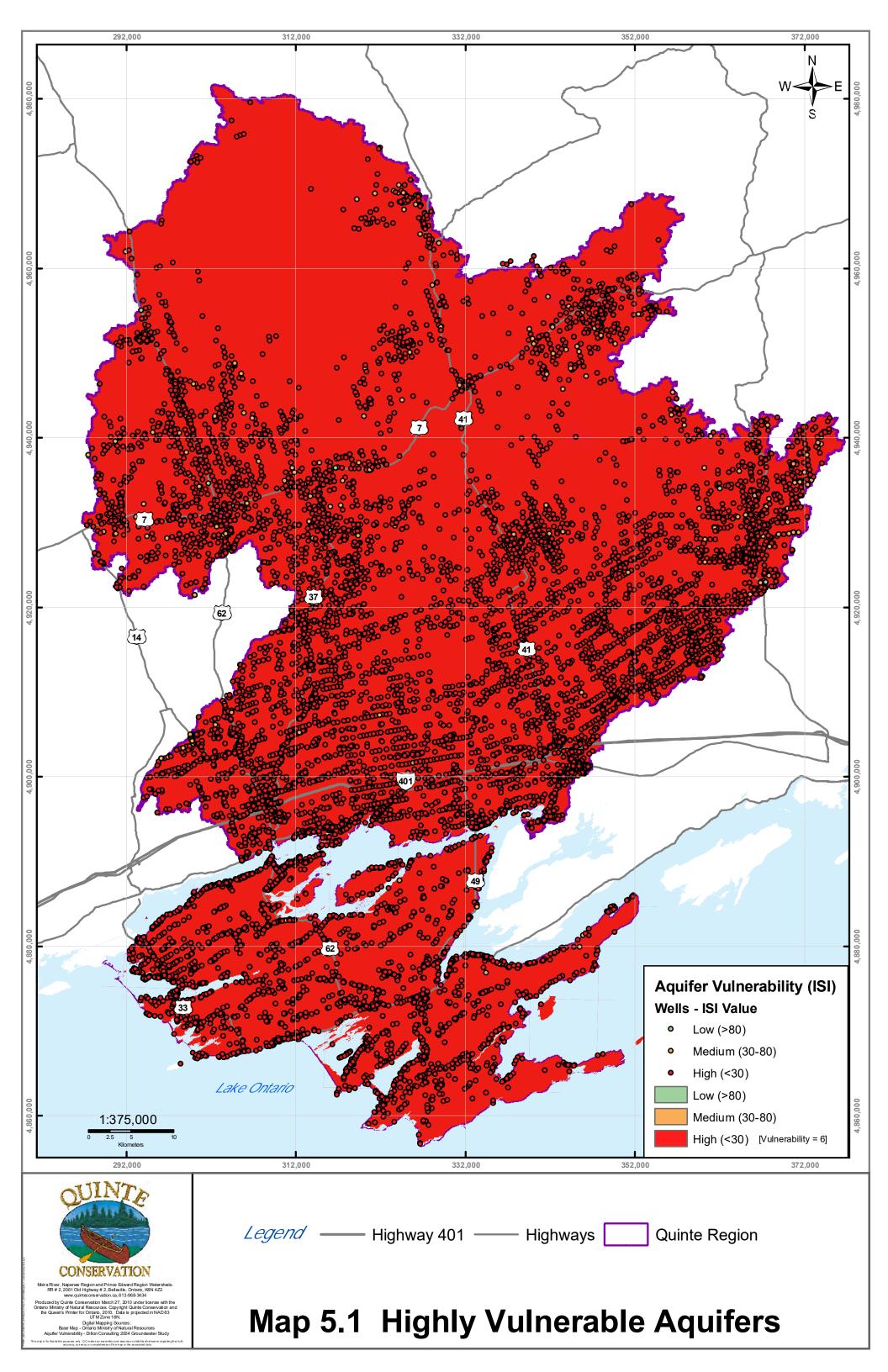
Note:

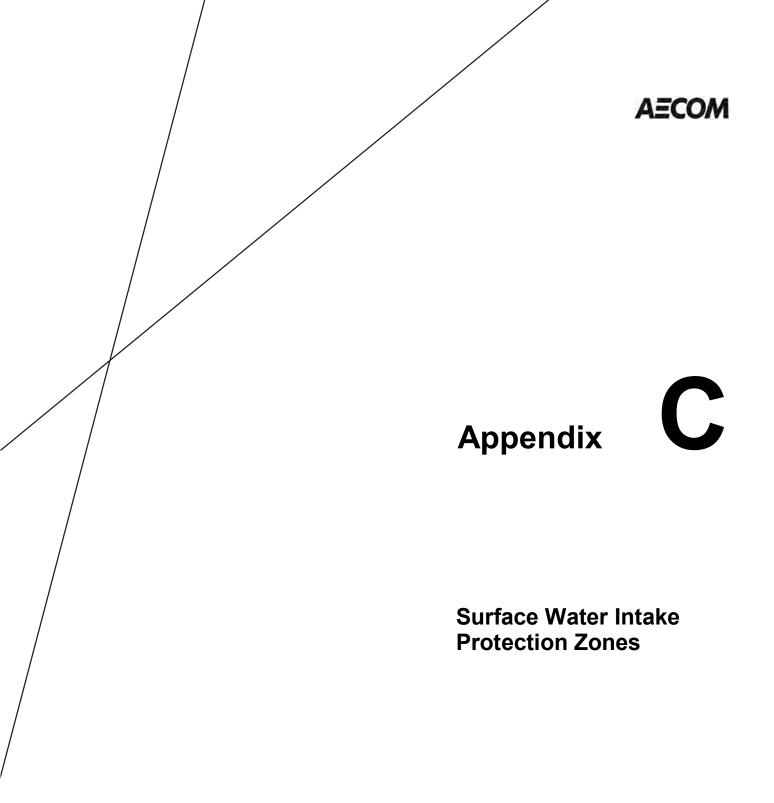
mASL: m above mean sea level NA: No information available bgs:Below ground surface gpm: gallon per minute

