

Transportation Environmental Study Report (TESR)

Highway 401 / Napanee River Bridge Improvements Preliminary
Design and Class Environmental Assessment Study (WP 4039-19-01)

Ministry of Transportation of Ontario (MTO)

60734357

October 2026

Statement of Qualifications and Limitations

The attached Report (the “Report”) has been prepared by AECOM Canada ULC (“AECOM”) for the benefit of the Client (“Client”) in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the “Agreement”).

The information, data, recommendations and conclusions contained in the Report (collectively, the “Information”):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the “Limitations”);
- 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.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information (“improper use of the Report”), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

Authors

Report Prepared By:



Jordan Witt, MES

Senior Environmental Planner



Nelson Gonzalez Toledo, HBAS

Environmental Planner



Felipe Sapateiro, P. Eng.

Deputy Project Manager

Report Reviewed By:



Andrea Potter, B.E.S.

Senior Environmental Planner

Report Approved By:



Tim Soroichinsky, P. Eng.

Senior Project Manager

Ministry of Transportation of Ontario (MTO)

Transportation Environmental Study Report (TESR)

*Highway 401 / Napanee River Bridge Improvements Preliminary Design
and Class Environmental Assessment Study WP 4039-19-01*

Prepared for:

Ministry of Transportation of Ontario (MTO)

Prepared by:

AECOM Canada ULC

105 Commerce Valley Drive West, 8th Floor

Markham, Ontario L3T 7W3

Canada

T: 905.886.7022

F: 905.538.8076

aecom.com

Public Record

This Transportation Environmental Study Report has been prepared under the 2024 *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways*, in compliance with the requirements of the Ontario *Environmental Assessment Act*.

This Transportation Environmental Study Report has been prepared to document the Recommended Plan, consultation undertaken, and potential environmental impacts and mitigation measures associated with the Preliminary Design and Class Environmental Assessment (Group 'B') Study for the Napanee River Bridge Improvements Study along Highway 401.

This Transportation Environmental Study Report is available for a 30-day public comment period commencing **October 29, 2026**, and ending **November 30, 2026**. The Transportation Environmental Study Report can be viewed on the Study Website at www.hwy401bellevilletokingston.ca/napanee-project/.

Interested persons are encouraged to review this Transportation Environmental Study Report and provide comments by **November 30, 2026**.

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. To obtain additional information, to provide comments, or if you have any accessibility requirements in order to participate in this Study, please contact the following individual:

■ **Lucas Bilow**

Lead Project Engineer

Ministry of Transportation of Ontario, Eastern Region

Engineering Program Delivery East

1355 John Counter Boulevard, Postal Bag 4000

Kingston, Ontario K7L 5A3

Telephone: +1 866-753-2640

Email: ProjectTeam@Hwy401BellevilleToKingston.ca

Additionally, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (i.e., requiring an individual / comprehensive Environmental Assessment approval before being able to proceed), or that conditions be imposed (e.g., require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and treaty rights.

Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

Requests should specify what kind of order is being requested (request for additional conditions or a request for an individual/comprehensive environmental assessment), how an order may prevent, mitigate, or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to the following and copied to the Ministry of Transportation of Ontario Project Engineer listed above:

■ **Minister of the Environment, Conservation and Parks**

Ministry of the Environment, Conservation and Parks

777 Bay Street, 5th Floor

Toronto, Ontario M7A 2J3

Email: minister.mecp@ontario.ca

and

■ **Director, Environmental Assessment Branch**

Ministry of the Environment, Conservation and Parks

135 St. Clair Avenue West, 1st Floor

Toronto, Ontario M4V 1P5

Email: EABDirector@ontario.ca

Executive Summary

Overview of Study and Class Environmental Assessment Process (Sections 1 and 2)

AECOM Canada ULC (AECOM) was retained by the Ministry of Transportation of Ontario to undertake a Preliminary Design and Class Environmental Assessment Study for the Highway 401 / Napanee River Bridge Improvements in the Town of Greater Napanee and County of Lennox and Addington. The Study includes the replacement of the existing Napanee River Bridge with consideration for profile refinements to meet drainage, fluvial geomorphic, and environmental requirements and to accommodate the future eight lanes along Highway 401. While the bridge will accommodate the future eight lanes of Highway 401, there is no timing for the construction of additional lanes at this time. Therefore, the bridge construction will consider an interim tie-in to the existing Highway 401 configuration, with consideration for six lanes and eight lanes in the future for the section stretching from west of the Napanee River Bridge to east of Palace Road. This Transportation Environmental Study Report documents the Study process, consultation, existing conditions, alternatives assessment, Recommended Plan, environmental impacts and mitigation measures.

Consultation (Section 3)

External agencies, Indigenous communities, municipalities and emergency service providers, members of the public (including affected landowners and businesses, community/interest groups and the general public) were notified at the beginning of the Study in November 2024. The general public was notified via newspaper advertisements and letters for the Public Information Centre, informing them of the Study and to solicit their comments. One Public Information Centre was held for this Study in March 2026. A website was also created for the public to access and learn more about the project.

Meetings were held throughout the Study at key milestones with the Town of Greater Napanee, County of Lennox and Addington, emergency services and Quinte Conservation Authority. These meetings focused on collection of existing conditions information and to present and obtain feedback on the generation and evaluation of alternatives, the Preliminary Design details of the preferred alternatives, potential environmental impacts and proposed mitigation measures.

A Project Website (<https://www.hwy401bellevilletokingston.ca>) and Project Team email address (projectteam@hwy401bellevilletokingston.ca) were developed for the Study. The website was established to provide up-to-date information including Study notices,

Public Information Centre materials, and a contact form and email address to contact the Project Team and for the public to submit comments and questions.

This Transportation Environmental Study Report is available for a 30-day public comment period and documents the study process, Recommended Plan, consultation undertaken throughout the Study, and potential environmental impacts and proposed mitigation measures and future requirements.

Overview of Existing Conditions (Section 4)

Existing transportation, natural environment, socio-economic and cultural conditions were documented through field investigations, technical studies and consultation. Features assessed included fish and fish habitat, Species at Risk, terrestrial ecosystems, drainage, cultural heritage resources, archaeology, land use and transportation infrastructure.

Need for Highway Improvements (Section 5)

The Study identified the need to replace the existing Napanee River Bridge to accommodate the future footprint for the interim six lane and ultimate eight lane widening of Highway 401 by examining problems and opportunities based on structural evaluations of the existing Napanee River Bridge structure, traffic operations and by reviewing geometric deficiencies of the Napanee River Bridge.

Alternatives to the Undertaking (Section 6)

Alternatives to the 'Undertaking' are broad-based alternatives that represent fundamentally different ways of addressing identified transportation needs. These are reviewed early in the process and evaluated based on their ability to address the identified Problems and Opportunities within the area of study. The Project Team considered a range of alternatives, including the Do Nothing alternative. Based on the assessment of the Alternatives to the Undertaking, Improvements to Provincial Transportation Facilities was identified as the only alternative capable of fully addressing the project needs and was therefore carried forward.

Generation and Evaluation of Improvement Alternatives (Section 7)

Following assessment of the Alternatives to the Undertaking and the decision to carry forward the 'Improvements to Provincial Transportation Facility' alternative, alternative bridge configurations were assessed considering environmental impacts, constructability, cost, maintenance and operational requirements. A single-span prestressed concrete NU girder bridge was selected as the preferred alternative. The generation and evaluation of alternatives is described further in this section.

Detailed Description of the Recommended Plan (Section 8)

The Recommended Plan includes replacement of the existing Napanee River Bridge with a new 44-metre single-span structure, highway profile adjustments, drainage improvements, establishes the footprint for the interim six lane and ultimate eight lane configuration of Highway 401, environmental mitigation measures and traffic staging to maintain Highway 401 operations during construction.

Environmental Issues and Commitments (Section 9)

Potential impacts on the natural, socio-economic and cultural environments were evaluated, and mitigation measures were identified. The mitigation measures and commitments outlined in **Section 9** will be refined in greater detail in the Detail Design stage. A summary of the environmental impacts, mitigation measures and commitments to future work is provided in **Table 9-6**.

Monitoring (Section 10)

Following the 30-day comment period of the Transportation Environmental Study Report, the Ministry of Transportation of Ontario may proceed to Detail Design as outlined in the 2024 Ministry of Transportation of Ontario *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways*.

The Detail Design phase will advance the Recommended Plan to a refined level and an individual contract package for construction will be prepared. Additional field investigations will be completed to provide more data that is specific to the refined design. A summary of the proposed future consultation requirements is provided in **Table 10-1**.

Table of Contents

1.	Overview of the Undertaking	1
1.1	Study Background and Location	1
1.2	Study Purpose, Objectives and Scope	2
1.3	Study Process	3
1.4	Related Projects	5
1.5	General Description of the Recommended Plan	5
2.	Environmental Assessment Process	6
2.1	Ontario <i>Environmental Assessment Act</i> and Class Environmental Assessment Process	6
2.2	Federal Impact Assessment Act	7
2.3	Purpose of the Transportation Environmental Study Report	7
3.	Consultation	10
3.1	Public Consultation	11
3.1.1	Study Website	11
3.1.2	Study Notices	11
3.1.2.1	Notice of Study Commencement	11
3.1.2.2	Notice of Public Information Centre	12
3.1.2.3	Notice of Completion	13
3.1.3	Public Information Centre	13
3.2	External Stakeholder and Indigenous Consultation	17
3.2.1	Indigenous Communities	17
3.2.2	External Agencies	18
3.2.3	External Stakeholder Meetings and Comments	19
3.2.4	Municipal Technical Advisory #1 Meeting	20
3.2.5	Municipal Technical Advisory #2 Meeting	21
3.2.6	Municipal Technical Advisory #3 Meeting	21
4.	Overview of Existing Conditions	22
4.1	Natural Environment	23
4.1.1	Physiography, Topography and Drainage	23
4.1.2	Geology	24
4.1.3	Hydrogeology	25
4.1.3.1	Groundwater	25
4.1.3.2	Source Water Protection	25
4.1.3.3	Permits to Take Water	27
4.1.3.4	Municipal Wells and Wellhead Protection Areas	27
4.1.3.5	Surface Water Intakes	27
4.1.3.6	Threats to Drinking Water	27

4.1.4	Drainage	28
4.1.5	Fish and Fish Habitat	29
4.1.6	Aquatic Species at Risk	35
4.1.7	Terrestrial Ecosystems	36
4.1.7.1	Designated Natural Areas	36
4.1.7.2	Vegetation Communities and Plants	39
4.1.7.3	Wildlife	44
4.1.7.4	Species at Risk and Species at Risk Habitat	46
4.1.7.5	Significant Wildlife Habitat	47
4.2	Socio-Economic Environment	53
4.2.1	Land Use	53
4.2.1.1	Existing Land Use	53
4.2.1.2	Future / Planned Land Use	55
4.2.1.3	Active Transportation	56
4.2.2	Noise	56
4.2.3	Air Quality	57
4.2.3.1	Traffic Assessment	58
4.2.3.2	Predicted Cumulative Concentrations: Existing Conditions	58
4.2.4	Contamination, Waste, and Excess Materials Management	59
4.2.5	Designated Substance Survey	61
4.3	Cultural Environment	63
4.3.1	Archaeology	63
4.3.2	Built Heritage	64
4.4	Transportation Infrastructure	70
4.4.1	Road Network	70
4.4.1.1	Highway 401	70
4.4.1.2	Interchanges	71
4.4.2	Structures	74
4.4.2.1	Adjacent Municipal Roads and Railway Structures	74
4.4.3	Traffic Operations	76
4.4.4	Pavement	77
4.4.5	Electrical	77
4.4.5.1	Illumination	77
4.4.5.2	Traffic Signals	78
4.4.5.3	Road Weather Information System	78
4.4.6	Utilities	78
5.	Need for Highway Improvements	79
5.1	Problems	79
5.2	Opportunities	79
6.	Alternatives to the Undertaking	81
6.1	Do Nothing	81
6.2	Transportation Demand Management	81

6.3	Improvements to Adjacent Road Systems	81
6.4	Improvements to Provincial Transportation Facility	83
7.	Generation, Assessment and Evaluation of Alternatives	84
7.1	Highway 401 Mainline Alternatives	84
7.2	Napanee River Bridge Replacement	84
7.2.1	Evaluation Process	84
7.2.2	Evaluation Methodology and Criteria	85
7.2.3	Evaluation of Alternatives	86
8.	The Recommended Plan	89
8.1	Highway 401	89
8.1.1	Cross-section	89
8.1.2	Horizontal Alignment	91
8.1.3	Vertical Alignment	91
8.2	Napanee River Bridge	91
8.3	Foundations	91
8.4	Pavement	93
8.5	Electrical	93
8.5.1	Highway and Interchange Illumination	93
8.6	Utilities	94
8.7	Drainage	94
8.8	Construction Staging and Traffic Management During Construction	96
9.	Environmental Impacts, Mitigation Measures and Commitments	100
9.1	Natural Environment	100
9.2	Fish and Fish Habitat	100
9.2.1	Summary of Proposed Culvert Works	101
9.2.2	Summary of Potential Impacts to Fish and Fish Habitat	102
9.2.3	Proposed Mitigation Measures	106
9.2.4	Environmental Provisions	109
9.2.5	Potential Fish Habitat Enhancement or Offsetting Opportunities	110
9.3	Fluvial Geomorphology	111
9.3.1	Summary of Potential Impacts	111
9.3.2	Proposed Mitigation Measures	113
9.4	Hydrogeology	113
9.4.1	Potential Impacts	113

9.4.1.1	Groundwater Recharge and Discharge	114
9.4.1.2	Construction below Groundwater Table and Dewatering	114
9.4.1.3	Likelihood of Release of Contaminants	115
9.4.2	Proposed Mitigation Measures	117
9.5	Terrestrial Ecosystems	118
9.5.1	Summary of Potential Impacts	118
9.5.1.1	Designated Natural Areas, Vegetation Communities and Plants	119
9.5.1.2	Wildlife and Wildlife Habitat	121
9.5.1.3	Species at Risk	123
9.5.2	Proposed Mitigation Measures	124
9.6	Socio-Economic Environment	133
9.6.1	Land Use and Property	133
9.6.1.1	Active Transportation	133
9.6.1.2	Municipal Infrastructure	134
9.7	Waste Management and Contamination	134
9.7.1	Summary of Potential Impacts	134
9.7.2	Proposed Mitigation Measures	134
9.8	Designated Substance Survey	135
9.8.1	Summary of Potential Impacts	135
9.8.2	Proposed Mitigation Measures	136
9.9	Canadian Navigable Waters Act	137
9.10	Noise	137
9.10.1	Summary of Potential Impacts	138
9.10.2	Proposed Mitigation Measures	138
9.10.2.1	Construction Contractor Requirements	139
9.10.2.2	Contract Administrator Requirements	140
9.11	Air Quality	140
9.11.1	Summary of Potential Impacts	140
9.11.2	Proposed Mitigation Measures	142
9.12	Landscape Composition	144
9.12.1	Summary of Potential Impacts	144
9.12.2	Proposed Mitigation Measures	144
9.12.2.1	General Mitigation Measures	144
9.13	Archaeology	146
9.13.1	Summary of Potential Impacts	146
9.13.2	Proposed Mitigation Measures	146
9.14	Cultural & Built Heritage Resources	147
9.15	Summary of Environmental Impacts, Mitigation and Commitments to Future Work	149
10.	Next Steps	161
10.1	Future Consultation and Commitments	161

Figures

Figure 1-1:	Study #1 and Study #2 Location Plan	1
Figure 1-2:	Project Key Plan	2
Figure 1-3:	Class Environmental Assessment Study Process	4
Figure 4-1:	Groundwater Existing Environmental Conditions	26
Figure 4-2:	Fish and Fish Habitat Existing Conditions	31
Figure 4-3:	Natural Heritage Features	38
Figure 4-4a:	Ecological Land Classification Within the Study Area	40
Figure 4-5:	Land Use Designations – Town of Greater Napanee	54
Figure 4-6:	Existing Highway 401 with Paved Median (Urban Section)	70
Figure 4-7:	Highway 401 Mainline Study Area 2 Existing LOS	76
Figure 4-8:	Overpass – Palace Road at Highway 401	77
Figure 6-1:	Assessment of the Alternatives to the Undertaking	82
Figure 8-1:	Highway 401 Interim 6 lane and Ultimate 8 lane Cross-sections	90
Figure 8-2:	Recommended Plan for the Napanee River Bridge	92
Figure 8-3:	Hydro One Networks Inc Tower Relocation and Highway 401 Cross-Sections	95
Figure 8-4:	Napanee River Bridge Construction Staging	97
Figure 8-5:	Napanee River Bridge Phasing	98

Tables

Table 3-1:	Summary of Public Information Centre Questions and Comments	15
Table 3-2:	Consultation Activities with Indigenous Communities	18
Table 3-3:	External Stakeholder Meetings	20
Table 4-1:	Existing Fish and Fish Habitat Conditions Summary Table	32
Table 4-2:	Designated Natural Areas within Study Area	37
Table 4-3:	Ecological Land Classification Community Descriptions within the Study Area	42
Table 4-4:	Incidental Wildlife Observations	45
Table 4-5:	Species at Risk with High or Medium Potential of Occurrence in the Study Area	48
Table 4-6:	Species of Conservation Concern with Confirmed High and Medium Potential to Occur within the Study Area	51
Table 4-7:	Summary of Air Quality Existing Conditions Cumulative Concentration: Maximum Concentration	60
Table 4-8:	Known or Potential Built Heritage Resources and Cultural Heritage Landscapes within the Cultural Heritage Study Area	65
Table 4-9:	Existing Palace Road Horizontal Elements	72
Table 4-10:	Existing Palace Road Vertical Alignment Elements	72
Table 4-11:	Palace Road Interchange Horizontal Elements	72

Table 4-12:	Palace Road Interchange Vertical Elements	72
Table 4-13:	Palace Road Interchange Speed Change Lanes along Highway 401	73
Table 4-14:	Ramp Terminal Intersections at Palace Road Interchange – Turning Sight Distance	73
Table 4-15:	Access Offsets and Sight Distance in the Vicinity of Palace Road Interchange	73
Table 4-16:	Adjacent Municipal Roads and Railway Structures	75
Table 4-17:	Existing Utilities	78
Table 7-1:	Evaluation of the Napanee River Bridge Alternatives	87
Table 9-1:	Summary of Proposed Works in or near Fish Habitat	103
Table 9-2:	100-Year Erosion Rate Considerations	112
Table 9-3:	Vegetation Removal by Ecological Land Classification Community in Study Area	120
Table 9-4:	Summary of Anticipated Next Steps Permits and Approvals	132
Table 9-5:	Comparison of Maximum Modelled Concentration (without Background Concentration) for Representative Existing, Future No Build, and Future Build Conditions	141
Table 9-6:	Summary of Environmental Impacts, Mitigating Measures and Commitments to Future Work	150
Table 10-1:	Summary of Future Consultation Requirements	161

Appendices

- Appendix A. Consultation
- Appendix B. Fisheries Existing Conditions and Impact Assessment
- Appendix C. Terrestrial Existing Conditions and Impact Assessment
- Appendix D. Noise Impact Assessment
- Appendix E. Draft Archaeological Assessment Report
- Appendix F. Cultural Heritage Resource Assessment Report
- Appendix G. Recommended Plan

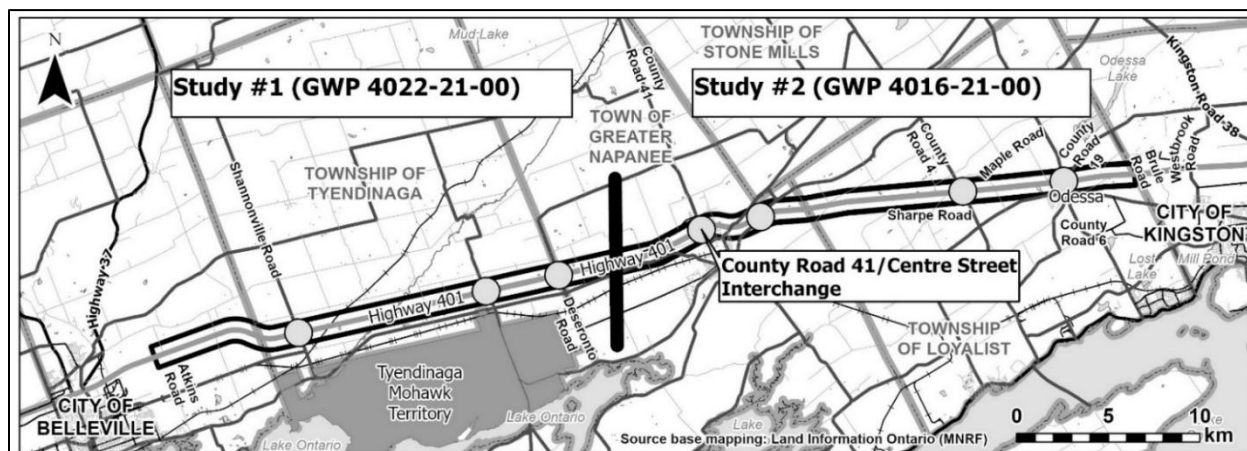
*Note: The Fluvial Geomorphic Assessment, Groundwater Assessment, Hydrology and Drainage Assessment, Land Use Factors Assessment, Air Quality Assessment Report, Contamination Overview Study, and the Designated Substance Survey are available under separate cover upon request.

1. Overview of the Undertaking

1.1 Study Background and Location

In 2024, the Ministry of Transportation of Ontario initiated two Planning, Preliminary Design and Class Environmental Assessment Studies, Group B, to address current and future transportation needs by developing a plan for the rehabilitation and/or replacement of various bridges and culverts, determining the long-term interchange configuration at seven locations, and establishing the footprint for the interim six and ultimate eight lanes of Highway 401, between the City of Belleville and the City of Kingston. As illustrated on **Figure 1-1, Study #1 (GWP 4022-21-00)** includes Highway 401 from 4.3 kilometres east of Highway 37 to 5.0 kilometres west of County Road 41 / Centre Street for a total length of approximately 26 kilometres. **Study #2 (GWP 4016-21-00)** includes Highway 401 from 5.0 kilometres west of County Road 41 / Centre Street to 8.0 kilometres west of Kingston Road 38 for a total length of approximately 29 kilometres.

Figure 1-1: Study #1 and Study #2 Location Plan



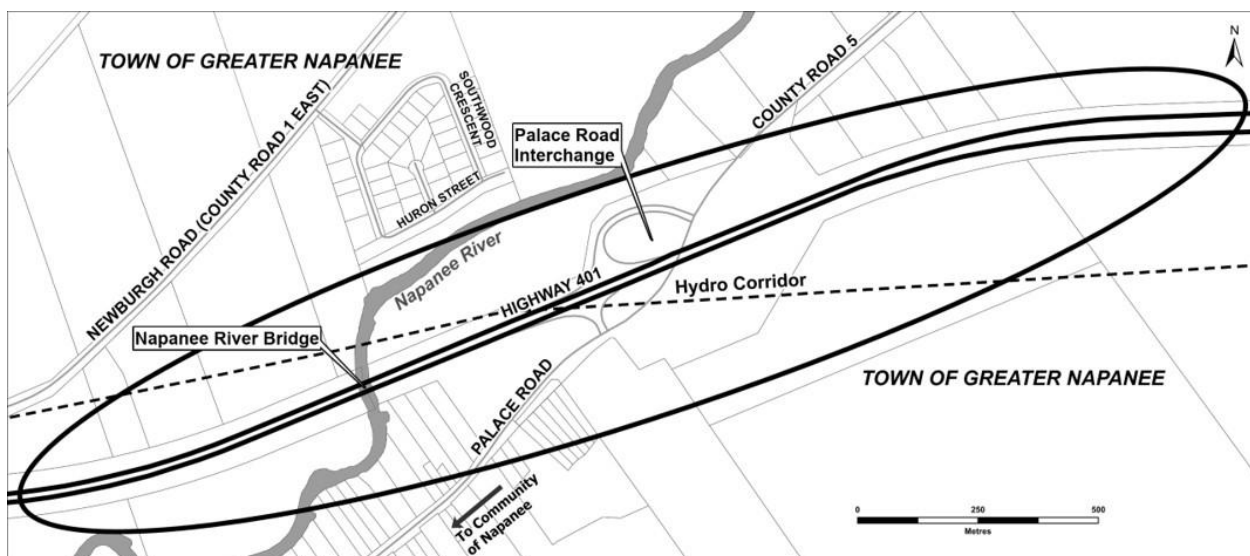
As part of the Study #2 project, the previously approved Palace Road Interchange Recommended Plan, as documented in the *Highway 401 Interchange Improvements at Palace Road Class Environmental Assessment and Preliminary Design Study Transportation Environmental Study Report* (March 2019), was revisited to assess compatibility with an interim and ultimate footprint of Highway 401, as well as to accommodate a potential 130 kilometres per hour design speed. Based on this review, no significant modifications to the previously approved configuration are recommended. However, as the Palace Road Interchange Recommended Plan is now moving forward to Detail Design, advancement of the Napanee River Bridge (Site 17X-0062/B0)

improvements from the current Study #2 project is required due to its proximity to Palace Road. As such, the improvements to the Napanee River Bridge are being advanced as a separate Preliminary Design and Class Environmental Assessment Study (WP 4039-19-01).

The Preliminary Design and Class Environmental Assessments for Study #1 and the remaining portions of Study #2 will be completed at a later date and documented in two separate Transportation Environmental Study Reports.

The Napanee River Bridge Improvements Preliminary Design and Class Environmental Assessment Study, Group B, (WP 4039-19-01) is located in the Town of Greater Napanee and in the County of Lennox and Addington as shown on **Figure 1-2** below.

Figure 1-2: Project Key Plan



1.2 Study Purpose, Objectives and Scope

The purpose of this Preliminary Design and Class Environmental Assessment study is to review the Group 'B' Class Environmental Assessment and Preliminary Design completed in 2019 for the Highway 401 interchange at Palace Road (GWP 4197-13-00), which looked at improvements to the Palace Road interchange to accommodate six lanes of Highway 401, and complete the Planning, Preliminary Design, and Class Environmental Assessment for the Napanee River Bridge. This work will enable the Palace Road interchange improvements and the Napanee River Bridge replacement to be advanced together under a single future Detail Design.

This Study aims to advance the replacement of the Napanee River Bridge (Site 17X-0062/B0) with consideration for profile refinements to meet drainage, fluvial geomorphic,

and environmental requirements and to accommodate the future eight lanes along Highway 401. While the bridge will accommodate the future eight lanes of Highway 401, there is no timing for the construction of additional lanes at this time. Therefore, the bridge construction will consider an interim tie-in to the existing Highway 401 configuration, with consideration for six lanes and eight lanes in the future for the section stretching from west of the Napanee River Bridge to east of Palace Road.

This Study will form the basis for the Detail Design and preparation of contract package(s) for construction.

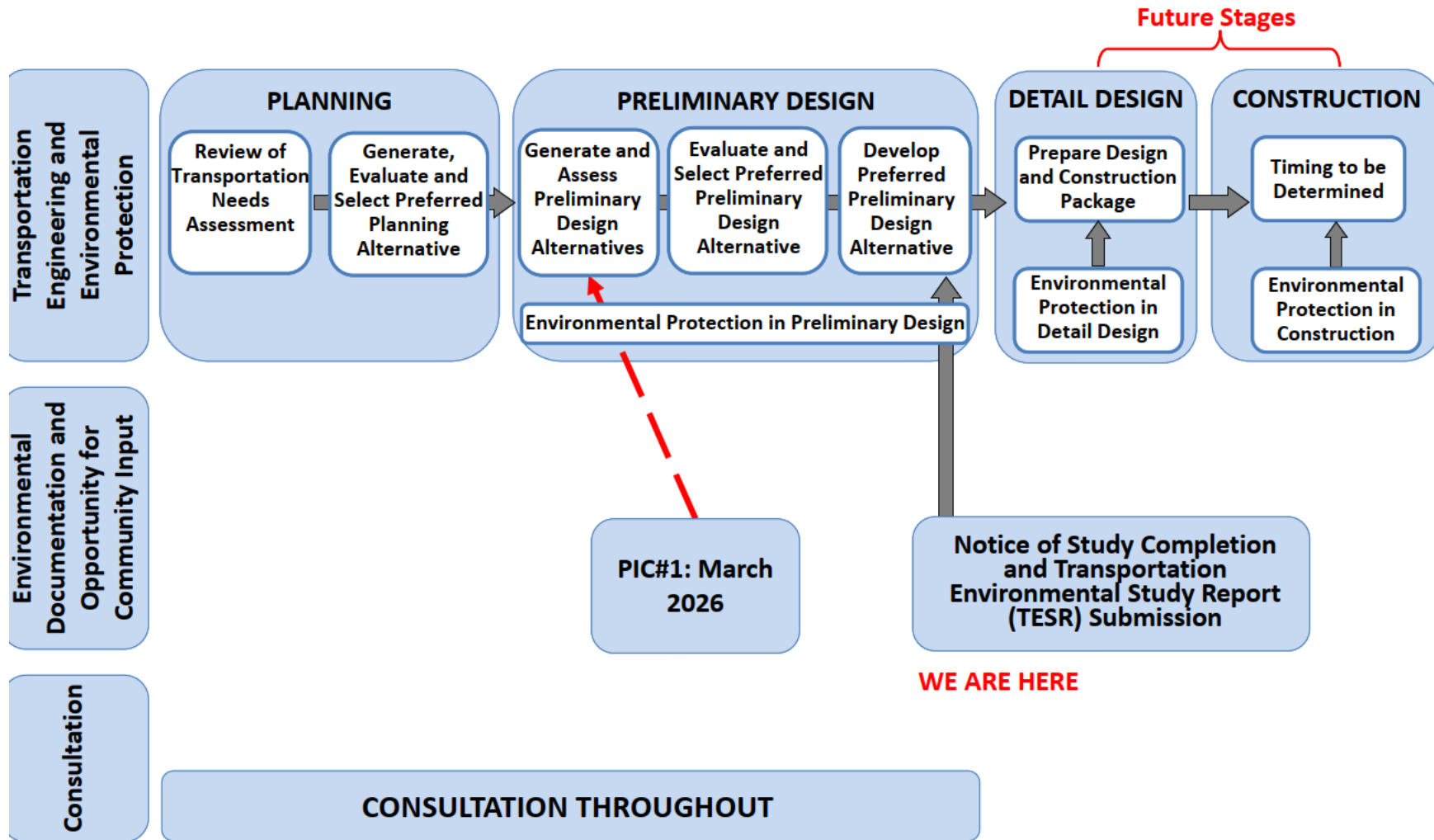
1.3 Study Process

This Study has been completed in accordance with the approved planning process for a Group 'B' Study under the 2024 *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways*. This Transportation Environmental Study Report has been prepared to document the Class Environmental Assessment process that was followed for the Study and includes the following:

- A description of the Class Environmental Assessment process and consultation that was undertaken throughout the Study;
- A summary of existing environmental (natural, socio-economic and cultural) and transportation conditions within the Study Area;
- An assessment of the identified transportation challenges and opportunities within the Study Area, along with the potential to address these items;
- The generation, assessment, and evaluation of improvement alternatives leading to selection of the Recommended Plan;
- Details of the Recommended Plan; and
- Potential impacts associated with the Recommended Plan and proposed measures to avoid, minimize and mitigate adverse effects.

Figure 1-3 provides an overview of the Class Environmental Assessment process for Group 'B' studies. Consultation was completed throughout the process with Indigenous communities, agencies, the public, and key stakeholders including meetings with a Municipal Technical Advisory Committee at key Study milestones, to provide opportunity for input.

Figure 1-3: Class Environmental Assessment Study Process



1.4 Related Projects

The current undertaking is one of several Highway 401 improvement projects initiated by the Ministry of Transportation of Ontario to address existing and future needs of the corridor.

Previously completed studies within proximity to the current Study Area include the following:

- **Highway 401 Interchange Improvements at County Road 41 (GWP 4459-04-00).** Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at County Road 41 located in the Town of Greater Napanee within the County of Lennox and Addington.
- **Highway 401 Interchange Improvements at Palace Road Class Environmental Assessment and Preliminary Design (G.W.P. 4197-13-00).** Preliminary Design and Class Environmental Assessment Study for improvements to the Highway 401 interchange at Palace Road, located in the Town of Greater Napanee within the County of Lennox and Addington.

1.5 General Description of the Recommended Plan

The Recommended Plan for the Study includes:

- Replacement of the existing Napanee River Bridge;
- Future footprint of Highway 401 for the interim six lanes and an ultimate eight lane cross-section; and
- Drainage improvements including a new storm sewer system and stormwater management pond.

The Recommended Plan drawings can be found in **Appendix G**.

2. Environmental Assessment Process

2.1 Ontario *Environmental Assessment Act* and Class Environmental Assessment Process

The purpose of Ontario's *Environmental Assessment Act* (1990) (herein referred to as the *Environmental Assessment Act*) is to help protect and conserve Ontario's environment by requiring that Studies subject to the Act follow a planning process leading to environmentally sound decision-making.

For Studies subject to the *Environmental Assessment Act*, an Environmental Assessment involves identifying and planning for environmental issues and effects prior to implementing a Study. The process allows reasonable opportunities for public involvement in the decision-making process of the Study. An Environmental Assessment document is prepared by the proponent of the Study.

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

The word "environment" within the *Environmental Assessment Act* is broadly defined and includes the built, natural, social, economic and cultural environments. The 2024 *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways* outlines the environmental assessment process to be followed for specific groups of provincial transportation studies that include the following:

- **Group 'A'** — Projects involving new provincial and municipal transportation facilities, and highway/freeway and municipal expressway realignments;
- **Group 'B'** — Projects that modify access or add capacity to existing provincial transportation facilities or municipal expressways, and new service/maintenance/operations facilities;
- **Group 'C'** — Projects involving improvements to existing provincial transportation facilities or municipal expressway facilities; and

- **Group 'D'** — Projects involving the operation, maintenance, administration and miscellaneous work required to facilitate the provincial transportation facilities as well as select safety, rehabilitation, reconstruction, and replacement projects and improvements and upgrades to existing facilities within existing Ministry of Transportation of Ontario property or designated rights of way. Group D projects have no requirements under the Class Environmental Assessment because they are exempt.

This Study is following the Class Environmental Assessment process for a Group 'B' Study. For additional details, please refer to the 2024 *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways*.

2.2 Federal Impact Assessment Act

The *Impact Assessment Act* (2019) establishes a federal environmental assessment 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 Act applies ("designated projects") are identified in the regulations.

The proposed improvements associated with this Study are not listed as a "designated project" under the Act and the work proposed is not taking place on Federal lands. Approval from the Impact Assessment Agency of Canada is therefore not required for this undertaking.

2.3 Purpose of the Transportation Environmental Study Report

This Transportation Environmental Study Report has been prepared to document the Preliminary Design and Class Environmental Assessment process completed for this Study in accordance with the requirements of the 2024 *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways*, which has been approved under the *Environmental Assessment Act*. The Transportation Environmental Study Report provides an overview of the Study, identifies the challenges / opportunities to be addressed, details the alternatives under consideration and the associated evaluation leading to selection of the Recommended Plan, as well as the consultation completed throughout the process. The document also summarizes existing conditions, the potential for environmental impact resulting from the Recommended Plan, recommendations for mitigation to minimize adverse effects as well as commitments to future work and monitoring.

The Transportation Environmental Study Report fulfills the documentation requirements of the Class Environmental Assessment process for a Group 'B' project. In accordance with the Ministry of Transportation of Ontario Group 'B' Class Environmental Assessment process, the Transportation Environmental Study Report is available for a 30-day comment period from **October 29, 2026** and ending **November 30, 2026**, on the Study website (Hwy401bellevilletokingston.ca) and at the following locations:

■ **County of Lennox & Addington Public Library**

25 River Road, Napanee, Ontario K7R 3S6

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

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

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

■ **Town of Greater Napanee – Town Hall**

99 Advance Avenue, Napanee, Ontario K7R 3Y5

Monday to Friday: 9:00 a.m. to 4:00 p.m.

All interested parties are encouraged to review the Study details and provide input. Comments can be submitted to members of the Project Team at the following email projectteam@hwy401bellevilletokingston.ca or by contacting the individual below:

■ **Tim Sorochinsky**

Project Manager

AECOM

105 Commerce Valley Drive West, 8th Floor

Markham, Ontario L3T 7W3

Telephone: +1 866-753-2640

Email: projectteam@hwy401bellevilletokingston.ca

■ **Lucas Bilow**

Lead Project Engineer

Ministry of Transportation of Ontario, Eastern Region

Engineering Program Delivery East

1355 John Counter Boulevard, Postal Bag 4000

Kingston, Ontario K7L 5A3

Telephone: +1 866-753-2640

Email: projectteam@hwy401bellevilletokingston.ca

In addition, a request may be made to the Ministry of the Environment, Conservation and Parks for an order requiring a higher level of study (requiring a comprehensive

Environmental Assessment approval before being able to proceed), or that conditions be imposed (such as require further studies), only on the grounds that the requested order may prevent, mitigate or remedy adverse impacts on constitutionally protected Aboriginal and Treaty Rights. Requests on other grounds will not be considered. Requests should include the requester contact information and full name for the ministry.

Requests should specify what kind of order is being requested (request for additional conditions or a request for a comprehensive environmental assessment), how an order may prevent, mitigate or remedy those potential adverse impacts, and any information in support of the statements in the request. This will ensure that the ministry is able to efficiently begin reviewing the request.

The request should be sent in writing or by email to the following and copied to the Ministry of Transportation of Ontario Project Engineer listed above:

■ **Minister of the Environment, Conservation and Parks**

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

and

■ **Director, Environmental Assessment Branch**

Ministry of the Environment, Conservation and Parks
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario M4V 1P5
Email: EABDirector@ontario.ca

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 Study 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 Transportation Environmental Study Report, please contact the Project Team.

3. Consultation

Consultation is an integral part of a “Group B” project under the Class Environmental Assessment process, as it provides opportunity for two-way communication between the Project Team and interested rights holder and/or stakeholders. At the Study start, a Consultation Plan was prepared to detail the planned engagement strategy proposed and to demonstrate that the notification requirements of the Class Environmental Assessment process are being fulfilled. A Project Contact List was developed and updated, as required, throughout the Study to ensure that potentially affected and interested rights holders or stakeholders were kept informed regarding the Study. Individuals and organizations consulted included:

- External agencies (Provincial Ministries and Agencies, Federal Departments, and the local Conservation Authorities);
- Municipalities and Emergency Service providers;
- Indigenous communities; and
- Members of the public (including affected landowners and businesses, community/interest groups and the general public).

To facilitate a comprehensive consultation program for this Study, the Project Team implemented the following communication and consultation activities to reach all rights holders and stakeholders and provide opportunity for the submission of comments and feedback for consideration by the Project Team:

- Study Website: <https://hwy401bellevilletokingston.ca>;
- Dedicated email address for easy access to Project Team (projectteam@hwy401bellevilletokingston.ca);
- Notifications issued via direct mail and / or email;
- Newspaper advertisements (Napanee Beaver and Kingston Whig-Standard);
- Distribution of brochure (copy of Ontario Government Notice) through Canada Post Neighbourhood AdMail to residences and businesses within 500 metres of the Study Area;
- Toll-Free Telephone Number: 1-866-753-2640;
- Public Information Centre;
- Engagement and consultation with Indigenous communities;

- Development of a Municipal Technical Advisory Committee and the scheduling of meetings and correspondence with municipalities, conservation authorities and government agencies; and
- Correspondence with technical stakeholders, local community groups and property owners.

Relevant correspondence including copies of notification materials are included in **Appendix A** of this document.

3.1 Public Consultation

3.1.1 Study Website

A Study website at www.hwy401bellevilletokingston.ca was maintained for the duration of the Study and updated regularly with Project information and updates. The purpose of the website was to provide an easily accessible platform to keep all interested parties informed regarding the Study, to share publicly available reports and other materials, and to allow for public comment.

The website provides a Study overview, details on the Class Environmental Assessment process, the Study schedule, and contains all relevant Study information for review, including links to Study-specific documents (i.e., Study notifications, Public Information Centre display boards, Transportation Environmental Study Report, etcetera.), as well as provides a community feedback function for stakeholders to submit comments directly to the Project Team.

3.1.2 Study Notices

3.1.2.1 Notice of Study Commencement

A Notice of Study Commencement was published for the Study in the following newspapers:

- Belleville & Region, The Community Press – November 28, 2024;
- Belleville Intelligencer – November 30, 2024;
- Napanee Beaver – November 25, 2024;
- Kingston/Frontenac This Week – November 28, 2024; and
- Kingston Whig-Standard – November 30, 2024

A cover letter and copy of the notice were distributed to the Study contact list by mail and email in November 2024. The notice was distributed through Canada Post Neighbourhood AdMail in January 2025 (delayed due to Canada Post strike) to residences and business within 0.5 kilometres of the Study Area (approximately 5,500

notices at the time of issue). A website for the project was developed and made live on November 20, 2024.

A combined notice was issued at the project start for Study #1 and Study #2, that included the current Napanee River Bridge improvements.

Following issue of the Notice of Commencement, comments were received from the affected municipalities, the public, several agencies, and three Indigenous communities.

The Town of Greater Napanee identified a need for pedestrian connectivity over/under Highway 401 to accommodate active transportation and utility corridor crossing(s) for water/sewer servicing as well as identified the presence of the Spook Horn Cemetery within proximity to Highway 401. The County of Lennox and Addington also indicated interest in providing active transportation and in discussing how their 10-year capital plan may affect or be affected by the project. Municipal concerns were further discussed through several Municipal Technical Advisory Committee meetings hosted by the Project Team.

Three Indigenous communities expressed an interest in the project that included Kawartha Nishnawbe First Nation, Alderville First Nation, and Hiawatha First Nation. Indigenous communities were kept informed throughout the duration of the project as detailed in the sections that follow.

Public comments related to property impacts and why it was necessary to widen Highway 401. With regard to agency comments, the Quinte Conservation Authority provided instruction regarding flood plain mapping, water resource contacts, and source protection information. The A2A Collaborative and Hydro One Networks Inc. expressed an interest in the project and a desire to be kept informed. The Ontario Provincial Police, City of Kingston Fire & Rescue, and the Cataraqui Region Conservation Authority identified primary contacts for the project. Additionally, the Ministry of Citizenship and Multiculturalism advised of their interest in reviewing any heritage studies prepared for the project. A formal response was provided to all comments received and the project contact list was updated accordingly.

3.1.2.2 Notice of Public Information Centre

A Notice of Public Information Centre was published for the Study in the following:

- Napanee Beaver – March 27, 2026; and
- Kingston Whig-Standard – March 24, 2026.

Note: A Notice of Public Information Centre was submitted for publication in the Kingston/Frontenac This Week newspaper; however, publication of the notice did not occur because the newspaper ceased operations.

The time, location and purpose of Public Information Centre #1 was posted on the Consultation page of the Project Website on March 17, 2026. On March 31, 2026, a copy of the presentation material was also posted on the Project Website for public comment until April 30, 2026. Letters were distributed to the Study contact list by mail and email in March 2026. The notice was also distributed through Canada Post Neighbourhood AdMail in March 2026 to residences and business within 0.5 kilometres of the Study Area (approximately 5500 notices at the time of issue).

In addition, approximately 25 properties were sent a combined Notice of Public Information Centre #1 and a potentially impacted property letter through Registered Mail on March 30, 2026. Affected property owners were notified that the preliminary design alternatives developed to support the proposed improvements within the Study Area could result in impacts to their properties. The letter invited impacted property owners to attend the Public Information Centre #1, where they would have the chance to direct questions and concerns to the Project Team for further discussion.

3.1.2.3 Notice of Completion

Notification letters were mailed and emailed in late October 2026 to individuals on the Study mailing list to notify stakeholders of the 30-day public and agency comment period for this Transportation Environmental Study Report. In addition, a “Notice of Completion” was placed in the Napanee Beaver on October 30, 2026, and Kingston Whig-Standard on October 31, 2026. The Notice was also made available on the Study website (<https://www.hwy401bellevilletokingston.ca>) along with a copy of the Transportation Environmental Study Report.

3.1.3 Public Information Centre

One Public Information Centre was held as a part of the Study to provide interested parties with an opportunity to review the Study findings and Project materials, discuss the Study with Project Team representatives, and provide feedback. Materials presented at the Public Information Centre were prepared in accordance with *Accessibility for Ontarians with Disabilities Act* requirements and were made available for public comment on the Project Website.

Information regarding the Study background, existing conditions, improvement alternatives and related evaluation as well as the next steps in the Class Environmental Assessment process was presented. The Public Information Centre was hosted on March 31, 2026, at the Best and Bash Arena, formerly the Strathcona Paper Centre, on 16 McPherson Drive, Napanee, Ontario. Indigenous communities, municipalities, and agencies were invited to a preview session between 3:00 p.m. to 4:00 p.m., while the

public session was held between 4:00 p.m. to 7:00 p.m. Members of the public were able to submit comments and feedback between March 31, 2026, and April 30, 2026.

A total of 54 stakeholders chose to sign the visitor's register at the Public Information Centre. In addition to verbal comments and discussions during the event, the Project Team encouraged visitors to express in writing, all suggestions, comments or concerns that they had regarding the information presented and requested comments to be submitted at the event or through e-mail or mail by April 30, 2026. A total of 18 written comments were received during this event, and 13 were subsequently received during the comment period, for a total of 31 written comments.

Project Team representatives worked to compile, record, and prepare responses to stakeholders via email or letter and issued them directly to those stakeholders who submitted a comment or question. The display materials presented at Public Information Centre #1 can be found in **Appendix A. Table 3-1** provides a summary of the notable questions and comments received.

Table 3-1: Summary of Public Information Centre Questions and Comments

Stakeholders	Comments/Concerns	Response Provided and/or Action Taken
Key Agency and Stakeholder	Town of Greater Napanee and County of Lennox and Addington staff members requested that the Highway 401 Expansion Environmental Assessment keeps flexibility to support future active transportation and municipal servicing crossings, namely at Palace Road overpass and County Road 41/Centre Street underpass.	■ Where warranted and technically feasible, the Project Team will evaluate opportunities to incorporate and enhance active transportation connectivity (e.g., crossings, pathways, and links to local networks) at Palace Road as part of interchange design, balancing safety, operational, environmental, constructability, and staging considerations. Our team will continue to consult with the Township of Napanee and County of Lennox and Addington to maintain safe access during construction, confirm local priorities, and maintain flexibility for future connections as design advances.
Key Public	Request for inclusion of provisions for kayak travel and snowmobiles at Napanee River.	■ The Project Team will explore opportunities to enhance active transportation safety and continuity as a part of the Napanee River Bridge improvements. In particular, our team is giving consideration to navigation and access requirements at the Napanee River. The bridge improvements will balance safety, operational, environmental, and constructability constraints.
Key Public	Concerns about property impacts, including potential expropriation and effects on property value.	■ The Project Team will evaluate alternatives for potential property impacts while balancing considerations related to the natural, socio-economic, and cultural environments, constructability, technical requirements, and stakeholder feedback. The Ministry's intent is to plan responsibly for the future while minimizing environmental and property impacts.
Key Public	Noise concerns related to increased highway capacity.	■ The Project Team will undertake a noise assessment to evaluate potential impacts associated with both the interim and ultimate footprint of the Highway 401 improvements. The assessment will provide insights into how noise levels may change following the improvements and will support the development of appropriate mitigation measures. Findings will be included in the Transportation Environmental Study Report upon completion.
Key Public	Agricultural impacts as it relates to direct property impacts including loss of acreage / income as well as indirect impacts associated with noise, drainage, livestock fencing, contamination from salt/construction/traffic spills and the movement of agricultural equipment during construction.	■ The Project Team acknowledged specific property concerns and discussed the Class Environmental Assessment process, environmental factors considered, the evaluation and the opportunities for respondent to participate in the process and provide feedback at the Public Information Centre as well as during issue of the Transportation Environmental Study Report for the 30-day comment period. It was also highlighted that following completion of the current Preliminary Design process the project will move forward to Detail Design where the Technically Preferred Plan will be further refined and impacts confirmed with mitigation updated to reflect any changes.
Key Public	Drainage impacts including potential increased runoff and flooding as well as impacts to existing tile drainage.	■ The Project Team acknowledged drainage concerns and potential impacts to property. Response noted that as part of this project an assessment of fluvial geomorphology, hydrogeology and drainage conditions are being completed for the Study Area to understand existing surface water and groundwater conditions. These factors are included in the criteria to assess the short -list alternatives to compare potential impacts and benefits, and in understanding the potential impacts associated with the Preferred Alternative. ■ In terms of tile drainage, the response noted that potential impacts to agricultural lands and operations, including tile drainage systems, will be identified and assessed. The Project Team is reviewing potential culvert improvement strategies, which include replacing and/or rehabilitating culverts along Highway 401 within the Study Area.
Key Public	Concerns with adverse effects to natural habitat, protected wetlands, etc. as well as the potential to include wildlife crossings.	■ Response discussed the Class Environmental Assessment process, environmental factors considered, the evaluation and the opportunities for respondent to participate in the process and provide feedback at the Public Information Centre as well as during issue of the Transportation Environmental Study Report for the 30-day comment period. It was also highlighted that following completion of the current Preliminary Design process the project will move forward to Detail Design where the Technically Preferred Plan will be further refined and impacts confirmed with mitigation updated to reflect any changes. ■ With regard to wildlife crossings, it was noted that the Ministry recognizes the importance of wildlife connectivity and strives to support it, where feasible. While the primary focus of these studies is to address the rehabilitation or replacement needs of existing bridges and structural culverts, the studies will also explore opportunities to enhance wildlife passage. This may include, where appropriate, expanding existing openings by upsizing culverts or incorporating design features that help facilitate wildlife movement.