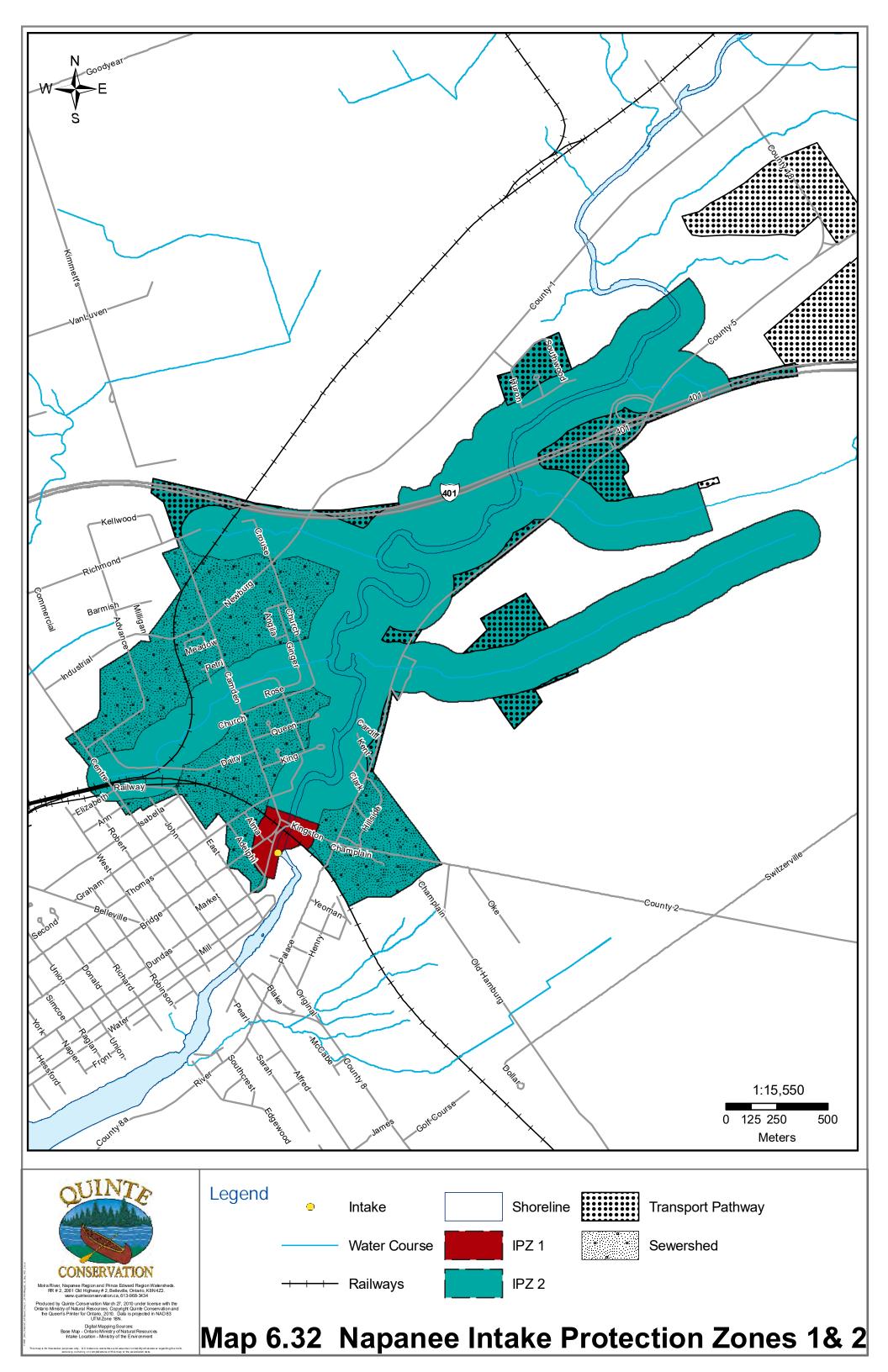


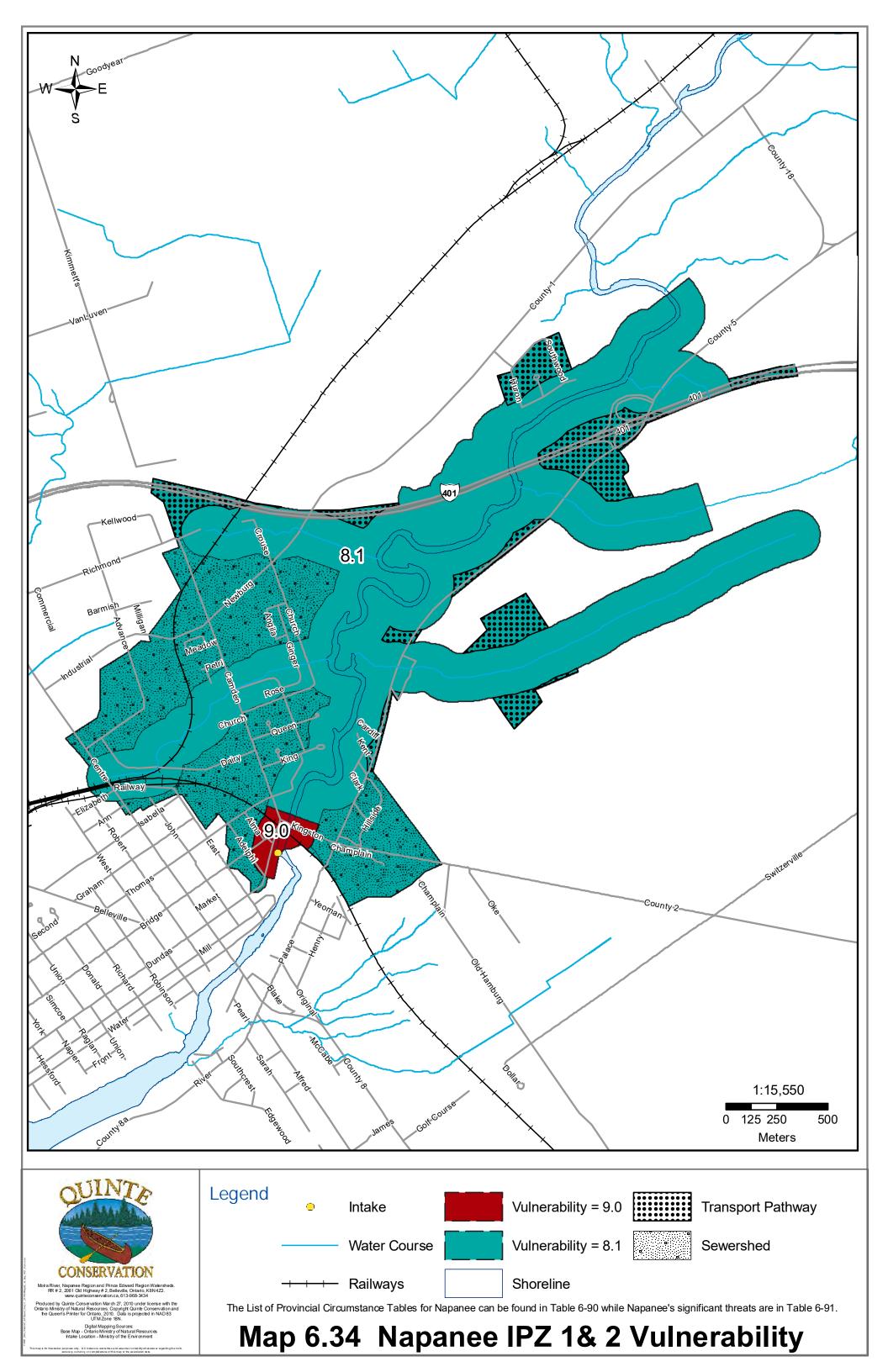


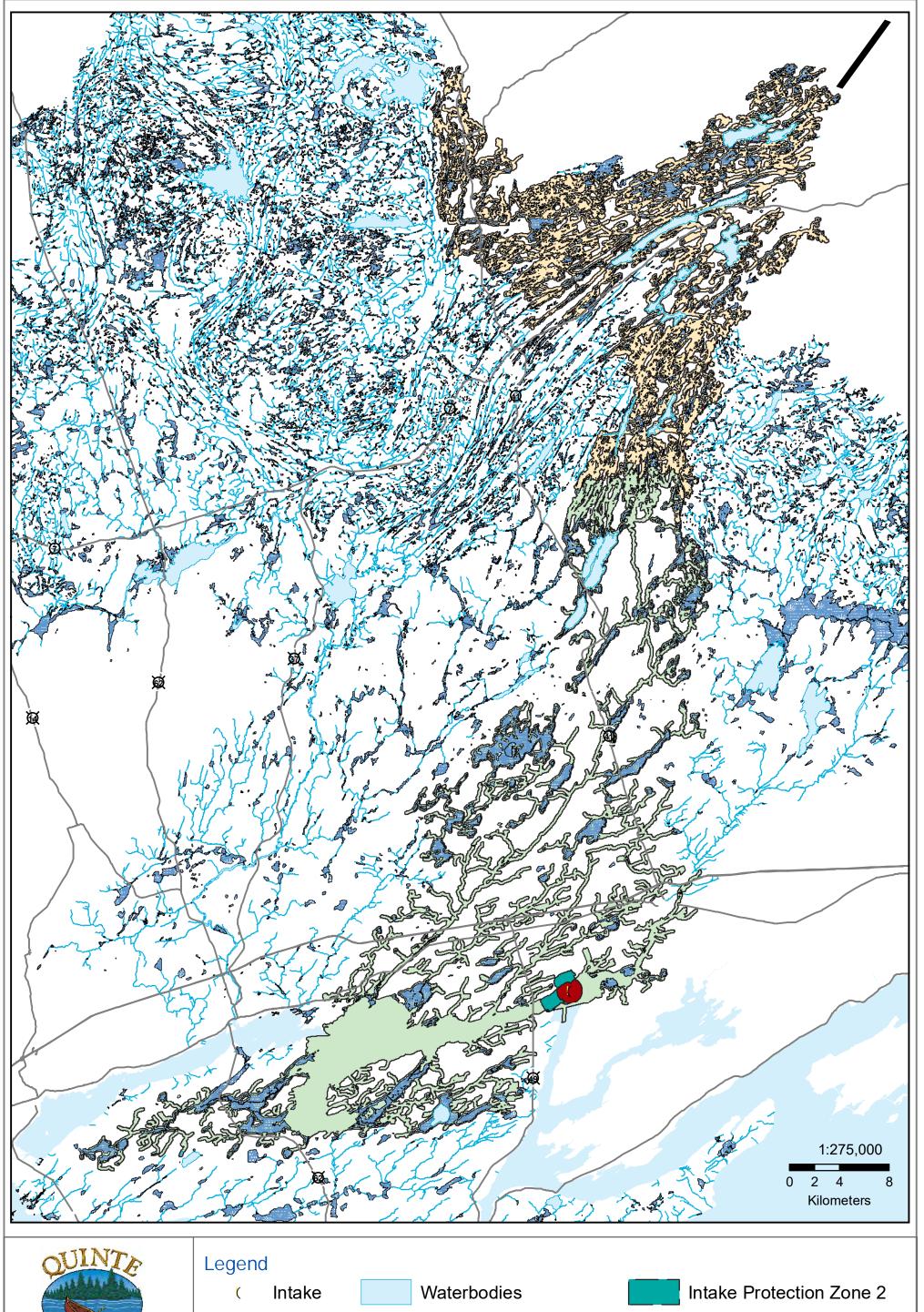




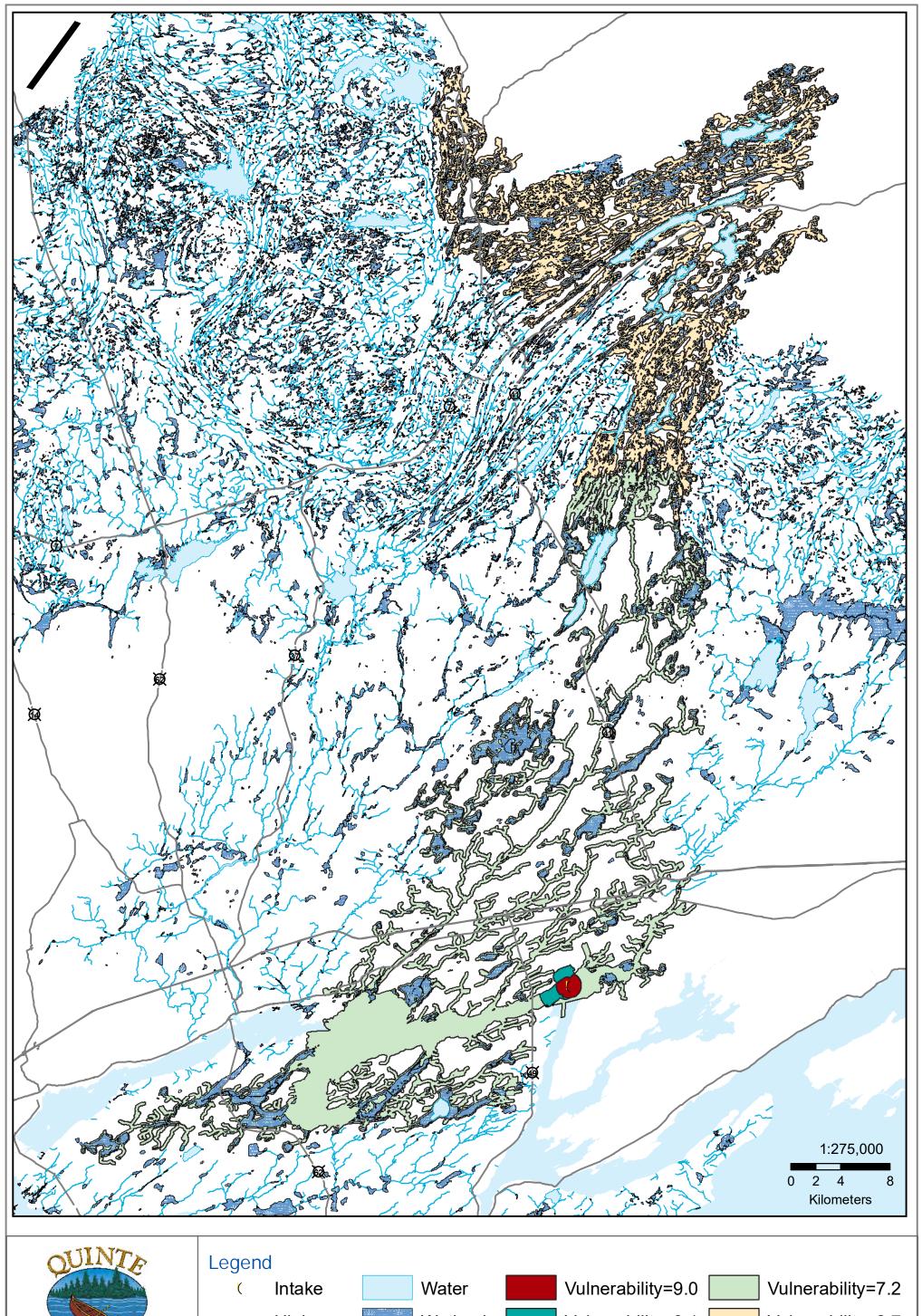














Wetlands Vulnerability=8.1 Highways Vulnerability=2.7 The List of Provincial Circumstance Tables for Deseronto can be found in Table 6-71 while Deseronto's Significant threats are in Table 6-72.

**Map 6.26** Deseronto Intake Protection Zones Vulnerability

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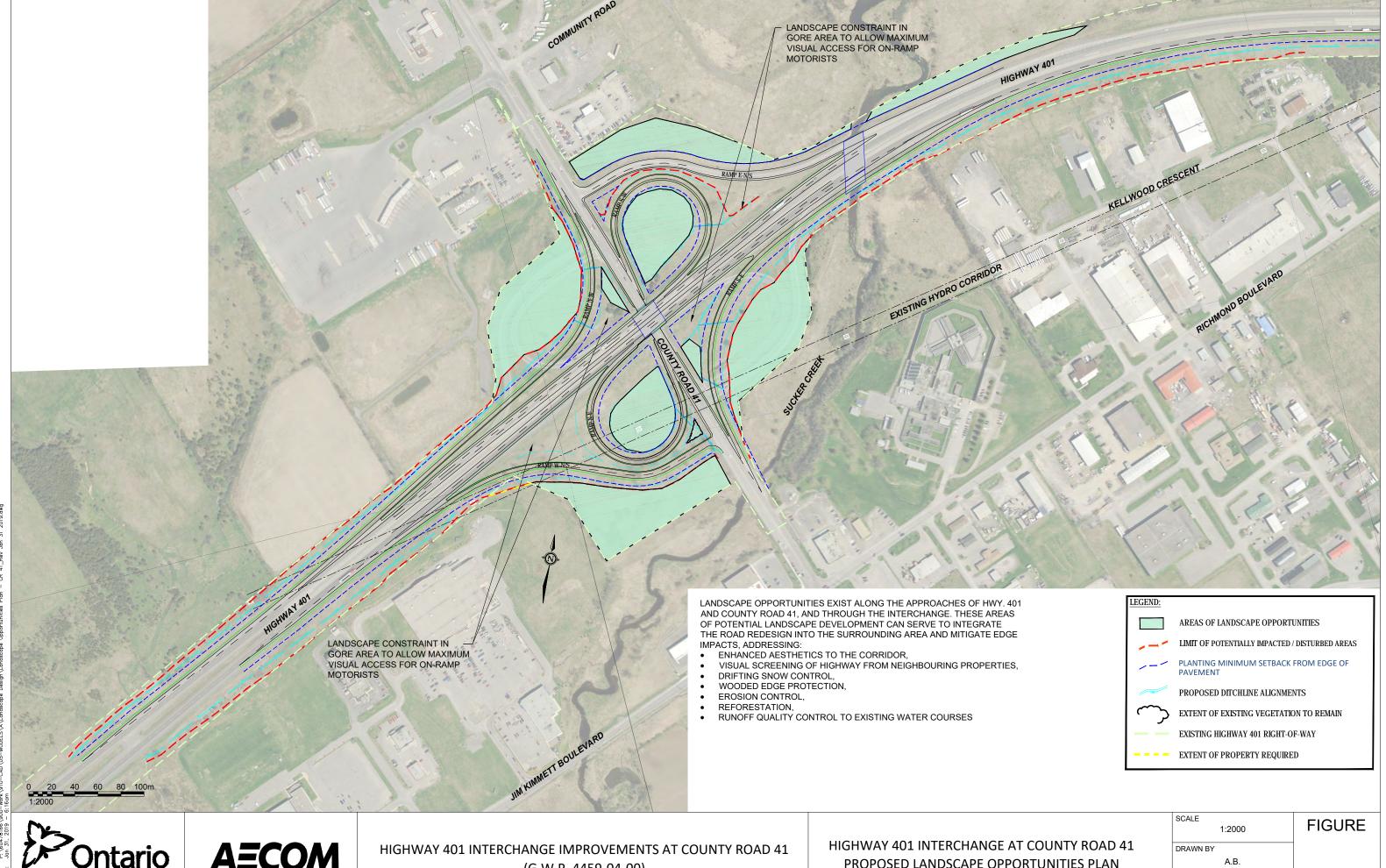
As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges.

From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM companies had revenue of approximately US \$19 billion during the 12 months ended June 30, 2015.

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### **Appendix L – Landscape Opportunities Plan**

Prepared for: Ontario Ministry of Transportation



Ontario Ministry of Transportation

**AECOM** 

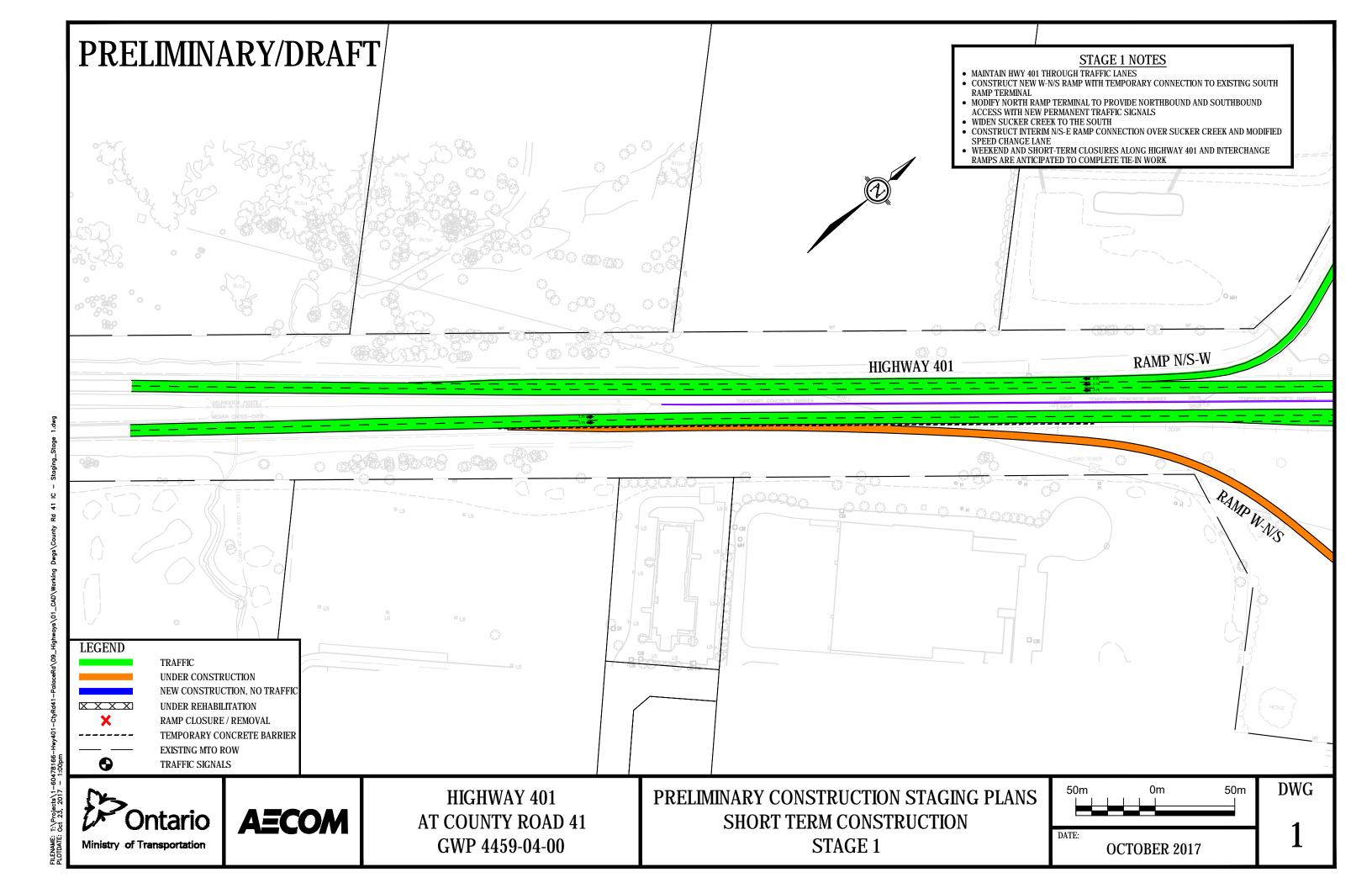
(G.W.P. 4459-04-00)