Stakeholders	Comments/Concerns	Response Provided and/or Action Taken
Key Public	Maintaining reliable emergency access during and after construction	■ Maintaining reliable emergency access during and after construction is a top priority for the Ministry of Transportation of Ontario and the Project Team. These studies are actively considering how proposed changes to Highway 401 and its interchanges along the project corridor may affect emergency response times for police, fire, and paramedic services, while also seeking opportunities to improve overall safety and traffic operations. As part of the current Preliminary Design and Class Environmental Assessment process, consultation is being completed with area emergency service providers, and this will continue during the future Detail Design phase to follow.
Key Public	Road access and detour routes	■ With respect to road access and detour routes, the Project Team will continue to engage with municipalities and local stakeholders to address specific concerns and, where feasible, identify measures to mitigate potential impacts. As the Project advances through future phases, including Detail Design and construction, additional information will become available.

3.2 External Stakeholder and Indigenous Consultation

3.2.1 Indigenous Communities

Consultation is an integral part of the Study process and under Section 35 of the *Constitution Act*, the Crown has the Duty to Consult with affected Indigenous communities if a proposed Crown activity or decision has the potential to adversely impact Aboriginal and/or treaty rights.

As such, at Study Commencement, planned Indigenous communication and engagement was incorporated into the project Communication and Consultation Plan and reviewed by the Ministry of Transportation of Ontario Indigenous Liaison Specialist. The Consultation Plan outlined the method of notification proposed for this Study and demonstrated that the notification requirements of the Ministry of Transportation of Ontario Class Environmental Assessment process are being fulfilled. The Indigenous community contacts for this assignment were established through discussion with the Ministry of Transportation of Ontario Indigenous Liaison Specialist and included:

- Alderville First Nation;
- Curve Lake First Nation;
- Hiawatha First Nation;
- Kawartha Nishnawbe Council;
- Metis Nation of Ontario;
- Mississaugas of Scugog Island First Nation; and
- Mohawks of the Bay of Quinte.

The Ministry of Transportation of Ontario Director, Operations issued the notifications for the Study Commencement, Public Information Centre, and the Notice of Completion and Filing of the Transportation Environmental Study Report to the identified Indigenous communities for review and comment.

In addition to the above, the Stage 1 Archaeological Assessment completed for this Study was circulated by the Ministry of Transportation of Ontario Indigenous Liaison Specialist to the noted Indigenous communities above on July 8, 2026. No comments were received. The Stage 1 Archaeological Assessment Report, which recommended a Stage 2 Archaeological Assessment for any potentially impacted areas that contain archaeological potential, was subsequently submitted to the Ministry of Citizenship and Multiculturalism on September 18, 2026.

Consultation with Indigenous communities throughout the Project to date is presented in **Table 3-2** below.

Table 3-2: Consultation Activities with Indigenous Communities

Date	Consultation Activity	Consultation Purpose
November 20, 2024	Notice of Study Commencement	Provided notification of the commencement of this Preliminary Design and Class Environmental Assessment Study, along with the Study Purpose and Process.
Spring 2025	Invitation for Environmental Community Field Liaison Participation	Invited Indigenous communities to participate in ecological fieldwork through funded Community Field Liaison opportunity.
March 4, 2026	Notice of Public Information Centre #1	Advised of the planned Public Information Centre including an invitation to attend a preview session from 3:00 to 4:00 pm in advance of the main Public Information Centre from 4:00 to 7:00 pm.
July 8, 2026	Circulation of Stage 1 Archaeological Assessment	Provided the Draft Stage 1 Archaeological Assessment for Indigenous Community review and comment.
September 8, 2026	Williams Treaties First Nations Meeting	To provide a study update and to explain why the Napanee River Bridge improvements were being expedited as a separate study.
October 2, 2026	Mohawks of the Bay of Quinte Meeting	To provide a study update and to explain why the Napanee River Bridge improvements were being expedited as a separate study.

3.2.2 External Agencies

External agencies and other technical stakeholders were engaged throughout the Study, including federal, provincial, and municipal agencies, conservation authorities and other technical stakeholders as listed below:

■ Federal Agencies

- Fisheries and Oceans Canada;
- Transport Canada;
- Environment and Climate Change Canada; and
- Natural Resources Canada.

■ Provincial Agencies

- Infrastructure Ontario;
- Ministry of Agriculture, Food and Rural Affairs;

- Ministry of the Environment, Conservation and Parks;
- Ministry of Citizenship and Multiculturalism (formerly Ministry of Tourism, Culture and Sport);
- Ministry of Indigenous Affairs and First Nations Economic Reconciliation;
- Ministry of Natural Resources;
- Ministry of Tourism, Culture and Gaming and Ministry of Sport;
- Ministry of Municipal Affairs and Housing;
- Ministry of the Solicitor General;
- Ontario Trucking Association; and
- Ontario Provincial Police.

■ **Municipal Agencies**

- Lennox and Addington County;
- Lennox and Addington County Paramedic Services;
- Town of Greater Napanee; and
- Town of Greater Napanee Fire and Emergency Services.

■ **Conservation Authorities**

- Quinte Conservation Authority.

■ **Other Technical Stakeholders**

- Ontario Federation of Agriculture;
- Lennox & Addington Federation of Agriculture; and
- Hydro One Networks, Inc.

A copy of the Project Contact List can be found in **Appendix A**.

3.2.3 External Stakeholder Meetings and Comments

At the outset of the Study and at key milestones, external agencies were contacted by mail and asked to provide input. Discussions and meetings with agencies and other stakeholders were conducted, in which the collection of data and the resolution of any identifiable issues were undertaken.

Early in the process, a Municipal Technical Advisory Committee consisting of area municipalities, emergency services and relevant agencies was established. Meetings were scheduled with this group at key Project milestones to inform them of the Study process, present the design alternatives being considered, including the Technically Preferred Plan and to generally receive input and comments for consideration during the Study.

A meeting with the Ontario Federation of Agriculture and the Lennox and Addington Federation of Agriculture was held on August 6, 2026, in order to discuss the Study, obtain feedback, and identify any agricultural considerations to be addressed as part of the Study process.

Additional details regarding the above noted meetings are presented in **Table 3-3**.

Table 3-3: External Stakeholder Meetings

Date	External Stakeholder Meeting	Meeting Purpose
March 20, 2025	Municipal Technical Advisory Meeting #1	Introduce Study and present existing conditions alternatives, seek municipal feedback.
March 26, 2026	Municipal Technical Advisory Meeting #2	Present the Public Information Centre #1 information and to receive input and comments on the material.
August 6, 2026	Ontario Federation of Agriculture and Lennox and Addington Federation of Agriculture	To provide a high-level overview of the project and obtain feedback, especially regarding implications with Highway 401 crossing with large farm equipment and construction staging/detours.
September 23, 2026	Municipal Technical Advisory Meeting #3	To provide a study update and to explain why the Napanee River Bridge improvements were being expedited as a separate study.

Correspondence with external agencies is documented in **Appendix A**.

3.2.4 Municipal Technical Advisory #1 Meeting

Municipal Technical Advisory Meeting #1 was held on March 20, 2025, and included representatives from the County of Lennox and Addington, Loyalist Township, City of Kingston, Kingston Police, Loyalist Township Emergency Services, Bereavement Authority of Ontario, Cataraqui Conservation Authority and Quinte Conservation Authority. It should be noted that this Municipal Technical Advisory meeting was not specifically focused on this Study, but rather included details on Study #2 for the Highway 401 Improvements from Belleville to Kingston Project, which included the Highway 401 / Napanee River Bridge improvements.

The purpose of this meeting was to provide an overview of the Study Area, the Study background, the Class Environmental Assessment process, proposed consultation, the

interchanges and structures within the corridor, the transportation needs of the corridor, the proposed Study schedule and the purpose of the Municipal Technical Advisory Meeting meetings.

A summary of the topics discussed, and the responses provided by the Project Team are presented in **Appendix A**.

3.2.5 Municipal Technical Advisory #2 Meeting

Municipal Technical Advisory Meeting #2 was held on March 26, 2026, and included representatives from the Town of Greater Napanee, Loyalist Township, County of Lennox and Addington, City of Kingston, Cataraqui Conservation Authority and Quinte Conservation Authority, Bereavement Authority of Ontario, Kingston Police and Kingston Fire & Rescue. Again, similar to the first Municipal Technical Advisory meeting, Meeting #2 focused on the larger Study #2 project that included the Napanee River Bridge improvements.

The purpose of this meeting was to provide a study update, present the design alternatives being considered and to generally receive input and comments for consideration during the Study. This meeting included presentation of the Public Information Centre information. A summary of the topics discussed, and the responses provided by the Project Team are presented in **Appendix A**.

3.2.6 Municipal Technical Advisory #3 Meeting

Municipal Technical Advisory Meeting #3 was held on September 23, 2026, and included representatives from the Town of Greater Napanee, County of Lennox and Addington, City of Kingston, Quinte Conservation Authority, and Kingston Fire & Rescue. This Municipal Technical Advisory meeting specifically focused on the current Napanee River Bridge Improvements Preliminary Design and Class Environmental Assessment Study but also included a brief overview of the larger Study #1 and Study #2 projects.

The purpose of this meeting was to provide a study update and to explain why the Napanee River Bridge improvements were being expedited as a separate study and to discuss the Class Environmental Assessment process being completed including existing conditions, the bridge alternatives considered, the preferred design alternative, potential impacts and proposed mitigation as well as proposed construction staging and project timelines. A summary of the topics discussed, and the responses provided by the Project Team are presented in **Appendix A**.

4. Overview of Existing Conditions

To support the development and evaluation of a reasonable range of alternatives, existing environmental conditions within the Study Area, including transportation features and traffic conditions, were reviewed to determine their sensitivity and potential for impacts associated with the alternatives under consideration. Identifying existing conditions involved the collection of primary and secondary source data derived from surveys, field investigation, published and unpublished literature, government sources and consultation with agencies and the public. The data collected was grouped into the following categories:

- Natural Environment;
- Socio-Economic Environment;
- Cultural Environment; and
- Transportation.

Information about the existing features within the Study Area was collected from the following sources:

- Observations recorded during site visits;
- Aerial photos of the Study Area;
- Lennox and Addington County Official Plan;
- Town of Greater Napanee Official Plan and Zoning By-law;
- Ministry of Natural Resources data sources, including the Natural Heritage Information Centre database and records and the Geospatial Ontario GeoHub database were reviewed to identify significant species and significant wildlife habitat, designated natural heritage features, fisheries resources, and other relevant environmental attributes within, adjacent to, or in the vicinity of the Study Area;
- Canada Water Agency and Ministry of Natural Resources for a review of ecologically significant coastal wetlands and wetlands under pressure, as well as digital elevation model data, respectively;
- A review of available aerial photography, and geological and topographic maps provided by Environmental Risk Information Services;
- Data from field investigations;
- Ministry of the Environment, Conservation, and Parks water well records and relevant groundwater, geological, and hydrogeological information;
- Ministry of Citizenship and Multiculturalism and Ontario Heritage Trust for a review of cultural resources, conservation easements, heritage plaques and heritage properties;

- *Transportation Environmental Study Report Addendum Assessment – Highway 401 Interchange Improvements at Palace Road, GWP 4197-13-00* (McIntosh Perry, 2020); and
- Quinte Conservation Authority.

The following sections provide an overview of the existing environmental conditions within the Study Area.

4.1 Natural Environment

Natural environment studies were conducted to document and assess existing features, to inform a discussion of potential impacts and mitigation associated with the proposed highway improvements, and to identify applicable municipal, provincial, federal or other regulatory approvals or permits associated with the environment that may be required for the Study.

4.1.1 Physiography, Topography and Drainage

The Study Area is located within the Napanee Plain physiographic region, described as a thin plain of limestone and clay (Chapman & Putman, 2007). The Napanee Plain is composed of a small section of limestone plains on the eastern portion of the Project Study Area (east of the Palace Road interchange), while the western portion of the Project Study Area is dominated by the Clay Plains. The Study reach borders the limestone plains to the north and south with Paleozoic bedrock and till in the south of the reach. Bedrock is relatively impermeable and therefore experiences higher runoff during spring melt and high rainfall events. The erosion rate of bedrock varies greatly, with hard bedrock (e.g., granite) being the most resistant to erosion, and soft bedrock (i.e., limestone) being less resistant to erosion.

An assessment of channel topography, including longitudinal bed slope and channel form, provides important information on existing geomorphic conditions. The Study Area consists of pockets of shallow glacial till and modern alluvial deposits that overlie Paleozoic bedrock of the Shadow Lake Formation. The ground surface elevation within the Study Area increases significantly to toward the east of the Napanee River, changing from approximately 85 metres above sea level at the river valley bottom, to 130 metres above sea level closer to the eastern limit of the Study Area. West of the Napanee River, the change in elevation is more gradual, changing to approximately 95 metres above sea level at the western limit of the Study Area. Locally, the topography is irregular and is controlled by bedrock outcrops. The Shadow Lake Formation is a discontinuous, thin wedge of sedimentary rock that overlies Precambrian rocks of the Canadian Shield. It has a gentle slope that is controlled by the underlying gently sloping Precambrian rocks (Hamblin, 2011).

The Napanee River Bridge crossing is located within the Quinte Conservation Authority. The Quinte Conservation watershed covers over 6,000 square kilometres, spanning from Upper Partridge Lake to the Bay of Quinte and Lake Ontario (QCA, 2024A). The watershed contains numerous water features including large river systems and several small lakes, providing an ample supply for municipal drinking water, irrigation, agriculture, industry, manufacturing, and recreation. The region receives approximately 900 millimetres of annual precipitation (rain and snow combined), with 60% lost to evaporation and transpiration. Water consumption is temperature-dependent, with warmer temperatures increasing evaporation rates. The remaining water is equally divided between groundwater recharge and runoff to streams and rivers (QCA, 2024A).

4.1.2 Geology

A review of published Ontario Geological Survey (2010) surficial geology mapping for the Study Area indicates a shallow soil profile was laid down in several depositional environments, with the following five surficial geologic units reported to occur locally.

- **Unit 3:** Paleozoic bedrock
- **Unit 5b:** Stone-poor, carbonate-derived silty to sandy till
- **Unit 7a:** Sandy glaciofluvial river deposits
- **Unit 8a:** Massive to well-laminated glaciolacustrine deposits
- **Unit 19:** Modern alluvial deposits: clay, silt, sand, gravel, may contain organic remains.

The Napanee River Bridge is entirely located within modern alluvial deposits, consisting of clay, silt, sand, gravel, and potentially organic remains. Quaternary overburden geology within the Study Area is primarily characterized as one geologic unit of glaciolacustrine deposits comprised of silt and clay, minor sand, derived from basin and quiet water deposits. The northern point of the Study Area is within pre-Cambrian bedrock. 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 from the Ministry of the Environment, Conservation and Parks, the underlying bedrock is a deposit of limestone, dolostone, shale, arkose, and sandstone of the Ottawa Group, Simcoe Group, and Shadow Lake Formation. A bedrock outcrop was identified eastbound of the Palace Road interchange within the Study Area. Further information related to the Physiography, Topography and Surficial Drainage can be seen in the *Fluvial Geomorphic Assessment* (AECOM, September 2026), available under separate cover upon request.

4.1.3 Hydrogeology

AECOM field staff conducted a “Windshield Survey” of the Study Area on May 20 and 21, 2025, to identify potential hydrogeologic features visible from public roadways, including groundwater seepage areas (such as wetlands), exposed geologic features such as bedrock outcrops, and the presence of private water wells.

No Provincially Significant Wetlands were identified within the Project Study Area; however, according to the Ontario Wetland Evaluation System, there are two unevaluated wetlands. These are located to the northeast and southwest of the Napanee River, though additional wetland areas may also be present that have not been formally identified or evaluated.

The Groundwater existing environmental conditions and location of water wells are illustrated on **Figure 4-1**.

4.1.3.1 Groundwater

The ground surface within the Study Area varies significantly, increasing toward the east of the Napanee River. Locally, surface water runoff and groundwater flow are influenced by ground surface topography, flowing from elevated areas to the valleys, ultimately discharging into the Bay of Quinte at Napanee, Ontario. According to the Ministry of the Environment, Conservation and Parks Water Well Records, there are fifty-five water wells within the Project Study Area.

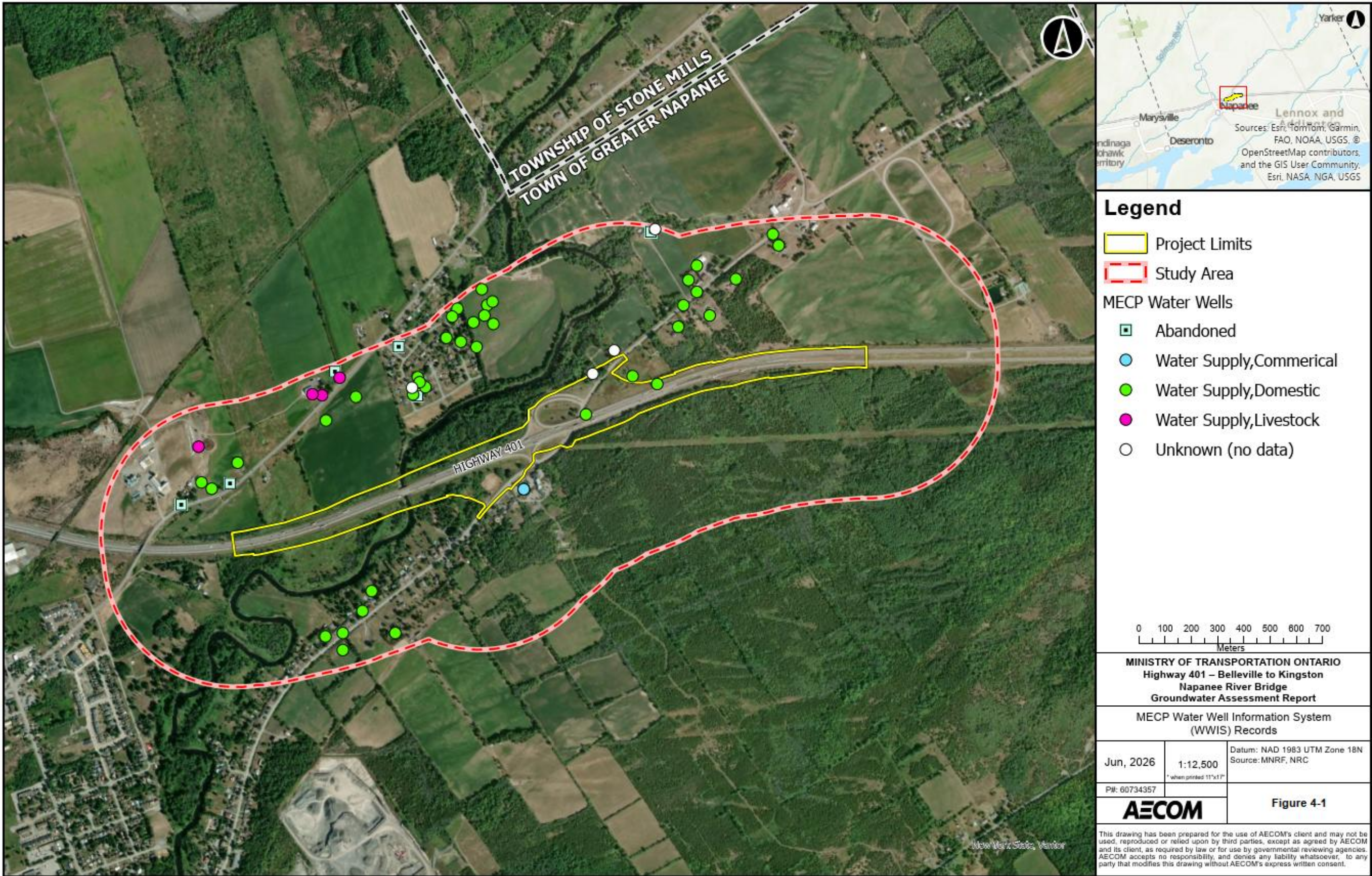
4.1.3.2 Source Water Protection

The primary municipal drinking water source associated with the Project Study Area is surface water from Lake Ontario. No municipal or public groundwater wells are located within the Project Study Area, and associated Wellhead Protection Areas do not intersect the Study Area. Several properties within the Project Study Area are serviced by private wells. The Quinte Source Protection Area Assessment Report identifies a small portion of the Project Study Area’s eastern limit to be located within a Significant Groundwater Recharge Area, though the Napanee River Bridge site limits are not within this Recharge Area.

A summary of the existing fifty-five “Water Supply” water wells is provided below:

- Commercial: three wells;
- Domestic: thirty-eight wells;
- Livestock: four wells;
- Other/ Unknown: four wells; and
- Abandoned: six wells.

Figure 4-1: Groundwater Existing Environmental Conditions



4.1.3.3 Permits to Take Water

A review of the Ministry of the Environment, Conservation and Parks Permit to Take Water and Environmental Activity and Sector Registry databases identified no previous permits or registrations within the Project Study Area; however, two active Permits to Take Water were identified.

A summary of the Environmental Activity and Sector Registry are identified within the *Groundwater Assessment Report* (AECOM, July 2026), available under separate cover upon request.

4.1.3.4 Municipal Wells and Wellhead Protection Areas

According to the Ministry of the Environment, Conservation and Parks Source Protection Information Atlas and Source Protection Assessment Reports, there are no municipal or public water wells located within the Project Study Area.

4.1.3.5 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 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, with Zones 2 and 3 extending out sequentially from the previous zone. Intake Protection Zone 1 is the most vulnerable zone for contamination, while Zone 3 is the least vulnerable zone.

A review of the Ministry of the Environment, Conservation and Parks Source Protection Information Atlas and Assessment Report identified no surface water intakes within the Project Study Area. However, Intake Protection Zones 2, and 3a are found within the Project Study Area along the Napanee River and its tributaries within the Project Study Area. The Intake Protection Zones in the Project Study Area may be vulnerable to highway seeding activities.

4.1.3.6 Threats to Drinking Water

As discussed in the previous sections, there are no municipal supply wells or surface water intakes located within the Project Study Area, rather the main municipal water source for the Town of Greater Napanee is surface water from Lake Ontario. According to the Highly Vulnerable Aquifer map, derived from the Ministry of the Environment, Conservation and Parks Source Protection Information Atlas, the entirety of the Project Study Area is within a Highly Vulnerable Aquifer area with a vulnerability score of 6.

A Highly Vulnerable Aquifer is defined as an aquifer on which external sources have or are likely to have a significant adverse effect and includes the land above the aquifer (*Ontario Regulation 287/07*). In general, a Highly Vulnerable Aquifer consists of coarse granular aquifer materials or fractured rock that have a high permeability and are exposed near the ground surface with a relatively shallow water table.

4.1.4 Drainage

A review of existing drainage features was undertaken as part of the broader *Drainage and Hydrology Structural Crossings Report* (AECOM, June 2026) completed for this Study. The assessment included a background review of existing reports and documentation, field investigations between June 16th to 18th, 2025, to review the existing crossing, and both a hydrology and hydraulic assessment of existing and proposed drainage conditions.