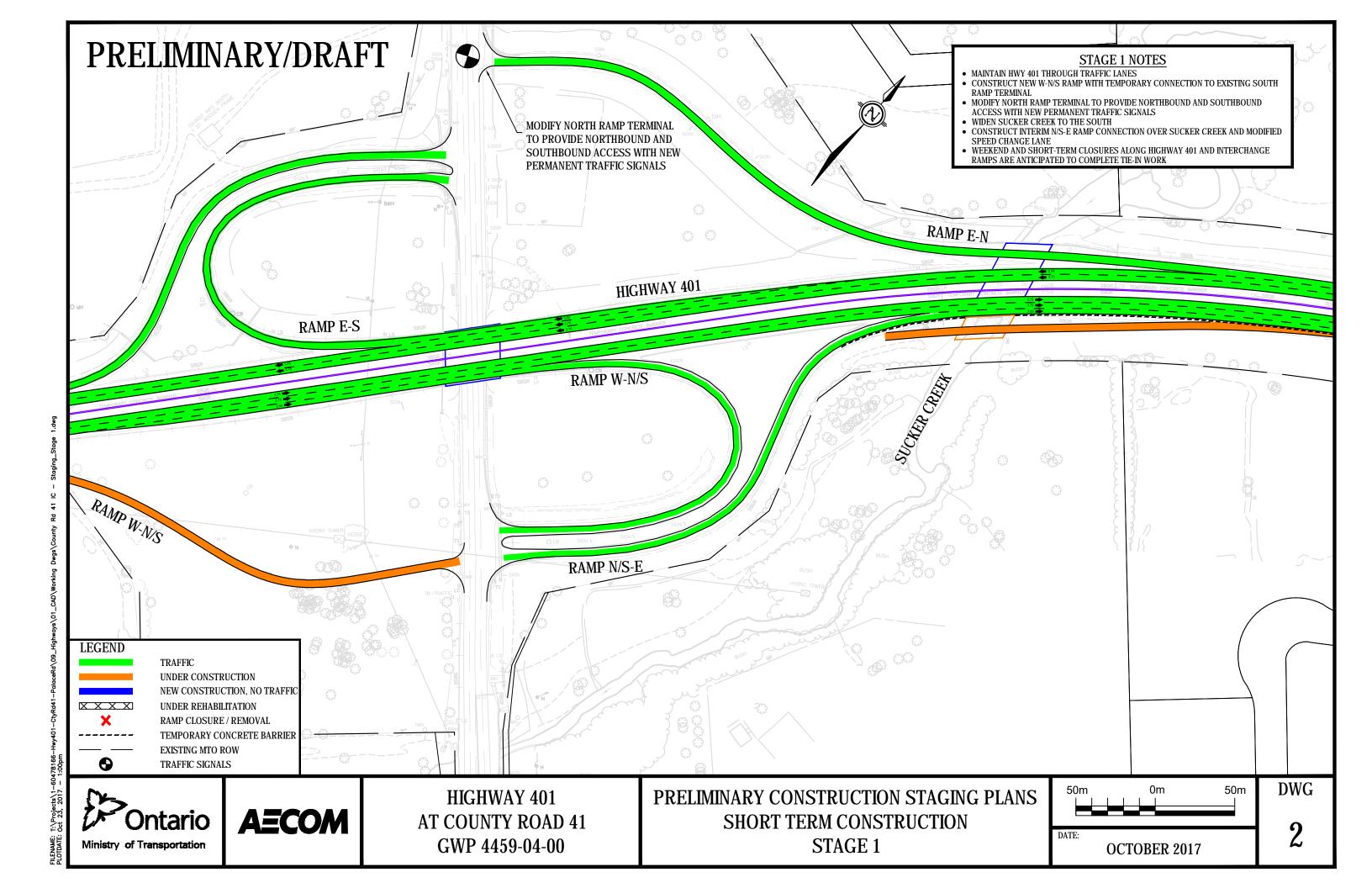
PROPOSED LANDSCAPE OPPORTUNITIES PLAN

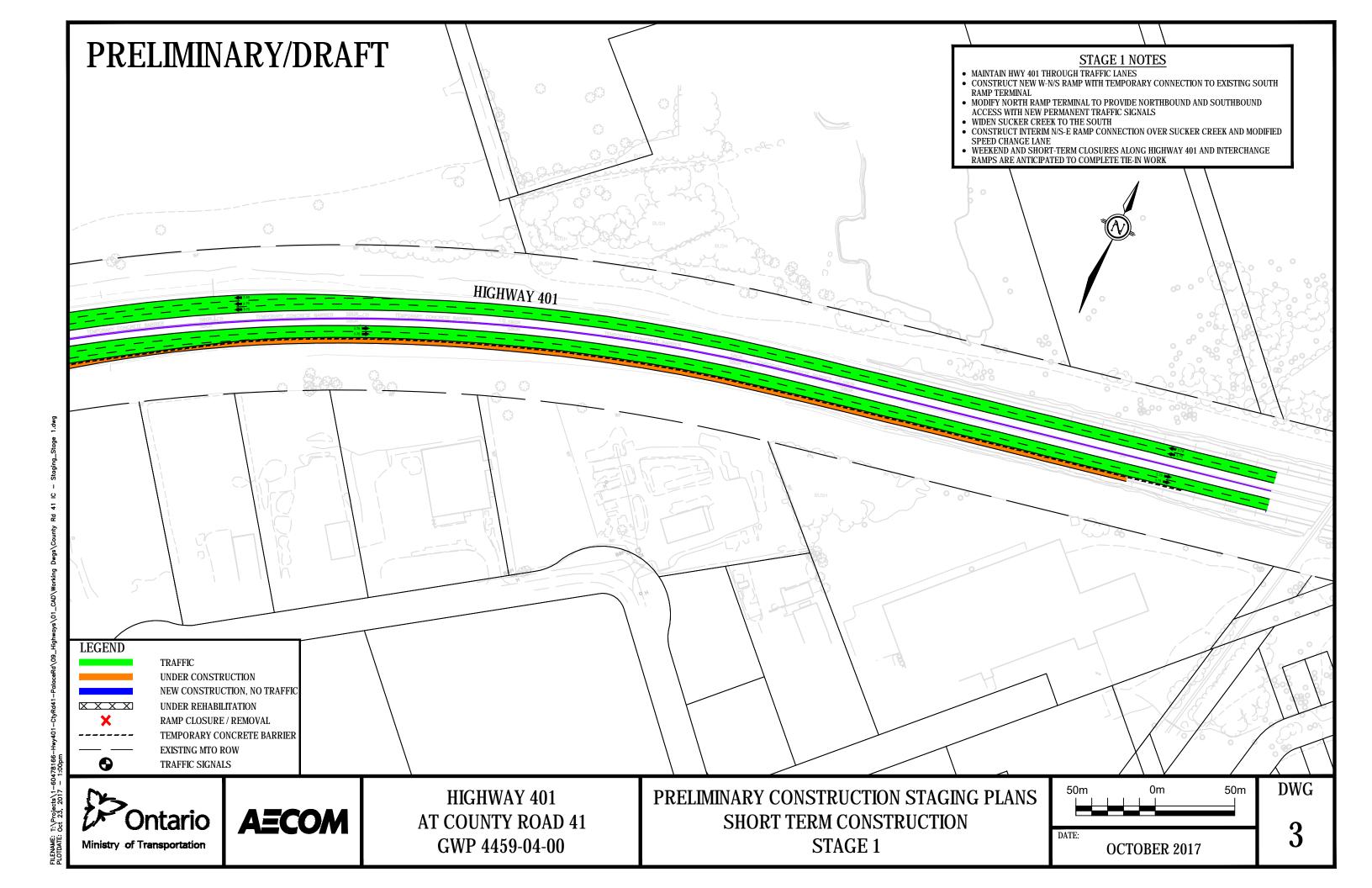
SCALE	FIGURE
1:2000	IIGUIL
DRAWN BY	
A.B.	
DATE JANUARY 2019	

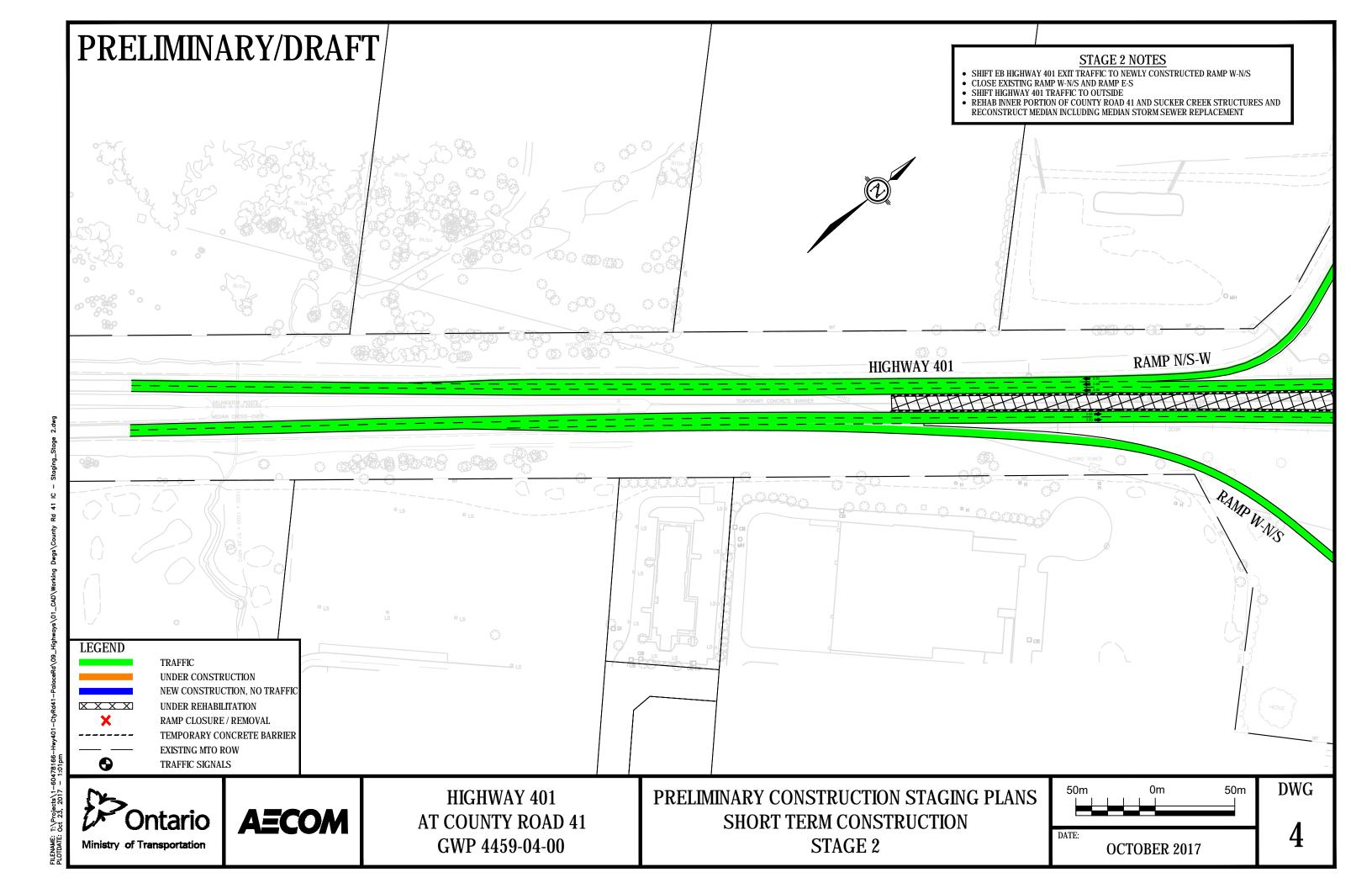
# **Appendix M – Conceptual Construction Staging Strategy**

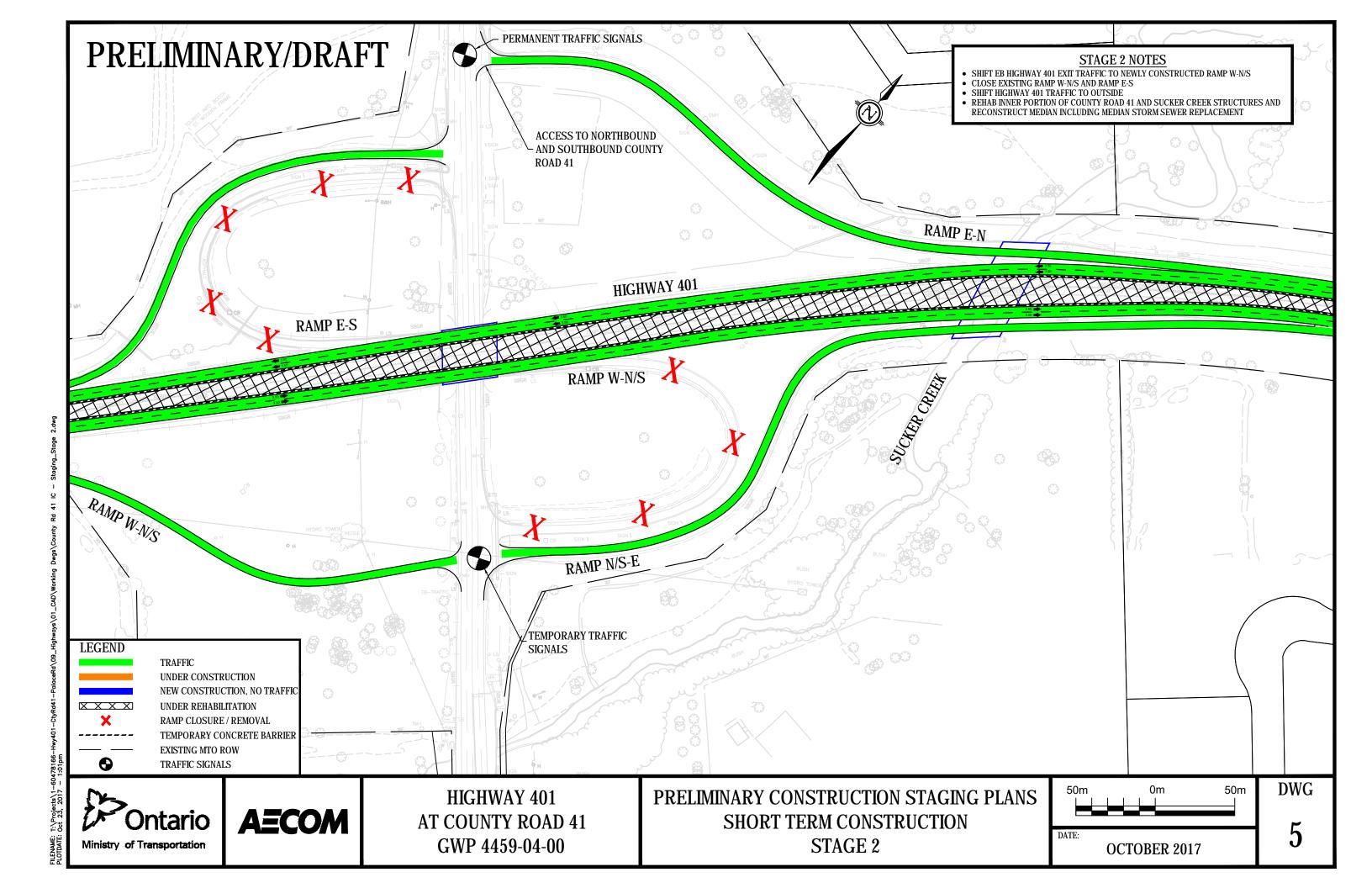
Prepared for: Ontario Ministry of Transportation