The existing Napanee River Bridge is located on Highway 401 and is approximately 0.7 kilometres west of the Highway 401 and Palace Road Interchange. The bridge is a continuous, integral structure across the full width of the highway, accommodating the current four lanes of traffic along with shoulders for westbound and eastbound lanes. Napanee River flows through the crossing from north to south on a relatively straight alignment. The bridge was constructed in 1960 and is comprised of a multi-span, reinforced cast-in-place concrete structure with a total span of 31.2 metres. The parapet walls are solid upstream and downstream of the bridge, and there is also a solid median barrier separating the eastbound and westbound traffic lanes. The bridge has wide shoulders, estimated at around 4 to 5 metres, and has no deck drains.

The contributing catchment area that drains towards Napanee River Bridge crossing and watercourse is estimated to be approximately 799.4 kilometres squared. This catchment was manually delineated based on the available topographic data and existing drainage patterns, which is considered appropriate for use in the hydrologic analysis. The drainage area is generally characterized by agricultural and undifferentiated rural land use, along with a wooded landscape. The imperviousness associated with built-up/ urban areas accounts for only 1.4% of the catchment. According to Ontario Watershed Information Tool, 19.4% of the area is covered by lakes and wetlands. Based on the Ministry of Agriculture, Food and Rural Affairs' Atlas information, the predominant soil type consists of Farmington Loam, which can be classified as a Hydrology Soil Group (HSG) "B". There are two streamflow gauges located in the watershed, listed below:

- Hydrometric Station 02HM007 – located in Camden East (upstream of Napanee-Highway 401 Bridge); and
- Hydrometric Station 02HM001 – located in Napanee (near Napanee-Highway 401 Bridge crossing).

The Napanee River flows through well-defined banks with sharp-curved alignment, immediately upstream and downstream of the crossing. At the bridge crossing, the river maintains a relatively straight alignment, indicating minimal channel curvature through this section. The channel and overbank areas are heavily vegetated and extend to the water's edge. There are ditches located on either side of Highway 401 that collect the flow from external areas and some segments of the highway, ultimately discharging it to the Napanee River. The flow is tranquil, and the river appears to be generally stable, with minimal bank erosion limited to the left bank at the inlet of the crossings, undercutting at the outlet, and exposed clay on the riverbed, upstream of the crossing.

Existing drainage and hydrology conditions can be summarized as follows:

- The existing Highway 401 road configuration includes two lanes in each direction with wide shoulders on both sides of the road. The current structure is a three-span concrete bridge with a total span of 30.5 metres.
- The Napanee River crossing drainage area was estimated to be 799.4 kilometres squared with an associated imperviousness of only 1.4% of the catchment. The bridge is located approximately 3.6 kilometres upstream of Springside Dam.
- Multiple hydrology methods (UOFM, Visual OTTHYMO, Statistical Analysis) were used to evaluate the 2- to 100-year peak design flows, including the climate change flow and check flow (130% of 100-year), at the bridge crossing. The flows obtained using statistical analysis were carried forward for the hydraulic analysis.
- Ministry of Transportation of Ontario's bathymetric information near the crossing and Ontario Geohub's Open LiDAR data were utilized to complete the bridge hydraulic assessment using HEC-RAS. The Springside Dam rating curve from the NRBS study (CCL, 1978) was used as the downstream boundary condition.
- The hydraulic analysis showed that the existing bridge does not satisfy the Ministry of Transportation of Ontario's HDSS 2024 criteria for freeboard and clearance under both the design flow (100-year) and check flow (130% of 100-year) events. However, no overtopping of Highway 401 is expected during either condition.

4.1.5 Fish and Fish Habitat

The fisheries assessment was completed in accordance with the *Environmental Guide for Fisheries* (Fish Guide) (MTO, 2025a). For the purposes of the fisheries assessment,

the Study Area includes water features within 120 metres of the right of way, identified through a background information review and field investigations.

Two assessments were completed for watercourses within the Study Area to capture potential seasonal changes in habitat conditions between spring and summer. During the spring field investigations, between June 10th to 17th, 2025, the watercourses were inspected to determine the potential to support fish. Habitat features, impediments to fish passage, flow regime, and connectivity to direct fish habitat were among the details recorded during this initial assessment. A second assessment of fish habitat in the Study Area was completed during the summer from August 19 to August 21, 2025. During the summer field investigations, previously assessed fish habitat was re-assessed to confirm habitat conditions and to capture seasonal changes. Fish sampling was also completed in the summer of 2025, wherein drought conditions were present. A variety of sampling methods were deployed, such as dip netting, electrofishing, and baited minnow traps, based on site conditions at the time of the assessment, including water depth, visibility, conductivity, substrate type, safe access, etc. The fisheries assessment was documented in the *Fish and Fish Habitat Existing Conditions and Impact Assessment Report* (AECOM, September 2026), which is included in **Appendix B**.

The watercourses in the Study Area fall under the jurisdiction of the Quinte Conservation Authority within the Napanee River watershed, covering more than 196,000 hectares and six sub-watersheds (QC, 2021). Of the seven watercourses in the Study Area, one was identified as direct fish habitat, four as indirect fish habitat (including one identified during fieldwork), and one was identified as not fish habitat. A seventh watercourse was originally intended to be surveyed, but due to field constraints, was assessed by desktop review only and determined to provide seasonal fish habitat due to its direct connection to the Napanee River.

The six surveyed watercourses within the Study Area were assessed for permanency, with the Napanee River being classified as a permanent feature with a defined stream bottom that lacked terrestrial vegetation, and exhibited prominent, continuous banks (Irwin, Bergmann and Boos, 2013). The remaining five surveyed watercourses had a mixture of permanent, intermittent, and ephemeral reaches/ branches. Based on background information, it is assumed that the seventh watercourse is intermittent (MNR, 2026).

The majority of watercourses were relatively small—that is, smaller than 5 metres in bankfull width and less than 1 metre in bankfull depth—with the exception of the Napanee River, which is a major watercourse with an approximate bankfull width of 20 metres. The surveyed watercourses are comprised of a variety of sediment types and sizes, and generally a well-established cover of instream and on shore macrophytes. Obstacles to fish passage were identified in two locations where seasonally low flows and dry conditions presented potential restrictions to movement. **Figure 4-2** highlights the watercourses and their existing conditions within the Study Area.

Figure 4-2: Fish and Fish Habitat Existing Conditions

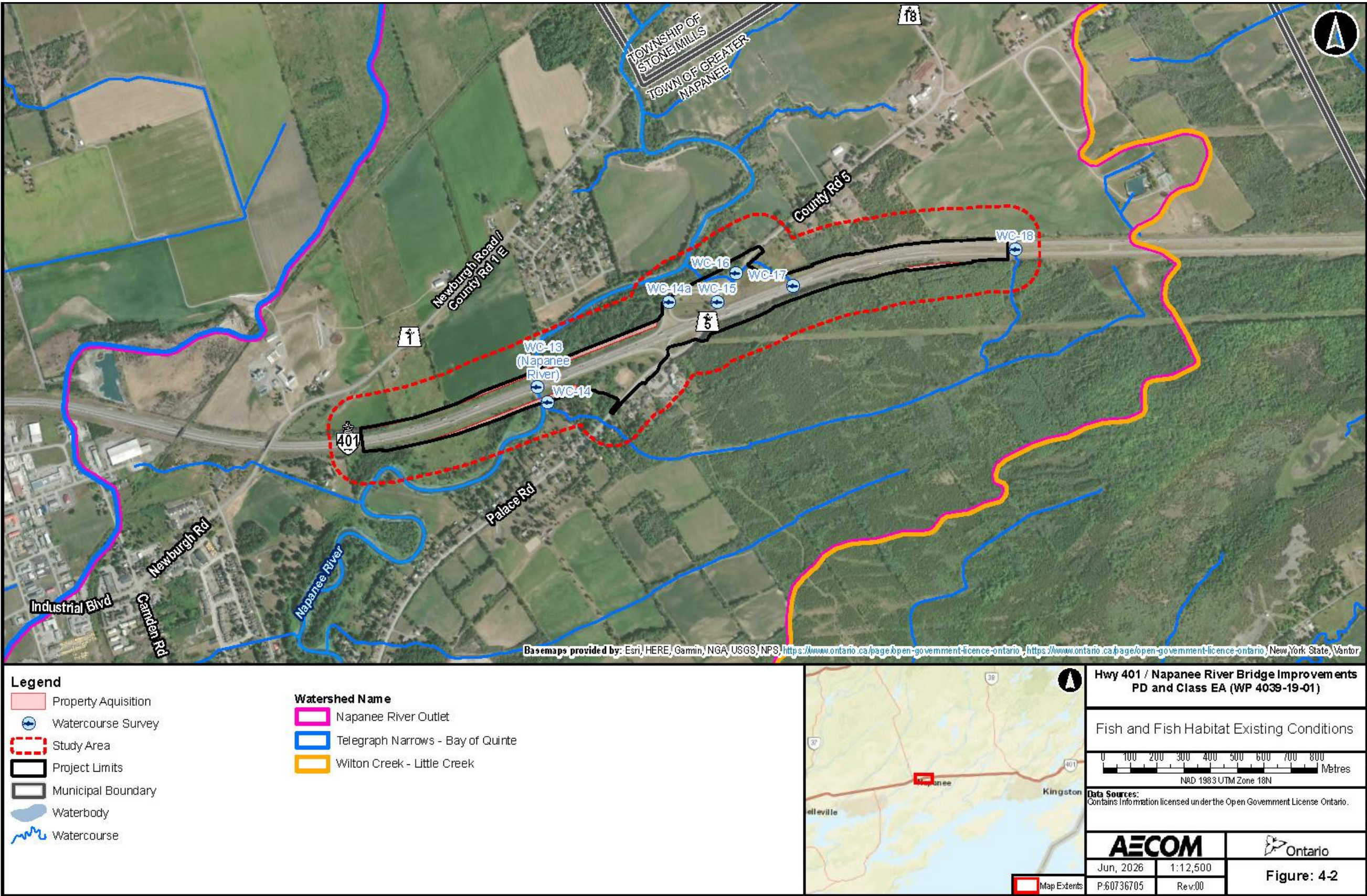


Table 4-1: Existing Fish and Fish Habitat Conditions Summary Table

Waterbody ID	MTO ID	Highway / Road Crossing	Date	Flow	Thermal Regime	Fish Habitat ¹	Channel Morphology	Substrate Type	Channel Dimensions (metres ²)	Vegetation	Constraints & Opportunities	Significant Fish Habitat
WC-13 Napanee River	17X-0062/B0	Highway 401	June 17, 2025 August 21, 2025	Permanent	Warm (MNR, 2026)	Direct	Upstream: <u>Spring:</u> Run (100%) <u>Summer:</u> Flats (100%) Downstream: <u>Spring:</u> Flats (100%) <u>Summer:</u> N/A	Upstream: <u>Spring:</u> Run: Sand (50%), Clay (50%) <u>Summer:</u> Flats: Clay (40%), Muck (50%), Detritus (10%) Downstream: <u>Spring:</u> Flats: Clay (30%), Muck (50%), Detritus (20%) <u>Summer:</u> N/A	Upstream: <u>Spring:</u> N/A <u>Summer:</u> Flats WD = N/A Flats WW = 18.00 Flats BFD = N/A Flats BFW = 20.00 Downstream: <u>Spring:</u> Flats WD = N/A Flats WW = 16.00 Flats BFD = 3.00 Flats BFW = 20.00 <u>Summer:</u> N/A	Emergent: Flowering Rush (<i>Butomus umbellatus</i>), American Burreed, American Bulrush (<i>Schoenoplectus americanus</i>), Hybrid Cattail (<i>Typha x glauca</i>), Broad-leaved Cattail (<i>Typha latifolia</i>), Canada Anemone (<i>Anemone canadensis</i>) Submergent: Curly-leaved Pondweed (<i>Potamogeton crispus</i>), Alpine Pondweed (<i>Potamogeton alpinus</i>), Water-milfoil (<i>Myriophyllum</i> sp.) Floating: Floating-leaved Pondweed, Algae, Fragrant Water-lily (<i>Nymphaea odorata</i>)	<ul style="list-style-type: none">■ Invasive species removal – Flowering Rush. Reduce invasive species spread by following clean equipment protocols and BMP for Flowering Rush (Simkovic, 2020a).■ Tree removal at bridge.■ Low flows during spring assessment and more evident during summer assessment.	<ul style="list-style-type: none">■ Capacity to support key lifecycle functions, including spawning, rearing, feeding, and migration of fish, but is not limited within the Study Area and broader watershed.
WC-14	-	Palace Road	N/A	Intermittent (MNR, 2026)	Unknown	Seasonally Direct	Desktop review only due to field constraints	Desktop review only due to field constraints	Desktop review only due to field constraints	Desktop review only due to field constraints	Desktop review only due to field constraints	Desktop review only due to field constraints
WC-14a	CV-0401-000398	Palace Road (County Road 5) ramps north of Hwy 401	June 10, 2025 August 21, 2025	Upstream: Intermittent Downstream: Permanent	Unknown	Indirect	Upstream: <u>Spring:</u> Run (95%), Riffle (5%) <u>Summer:</u> Dry Channel Downstream: <u>Spring:</u> Run (60%), Riffle (20%), Other (Cascade; 20%) <u>Summer:</u> Dry Channel	Upstream: <u>Spring:</u> Run: Gravel (20%), Sand (20%), Silt (20%), Muck (20%), Detritus (20%) Riffle: Gravel (35%), Sand (10%), Detritus (55%) <u>Summer:</u> N/A Downstream: <u>Spring:</u> Run: Cobble (40%), Gravel (30%), Sand (15%), Silt (15%) Riffle: Cobble (45%), Gravel (35%), Sand (20%) Other (Cascade): Cobble (20%), Gravel (10%), Detritus (70%) <u>Summer:</u> N/A	Upstream: <u>Spring:</u> Run WD = 0.15 Run WW = 0.60 Run BFD = 0.65 Run BFW = 3.50 Riffle WD = 0.09 Riffle WW = 0.35 Riffle BFD = 0.65 Riffle BFW = 1.50 <u>Summer:</u> Dry Channel BFD = 0.65 BFW = 3.50 Downstream: <u>Spring:</u> Run WD = 0.07 Run WW = 0.85 Run BFD = 0.30 Run BFW = 2.50 Riffle WD = 0.05 Riffle WW = 0.30 Riffle BFD = 0.30 Riffle BFW = 2.00 Cascade WD = N/A Cascade WW = 0.20	Emergent: Narrow-leaved Cattail	<ul style="list-style-type: none">■ This culvert is associated with surface water drainage from the highway interchange. There is no channelized feature upstream of the interchange and a steep cascade located downstream of the culvert impedes passage upstream, thus this channel provides indirect habitat to the downstream habitat.■ Seasonal low flow	<ul style="list-style-type: none">■ None

Waterbody ID	MTO ID	Highway / Road Crossing	Date	Flow	Thermal Regime	Fish Habitat ¹	Channel Morphology	Substrate Type	Channel Dimensions (metres ²)	Vegetation	Constraints & Opportunities	Significant Fish Habitat
									Cascade BFD = 0.03 Cascade BFW = 1.00 <u>Summer:</u> Dry Channel BFD = 0.30 BFW = 2.00			
WC-15	CV-0401-000394	Palace Road (County Road 5) ramps north of Hwy 401	June 10, 2025 August 21, 2025	Intermittent	Unknown	Indirect	Downstream: <u>Spring:</u> Pool (5%), Flats (95%) <u>Summer:</u> Dry Channel	Downstream: <u>Spring:</u> Pool: Gravel (70%), Sand (20%), Silt (10%) Flats: Gravel (70%), Sand (20%), Silt (10%) <u>Summer:</u> N/A	Downstream: <u>Spring:</u> Pool WD = 0.19 Pool WW = 1.00 Pool BFD = 0.60 Pool BFW = 3.00 Flats WD = 0.04 Flats WW = 0.15 Flats BFD = 0.60 Flats BFW = 3.00 <u>Summer:</u> Dry Channel BFD = 0.60 BFW = 3.00	Emergent: Reed Canary Grass, Cattail	■ This feature conveys drainage into the interchange via a storm drain that connects to WC-2-14a. There is no defined channel upstream, and fish passage is impeded downstream at WC-2-14a; therefore, the feature contributes indirectly to downstream habitat. ■ Bank stabilization.	■ None
WC-16		County Road 5	June 10, 2025 August 21, 2025	Intermittent	Unknown	Indirect	Upstream: <u>Spring:</u> Run (100%) <u>Summer:</u> Dry Channel Downstream: <u>Spring:</u> Flats (95%), Pool (5%) <u>Summer:</u> Dry Channel	Upstream: <u>Spring:</u> Run: Cobble (20%), Sand (10%), Silt (30%), Clay (40%) <u>Summer:</u> N/A Downstream: <u>Spring:</u> Pool: Sand (30%), Silt (60%), Detritus (10%) Flats: Boulder (5%), Cobble (10%), Sand (10%), Silt (50%), Clay (25%) <u>Summer:</u> N/A	Upstream: <u>Spring:</u> Run WD = 0.10 Run WW = 0.25 Run BFD = 0.60 Run BFW = 1.20 <u>Summer:</u> Dry Channel BFD = 0.60 BFW = 1.20 Downstream: <u>Spring:</u> Pool WD = 0.10 Pool WW = 2.50 Pool BFD = 0.75 Pool BFW = 3.50 Flats WD = 0.07 Flats WW = 0.40 Flats BFD = 0.35 Flats BFW = 1.25 <u>Summer:</u> Dry Channel BFD = 0.35 BFW = 3.50	Emergent: Reed Canary Grass	■ This culvert conveys overland surface water from within the ROW and upstream drainage associated with WC-2-17. A steep channel grade and a cobble berm ~100 metres downstream of the culvert impede upstream fish passage, thus this channel provides indirect habitat to the downstream habitat. ■ Bank stabilization ■ Litter clean up	■ None

Waterbody ID	MTO ID	Highway / Road Crossing	Date	Flow	Thermal Regime	Fish Habitat ¹	Channel Morphology	Substrate Type	Channel Dimensions (metres ²)	Vegetation	Constraints & Opportunities	Significant Fish Habitat
WC-17	CV-0401-000061	Highway 401	June 11, 2025 June 12, 2025 August 21, 2025	Upstream: Ephemeral Downstream: Intermittent	Unknown	Indirect	Upstream: <u>Spring:</u> Run (95%), Culvert (5%) <u>Summer:</u> Dry Channel Downstream: <u>Spring:</u> Run (60%), Flats (40%) <u>Summer:</u> Dry Channel	Upstream: <u>Spring:</u> Run: Sand (10%), Silt (40%), Clay (50%) Culvert: Cobble (15%), Gravel (20%), Sand (10%), Silt (30%), Clay (25%) <u>Summer:</u> N/A Downstream: <u>Spring:</u> Run: Gravel (30%), Sand (10%), Silt (20%), Clay (40%) Flats: Silt (30%), Clay (60%), Detritus (10%) <u>Summer:</u> N/A	Upstream: <u>Spring:</u> Run WD = 0.07 Run WW = 0.20 Run BFD = 0.25 Run BFW = 0.75 Culvert WD = 0.20 Culvert WW = 1.20 Culvert BFD = 0.50 Culvert BFW = 1.20 <u>Summer:</u> Dry Channel BFD = 0.50 BDW = 1.20 Downstream: <u>Spring:</u> Run WD = 0.08 Run WW = 0.40 Run BFD = 0.30 Run BFW = 0.60 Flats WD = 0.50 Flats WW = 1.25 Flats BFD = 0.60 Flats BFW = 1.50 <u>Summer:</u> Dry Channel BFD = 0.60 BFW = 1.50	Emergent: Reed Canary Grass	<div>■ This culvert is associated with surface water drainage collected from within the highway ROW. No channelized feature upstream (south) of the ROW was observed and downstream fish passage is impeded at WC-2-16 by the same steep channel and cobble berm; thus, this feature contributes indirectly to downstream habitat.</div> <div>■ Seasonally dry in summer.</div>	<div>■ None</div>
WC-18	CV-0401-000060 / CV-0401-000348	Highway 401	June 11, 2025 June 12, 2025 August 19, 2025 August 21, 2025	Upstream: Ephemeral Downstream: Intermittent	Unknown	Not Fish Habitat	Upstream: <u>Spring:</u> Flats (100%) <u>Summer:</u> Dry Channel Downstream: <u>Spring:</u> Culvert (100%) <u>Summer:</u> Dry Channel	Upstream: <u>Spring:</u> Flats: Silt (35%), Clay (10%), Muck (55%) <u>Summer:</u> N/A Downstream: <u>Spring:</u> Culvert: Silt (30%), Clay (40%), Muck (30%) <u>Summer:</u> N/A	Upstream: <u>Spring:</u> Flats WD = 0.10 Flats WW = 2.00 Flats BFD = 0.30 Flats BFW = 2.50 <u>Summer:</u> Dry Channel BFD = 0.30 BFW = 2.50 Downstream: <u>Spring:</u> Culvert WD = 0.12 Culvert WW = 1.20 Culvert BFD = 0.30 Culvert BFW = 1.20 <u>Summer:</u> Dry Channel BFD = 0.30 BFW = 1.20	Emergent: Narrow-leaved Cattail	<div>■ Low elevation point conveying highway drainage. Aerial imagery does not show direct connection to Napanee River. Defined channel absent approximately 150 metres downstream of ROW. No feature upstream (north) of highway. Permission to enter had not been granted at time of assessment to confirm connectivity outside of ROW.</div> <div>■ Vehicle fording – avoid when water present.</div>	<div>■ None</div>

Fish community sampling was conducted during field investigations. Fish community surveys in the Napanee River captured six different species, with Bluntnose Minnow being the most abundant. Eastern Elliptio was observed along the downstream banks during the spring assessment. The thermal regime of the Napanee River was warmwater, according to the Ministry of Natural Resources (2026) records. A summary of fish sampling results and fish communities expected to inhabit the watercourses based on background information and site investigations is available in the *Fish and Fish Habitat Existing Conditions and Impact Assessment Report* (AECOM, September 2026), which is included in **Appendix B**.

In-water work timing windows are determined by the Ministry of Natural Resources and are based on the spawning and early development periods of fish that occur in the identified watercourses. Limited fish community data was available for the watercourses in the Study Area. Through correspondence, the Ministry of Natural Resources identified a restricted in-water work timing window of March 15 to July 15 for construction.

4.1.6 Aquatic Species at Risk

Under the Ontario *Species Conservation Act*, 2025 (in effect as of March 30, 2026), only species listed as Threatened and Endangered under the *Ontario Regulation 60/26 Protected Species in Ontario* List receive individual and habitat protection. Similar to the *Species Conservation Act*, species listed as Threatened or Endangered under Schedule 1 of the federal *Species at Risk Act* (2002) receive individual and habitat protection. For the purposes of this report, these species will be considered Species at Risk. It is important to note that any Special Concern species potentially present within the Study Area may be uplisted to Threatened or Endangered during the lifetime of the Study. Should this occur, relevant federal and provincial government agencies should be consulted immediately to determine how to proceed and avoid contravention of the *Species Conservation Act* and/or *Species at Risk Act*.

Based on Fisheries and Oceans Canada's online Species at Risk Mapping tool, there are no known federally listed aquatic Species at Risk within the Study Area. Online records from the Ministry of Natural Resources returned Bridle Shiner in the Napanee River. This species is listed as Special Concern under the *Species at Risk Act* and *Species Conservation Act*; however, Special Concern species are not included on the *Protected Species in Ontario* List and are not afforded protection under either Act. Previous records of American Eel exist for the Napanee River (AECOM, 2019a); however, these records are no longer returned through Natural Heritage Information Centre as they date from 2010 and are considered historic.

4.1.7 Terrestrial Ecosystems

A terrestrial ecosystem assessment was completed for this assignment in accordance with the Environmental Reference for Highway Design (ERHD; MTO, 2013) and documented in a *Terrestrial Ecosystems Existing Conditions and Impact Assessment Report* (AECOM, September 2026). A copy of the report is included in **Appendix C**.

A background review was completed to obtain information on known natural heritage features and species records including Species at Risk within the Study Area. As part of the background review, the Project Team obtained information from the Ministry of Natural Resources Natural Heritage Information Centre and the Geospatial Ontario Geohub database along with wildlife atlases and other online databases. Further, a thorough review of applicable planning documents and guidelines as well as previous reports near the Study Area were undertaken as a part of the background review.

In order to acquire up-to-date information on the existing terrestrial ecosystems within the Study Area, field investigations were conducted in 2025 between July 14 and July 18, 2025, by AECOM ecologists. The terrestrial ecosystem assessment also relies on a synthesis and review of existing data collected through prior field investigations completed at Palace Road, documented in the *Terrestrial Ecosystems Existing Conditions and Impact Assessment Report – Highway 401 Interchange Improvements at Palace Road (GWP 4197-13-00)* (AECOM, 2016). Field investigations for the Highway 401 / Napanee River Bridge Study were completed in accordance with the Environmental Reference for Highway Design (MTO 2013) to supplement available background information.

4.1.7.1 Designated Natural Areas

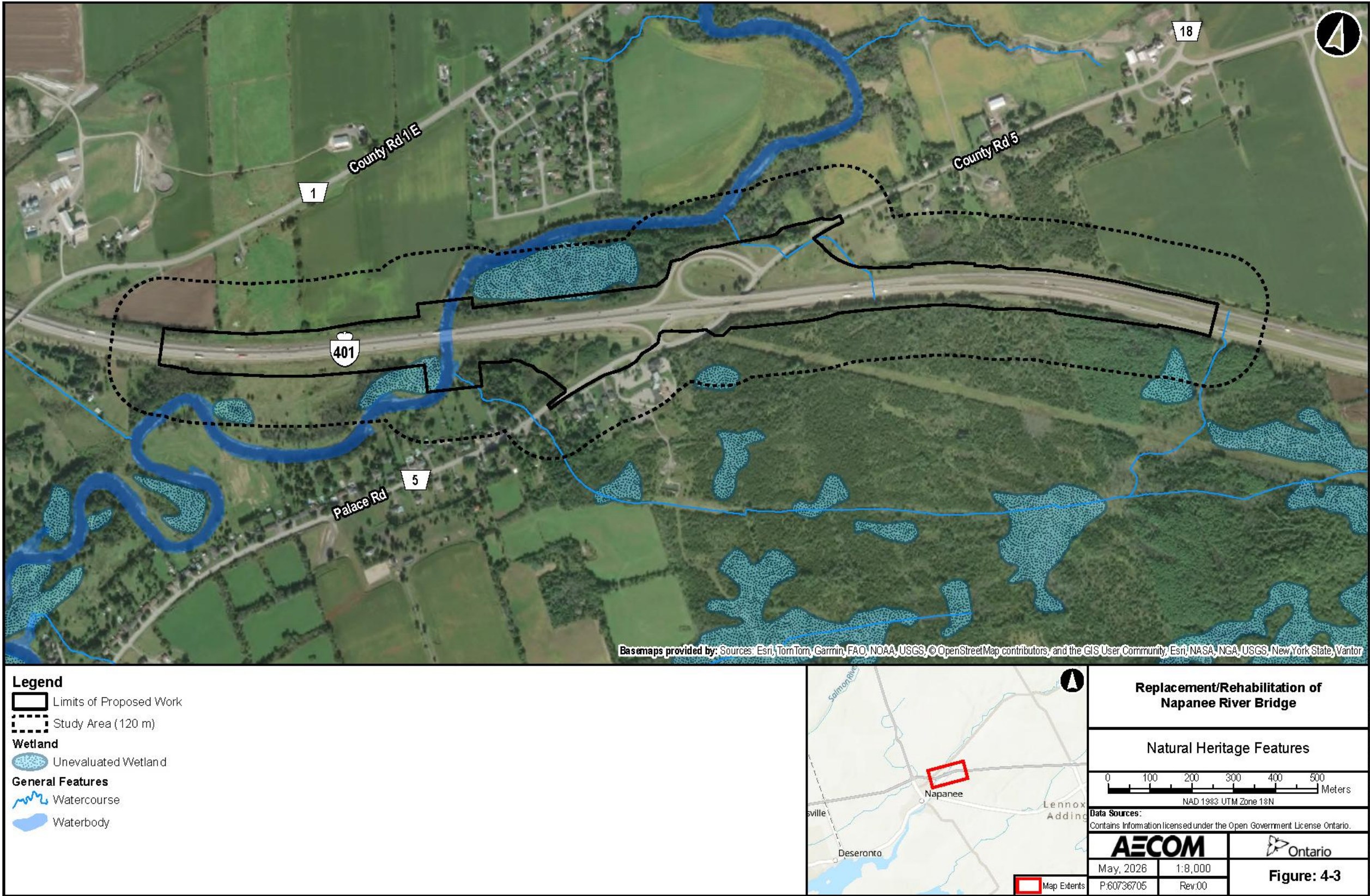
As per the Environmental Reference for Highway Design (MTO, 2013), Designated Areas are defined by resource agencies, municipalities, the government and/ or the public, through legislation, policies, or approved management plans, to have special or unique value. Such areas may have a variety of ecological, recreational, and / or aesthetic features and functions that are highly valued. Designated Natural Areas include, but are not limited, to Provincially Significant Wetlands, Areas of Natural and Scientific Interest, and Environmentally Significant / Sensitive Areas.

A summary of Designated Natural Areas identified within the Study Area through the background review are provided in **Table 4-2** below. Designated Natural Areas within and in the vicinity of the Study Area are illustrated on **Figure 4-3**. No Provincially Significant Wetlands or Areas of Natural and Scientific Interest were located in the Study Area.

Table 4-2: Designated Natural Areas within Study Area

Area Type	Designated Natural Area Name	Presence Within Study Area
Wetlands	Unevaluated Wetlands	Several unevaluated wetlands are identified within the Study Area.
Policy Areas	County of Lennox and Addington Natural Heritage Features and Areas	Schedule B of the County of Lennox and Addington's Official Plan identifies selected Natural Heritage Features and Areas, including Provincially Significant Wetlands, Areas of Natural and Scientific Interest and Significant Wildlife Habitat. None of these Natural Heritage Feature mapped on Schedule B of the County of Lennox and Addington's Official Plan were identified in the Study Area.
Policy Areas	Town of Greater Napanee Natural Heritage Features	Schedule B of the Town of Greater Napanee's Official Plan identifies Natural Heritage Features, which include Environmental Protection Areas (Provincially Significant Wetlands), other wetlands, Significant Woodlands, Areas of Natural and Scientific Interest, Deer Wintering Yards (Significant Wildlife Habitat) and Watercourses (Fish Habitat). The only Natural Heritage Feature mapped on Schedule B of the Napanee Official Plan was Significant Woodland.
Important Bird Area (IBA)	Napanee Limestone Plain IBA	The Napanee Limestone Plain Important Bird Area (IBA) overlaps the full extent of the Study Area. The Napanee Limestone Plain has been designated a nationally significant Important Bird Area under the threatened species and congregatory species categories, particularly for the Loggerhead Shrike (Birds Canada, 2026b). The Important Bird Area program is an international initiative coordinated by BirdLife International. It is a partnership of member-based organizations in over 100 countries that seeks to identify and conserve sites important to all bird species worldwide.

Figure 4-3: Natural Heritage Features



4.1.7.2 Vegetation Communities and Plants

The Napanee River located in the Study Area, is a large, open watercourse that flows north south under Highway 401. On the north side of Highway 401, the Napanee River was bordered by Green Ash Mineral Deciduous Swamp (SWD2-2) to the west, and agricultural fields with soybean crops to the east. On the south side of Highway 401, the river was bordered by Green Ash Mineral Deciduous Swamp (SWD2-2) and Dry – Fresh Sugar Maple Deciduous Forest (FOD5-1). Vegetation communities around the Palace Road intersection generally consisted of cultural vegetation communities, including Cultural Meadows, succeeding Cultural Woodlands, and Cultural Thickets associated with residential developments along Palace Road.

Ecological Land Classification was completed for the Study Area. Additional context was obtained from historical Ecological Land Classification completed in support of *Terrestrial Ecosystems Existing Conditions and Impact Assessment Report – Highway 401 Interchange Improvements at Palace Road (GWP 4197-13-00)* (AECOM, 2016). A map illustrating the Ecological Land Classification within the Study Area is included on **Figure 4-4a** and **Figure 4-4b**.

Vegetation communities within the existing Ministry of Transportation of Ontario right of way were primarily those that resulted from or have been maintained by anthropogenic disturbances (i.e., continued maintenance or mowing). Community types within the Study Area include cultural meadows, cultural thickets, meadow marshes, deciduous swamps, deciduous forests, and cultural woodlands and plantations, reflecting a predominantly disturbed landscape associated with agriculture, highway infrastructure and managed vegetation. A summary of Ecological Land Classification Community Descriptions for the Study Area is included in **Table 4-3** below.

A total of 191 plant species were recorded; of which 124 (65%) were native and 67 (35%) were non-native. No Species at Risk or Species of Conservation Concern plants or rare vegetation communities (S-Rank S1-S3) were identified in previous field investigations (AECOM, 2016). No Species of Conservation Concern plant records were identified from the background review. The background review identified two Species at Risk trees with ranges that overlapped the Study Area: Butternut (*Juglans cinerea*) and Black Ash (*Fraxinus nigra*). However, neither species was observed during the Ecological Land Classification field investigations.

Figure 4-4a: Ecological Land Classification Within the Study Area

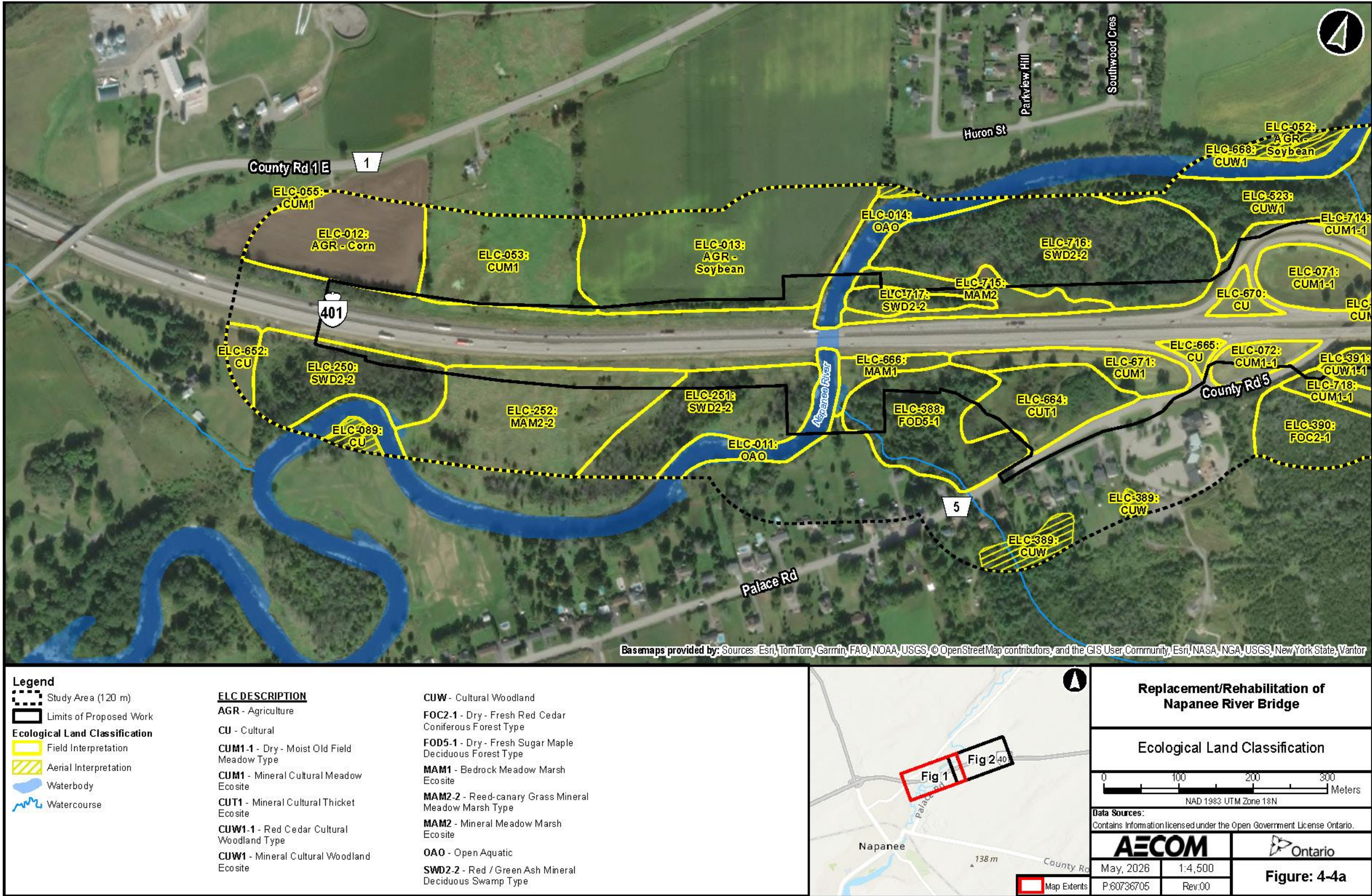


Figure 4-4b: Ecological Land Classification Within the Study Area

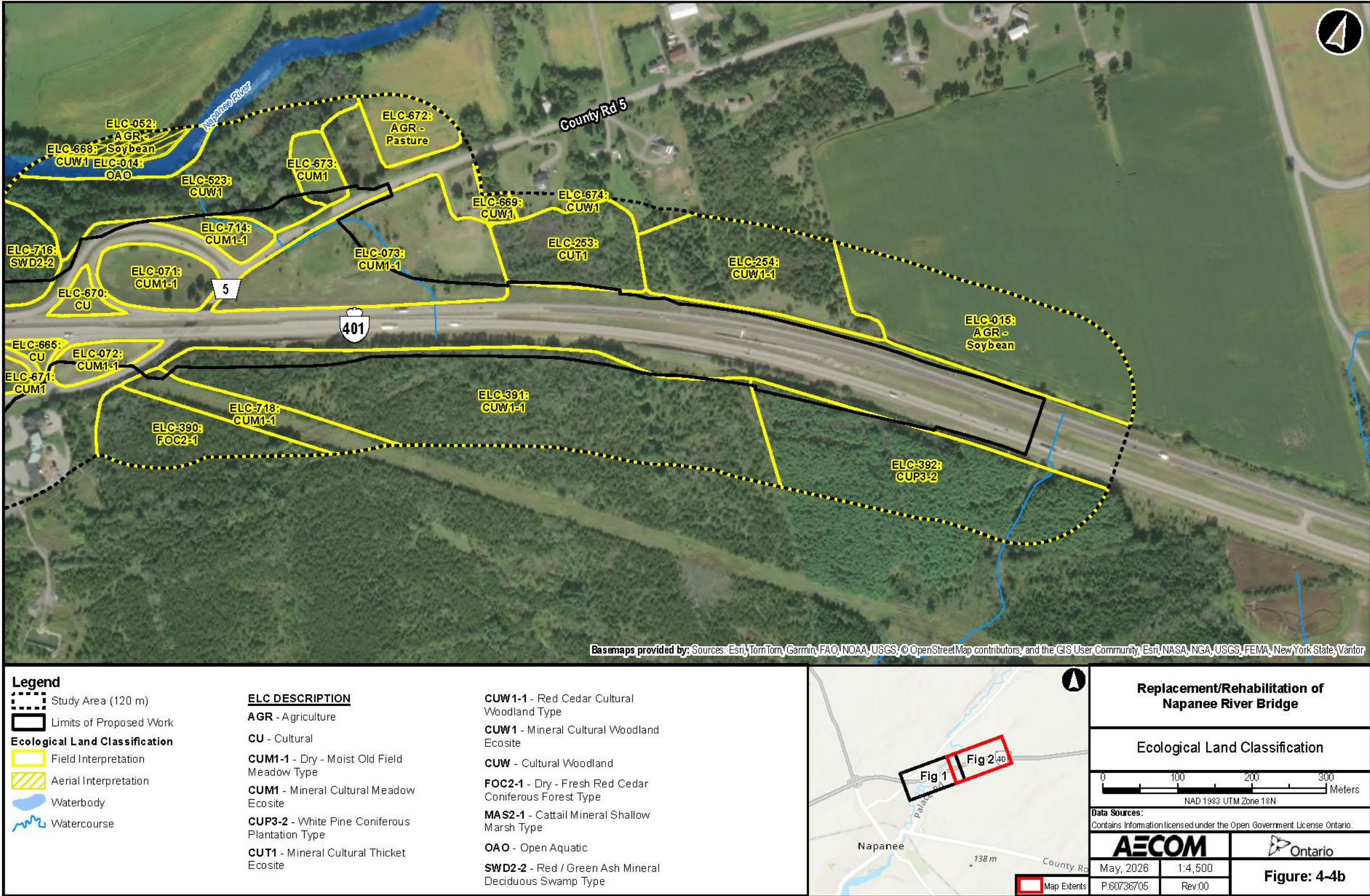


Table 4-3: Ecological Land Classification Community Descriptions within the Study Area

ELC Code	ELC Community	Description
AGR	Agriculture	Represents agricultural fields, with varying types of crop-cover.
CU	Cultural	Represents culturally managed, manicured/mowed areas (i.e. lawns, mowed grass).
CUM1	Mineral Cultural Meadow Ecosite	High level classification assigned to areas where access was limited or identified via aerial interpretation and/or full plant list was not completed.
CUM1-1	Dry-Moist Old Field Meadow Type	This community lacked a canopy layer and contained some young trees in the shrub layer including Eastern Red Cedar (<i>Juniperus virginiana</i>), Manitoba Maple (<i>Acer negundo</i>), Common Buckthorn (<i>Rhamnus cathartica</i>) and Green Ash (<i>Fraxinus pennsylvannica</i>). The dense ground layer was vegetated with Kentucky Bluegrass (<i>Poa pratensis</i>), Smooth Brome (<i>Bromus inermis</i>), Reed Canary Grass (<i>Phalaris arundinacea</i>) and Wild Carrot (<i>Daucus carota</i>).
CUT1	Mineral Cultural Thicket Ecosite	This community contained Manitoba Maple, Green Ash, White Elm (<i>Ulmus americana</i>) and Black Walnut (<i>Juglans nigra</i>) in the canopy. The subcanopy was vegetated with Manitoba Maple, Trembling Aspen (<i>Populus tremuloides</i>), Eastern Red Cedar and Black Locust (<i>Robinia pseudoacacia</i>). The shrub layer was dominated by Gray Dogwood (<i>Cornus racemosa</i>), Manitoba Maple, Common Buckthorn and Common Lilac (<i>Syringa vulgaris</i>).
CUW1	Mineral Cultural Woodland Ecosite	This vegetation community consists of Manitoba Maple, Norway Maple (<i>Acer platanoides</i>), Austrian Pine (<i>Pinus nigra</i>), Eastern White Pine (<i>Pinus strobus</i>), Red Maple (<i>Acer rubrum</i>), Sugar Maple (<i>Acer saccharum</i>), Basswood (<i>Tilia americana</i>), Black Walnut, Eastern Red Cedar, Bur Oak (<i>Quercus macrocarpa</i>), Eastern Cottonwood (<i>Populus deltoides</i>), and Eastern White Cedar (<i>Thuja occidentalis</i>) within the canopy. The shrub layer included Common Buckthorn, Cottony Willow (<i>Salix eriocephala</i>), Common Juniper (<i>Juniperus communis</i>), Common Lilac, Chokecherry (<i>Prunus virginiana</i>), and Tatarian Honeysuckle (<i>Lonicera tatarica</i>). Ground cover contained Smooth Brome, Reed Canary Grass, Tufted Vetch (<i>Vicia cracca</i>), Orchard Grass (<i>Dactylis glomerata</i>), Wild Parsnip (<i>Pastinaca sativa</i>), Common Milkweed (<i>Asclepias syriaca</i>), Wild Carrot, Canada Goldenrod (<i>Solidago canadensis</i>), Kentucky Bluegrass, Red Clover (<i>Trifolium pratense</i>), and Tall Goldenrod (<i>Solidago altissima</i>).
CUW1-1	Red Cedar Cultural Woodland Type	The canopy layer of this community dominated by Eastern Red Cedar with Red Pine (<i>Pinus resinosa</i>), Eastern White Pine, Scots Pine (<i>Pinus sylvestris</i>), Eastern White Cedar, Trembling Aspen, Sugar Maple, Bur Oak, White Elm, Green Ash, and White Oak (<i>Quercus alba</i>). The shrub layer of this community contained Gray Dogwood, Smooth Sumac (<i>Rhus glabra</i>), Morrow's Honeysuckle (<i>Lonicera morrowii</i>), and Manitoba Maple. The ground layer was densely vegetated with Tufted Vetch, Red Clover, Smooth Brome, Common Timothy (<i>Phleum pratense</i>), Riverbank Grape (<i>Vitis riparia</i>), Kentucky Bluegrass, Eastern Poison Ivy (<i>Toxicodendron radicans</i> var. <i>radicans</i>), Common Viper's Bugloss (<i>Echium vulgare</i>), Thicket Creeper (<i>Parthenocissus vitacea</i>), Canada Goldenrod, Red Raspberry (<i>Rubus idaeus</i>), Mouse-ear Hawkweed (<i>Pilosella officinarum</i>), Common Dandelion (<i>Taraxacum officinale</i>), Red Ash, Purple Crown-vetch (<i>Securigera varia</i>), Elecampane (<i>Inula helenium</i>), Wild Carrot, Spotted Knapweed (<i>Centaurea stoebe</i>), Calico Aster (<i>Symphyotrichum lateriflorum</i>), Orchard Grass, Redtop (<i>Agrostis gigantea</i>), Common Milkweed, and Tall Goldenrod.
CUW1	Cultural Woodland	Red Pine and White Pine (<i>Pinus strobus</i>) dominated the canopy. This plantation community exhibited signs of becoming naturalized to a Cultural Woodland (CUW1) as other species have colonized the subcanopy, understory and ground layer. The subcanopy was still mostly dominated by Red Pine and White Pine followed by Norway Maple and American Basswood (<i>Tilia americana</i>). The shrub layer contained Common Buckthorn, Green Ash, Black Cherry (<i>Prunus serotina</i>) and young Norway Maples. The ground layer was vegetated with Thicket Creeper, Yellow Avens (<i>Geum aleppicum</i>), Common Buckthorn seedlings and Black Cherry saplings.
CUP3-2	White Pine Coniferous Plantation Type	The vegetation community included Eastern White Pine, White Elm, Red Ash, Eastern Red Cedar, Norway Maple, and Sugar Maple. The shrub layer consisted Grey Dogwood, European Buckthorn, Red Ash, and Eastern Red Cedar. The ground layer included Kentucky Bluegrass, Early Goldenrod (<i>Solidago juncea</i>), Tufted Vetch, Wild Parsnip, Field Horsetail (<i>Equisetum arvense</i>), Canada Goldenrod, and Virginia Creeper (<i>Parthenocissus quinquefolia</i>).
FOC2-1	Dry – Fresh Redcedar Coniferous Forest Type	The canopy and subcanopy was dominated by Eastern Red Cedar, interspersed with White Elm, Green Ash, Jack Pine (<i>Pinus banksiana</i>), Austrian Pine, Eastern White Pine, Northern Red Oak (<i>Quercus rubra</i>), Eastern Cottonwood, Basswood, White Spruce, Bur Oak, Sugar Maple, Balsam Poplar (<i>Populus balsamifera</i>), and Manitoba Maple. The shrub layer consisted Eastern Red Cedar, Grey Dogwood, Common Buckthorn, Tatarian Honeysuckle, Green Ash, Nannyberry (<i>Viburnum lentago</i>), Common Prickly-ash (<i>Zanthoxylum americanum</i>), Common Juniper, Manitoba Maple, White Elm, Red Raspberry, and Staghorn Sumac (<i>Rhus typhina</i>). The ground cover included Kentucky Bluegrass, Crested Sedge (<i>Carex cristatella</i>), Green Ash, Wild Carrot, Smooth Brome, Canada Goldenrod, Tufted Vetch, Reed Canary Grass, Narrow-leaved Cattail (<i>Typha angustifolia</i>), Purple Loosestrife (<i>Lythrum salicaria</i>), Grass-leaved Goldenrod (<i>Euthamia graminifolia</i>), Common Buckthorn, Eastern Poison Ivy, Arrow-leaved Aster (<i>Symphyotrichum urophyllum</i>), Thicket Creeper, Tall Goldenrod, and Wild Parsnip.