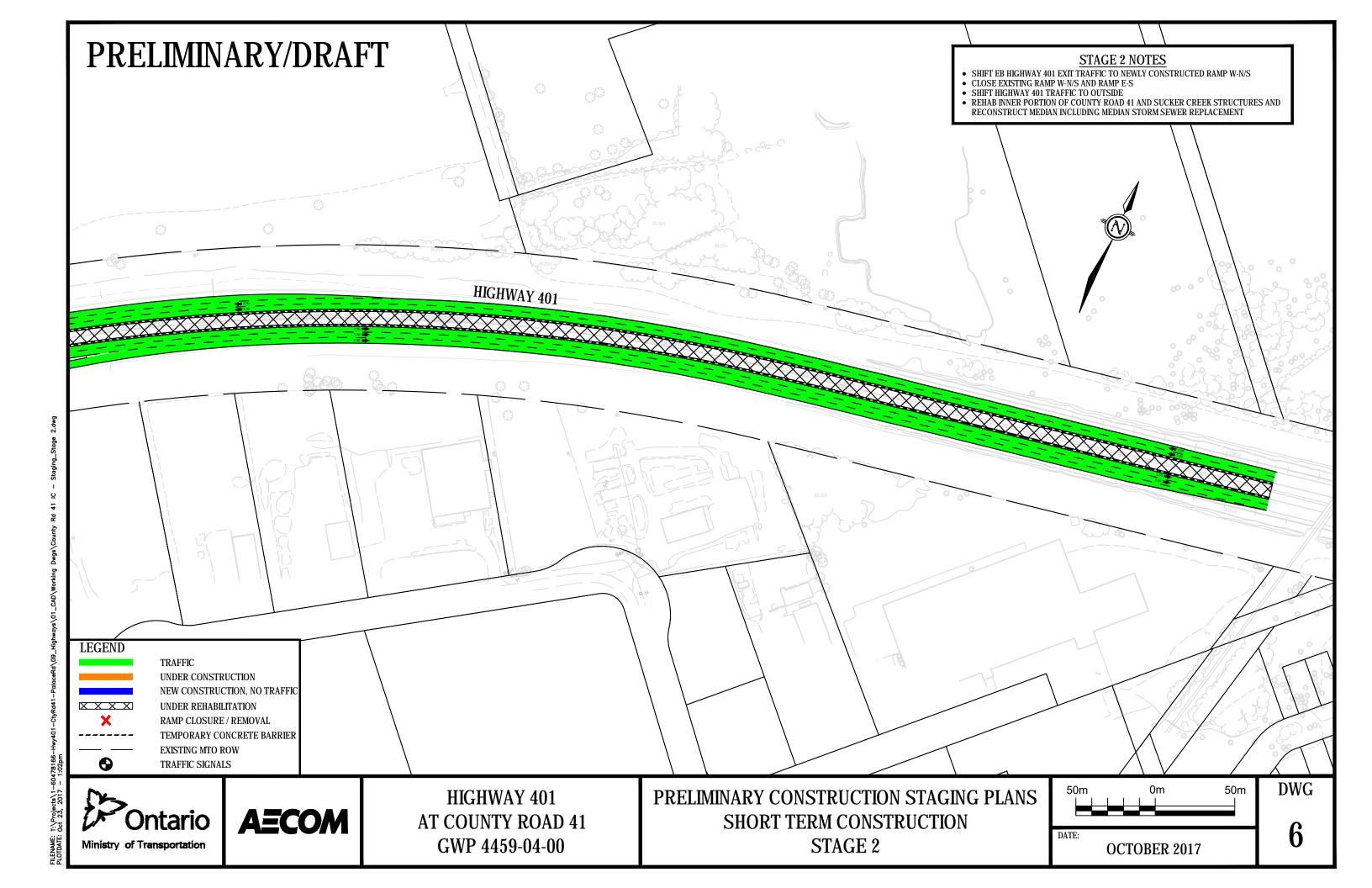


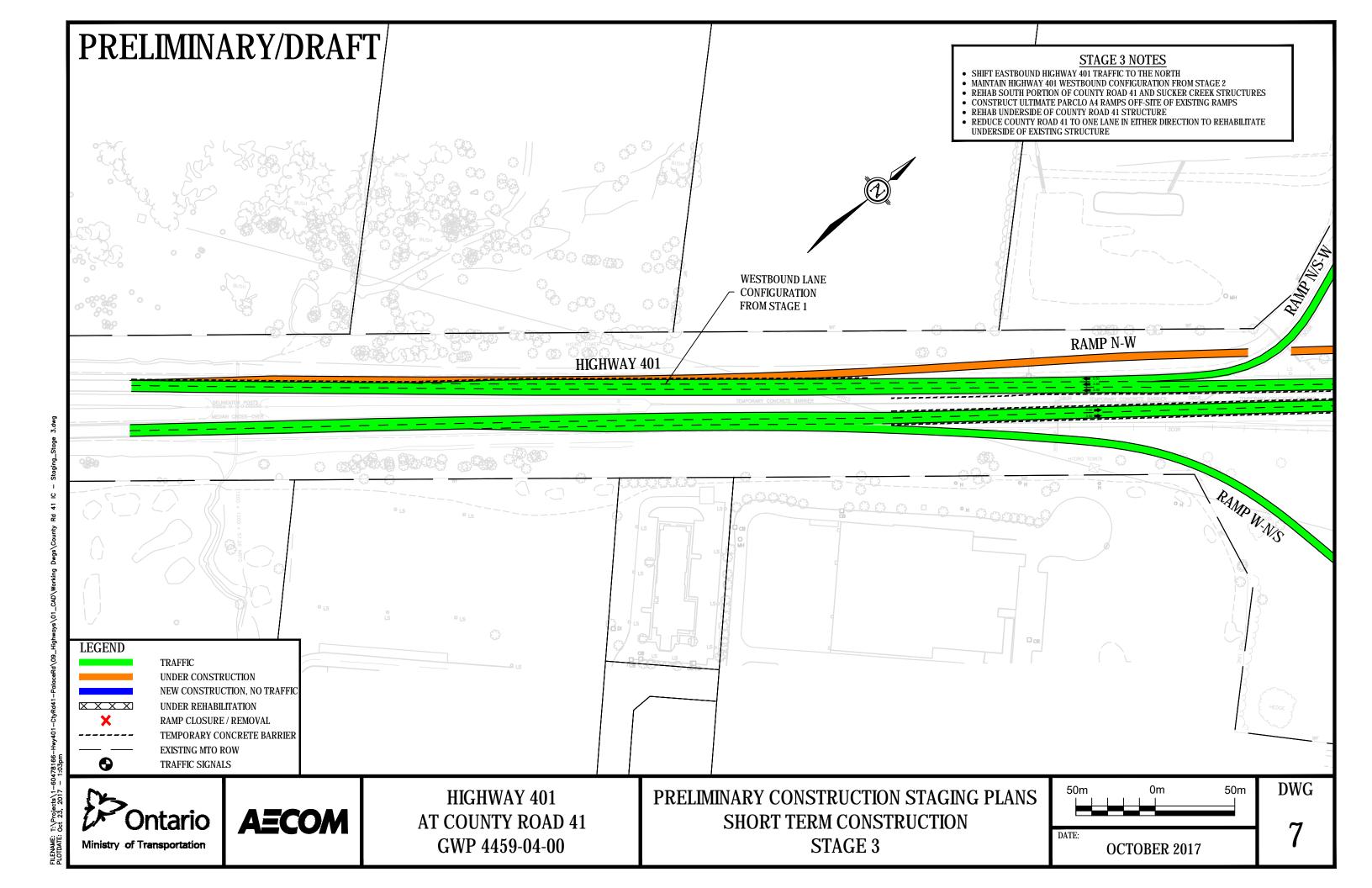


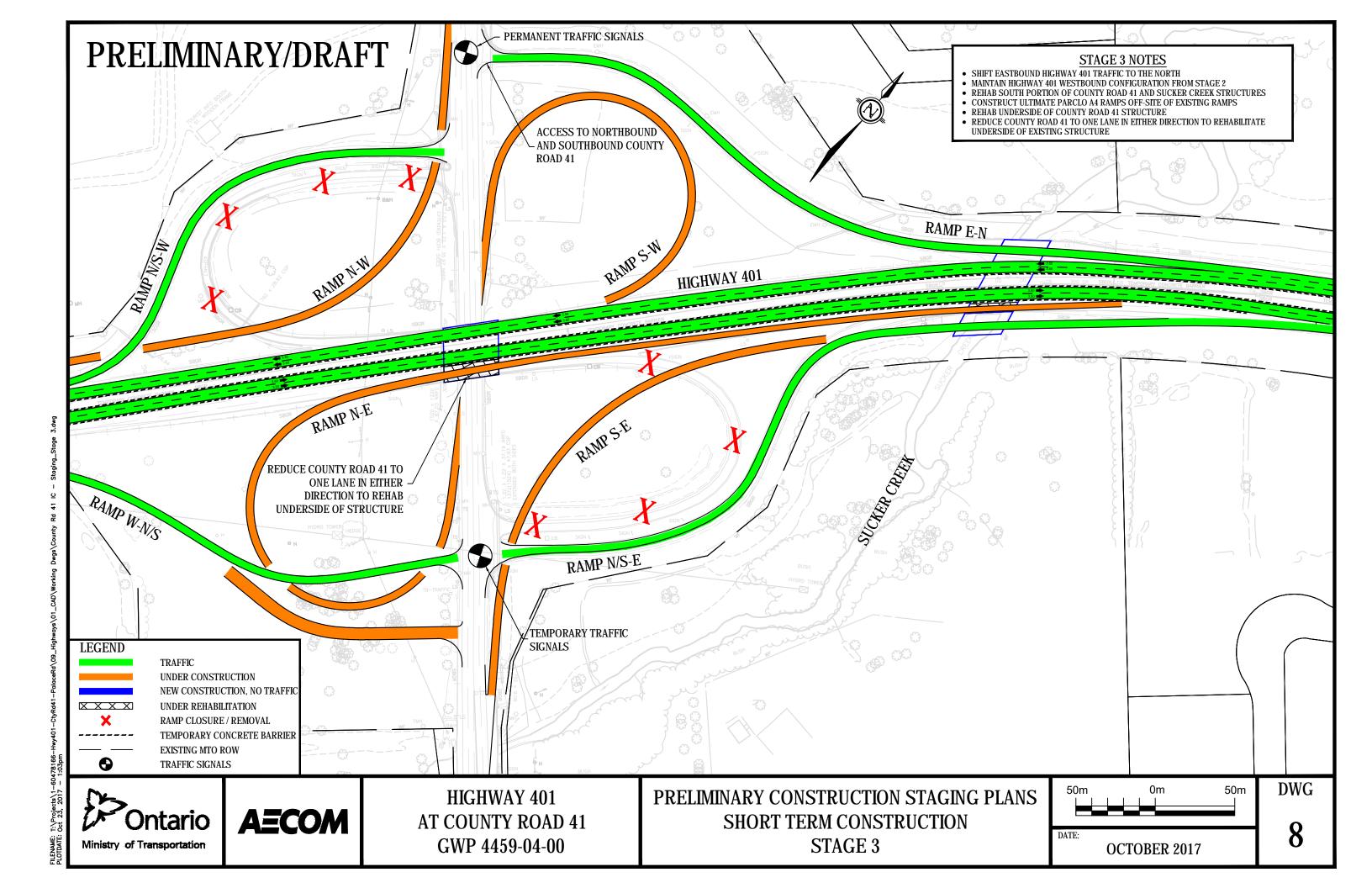


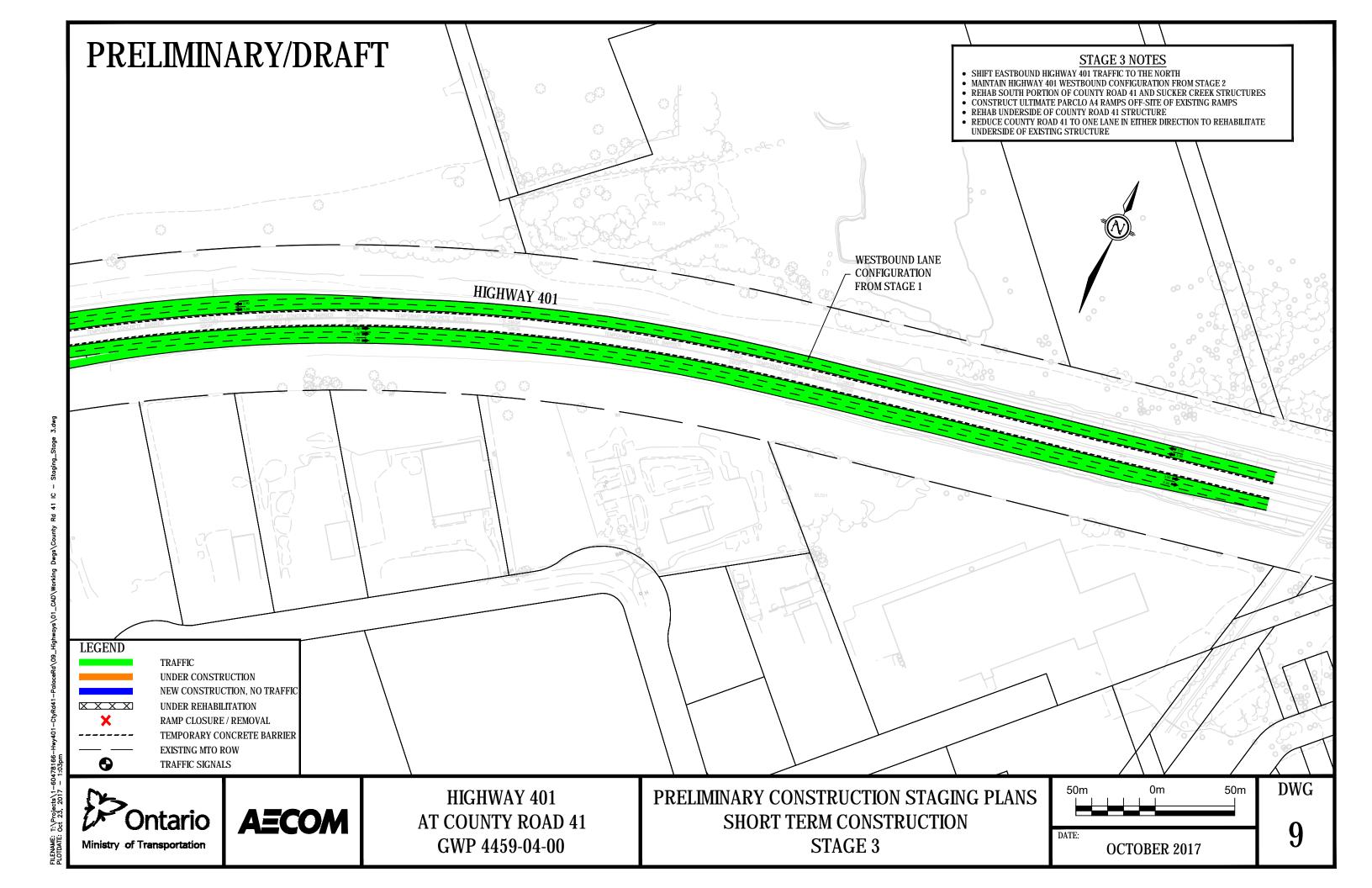


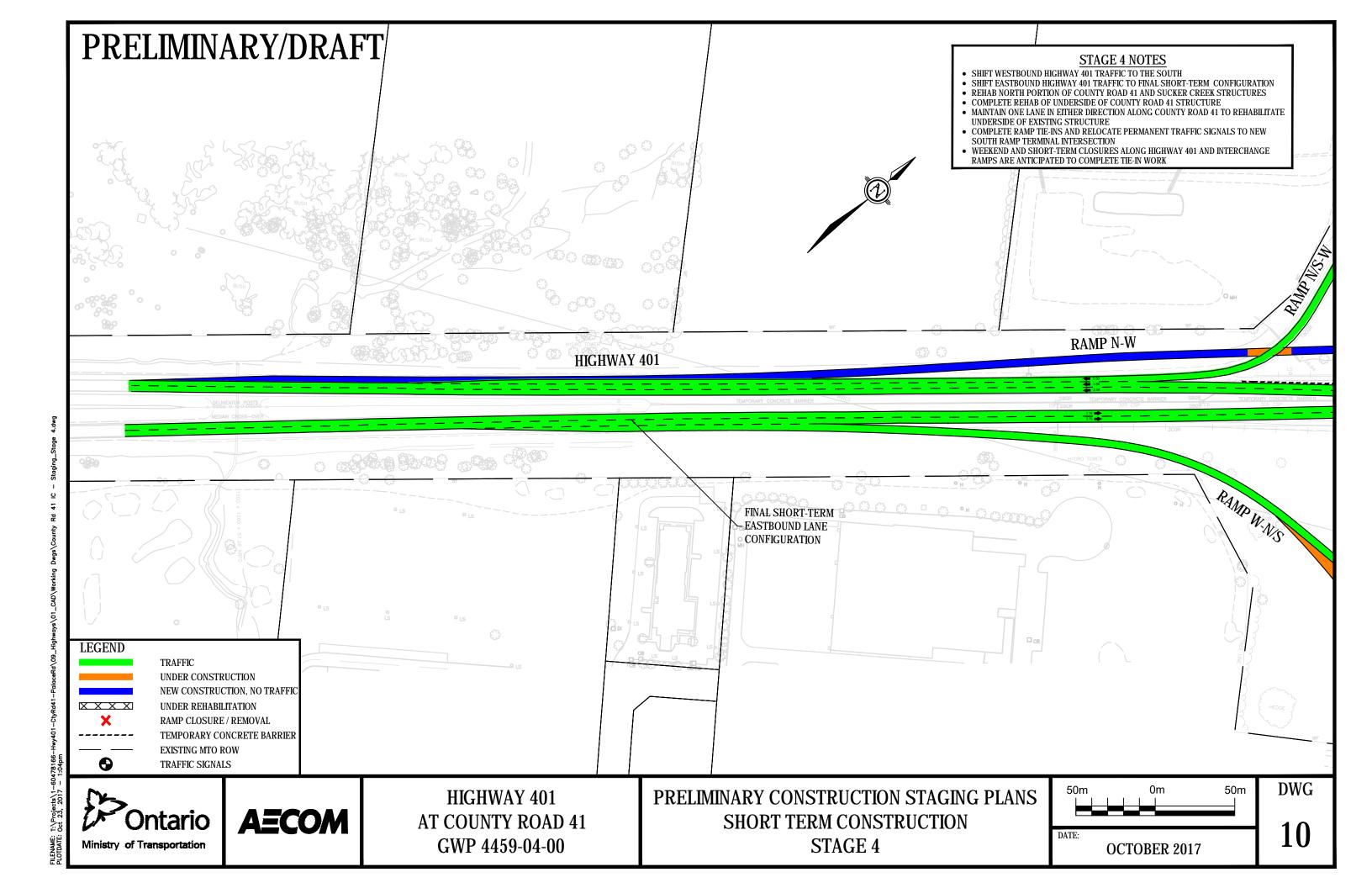


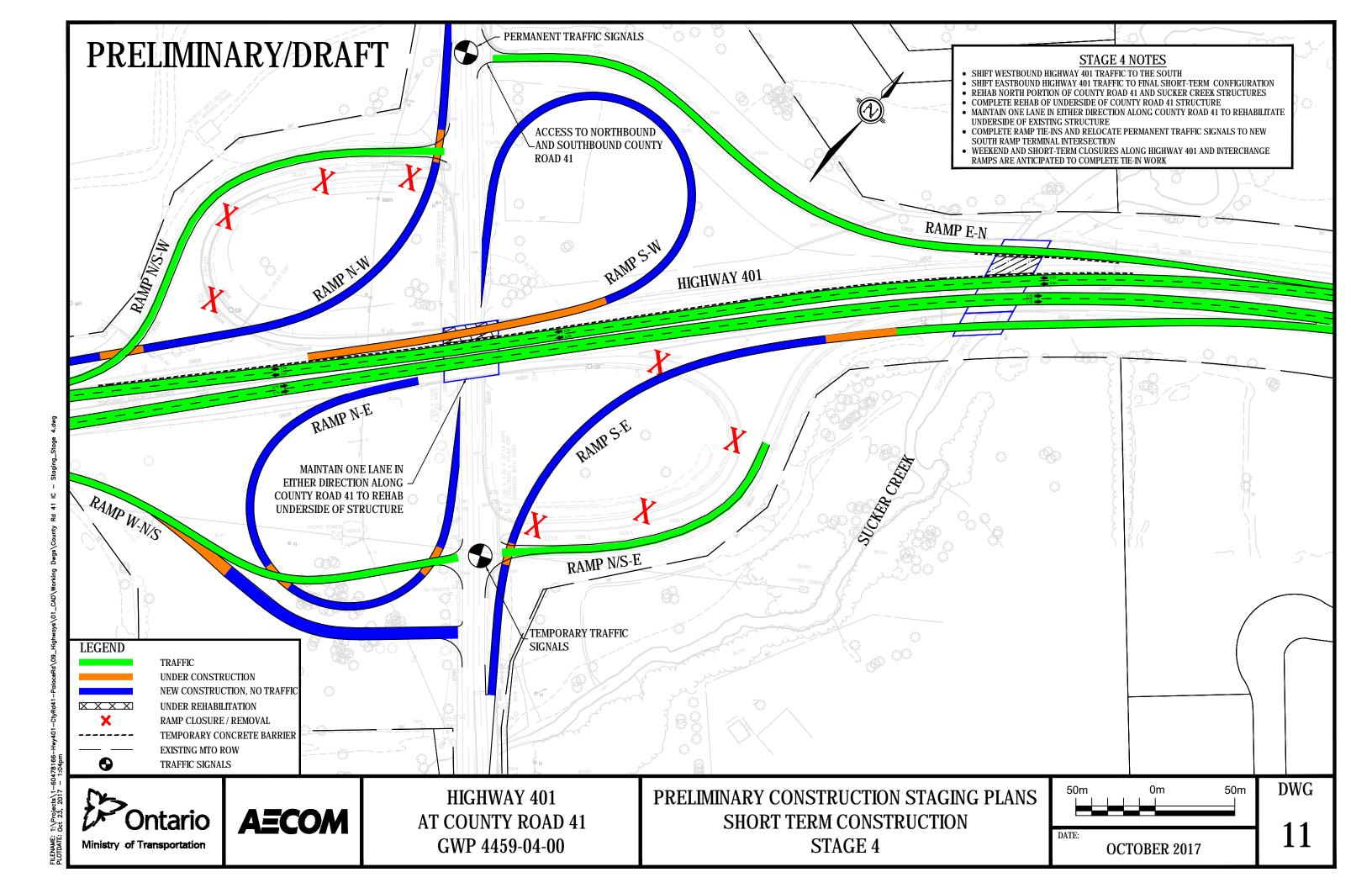


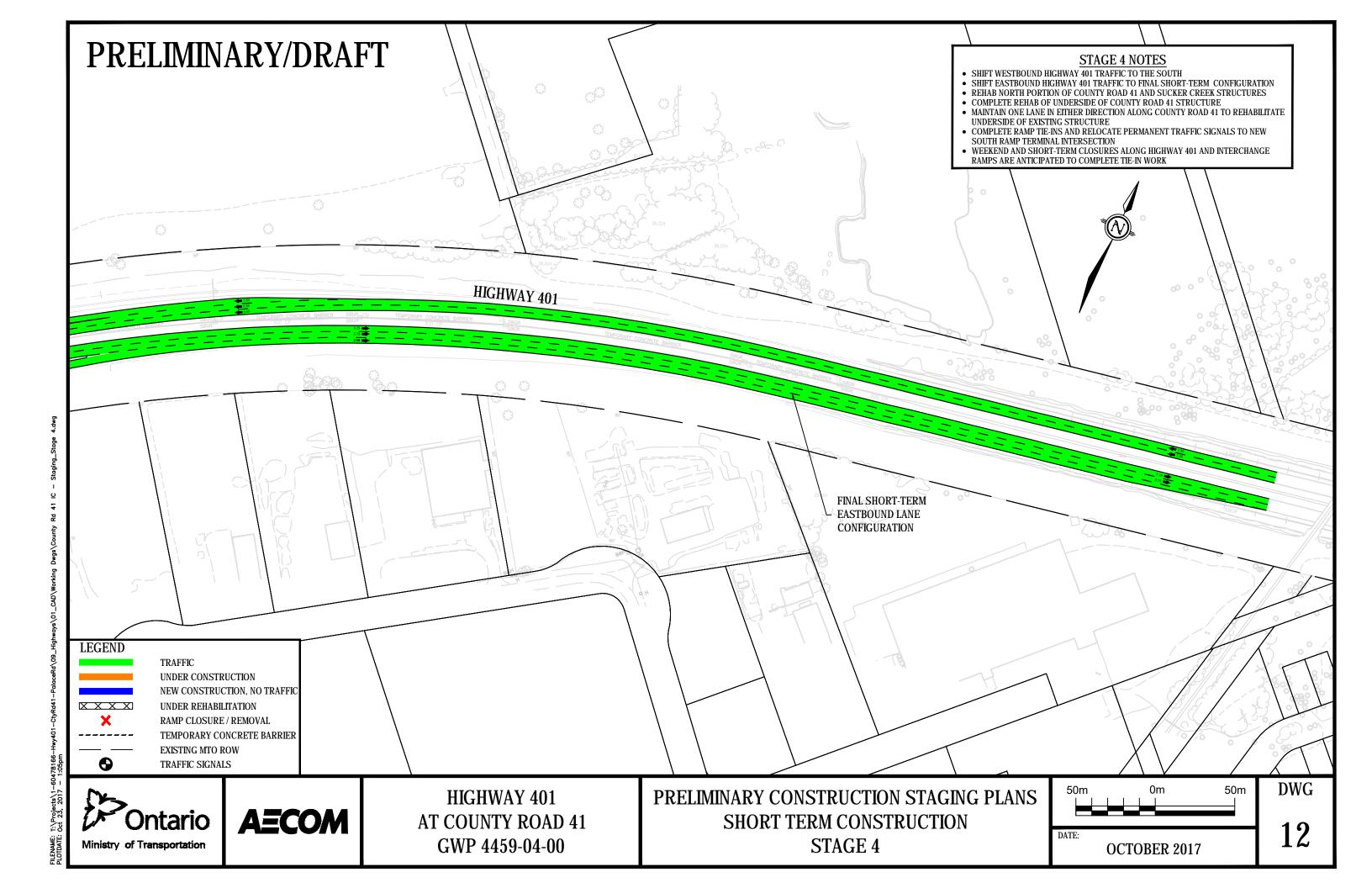


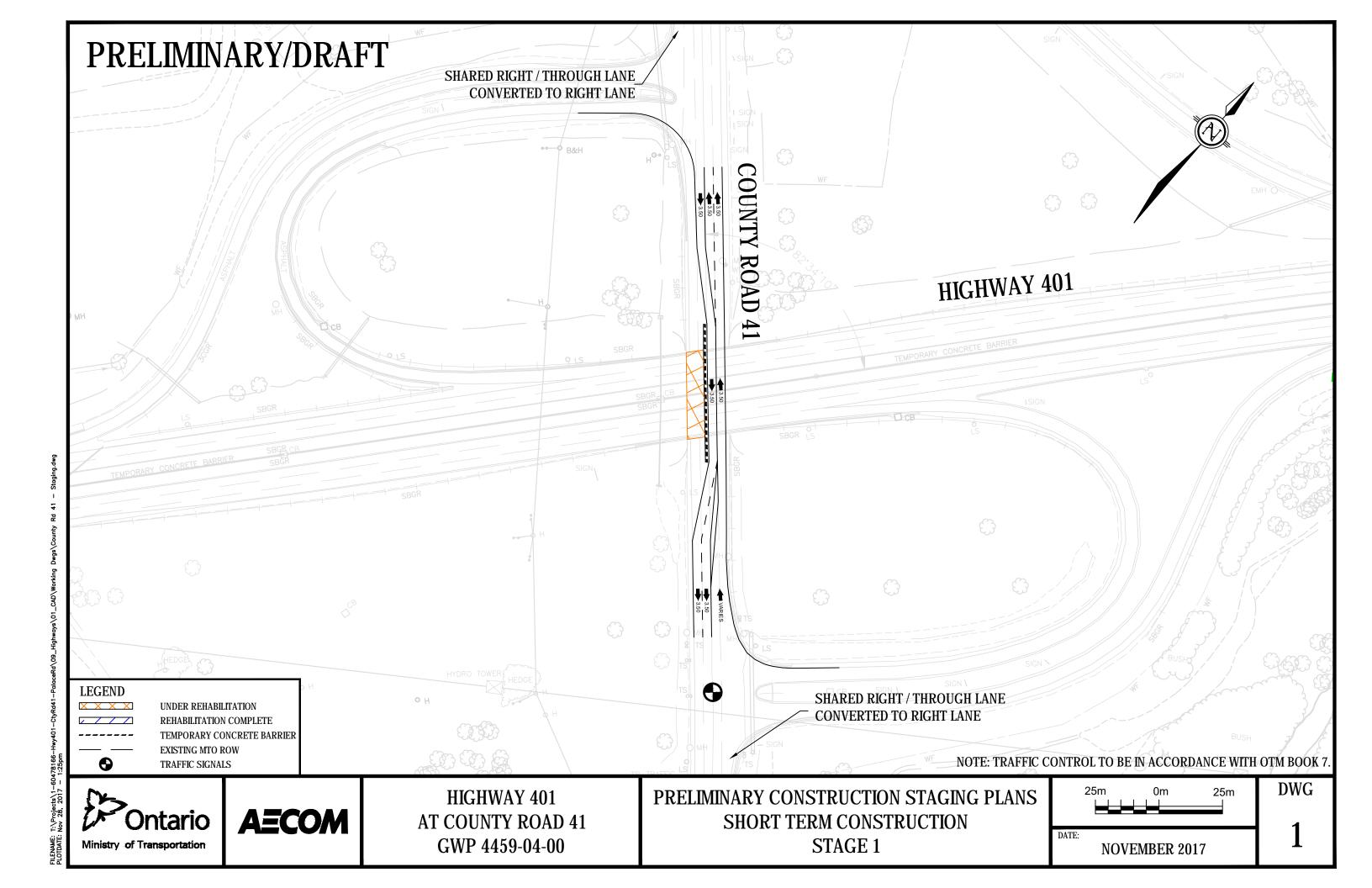


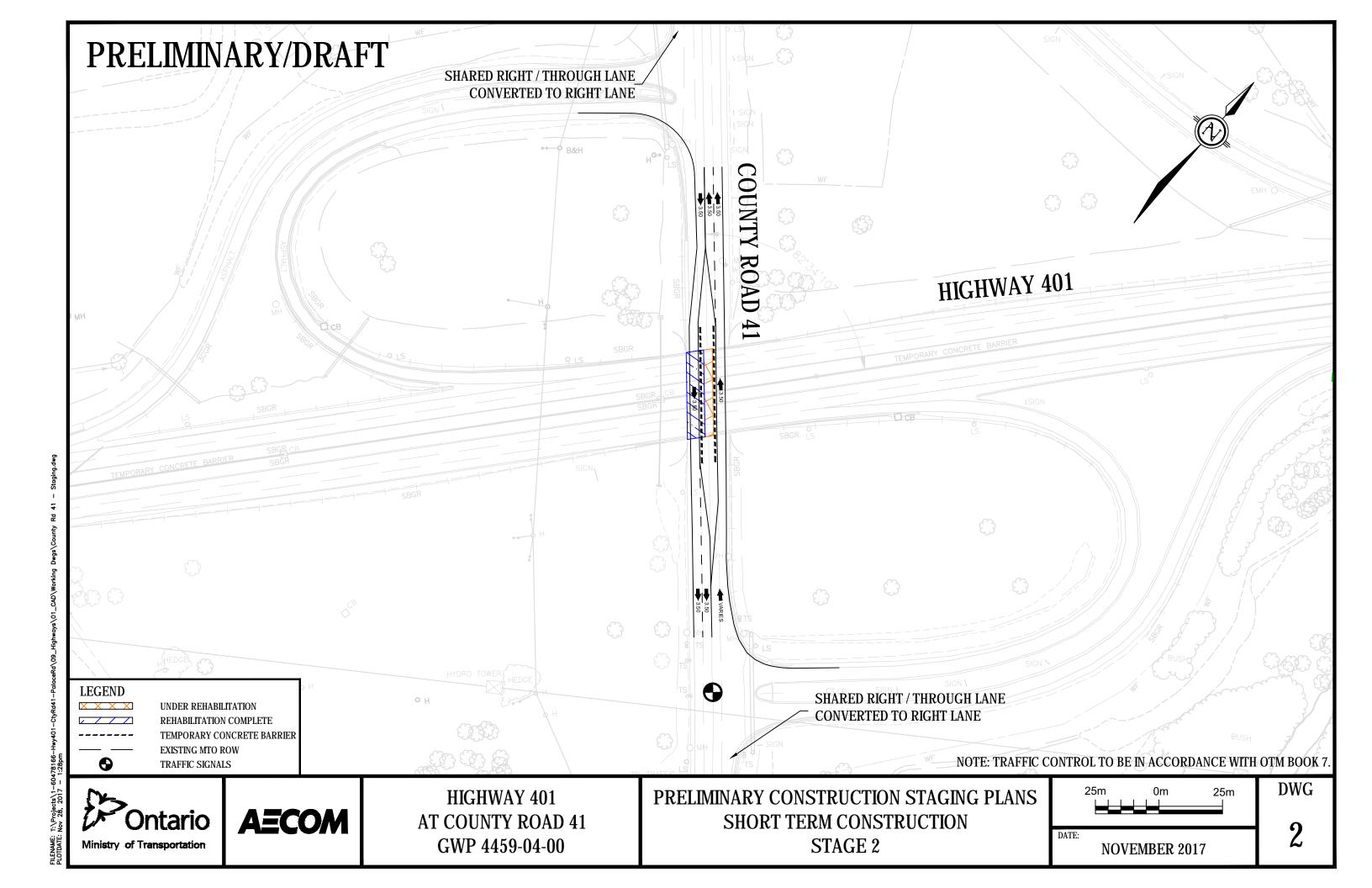


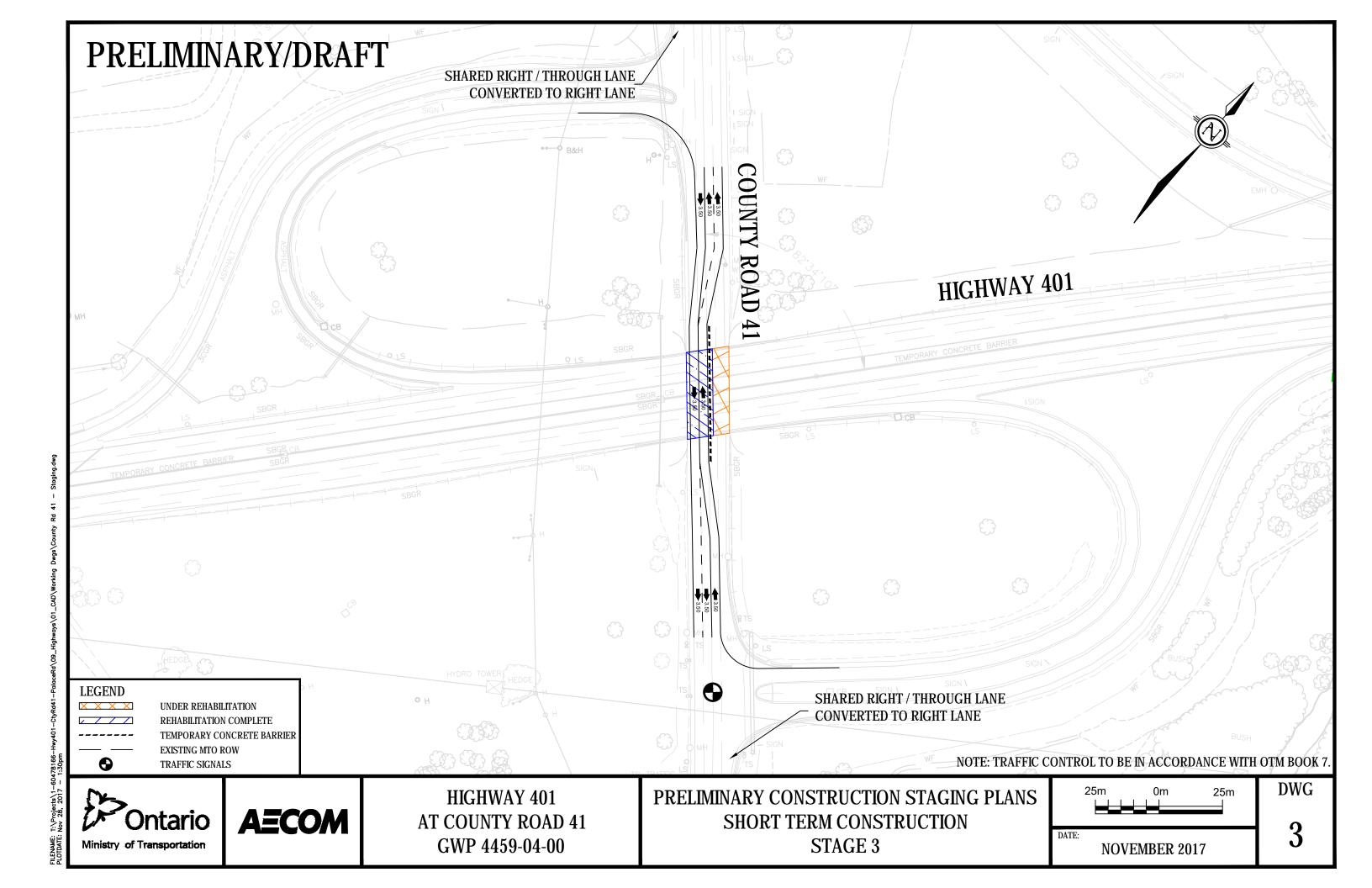