ELC Code	ELC Community	Description
FOD5-1	Dry – Fresh Sugar Maple Deciduous Forest	Dominant species in the canopy included Sugar Maple, Red Ash, Eastern Cottonwood, Eastern White Pine, Bitternut Hickory (<i>Carya cordiformis</i>), Basswood, Bur Oak, Shagbark Hickory (<i>Carya ovata</i>), and Black Cherry. Dominant species in the sub-canopy included Sugar Maple, Red Ash, Trembling Aspen, White Elm, Bitternut Hickory, Shagbark Hickory, Eastern White Pine, and Eastern Red Cedar. The understory included Grey Dogwood, European Buckthorn, Tatarian Honeysuckle, Red Ash, Common Prickly-ash, White Elm, Thicket Creeper, and Sugar Maple. Groundcover generally included Thicket Creeper, Canada Goldenrod, Chokecherry, and Woodland Strawberry (<i>Fragaria vesca</i>).
OA0	Open Aquatic	This vegetation community represented the open water areas associated with the Napanee River. Scattered species on the edges included with Trembling Aspen, Red Maple, Manitoba Maple, Green Ash, Crack Willow (<i>Salix fragilis</i>), Grey Dogwood, Sandbar Willow (<i>Salix interior</i>), Pussy Willow (<i>Salix discolor</i>), and Riverbank Grape. The emergent, submerged and floating vegetation included Reed Canary grass, Watershield (<i>Brasenia schreberi</i>), Fragrant Water-lily (<i>Nymphaea odorata</i>), Reed Canarygrass, Swamp Loosestrife (<i>Decodon verticillatus</i>), Pickerelweed (<i>Pontederia cordata</i>), Glaucous Cattail (<i>Typha x glauca</i>), Narrow-leaved Cattail, Fowl Mannagrass (<i>Glyceria striata</i>), Variegated Pond-lily (<i>Nuphar variegata</i>), Purple Loosestrife, Spotted Joe Pye Weed (<i>Eutrochium maculatum</i>), Broad-leaved Cattail, and Small Duckweed (<i>Lemna minor</i>).
MAM1	Bedrock Meadow Marsh Ecosite	High level classification assigned to areas where access was limited or identified via aerial interpretation and/or full plant list was not completed.
MAM2	Mineral Meadow Marsh Ecosite	The shrub layer of this community contained Gray Dogwood, Green Ash and Manitoba Maple. The ground layer was densely vegetated with Common Reed (<i>Phragmites australis</i>), Reed Canary Grass, Hybrid Cattail (<i>Typha x glauca</i>) and Tall Goldenrod (<i>Solidago altissima</i>).
MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type	This vegetation community typically consistent scattered species Eastern Red Cedar, Austrian Pine, White Elm, Tamarack (<i>Larix laricina</i>), Green Ash, European Buckthorn, Manitoba Maple, European Buckthorn, Black Elderberry (<i>Sambucus nigra</i>), Grey Dogwood, Nannyberry, Eastern Red Cedar, Morrow's Honeysuckle, Trembling Aspen, and Riverbank Grape. Ground layer dominated by Reed Canarygrass, with Narrow-leaved Cattail, Broad-leaved Cattail, Glaucous Cattail, and included Willowherb (<i>Epilobium coloratum</i>), Canada Goldenrod, Wild Parsnip, Elecampane, Smooth Brome, Wild Carrot, Kentucky Bluegrass, and Tall Goldenrod.
SWD2-2	Green Ash Mineral Deciduous Swamp Type	The canopy and subcanopy was dominated by Green Ash, White Elm, Manitoba Maple, Bur Oak (<i>Quercus macrocarpa</i>) and Tamarack (<i>Larix laricina</i>). The shrub layer contained young Green Ash followed by Gray Dogwood, Common Buckthorn and Riverbank Grape (<i>Vitis riparia</i>). The ground layer contained Spotted Jewelweed (<i>Impatiens capensis</i>), Tall Goldenrod, Reed Canary Grass and Wild Black Currant (<i>Ribes americanum</i>).

4.1.7.3 Wildlife

The Study Area falls within the Napanee Limestone Plain Important Bird Area, which has been recognized for its importance to grassland and alvar bird populations. Background data was collected from the Ontario Breeding Bird Atlas (OBBA; Birds Canada, 2026) to identify the species of birds that have been recorded in the vicinity of the Study Area. Thirty or more pairs of Loggerhead Shrikes have been recorded on the plain, representing about 20% of the Canadian population of the nationally endangered eastern subspecies, and roughly 75% of Ontario's breeding population (Bland, 2004). The Upland Sandpiper, a Species of Conservation Concern, has also been recorded in nationally significant numbers, with an estimated 150 to 200 pairs present annually, accounting for approximately 2% of the Canadian population (Bland, 2004).

The Napanee River Bridge over Highway 401 is the sole structure within the Study Area and was assessed for its potential to support nesting birds and roosting bats. Barn Swallow and Eastern Small-footed Myotis were identified as species that may nest or roost in suitable structures, including the Napanee River Bridge. As such, these species have medium to high potential for occurrence in the Study Area. In addition, migratory birds, including Species at Risk, may use the existing bridge for nesting.

Additional Species of Conservation Concern that have been recorded within the Napanee Limestone Plain Important Bird Area include the Common Nighthawk, Grasshopper Sparrow, and Eastern Meadowlark. Based on the background review of secondary sources completed as part of the terrestrial assessment, records were identified for numerous species of birds, butterflies, moths, insects, reptiles, amphibians and mammals occurring within or in the vicinity of the Study Area.

Previous field investigations completed by AECOM in 2016 for the *Terrestrial Ecosystems Existing Conditions and Impact Assessment Report – Highway 401 Interchange Improvements at Palace Road (GWP 4197-13-00)* did not identify any incidental wildlife observations, bird nests or Species at Risk or Species of Conservation Concern in the Palace Road Study Area (AECOM, 2019b).

4.1.7.3.1 Incidental Wildlife Observations

Incidental wildlife observations relied on field investigations undertaken as part of the larger Study #2 Project (GWP 4016-21-00). During field investigations, any evidence (such as observation, scat, tracks, calls, etcetera.) of wildlife and their associated habitat and habitat usages were documented. All incidental wildlife observations during the July 2025 field investigations, within the Napanee River Bridge Study Area are listed in **Table 4-4** below. The majority of species are common and widespread in Ontario; however, one Species at Risk (Eastern Meadowlark) and one Species of Conservation Concern (Monarch Butterfly) were observed in the Study Area.

Table 4-4: Incidental Wildlife Observations

Taxon	Common Name	Scientific Name	S-Rank ¹	On the PSO List? ²	SARA Status ³	MBCA Protected
Amphibian	Green Frog	<i>Lithobates clamitans</i>	S5	-	No Status	N/A
Birds	American Goldfinch	<i>Spinus tristis</i>	S5	-	No Status	Yes
Birds	Common Yellowthroat	<i>Geothlypis trichas</i>	S5B,S3N	-	No Status	Yes
Birds	Cedar Waxwing	<i>Bombycilla cedrorum</i>	S5	-	No Status	Yes
Birds	Eastern Meadowlark	<i>Sturnella magna</i>	S4B,S3N	-	THR	Yes
Birds	European Starling	<i>Sturnus vulgaris</i>	SNA	-	No Status	No
Birds	House Finch	<i>Haemorhous mexicanus</i>	SNA	-	No Status	Yes
Birds	Killdeer	<i>Charadrius vociferus</i>	S4B	-	No Status	Yes
Birds	Red-winged Blackbird	<i>Agelaius phoeniceus</i>	S5	-	No Status	No
Birds	Song Sparrow	<i>Melospiza melodia</i>	S5	-	No Status	Yes
Birds	Warbling Vireo	<i>Vireo gilvus</i>	S5B	-	No Status	Yes
Birds	Yellow Warbler	<i>Setophaga petechia</i>	S5B	-	No Status	Yes
Mammal	Meadow Vole	<i>Microtus pennsylvanicus</i>	S5	-	No Status	No
Reptile	Northern Watersnake	<i>Nerodia sipedon sipedon</i>	S5	-	No Status	-
Insects	Eastern Forktail	<i>Ischnura verticalis</i>	S5	-	No Status	-
Insects	Monarch	<i>Danaus plexippus</i>	S2N,S4B	-	END	-
Insects	Orange Bluet	<i>Enallagma signatum</i>	S4	-	No Status	-
Insects	River Jewelwing	<i>Calopteryx aequabilis</i>	S5	-	No Status	-
Insects	Viceroy	<i>Limenitis archippus</i>	S5	-	No Status	-

¹**S-rank:** The natural heritage provincial ranking system (provincial S-rank) is used by the MNRF Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. The following status definitions were taken from NatureServe Explorer (2015)
SX – Presumed Extirpated—Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH- Possibly Extirpated (Historical)—Species or community occurred historically in the province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become SH without such a 20–40-year delay if the only known occurrences in a province were destroyed or if it had been extensively and unsuccessfully looked for.
S1 – Critically Imperiled—Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province.
S2-Imperiled—Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province.
S3 – Vulnerable—Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 – Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 – Secure—Common, widespread, and abundant in the nation or state/province.
SNR – Unranked—Province conservation status not yet assessed.
SU – Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA – Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# - Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
Breeding Status Qualifiers
B – Breeding—Conservation status refers to the breeding population of the species in the province.
N – Nonbreeding—Conservation status refers to the non-breeding population of the species in the province.
M – Migrant—Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.
Note: A breeding status is only used for species that have distinct breeding and/or non-breeding populations in the province. A breeding-status S-rank can be coupled with its complementary non-breeding-status S-rank if the species also winters in the province, and/or a migrant-status S-rank if the species occurs regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. The two (or rarely, three) status ranks are separated by a comma (e.g., “S2B,S3N” or “SHN,S4B,S1M”).
Other Qualifiers
? -Inexact or Uncertain—Denotes inexact or uncertain numeric rank. (The “?” qualifies the character immediately preceding it in the S-rank).
²**PSO List:** The Species Conservation Act (SCA), 2025 protects species listed as Threatened and Endangered on the Protected Species in Ontario (PSO) List on provincial and private land. The PSO includes species based on recommendations from the Committee on the Status of Species at Risk in Ontario (COSSARO), which evaluates the conservation status of species occurring in Ontario.
³**SARA Status:** The Species at Risk Act (SARA) protects species listed as Threatened, Endangered or Extirpated on federal land. The following are the categories of at risk:
END (Endangered) – A species facing imminent extinction or extirpation in Canada.
THR (Threatened) – Any native species that, on the basis of the best available scientific evidence, is at risk of becoming endangered throughout all or a large portion of its Canadian range if the limiting factors are not reversed.
SC (Special Concern) – A species that may become threatened or endangered due to a combination of biological characteristics and identified threats.
NAR (Not at Risk) – A species that has been evaluated and found to be not at risk.
Note: species with “-” represents those that are not listed on Schedule 1 of SARA.

Many of the birds incidentally observed in the Study Area receive protection under the *Migratory Bird Convention Act*. The remaining species observed incidentally were designated as Secure (S5) or Apparently Secure (S4) in Ontario.

4.1.7.3.2 Schedule 1 Migratory Birds

Ecological Land Classification completed in the Study Area identified suitable nesting habitat for three of the Schedule 1 species, which included wetland habitats for Great Blue Heron and Green Heron, and forested habitats for Pileated Woodpecker. No nests of Green Heron or Great Blue Heron were observed incidentally in the Study Area and no cavity tree nests for Pileated Woodpecker were observed.

4.1.7.4 Species at Risk and Species at Risk Habitat

For this report, Species at Risk are defined as species that are listed as Threatened, Endangered or Extirpated provincially on the Protected Species of Ontario list under the current *Species Conservation Act*, as well as migratory bird species and fish species listed as Threatened, Endangered or Extirpated under the federal *Species at Risk Act*. The *Species Conservation Act* came into force March 30, 2026, and repealed the *Endangered Species Act*, 2007. Under the *Species Conservation Act*, bird species that are currently listed as Threatened, Endangered or Extirpated under the *Species at Risk Act*, that are also protected under the *Migratory Birds Convention Act*, 1994 are excluded from the Protected Species of Ontario list. Protection for these species is instead provided under *Species at Risk Act*, which applies to all species listed on Schedule 1, as well as their critical habitat where applicable and their residences as defined by the Act.

Species at Risk with ranges overlapping the Study Area, or with recent occurrence records in the vicinity of the Study Area, were identified and screened for probability of occurrence by comparing their habitat requirements to on-site conditions, as determined through the background information review and field investigations. The potential for the species to occur within the Study Area was determined through a probability of occurrence whereby the following rankings were applied:

- **Low Probability:** no suitable habitat for the species and no occurrence of the species incidentally observed through field reconnaissance within the Study Area but there is a known species record in the general area;
- **Medium Probability:** potentially suitable Species at Risk habitat identified within the Study Area, but no occurrence of the species incidentally observed through field reconnaissance although there is a known species record in the general area; and,

- **High Probability:** good quality Species at Risk habitat identified within the Study Area and known species record in the Study Area (either through current field assessment or background information).

There was a total of 21 Species at Risk identified in or within the vicinity of the Study Area, based on the background review. One Species at Risk, Eastern Meadowlark, was confirmed in the Study Area during field investigations. In addition, 15 Species at Risk were determined to have high and medium probability of occurrence in the Study Area based on the presence of suitable habitat, while the remaining Species at Risk were determined to have a low potential. **Table 4-5** below identifies Species at Risk with high or medium potential of occurrence in the Study Area.

4.1.7.5 Significant Wildlife Habitat

Significant Wildlife Habitat is divided into four broad categories that include the following:

- Seasonal Concentration Areas;
- Rare Vegetation Communities or Specialized Habitats for Wildlife;
- Habitats of Species of Conservation Concern; and
- Animal Movement Corridors.

Significant Wildlife Habitat includes the habitat of Species of Conservation Concern, which consists of the following:

- Species with Provincial S-rank assigned by the Natural Heritage Information Centre as S1 (critically imperilled), S2 (imperilled) or S3 (vulnerable);
- Species listed as 'SC' by the Committee on the Status of Species at Risk in Ontario; and
- Species identified as nationally Endangered or Threatened by the Committee on the Status of Endangered Wildlife in Canada, that are not protected under the *Species Conservation Act*.

Table 4-5: Species at Risk with High or Medium Potential of Occurrence in the Study Area

Taxa	Common Name	Scientific Name	On the PSO List? ¹	SARA Status ²	Probability of Occurrence	Confirmed or Candidate Habitat
Bird	Bank Swallow	<i>Riparia riparia</i>	No	THR	Medium	Candidate Vertical riverbanks with suitable substrate were not observed in the Study Area, however, Bank Swallow may use any stockpiled material in the Study Area if not maintained at an angle less than 70 degrees.
Bird	Barn Swallow	<i>Hirundo rustica</i>	No	THR	Medium	Candidate Barn Swallow may nest on any suitable structures in the Study Area, including the Napanee River Bridge.
Bird	Bobolink	<i>Dolichonyx oryzivorus</i>	No	THR	Medium	Candidate Large (> 5 hectare) Cultural Meadows and agricultural fields that may have suitable crop selection in a year (i.e., lightly grazed pastures, young hayfields, or alfalfa fields) were present in the Study Area (McCracken <i>et al.</i> , 2013). No incidental observations of Bobolink were made during field investigations.
Bird	Eastern Meadowlark	<i>Sturnella magna</i>	No	THR	High	Confirmed Two Eastern Meadowlark were observed calling within the Study Area. Locations of the observations are shown on Figure A5 in Appendix A of the <i>Terrestrial Ecosystems Existing Conditions and Impact Assessment Report</i> (AECOM, September 2026). The areas where these individuals were heard calling is considered confirmed habitat. Other large (> 5 hectare) Cultural Meadows, fallow fields, pasture and agricultural fields with suitable crop selection in a year (i.e., lightly grazed pastures, young hayfields, or alfalfa fields) are considered candidate habitat for this species (McCracken <i>et al.</i> , 2013).
Bird	Loggerhead Shrike	<i>Lanius ludovicianus</i>	No	THR	Medium	Candidate The Napanee Limestone Plain Important Bird Area (IBA), known core grassland habitat for the Loggerhead Shrike, is present in the Study Area. Succeeding Cultural Thicket (CUT) and Eastern Red Cedar Cultural Woodlands (CUW1-1) elsewhere in the Study Area may provide candidate habitat, but targeted surveys were not conducted.
Bird	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	No	END	Medium	Candidate Potentially suitable habitat found within hedgerows, forest and cultural woodland communities (FOD, SWD, CUW) in the Study Area where targeted surveys were not conducted remain candidate habitat.
Mammal	Eastern Red Bat	<i>Lasiurus borealis</i>	Yes (END)	No status	High	Candidate This species lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities (Humphrey and Fotherby, 2019). Forested communities (FOD, FOM, FOC SWD, CUW) with suitable roosting habitat were present within the Study Area.
Mammal	Eastern Small-footed Myotis	<i>Myotis leibii</i>	Yes (END)	No status	High	Candidate Eastern Small-footed myotis roosts in a variety of habitats, including under rocks and bridges and in rock outcrops, caves, mines, and hollow trees. (Humphrey, 2017). This species hibernates in caves and abandoned mines, preferring colder, drier sites and showing strong hibernation site fidelity. Forested communities (FOD, FOM, FOC, SWD, SWM, CUW) with suitable roosting habitat and a potentially suitable bridge were present within the Study Area.
Mammal	Hoary Bat	<i>Lasiurus cinereus</i>	Yes (END)	No status	High	Candidate This species lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities. (Humphrey and Fotherby, 2019). Forested communities (FOD, FOC, SWD, CUW, CUP) with suitable roosting habitat were present within the Study Area.
Mammal	Little Brown Myotis	<i>Myotis lucifugus</i>	Yes (END)	END	High	Candidate Roosts and maternity colonies of Little Brown Myotis may occur in manmade structures (attics, abandoned buildings, barns), rock crevices, behind loose or flaking bark, or within tree cavities (Humphrey and Fotherby, 2019). Forested communities (FOD, FOC, SWD, CUW, CUP) with suitable roosting habitat were present within the Study Area.

Taxa	Common Name	Scientific Name	On the PSO List? ¹	SARA Status ²	Probability of Occurrence	Confirmed or Candidate Habitat
Mammal	Northern Myotis	<i>Myotis septentrionalis</i>	Yes (END)	END	High	Candidate This species is associated with forest habitats, roosting under loose bark or in tree cavities (Humphrey and Fotherby, 2019). Forested communities (FOD, FOC, SWD, CUW, CUP) with suitable roosting habitat were present within the Study Area.
Mammal	Silver-haired Bat	<i>Lasionycteris noctivagans</i>	Yes (END)	No status	High	Candidate This species lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in barns or other man-made structures (Humphrey and Fotherby, 2019). Forested communities (FOD, FOC, SWD, CUW, CUP) with suitable roosting habitat were present within the Study Area.
Mammal	Tri-colored Bat	<i>Perimyotis subflavus</i>	Yes (END)	END	High	Candidate This species lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in barns or other man-made structures (Humphrey and Fotherby, 2019). Forested communities (FOD, FOC, SWD, CUW, CUP) with suitable roosting habitat were present in the Study Area.
Plant	Black Ash	<i>Fraxinus nigra</i>	Yes (END)	THR	Medium	Candidate Black ash grows in open, moist to wet communities such as swamps, bogs, and riparian areas. Deciduous swamp (SWD) communities were present in the Study Area that may provide suitable habitat. No Black Ash were recorded incidentally during ELC field investigations. Targeted searches for Black Ash were not completed.
Plant	Butternut	<i>Juglans cinerea</i>	Yes (END)	END	Medium	Candidate Butternut trees usually grow alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams but is also found on well-drained gravel sites and rarely on dry rocky soil (Poisson and Ursic, 2013). No Butternut were observed during Ecological Land Classification field investigations. Forest (FOD), and deciduous cultural woodland/hedgerow (CUW) vegetation communities observed in the Study Area may provide suitable habitat for Butternut. Targeted searches for Butternut were not completed.
Reptile	Blanding's Turtle	<i>Emydoidea blandingii</i>	Yes (THR)	END	Medium	Candidate Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants (MECP, 2021). They regularly travel hundreds of metres from the nearest water body, especially while they are searching for a mate or traveling to a nesting site. Blanding's Turtle prefers aquatic habitats but utilizes terrestrial habitats during the active season. They often favour eutrophic environments with shallow water less than 2 metres deep, soft organic substrates, and vegetation (MECP, 2021). Suitable aquatic habitat (OAO) with available basking sites were present within the Study Area. Suitable habitat may be present in the slower moving sections of the Napanee River, or in the adjacent swamp habitat. Blanding's Turtle individuals may also be found in the Study Area if travelling between wetland habitats.

Notes: 1,2 Refer to notes under **Table 4-4**.

Table 4-6 identifies Species of Conservation Concern with confirmed high and medium potential to occur within the Study Area.

A desktop Significant Wildlife Habitat assessment was conducted using secondary sources and a review of field data, to determine if habitat in the Study Area met either candidate or confirmed criteria for each Significant Wildlife Habitat category. In most cases, Significant Wildlife Habitat could only be assessed to the candidate level because species-specific surveys were not conducted to confirm species presence thresholds required to meet confirmed Significant Wildlife Habitat.

Candidate Significant Wildlife Habitat types that may be present within the Study Area, but that could not be confirmed in the absence of targeted surveys, are summarized below:

4.1.7.5.1 Seasonal Concentration Areas of Animals

- **Raptor Wintering Area** – The Study Area contained areas where forest communities were adjacent to agricultural fields, meadow, thicket and woodland communities that together could provide Raptor Winter Areas. Roosting sites are usually in mature or mixed conifer woodlands that abut windswept fields, including hayfields, pastures and meadows that support large and productive small mammal populations. Field investigations after the first accumulation of snow would be required to confirm significance.
- **Bat Maternity Colonies** – Suitable ecosites, including deciduous forest, cultural woodland and deciduous swamp were present in the Study Area, where tree with cavities or loose bark may be present. Acoustic monitoring would be required to confirm Significant Wildlife Habitat presence.
- **Turtle Wintering Areas** – The Napanee River is likely deep enough that it does not freeze completely and may provide suitable turtle wintering habitat for Northern Map Turtle. Targeted visual encounter surveys for turtles were not completed during preliminary design.
- **Reptile Hibernaculum** – Candidate habitat may be present anywhere in the Study Area where reptiles can hibernate below the frost line. Northern Water Snake, an indicator species, was observed within the Study Area, but no reptile hibernaculum features were incidentally observed. Targeted visual encounter surveys for reptiles and associated hibernaculum were not completed.

Table 4-6: Species of Conservation Concern with Confirmed High and Medium Potential to Occur within the Study Area

Taxa	Common Name	Scientific Name	S-Rank ¹	COSSARO Status ¹	COSEWIC Status ¹	SARA Status	Probability of Occurrence	Species Confirmed
Birds	Eastern Wood-pewee	<i>Contopus virens</i>	S4B	SC	SC	SC	Medium	No
Birds	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	S4B	SC	No Status	SC	Medium	No
Reptile	Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	SC	SC	SC	Medium	No
Reptile	Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	SC	SC	Medium	No
Reptile	Snapping Turtle	<i>Chelydra serpentina</i>	S4	SC	SC	SC	Medium	No
Insect	Judith’s Underwing Moth	<i>Catocala judith</i>	S2S3	-	-	-	Medium	No
Insect	Juniper Hairstreak	<i>Callophrys gryneus</i>	S3	-	-	-	Medium	No
Insect	Monarch	<i>Danaus plexippus</i>	S2N,S4B	SC	END	END	Medium	Confirmed
Insect	Penitent Underwing Moth	<i>Catocala piatrix</i>	S3	-	-	-	Medium	No
Insect	Walnut Caterpillar Moth	<i>Datana integerrima</i>	S3S4	-	-	-	Medium	No

Notes: 1,2 Refer to notes under **Table 4-4**.

4.1.7.5.2 Specialized Wildlife Habitat Considered Significant Wildlife Habitat

- **Waterfowl Nesting Areas** – A waterfowl nesting area extends 120 metres from a wetland or cluster of three or more small wetlands. Swamp and Meadow Marsh wetlands were identified throughout the Study Area, and therefore the upland habitat adjacent to these wetlands were considered candidate Waterfowl Nesting Areas.
- **Bald Eagle and Osprey Nesting, Foraging and Perching Habitat** – Treed swamp and forest communities directly adjacent to the Napanee River were present in the Study Area that may provide candidate habitat.
- **Turtle Nesting Areas** – For an area to function as a turtle nesting area, it must provide sand and gravel that turtles are able to dig in, and be in open, sunny areas adjacent to suitable wetland habitat. Suitable substrate may be adjacent to the Napanee River and treed swamp, but targeted surveys were not conducted.
- **Seeps and Springs** – No seeps were noted in the Study Area; however, forested communities within the Study Area where access was not granted remain candidate Significant Wildlife Habitat for Seeps and Springs.
- **Amphibian Breeding Habitat (Woodland)** – Suitable ecosites were present in the Study Area, some of which may contain suitable wetlands or vernal pools that support significant amphibian breeding. Targeted marsh monitoring surveys were not completed to confirm species presence thresholds for significance.
- **Amphibian Breeding Habitat (Wetlands)** – Suitable wetland ecosites were present in the Study Area that may contain suitable breeding habitat. Green Frog, an indicator species, was observed incidentally in the Study Area. Targeted marsh monitoring surveys were not completed to confirm species presence thresholds for significance.

4.1.7.5.3 Habitat for Species of Conservation Concern Considered Significant Wildlife Habitat

- **Marsh Breeding Bird Habitat** – Generally, wetlands with shallow water and emergent aquatic vegetation were not present in the Study Area. For Green Heron, all Swamp and Marsh are considered candidate habitat.
- **Terrestrial Crayfish** – Terrestrial crayfish chimneys were not observed in the Study Area during field investigations. However, areas surrounding suitable wetland communities in the Study Area are considered candidate habitat for terrestrial crayfish.
- **Special Concern and Rare Wildlife Species** – Adult Monarchs were observed flying in the Study Area. As larvae were not observed, exact locations of habitat were not identified, and habitats in the Study Area remain candidate only.

Additionally, of all Species of Conservation Concern records identified in the background review and screened, those determined to have high or medium probability of occurrence in the Study Area are considered to have candidate habitats in the Study Area.

4.1.7.5.4 Animal Movement Corridors

- **Amphibian Movement Corridors** – Candidate Amphibian Breeding Significant Wildlife Habitat (Woodland and Wetland) was identified in the Study Area. Movement corridors are likely present adjacent to candidate Amphibian Breeding Significant Wildlife Habitat.

4.2 Socio-Economic Environment

Socio-economic environment studies were undertaken to document and assess existing social and economic features.

4.2.1 Land Use

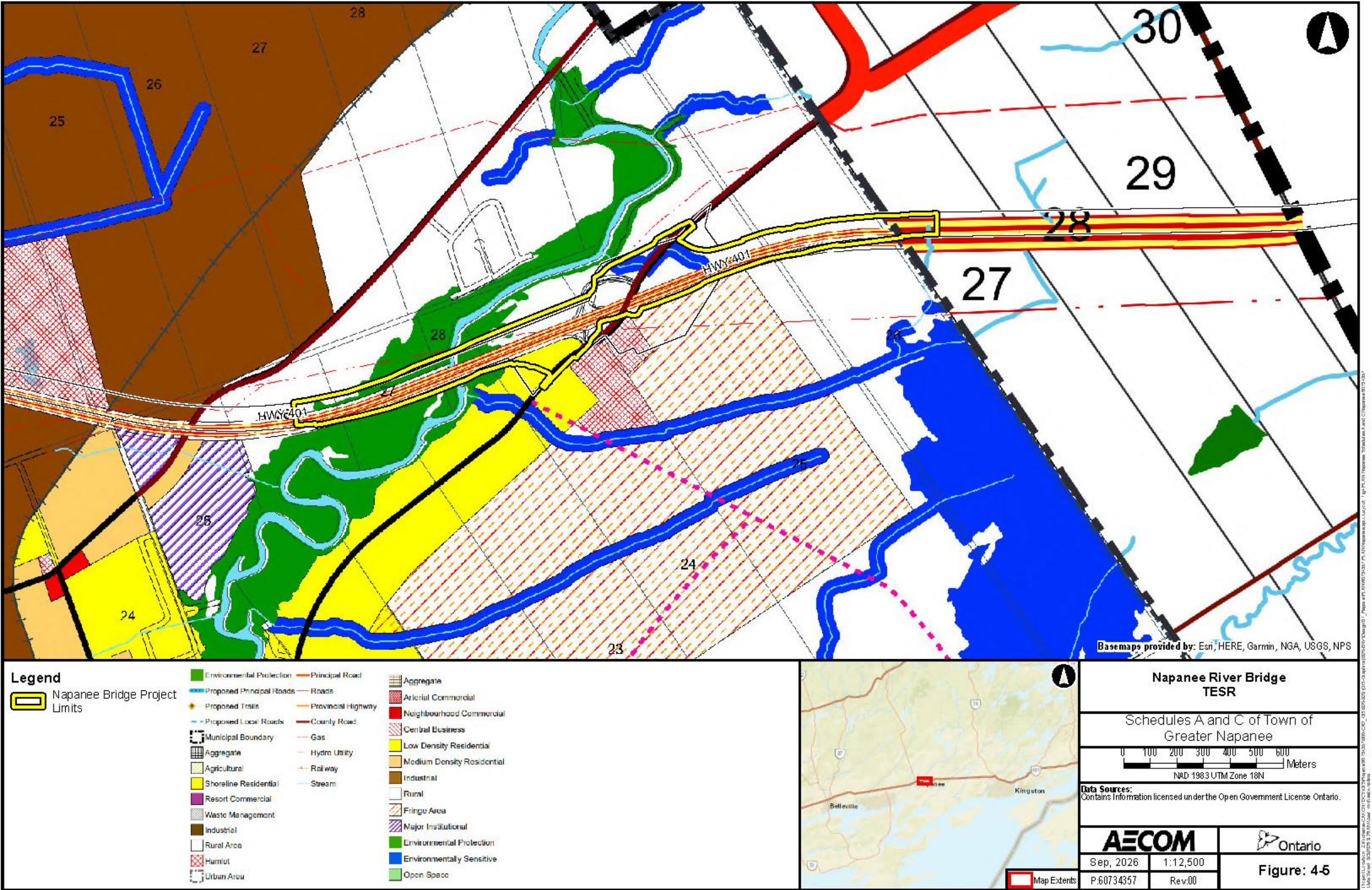
A land use review was completed in accordance with the *Ministry of Transportation of Ontario Environmental Reference for Highway Design* (June 2013) with the purpose of reviewing secondary source information including provincial and municipal planning documents so as to identify applicable land use policies as well as existing and future land use and development proposed within and adjacent to the Study Area. Additionally, the land use review captures all land uses that may experience direct or indirect impacts resulting from the project. The review was documented in a *Land Use Factors Report* (AECOM, August 2026), available under separate cover upon request.

4.2.1.1 Existing Land Use

The Study Area is located within the Town of Greater Napanee within the County of Lennox and Addington. Based on 2021 Statistics Canada census data, the Town of Greater Napanee has a population of 16,879, a growth of 6.2% since 2016.

The majority of the Study Area consists of ‘Low Density Residential’ in the southwest and southeast, ‘Arterial Commercial’ and ‘Fringe Area’ located in the southeast, as well as a combination of Rural, Environmentally Sensitive and Environmental Protection land uses on the northeast and northwest of the Napanee River Bridge Study Area. A map depicting land use designations within the Town of Greater Napanee is provided on **Figure 4-5**.

Figure 4-5: Land Use Designations – Town of Greater Napanee



To the north and south of Highway 401 along Palace Road there are residences on either side that mainly consists of single-family dwellings on large parcels of land. The land use in the southeast quadrant of the Study Area is designated as 'Arterial Commercial'. This land is currently occupied by Palace Childcare Daycare, although it formerly housed Palace Village, which included a number of retail stores, office spaces, and restaurants.

For additional details pertaining to area land use please refer to the *Land Use Factors Report* (AECOM, August 2026), available under separate cover upon request.

4.2.1.2 Future / Planned Land Use

Similar to other municipalities in Ontario, growth within the Study Area will be focused and promoted within settlement areas, in addition to appropriate limited growth in rural areas in keeping with the scale, character and service levels of the area and objectives detailed in local municipal Official Plans.

The County of Lennox and Addington and Town of Greater Napanee websites were reviewed on March 2, 2026, to identify any planned future developments within the Study Area. AECOM also reached out directly to the impacted municipalities to inquire about ongoing development applications and planned development within the Study Area in August 2026.

4.2.1.2.1 Town of Greater Napanee

The Town does not list active planning applications on their website. Town of Greater Napanee staff indicated their preference for adequate width and structural flexibility to be maintained within the Palace Road overpass replacement to preserve the opportunity for a future trail crossing should it be warranted. The Town further noted that they are currently undertaking a Utilities Master Plan to determine preferred future municipal water and wastewater servicing corridors, some of which may ultimately require crossing(s) of Highway 401. The municipality indicated their preference that the subject Class Environmental Assessment and related design work retain sufficient flexibility to accommodate future servicing infrastructure once planning work is complete and expressed their desire for continued coordination with the Ministry of Transportation of Ontario staff to ensure alignment as planning progresses for both the Ministry of Transportation of Ontario and the municipality.

4.2.1.2.2 County of Lennox and Addington

The County does not list active planning applications on their website. The County, as well as the Napanee Active Transportation Allies, have requested the inclusion of

pedestrian and cycling accommodations at Palace Road (County Road 5), among other locations through Lennox and Addington County. Feedback from the Public Information Centre held on March 31, 2026, included requests for the consideration of both kayak and snowmobile travel at the Napanee River and Millhaven Creek.

4.2.1.3 Active Transportation

Most road shoulders along the Study Area consist of gravel or grass surfaces, making them unsuitable for safe and consistent pedestrian or cyclist use.

The County of Lennox and Addington Geographic Information System Open Data Hub identify the following County bike trails along public roadways which intersect with the Study Area:

- **Cycling Route G** – Salmon River runs north-south along County Road 41 (Centre Street), crossing under Highway 401 at the interchange. The route crosses back over Highway 401 along Newburgh Road (County Road 1); and
- **Cycling Route A** – Newburgh crosses under Highway 401 via Palace Road (County Road 5).

4.2.2 Noise

A Noise Impact Assessment was completed in accordance with the *Ministry of Transportation of Ontario Environmental Guide for Noise* published in 2022. Under the Ministry Noise Guide, the “noise impact” is defined as the difference between the “No Project” and the “With Project” noise levels during the subject year of assessment (Horizon Year), which is typically 10 years post-construction. The Horizon Year of 2044 was used as the basis of assessment.

Land uses designated as noise sensitive by the *Ministry of Transportation of Ontario Environmental Guide for Noise* consist of the following:

- Private homes such as single-family residences;
- Townhouses;
- Multiple unit buildings, such as apartments with Outdoor Living Areas for use by all occupants; and
- Hospitals, nursing homes for the aged, where there are Outdoor Living Areas for the patients.

In addition to the above, where certain land uses are considered “part of a community”, meaning located next to a Traditional Noise Sensitive Areas, the land use is considered

noise sensitive and included in the analysis. The land uses considered noise sensitive when part of a community are:

- Educational facilities and day care centres, where there are Outdoor Living Areas for students;
- Campgrounds that provide overnight accommodation;
- Hotels/motels where there are Outdoor Living Areas for visitors;
- Community centres with Outdoor Living Areas (for example outdoor basketball courts);
- Municipal parks (excluding golf courses and trails); and
- Places of worship with Outdoor Living Areas.

Land uses that do not qualify as noise sensitive by the *Ministry of Transportation of Ontario Guide for Noise* consist of the following:

- Apartment balconies above ground floor;
- Cemeteries;
- All commercial; and
- All industrial.

In general, the areas adjacent to the Project consist of suburban development on both the north and south sides of Highway 401, along with rural dwellings to the northeast and northwest of the Project. Noise Sensitive Areas examined as part of the *Noise Impact Assessment Report* (AECOM, October 2026), are presented in **Appendix D**.

4.2.3 Air Quality

An Air Quality Impact Assessment was completed to determine the impacts of the project on regional air quality and greenhouse gases within the Study Area. This was done by incorporating traffic study data combined with a configuration of traffic-links in the CAL3QHCR model. Through this analysis, regional air quality impacts were predicted at the identified sensitive and critical receptors present within the Study Area for the three conditions (Current, Future No-Build, Future Build). Air quality data collected from 2015 to 2024 at the nearest representative ambient air monitoring stations was used as background data.

The air quality assessment was completed in accordance with the *Ministry of Transportation of Ontario Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects* (Ministry of Transportation of Ontario Air Quality Guideline).

This Study Area includes a 500 metre buffer to be able to capture air quality impacts and effects from traffic within the Town of Greater Napanee and the surrounding area. The

500 metre buffer is recommended through the Ministry of Transportation of Ontario Air Quality Guideline. The locations of the critical and sensitive receptors within the Study Area are identified in Appendix A of the *Air Quality Assessment Report* (AECOM, October 2026), available under separate cover upon request. As per the Ministry of Transportation of Ontario Air Quality Guideline, sensitive receptors are defined as all permanent locations of residence (such as detached housing, apartments, and condominiums, etcetera) and critical receptors included health care facilities, educational institutions, childcare facilities, or nursing/long-term care facilities. Within this Study Area, a total of 39 sensitive receptors and one critical receptor were identified.

The baseline ambient air quality levels were based on publicly available historical data from ambient air quality monitoring stations within Ontario and Quebec. Data utilized is the most recent publicly available at the time of the preparation of this assessment (June 2026).

The background concentrations for each contaminant were also compared to the applicable Provincial Ambient Air Quality Criteria and Federal Canadian Ambient Air Quality Standards for the time averaging periods, as shown in *Air Quality Impact Assessment Report* completed by AECOM (2026).

4.2.3.1 Traffic Assessment

Three conditions were modelled for this assessment: Existing Conditions, Future No-Build Conditions, and Future Build Conditions.

The sources located within the Study Area for Existing Conditions and Future No-Build Conditions remained identical. The only difference between the two conditions was the anticipated traffic volume within the Study Area that would result in a change to the air quality impact. The Future Build Conditions includes new sources of traffic emission from the proposed Study infrastructure.

Existing and projected future turning movement count data and processed annual averaged daily traffic volumes were provided by the Ministry of Transportation of Ontario and AECOM's traffic engineering modelling for 2024, to be used as current traffic volumes, and future projected data for 2044.

Annual emissions from all sources within the Study Area were estimated using the emission rates (grams per vehicle kilometre traveled), multiplied by the predicted annual traffic volumes and source lengths (kilometres).

4.2.3.2 Predicted Cumulative Concentrations: Existing Conditions

The highest predicted contaminant emissions for the Existing Conditions were modelled in CAL3QHCR using a receptor grid, including identified sensitive and critical receptors.

The results of the dispersion modelling identified the location of the maximum concentration at the most impacted receptor within the Study Area.

The maximum concentrations at sensitive and critical receptors within the Study Area are summarized in **Table 4-7**. Results are presented with the background concentrations for each contaminant per averaging period to determine the cumulative concentrations. The cumulative concentrations were compared to the applicable provincial and federal standards, and the predicted exceedances are noted in red in **Table 4-7**.

The maximum concentration cumulative impacts at each identified sensitive and critical receptor is included in the *Air Quality Assessment Report* (AECOM, October 2026), available under separate cover upon request – along with the isopleth figures showing the maximum impact for all contaminants within Existing Conditions.

4.2.4 Contamination, Waste, and Excess Materials Management

A Contamination Overview Study was undertaken for the Study Area that involved a records review and a site drive-by windshield survey completed in June 2026. Available data (such as land use, environmental databases, aerial photographs and fire insurance plans) was reviewed and a drive-by windshield survey conducted to analyze and identify known or potential contaminated sites.

The land use within the Contamination Overview Study Area is a mixture of agricultural and densely wooded forests, with a few residential properties and to the north and retail commercial, institutional and residential properties across the south portion. For identification purposes, land parcels were assigned Parcel Identifier numbers by AECOM.

Based on the observations identified during the site visit and review of available historical information, three properties/areas within the Study Area have been identified as having a “high” potential for soil and groundwater contamination, including a former gas station/service centre, a Hydro One construction site with imported fill of unknown quality and two fill piles, and a site adjacent to the westbound Highway 401 on ramp with imported fill of unknown quality. Five properties/areas within the Study Area have been identified as having “Medium” potential for soil and groundwater contamination. In addition to the properties rated high or medium due to site activities, there were twelve significant spill records, representing eleven spill locations, which are also considered as having “high” potential for soil and/or groundwater contamination. The contamination potential ratings for the properties within the Study Area and significant spill locations can be found in the *Contamination Overview Study* completed by AECOM (August 2026), available under separate cover upon request.

Table 4-7: Summary of Air Quality Existing Conditions Cumulative Concentration: Maximum Concentration

Contaminant	Averaging Period (hr)	Percentile or Mean	Background Concentration (µg/m³)	Maximum POI Concentration (µg/m³)	Sensitive Receptor	Cumulative Concentration (µg/m³)	AAQC/ CAAQS (µg/m³)	Source	Max POI % of AAQC/ CAAQS	Cumulative% of AAQC / CAAQS
NO ₂	1	90 th	13.9	185	SR28	199	400	AAQC	46%	50%
NO ₂	1	98 th	63.8	185	SR28	249	83.2	CAAQS	223%	300%
NO ₂	24	90 th	13.2	102.5	SR5	115.7	200	AAQC	51%	58%
NO ₂	Annual	Mean	7.5	65.7	SR5	73.2	23.8	CAAQS	277%	308%
CO	1	90 th	241.1	3906	SR28	4147	36,200	AAQC	11%	11%
CO	8	90 th	239.6	1259	SR5	1498	15,700	AAQC	8%	10%
SO ₂	1	99 th	46.39	3.41	SR28	49.79	179	CAAQS	2%	28%
SO ₂	1	90 th	1.103	3.41	SR28	4.51	106	AAQC	3%	4%
SO ₂	10 min	90 th	1.82	5.63	SR28	7.45	178	AAQC	3%	4%
SO ₂	Annual	Mean	0.701	0.211	SR5	0.911	10.6	AAQC	2%	9%
SO ₂	Annual	Mean	0.846	0.211	SR5	1.057	11	CAAQS	2%	10%
PM ₁₀	24	90 th	19.1	9.9	SR5	28.9	50	AAQC	20%	58%
PM _{2.5}	24	98 th	20.3	4.78	SR5	25.1	27	CAAQS	18%	93%
PM _{2.5}	24	98 th	20.3	4.78	SR5	25.1	23	CAAQS (2030)	21%	109%
PM _{2.5}	Annual	Mean	6.56	1.46	SR5	8.0	8.8	CAAQS	17%	91%
PM _{2.5}	Annual	Mean	6.56	1.46	SR5	8.0	8	CAAQS (2030)	18%	100%
Acetaldehyde	30 min	90 th	3.54	6.01	SR28	9.55	500	AAQC	1%	2%
Acetaldehyde	24	90 th	1.20	0.93	SR5	2.13	500	AAQC	0.2%	0.4%
Acrolein	1	90 th	0.197	0.483	SR28	0.680	4.5	AAQC	11%	15%
Acrolein	24	90 th	0.081	0.089	SR5	0.170	0.4	AAQC	22%	43%
Benzene	24	90 th	0.382	1.463	SR5	1.845	2.3	AAQC	64%	80%
Benzene	Annual	Mean	0.262	0.447	SR5	0.709	0.45	AAQC	99%	157%
Benzo(a)pyrene	24	90 th	3.21E-04	3.85E-03	SR5	4.17E-03	5.00E-05	AAQC	7690%	8332%
Benzo(a)pyrene	Annual	Mean	1.33E-04	1.19E-03	SR5	1.32E-03	1.00E-05	AAQC	11874%	13204%
1,3-Butadiene	24	90 th	0.1915	0.1044	SR5	0.2959	10	AAQC	1%	3%
1,3-Butadiene	Annual	Mean	0.0709	0.0319	SR5	0.1029	2	AAQC	2%	5%
Formaldehyde	24	90 th	1.21	0.91	SR5	2.12	65	AAQC	1%	3%

- Notes: (1) NO2 is represented using the MOVES emissions rate for NOx, converted to NO2 using the ozone limiting method.
- (2) Air Quality Threshold for fine particulate (PM_{2.5}) is based on the 98th percentile ambient measurement (24-hour), annually averaged over three years. This standard is referenced from the appropriate year of the Canadian Ambient Air Quality Standards (CAAQs). The CAAQs are voluntary objectives.
- (3) The 1 hour, 8 hour, and 24 hour ambient concentrations for the contaminants were obtained from the 90th percentile of hourly measurements from representative air quality monitoring stations. Annual ambient concentrations for the contaminants were obtained from the mean measurements from the representative air quality monitoring stations.
- (4) The annual maximum impacts presented in Appendix I in the *Air Quality Assessment Report* (AECOM, October 2026) reflect the average of all five years of meteorological data, rather than the highest predicted impact of each of the five year's individual annual average, as reflected in Table 6-1 of the *Air Quality Assessment Report* (AECOM, October 2026).
- (5) Concentrations above the provincial AAQC and CAAQs are shown in red.

4.2.5 Designated Substance Survey

A Designated Substance Survey was completed in the Spring of 2026 for the Napanee River Bridge structure. The purpose of the Designated Substance Survey was to identify and confirm the presence of hazardous materials or designated substances that may be present and to identify recommendations for the safe removal of any substances found. The Designated Substance Survey was conducted in accordance with the requirements of Ontario Regulation 490/09, Ontario Regulation 189/19 [amending Ontario Regulation 490/09 (Designated Substances)] ("Ontario Regulation 189/19"), and Ontario Regulation 278/05, Designated Substance – Asbestos on Construction Projects and in Buildings and Repair Operations, as amended by Ontario Regulation 479/10 ("Ontario Regulation 278/05") of the *Ontario Occupational Health and Safety Act*. For additional details regarding the assessment, please refer to the *Designated Substance Survey Report* (AECOM, October 2026), available under separate cover upon request.

The inspection revealed the following:

- **Asbestos:** The inspection of the individual Designated Substance Survey Site identified potential suspected asbestos containing materials and locations including the bridge barrier wall insulations, bearing components, conduit piping, and load distribution boards, including "Transite", bridge mastic compound, road level asphalt, road level tar, waterproofing membrane, expansion joint sealant, and embedded rigid conduit cement piping insulation. During the investigation, a variety of insulation materials along the surface areas of the Designated Substance Survey Site were also observed. Bulk samples of the road level asphalt were collected for laboratory analysis for asbestos content. However, the results indicated that asbestos containing materials are not present in any of the bulk samples that were sampled.
- **Friable and Non-Friable Asbestos Containing Materials:** AECOM did not encounter any friable or non-friable asbestos containing materials at the Designated Substance Survey Site.
- **Presumed Asbestos Containing Materials:** According to the Detailed Condition Survey Report Site No. 17X-0062/B0 prepared by the Ministry of Transportation of Ontario (September 2023), the Napanee River Bridge was originally constructed in 1960 and underwent two rehabilitations in 1983 and 2017. Work completed under the 2017 minor rehabilitation included structure rehabilitation, barrier wall patched but not fully replaced, and westbound lane waterproofing. The minor rehabilitation works also included eastbound lane waterproofing completed in 1988. Therefore, the waterproofing membrane installed along the bridge is not suspected to contain asbestos.