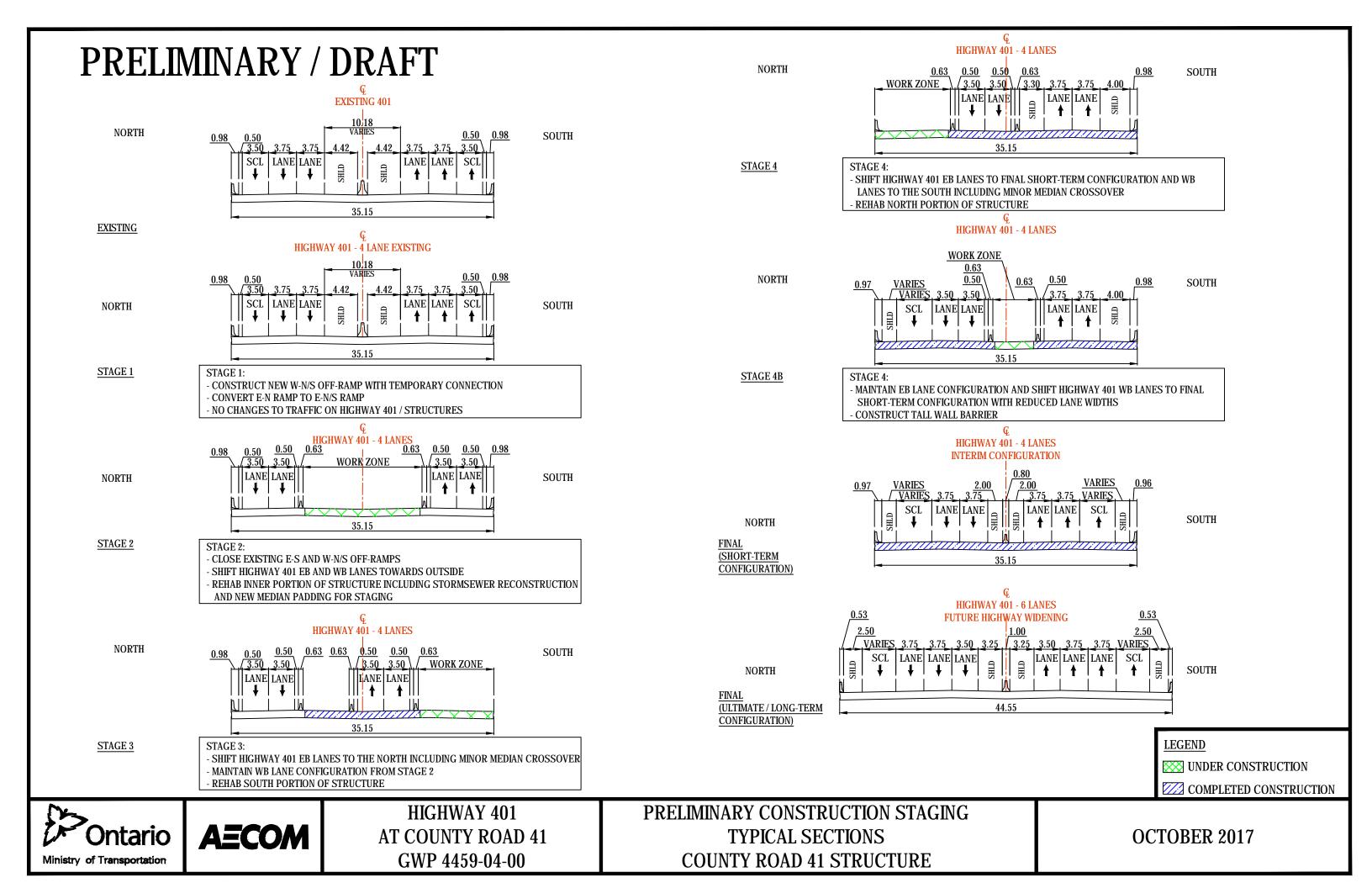


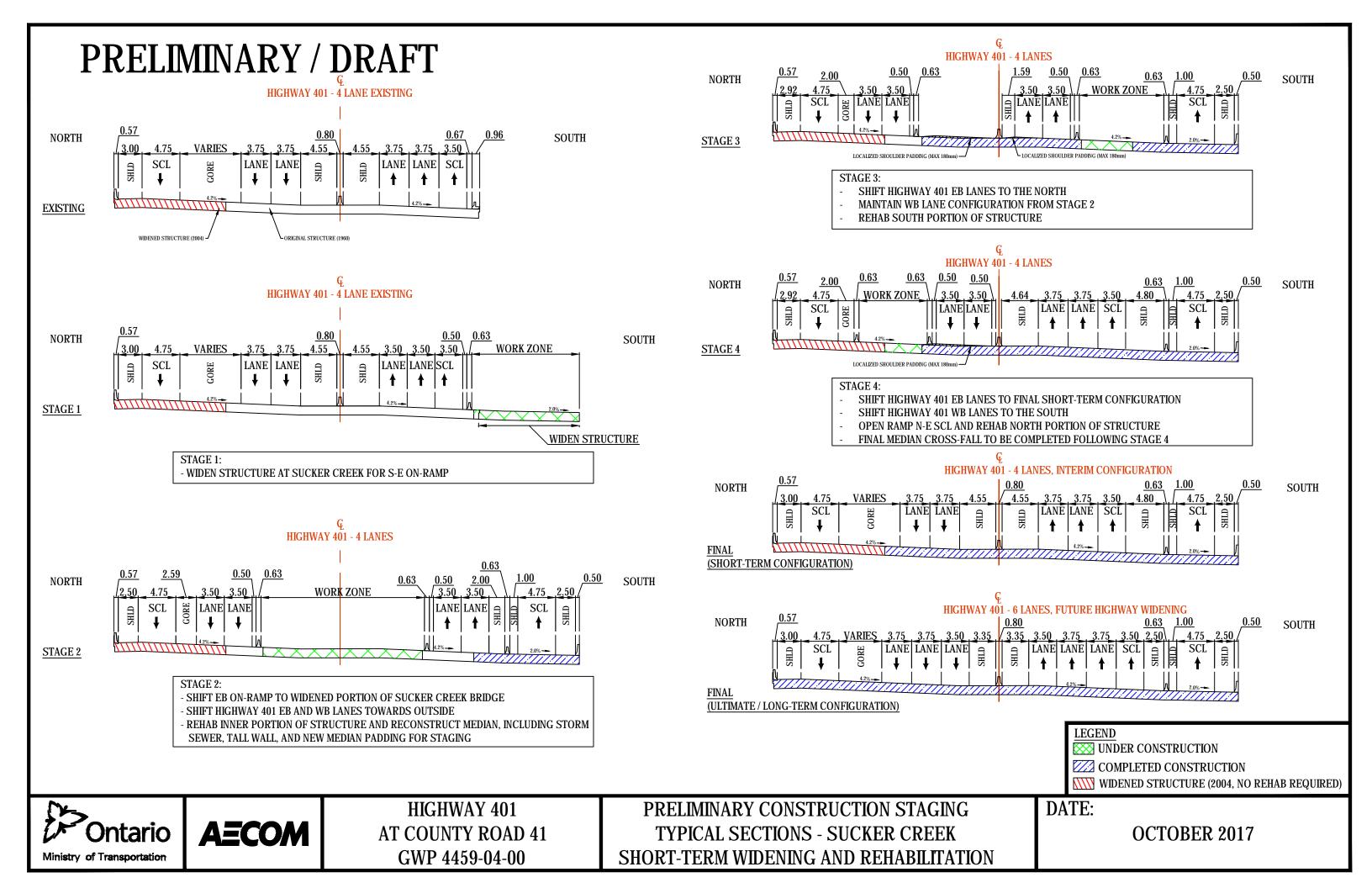












## **Appendix N – List of Reports Available under Separate Cover**

Prepared for: Ontario Ministry of Transportation

### **List of Reports Available under Separate Cover**

- AECOM (October 2017) Contamination Overview Study Preliminary Design and Class Environmental Assessment Study Highway 401 Interchange Improvements, County Road 41 (G.W.P. 4459-04-00)
- AECOM (July 2018) Drainage and Hydrology Report: Highway 401 / County Road 41 Interchange (IC 579) and Median Improvements
- AECOM (March 2018) Preliminary Structural Design Report: Highway 401 County Road 41 Overpass, Site No. 17-053.
- AECOM (April 2018) Preliminary Structural Design Report: Highway 401 Sucker Creek Bridge, Site No. 17-054.
- AECOM (July 2016) Socio-Economic Review Technical Memorandum: Highway 401 Interchange Improvements at County Road 41
- AECOM (August 2018) Operational Performance Review Report: Highway 401 Interchange Improvements at County Road 41
- Archaeological Services Inc. (May 1999) Stage 1 Archaeological Assessment of Highway 401 / City Road 41 Interchange.
- Archaeological Services Inc. (September 2003) Stage 2 Archaeological Resource
  Assessment: Highway 401 / County Road 41 Interchange Short-Term Improvements.

Prepared for: Ontario Ministry of Transportation