- **Lead:** During the Designated Substance Survey program, AECOM did not observe painted or otherwise coated surfaces along the Site. However, other potential sources may include:
 - Coated rebar previously inserted during original construction of the Site; and
 - Painted or otherwise coated surfaces along the Site not inspected by AECOM during this Study.
- **Silica:** The potential source of silica observed at the Site included poured concrete decking, beams, columns, foundations, abutments, footings, and guardrails. The only silica product used in concrete is most likely silica fume, which is a finely divided product used in high strength concrete or in concrete with special requirements such as very low permeability.
- **Mercury:** There were no bridge lighting poles or bases observed along either side of the Napanee River Bridge inspected as part of the Designated Substance Survey program. Based on the review of the historical bridge condition assessment and inspection reports for the Napanee River Bridge, there are no lighting fixtures along the underside of the bridge inspected as part of this project. Therefore, based on the Designated Substance Survey completed by AECOM of the Site, there are no suspected mercury containing fixtures or equipment observed or otherwise suspected to be present at the Site.
- **Other Designated Substances:** Other designated substances, including benzene, ethylene oxide, vinyl chloride, arsenic, coke oven emissions, acrylonitrile, and isocyanates were not observed or reported to be present at the Site inspected by AECOM. These materials are not expected to be present in any bulk form at the Site.
- **Polychlorinated Biphenyls:** There were no suspected Polychlorinated Biphenyls containing fixtures or equipment observed or reported at the Site.
- **Ozone Depleting Substances:** There were no Ozone Depleting Substances observed or reported at the Site inspected. Based on the results of the inspections, ozone depleting substances are not expected to be present.
- **Mould:** There was no mould observed at the DSS Site inspected. Based on the inspection, mould is not expected to be present.

4.3 Cultural Environment

4.3.1 Archaeology

As part of the current undertaking, a Stage 1 Archaeological Assessment was undertaken for the Study Area in accordance with the requirements of the Ontario *Heritage Act* and the Standards and Guidelines for Consultant Archaeologists. To inform the Stage 1 Archaeological Assessment and further establish the archaeological context of the study area, a search was made of the Ontario Archaeological Sites Database, maintained by the Ministry of Citizenship and Multiculturalism, to identify any previous archaeological work conducted within the Study Area boundaries. This search resulted in the identification of five archaeological sites are located within the study area.

Based on a review of the historical, environmental, and archaeological context of the Study Area, AECOM's Stage 1 background study has determined that the potential for the recovery of pre- and post-contact Indigenous and 19th century settler archaeological resources within the Study Area is high, based on the presence of the following features:

- Proximity to previously identified archaeological sites within the Study Area: BbGf-47, BbGf-48, BbGf-49, BbGf-50, and BbGf-51.
- Distance to various types of water sources (Napanee River).
- Early 19th century transportation routes [Situated between Kingston and Napanee (County Roads 41 and 5)].
- Areas of early 19th century colonial settlement (Town of Napanee).

Additionally, certain features indicate that archaeological potential has been removed, such as land that has been subject to extensive and intensive deep land alterations that have severely damaged the integrity of any archaeological resources. This includes landscaping that involves grading below the topsoil level, building footprints, quarrying and sewage and infrastructure development.

For additional details regarding previous studies and archaeological potential, please refer to the draft *Stage 1 Archaeological Assessment Report* (AECOM, October 2026) included in **Appendix E**. The findings and recommendations from the Stage 1 Archaeological Assessment, including recommendations for further archaeological assessments in the Study Area, are included in **Section 9.13**.

4.3.2 Built Heritage

As part of this undertaking a cultural heritage assessment was completed for the Study Area and documented in a *Cultural Heritage Resource Assessment Report* (AECOM, October 2026). The assessment identified the baseline cultural heritage conditions and includes a historical summary of the development of the Cultural Heritage Resource Assessment Report Study Area. The report further includes an inventory of existing and potential Built Heritage Resources and Cultural Heritage Landscapes and a preliminary impact assessment along with recommendations for mitigation and next steps to conserve potential Built Heritage Resources and Cultural Heritage Landscapes within the Study Area. To support a thorough review of Built Heritage Resources and Cultural Heritage Landscapes within the Study Area, AECOM reviewed the Town of Greater Napanee Heritage Register, available historical mapping and databases, and undertook a field review on April 28, 2026.

Eleven potential Built Heritage Resources and Cultural Heritage Landscapes, including seven potential Cultural Heritage Landscapes and four potential Built Heritage Resources, were identified during the field review. These properties have no formal heritage recognition but have the potential for cultural heritage value interest, pending further evaluation. Among the eleven Built Heritage Resources and Cultural Heritage Landscapes identified within the Cultural Heritage Resource Assessment Report Study Area, is the Spook Horn Cemetery, identified as Cultural Heritage Landscape 6.

Table 4-8 provides a summary of known or potential Built Heritage Resources and Cultural Heritage Landscapes located within the Cultural Heritage Resource Assessment Report Study Area and the locations can be referenced in the *Cultural Heritage Resource Assessment Report: Built Heritage Resources and Cultural Heritage Landscapes* (AECOM, October 2026) located in **Appendix F**.

Table 4-8: Known or Potential Built Heritage Resources and Cultural Heritage Landscapes within the Cultural Heritage Study Area

Feature IDs	Location/Address	Resource Type	Heritage Status	Description of Property
Cultural Heritage Landscape 1	395 Newburgh Road, Napanee, Ontario	Farmstead	None (Potential)	<p>Design</p> <p>Farmhouse</p> <ul style="list-style-type: none">■ Roof Type: Hipped with Dormers■ Number of Storeys: Two-and-a-half■ Style Design: Edwardian-Classical■ Structural Material: Red Brick■ Roof Material: Metal■ Notable Features: Symmetrical façade, sash windows with shutters, a brick chimney, and a large front verandah with decorative brackets and balusters atop fieldstone piers■ Additions: One rear addition <p>Farmstead</p> <ul style="list-style-type: none">■ Outbuildings: a gambrel roof barn with multiple additions, multiple concrete and steel silos, multiple drivesheds, and a large storage shed.■ Landscape features: a gravel laneway connecting domestic and production areas, agricultural fields, manicured lawns, and mature trees. <p>Historical</p> <ul style="list-style-type: none">■ Farmstead is historically located in the east half of Lot 25, Concession 2 in the Township of Richmond.■ A house in the vicinity of Cultural Heritage Landscape 1 is first depicted on the 1916 NTS Map. <p>Contextual</p> <ul style="list-style-type: none">■ The farmstead contributes to the rural character of Newburgh Road in the Town of Greater Napanee.
Cultural Heritage Landscape 2	334 Church Street, Napanee, Ontario (Riverside Cemetery)	Cemetery	None (Potential)	<p>Design</p> <ul style="list-style-type: none">■ The cemetery contains headstones that date from the early 19th century to the present day. The headstones are largely visible from the right of way.■ A mausoleum sits adjacent to the entrance to the cemetery.■ A series of winding, gravel paths wrap around the cemetery.■ Mature trees can be found scattered across the different sections of the cemetery. <p>Historical</p> <ul style="list-style-type: none">■ Cultural Heritage Landscape 2 is historically located in Lot 25, Concession 2 of Richmond Township.■ The cemetery is first depicted in the 1860 <i>Putnam & Walling Illustrated Historical Atlas</i>.■ The cemetery served the historic community of Richmond Township. <p>Contextual</p> <ul style="list-style-type: none">■ The Riverside Cemetery is currently associated with the Town of Greater Napanee.■ The cemetery is currently operational.■ The cemetery contributes to the rural, residential character of Newburgh Road in the Town of Greater Napanee.

Feature IDs	Location/Address	Resource Type	Heritage Status	Description of Property
Cultural Heritage Landscape 3	342 East Street, Napanee, Ontario	Farmstead	None (Potential)	<p>Design</p> <p>Farmhouse</p> <ul style="list-style-type: none">■ Roof Type: Cross-Gable■ Storeys: One-and-a-half■ Style Design: Gothic Revival■ Structural Material: Wood Frame and Siding■ Roof Material: Metal■ Notable Features: Large enclosed front porch <p>Farmstead</p> <ul style="list-style-type: none">■ Outbuildings: a gambrel roof barn with multiple additions, multiple concrete silos, multiple drivesheds, and a large storage shed.■ Landscape features: a gravel laneway, manicured lawns, and mature trees. <p>Historical</p> <ul style="list-style-type: none">■ Farmstead is historically located in Lot 26, Concession 1 in the Township of Richmond.■ A farmhouse in the vicinity of Cultural Heritage Landscape 2 is first depicted on the 1878 <i>H. Meaford & Co. Illustrated Historical Atlas</i>. <p>Contextual</p> <ul style="list-style-type: none">■ The farmstead contributes to the rural character of Newburgh Street in the Town of Greater Napanee.
Cultural Heritage Landscape 4	425 Newburgh Road, Napanee, Ontario	Farmstead	None (Potential)	<p>Design</p> <p>Farmhouse</p> <ul style="list-style-type: none">■ Roof Type: Hipped■ Number of Storeys: Two■ Style Design: Italianate■ Structural Material: Red Brick■ Roof Material: Metal■ Notable Features: Balanced, symmetrical façade, large, two-storey bay sections with decorative, stonework pieces, framing a central portico entrance with decorative trim and columns, large, stylized cornices with decorative brackets, a second-storey balcony above the portico entrance, and a pair of brick chimneys■ Additions: One rear addition <p>Farmstead</p> <ul style="list-style-type: none">■ Outbuildings: a gambrel roof barn, a storage shed, an apple barn, the remains of a potential round barn, and a potential driveshed.■ Landscape features: a gravel laneway, fenced paddocks, agricultural fields, manicured lawns, and mature trees. <p>Historical</p> <ul style="list-style-type: none">■ Farmstead is historically located in the east half of Lot 26, Concession 3 in the Township of Richmond.■ A farmhouse in the vicinity of Cultural Heritage Landscape 3 is first depicted on the 1916 NTS Map. <p>Contextual</p> <ul style="list-style-type: none">■ The farmstead contributes to the rural character of Newburgh Road in the Town of Greater Napanee.

Feature IDs	Location/Address	Resource Type	Heritage Status	Description of Property
Cultural Heritage Landscape 5	Napanee River	Waterway	None (Potential)	<p>Design</p> <ul style="list-style-type: none">■ The river begins at Camden Lake, where it curves eastward to pass through marshlands and Napanee Lake. The river then flows southward, passing through a number of small communities (i.e. Yarker, Camden East, and Newburgh) and Greater Napanee, before ending at the Bay of Quinte on Lake Ontario.■ The river’s landscape is primarily natural and flows through woodlands and small rural communities. <p>Historical</p> <ul style="list-style-type: none">■ The river, originally named <i>Appanea</i>, served as a source of sustenance and as a travel route for the Wendat, Anishinaabeg, and Haudenosaunee Peoples during the pre-contact period (Lennox and Addington County Museums & Archives, n.d.; Hall, 2023c).■ During the post-contact period, the river also served as a source of power for mills along the river’s edge and played a major role in the settlement of its surrounding communities. <p>Contextual</p> <ul style="list-style-type: none">■ The river contributes to the rural and natural character of the area.■ The wooded and natural landscape along the banks of the Napanee River contributes to the viewscales of the river.■ The river also acts as a physical landmark in the area.
Built Heritage Resource 1	480 Newburgh Road, Napanee, Ontario	House	None (Potential)	<p>Design</p> <p>Farmhouse</p> <ul style="list-style-type: none">■ Roof Type: Cross-Gable■ Storeys: One-and-a-half■ Style Design: Gothic Revival■ Structural Material: Red Brick■ Roof Material: Metal■ Notable Features: Asymmetrical façade, one arched entryway on the upper half-storey, large front verandah that connects to a side deck, an upper half-storey balcony above the verandah, and ornate bargeboard trim.■ Additions: One rear addition <p>Historical</p> <ul style="list-style-type: none">■ The farmhouse was once part of a larger farmstead that was historically located in the west half of Lot 26, Concession 7 in the Township of North Fredericksburgh.■ A farmhouse in the vicinity of Built Heritage Resource 1 is first depicted on the <i>1860 Putnam & Walling Illustrated Historical Atlas</i>. <p>Contextual</p> <ul style="list-style-type: none">■ The property contributes to the rural, residential character of Newburgh Road in the Town of Greater Napanee.

Feature IDs	Location/Address	Resource Type	Heritage Status	Description of Property
Cultural Heritage Landscape 6	Spook Horn Cemetery	Cemetery	None (Potential)	<p>Design</p> <ul style="list-style-type: none">■ The site is situated on a raised terrace along the Napanee River, backing onto private properties along Palace Road.■ The general area of the cemetery is distinguished by natural features such as overgrown, dense brush and mature trees.■ To the south of the cemetery is a horn-shaped point of land, likely inspiring the name of the cemetery (True North Archaeological Services, Preceding)■ No headstones are visible from the public ROW. <p>Historical</p> <ul style="list-style-type: none">■ The cemetery is set within Lot 25, Concession 7 of North Fredericksburgh Township.■ The cemetery is believed to have been connected to Clarksville, one of the oldest and most historic settlements within Greater Napanee (South Fredericksburgh, 2025b).■ Archaeological investigations completed in 1960s hypothesized that the cemetery was founded shortly after 1786 following the arrival of the first Loyalists into Napanee (South Fredericksburgh, 2025b).■ The cemetery is believed to have been abandoned after 1840 (South Fredericksburgh, 2025b).■ No available historical mapping has depicted the cemetery.■ The number of memorials found connected to the cemetery is currently unknown. <p>Contextual</p> <ul style="list-style-type: none">■ The cemetery contributes to the rural character of Palace Road in the Town of Greater Napanee.■ The Spook Horn Cemetery was likely associated with the historic community of Clarksville.
Cultural Heritage Landscape 7	760 Palace Road, Napanee, Ontario	Farmstead	None (Potential)	<p>Design</p> <p>Farmhouse</p> <ul style="list-style-type: none">■ Roof Type: Cross-Gable■ Storeys: Two■ Style Design: Gothic Revival■ Structural Material: Brick and Stucco Siding■ Roof Material: Metal■ Notable Features: Asymmetrical façade, a large, enclosed front porch, and a brick chimney on the gable end■ Additions: One rear addition <p>Farmstead</p> <ul style="list-style-type: none">■ Outbuildings: A gable-roof barn, and a driveshed.■ Landscape features: a gravel laneway, agricultural fields, manicured lawns, treelines dividing the domestic and production areas, and mature trees. <p>Historical</p> <ul style="list-style-type: none">■ The farmstead is historically located in the east half of Lot 23, Concession 7 in the Township of North Fredericksburgh.■ A farmhouse in the vicinity of Cultural Heritage Landscape 7 is first depicted on the 1916 NTS Map. <p>Contextual</p> <ul style="list-style-type: none">■ The farmstead contributes to the rural, residential character of Palace Road in the Town of Greater Napanee.

Feature IDs	Location/Address	Resource Type	Heritage Status	Description of Property
Built Heritage Resource 2	776 Palace Road, Napanee, Ontario	House	None (Potential)	<p>Design</p> <ul style="list-style-type: none">■ Roof Type: Hipped■ Storeys: Two■ Style Design: Vernacular Italianate■ Structural Material: Wood Frame and Synthetic Siding■ Roof Material: Asphalt■ Notable Features: Balanced, symmetrical façade, enclosed, central, portico entrance, and decorative brackets under the eaves of the hipped roof,■ Additions: One side addition <p>Historical</p> <ul style="list-style-type: none">■ The house was once part of a larger farmstead that was historically located in the east half of Lot 25, Concession 7 in the Township of North Fredericksburgh.■ A house in the vicinity of Built Heritage Resource 2 is first depicted on the 1916 NTS Map. <p>Contextual</p> <ul style="list-style-type: none">■ The property contributes to rural, residential character of Palace Road in the Town of Greater Napanee.
Built Heritage Resource 3	798 Palace Road, Napanee, Ontario	House	None (Potential)	<p>Design</p> <ul style="list-style-type: none">■ Roof Type: Hipped■ Storeys: Two■ Style Design: Vernacular Victorian farmhouse■ Structural Material: Wood Frame and Synthetic Siding■ Roof Material: Asphalt■ Notable Features: Balanced, symmetrical façade, central portico entrance, low pitched hipped roofline, large vertical sash windows, and a brick chimney on the side elevation■ Additions: One rear addition <p>Historical</p> <ul style="list-style-type: none">■ The house was once part of a larger farmstead that was historically located in the east half of Lot 25, Concession 7 in the Township of North Fredericksburgh.■ A house in the vicinity of Built Heritage Resource 3 is first depicted on the 1916 NTS Map. <p>Contextual</p> <ul style="list-style-type: none">■ The property contributes to the rural, residential character of Palace Road in the Town of Greater Napanee.
Built Heritage Resource 4	1011 Palace Road, Napanee, Ontario	House	None (Potential)	<p>Design</p> <ul style="list-style-type: none">■ Roof Type: Hipped■ Storeys: Two■ Style Design: Vernacular Edwardian Foursquare■ Structural Material: Wood Frame and Synthetic Siding■ Roof Material: Metal■ Notable Features: Asymmetrical façade, foursquare form, large, undecorated cornice, simplified cornice brackets, octagonal feature window, shallow segmental arch headers and multi pane windows and a brick chimney.■ Additions: One rear addition <p>Historical</p> <ul style="list-style-type: none">■ The house was once part of a larger farmstead that was historically located in the east half of Lot 25, Concession 7 in the Township of North Fredericksburgh.■ A house in the vicinity of Built Heritage Resource 4 is first depicted on the 1933 NTS Map. <p>Contextual</p> <ul style="list-style-type: none">■ The property contributes to the rural, residential character of Palace Road in the Town of Greater Napanee.

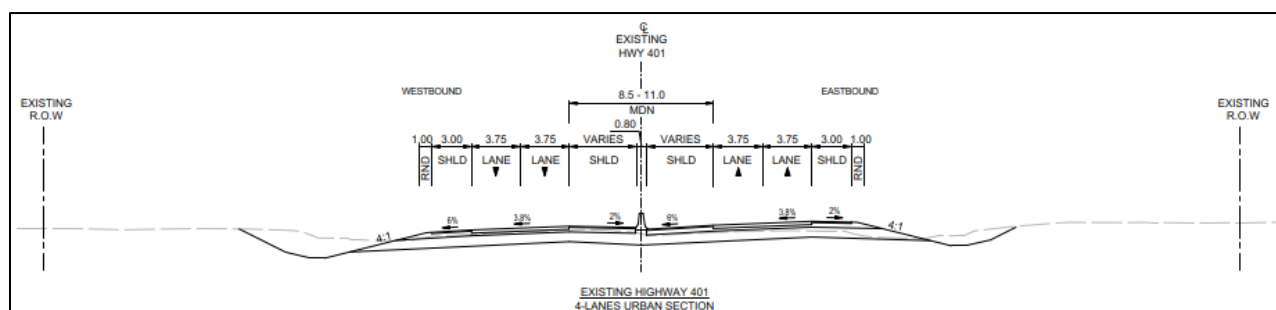
4.4 Transportation Infrastructure

4.4.1 Road Network

4.4.1.1 Highway 401

Highway 401 is a Controlled Access Highway under the jurisdiction of MTO. The section of Highway 401 within the Study Area is a divided four-lane rural highway with a design speed of 120 kilometres per hour and a posted speed of 100 kilometres per hour. Highway 401 through the study limits includes four through lanes (two in each direction) and additional speed change lanes located within the vicinity of the interchanges. The eastbound and westbound lanes are separated by a variable width paved median protected by concrete median barrier (urban section), from east of Newburgh Road to east of Palace Road interchange. The existing Highway 401 cross section is illustrated on **Figure 4-6** below.

Figure 4-6: Existing Highway 401 with Paved Median (Urban Section)



Horizontal Alignment

There are two horizontal curves along Highway 401 within the study limits. All existing horizontal curves meet or exceed the requirements of the existing 120 kilometres per hour design speed. Horizontal curves were also assessed in terms of the ability to meet the 130 kilometres per hour design speed.

Vertical Alignment

There is one vertical curve along Highway 401 within the study limits which meets the requirements for the existing design speed of 120 kilometres per hour. Profile changes throughout this corridor were assessed to meet the requirements for a design speed of 130 kilometres per hour.

4.4.1.2 Interchanges

Palace Road and Highway 401 Interchange

As described in the *Highway 401 Palace Road Transportation Environmental Study Report* (March 2019), Palace Road is a rural arterial two-lane road which is an interchange that has a buttonhook configuration in the eastbound direction and Parclo B configuration in the westbound direction with twin structures carrying Highway 401 traffic over Palace Road.

Numerous residential private entrances are located along Palace Road north and south of the interchange, while the interchange is also utilized by heavy truck traffic. North of Highway 401, Palace Road winds to the east and connects to County Road 1 (Newburgh Road), which crosses Highway 401 via an underpass. South of Highway 401, Palace Road winds southwestward as it crosses County Road 2 in the Town of Greater Napanee.

Within the Study Area, the alignment of Palace Road is skewed at approximately 46 degrees with respect to Highway 401 and has horizontal curves directly north and south of the interchange which restrict sight distance at the ramp terminal intersections.

The Napanee River crosses beneath Highway 401 approximately 700 metres west of the Palace Road crossing. Other notable constraints adjacent to the interchange include the Palace Village on the east side of Palace Road, a hydro corridor crossing through the interchange, rock cut and a woodlot in the southeast quadrant. Palace Road has a posted speed limit of 60 kilometres per hour south of Highway 401 and between the north and south ramp terminal. North of the north ramp terminal the posted speed is 80 kilometres per hour. **Table 4-9** to **Table 4-15** below, provide a summary of existing Palace Road geometrics in comparison to a Design Speed of 80 kilometres per hour.

Table 4-9: Existing Palace Road Horizontal Elements

Point of Intersection Station	Posted Speed (Assumed Design Speed) (km/h)	Existing Centre Line Radius (m)	Spiral Parameters	Curve Length (m)	Equivalent Design Speed based on Geometrics (km/h)
9+726	60 (80)	950	-	185	130
9+880	60 (80)	440	-	122	100
10+094	60 (80)	275	-	182	80
10+230	60 (80)	350	-	125	90

Note: ■ Element does not meet standard based on existing 120 kilometres per hour design speed.

Table 4-10: Existing Palace Road Vertical Alignment Elements

Vertical Point of Intersection Station	Posted Speed (Assumed Design Speed) (km/h)	Grade In (%)	Grade Out (%)	Existing K-Value (Crest or Sag)	Equivalent Design Speed based on K-Value (km/h)
9+723	60 (80)	-0.05	-0.90	70 (Crest)	100
9+806	60 (80)	-0.90	-0.30	40 (Sag)	90
9+875	60 (80)	-0.30	-1.05	50 (Crest)	90
10+065	60 (80)	-1.05	1.90	50 (Sag)	100
10+214	60 (80)	1.90	-0.30	50 (Crest)	90

Note: ■ Element does not meet standard based on existing 120 kilometres per hour design speed.

Table 4-11: Palace Road Interchange Horizontal Elements

Ramp	Type of Ramp	Advisory Speed (km/h)	MTO Design Supplement Standard Ramp Design Speed (km/h)	MTO Design Supplement Standard Ramp Radius (m)	Existing Radius of Critical Curve (m)	Equivalent Ramp Design Speed based on Critical Curve (km/h)
W-N/S	Single-Lane Exit	30	80 (min 60)	250 (min 130)	65	40
N/S-E	Entrance	40	60 (min 40)	130 (min 55)	45	<40
E-N/S	Single-Lane Exit – Inner Loop	30	80 (min 60)	250 (min 130)	40	<40
N/S-W	Entrance	40	60 (min 40)	130 (min 55)	65	40

Note: ■ Element does not meet standard based on existing 120 kilometres per hour design speed.

Table 4-12: Palace Road Interchange Vertical Elements

Ramp	Vertical Point of Intersection Station	Grade In (%)	Grade Out (%)	Existing K-Value (Crest or Sag)	Equivalent Design Speed based on K-Value (kilometres per hour)
Ramp W-N/S – Advisory Speed 30 kilometres per hour	10+078	4.00	1.75	20 (Crest)	70
Ramp N/S-E – Advisory Speed 40 kilometres per hour	9+980	-0.90	3.00	30 (Sag)	80
Ramp E-N/S – Advisory Speed 30 kilometres per hour	10+104	-4.00	0.50	15 (Sag)	50
Ramp N/S-W – Advisory Speed 40 kilometres per hour	10+018	-0.40	-3.00	15 (Crest)	60

Note: ■ Element does not meet standard based on existing 120 kilometres per hour design speed.

Table 4-13: Palace Road Interchange Speed Change Lanes along Highway 401

Ramp	Type of Ramp	Advisory Speed (km/h)	Speed Change Lane Length (m)	Speed Change Lane Approximately Equivalent Highway Design Speed (km/h)	Speed Change Lane Design Standard based on Advisory Speed (m)	Sight Distance to Exit Bullnose / Entrance SCL Taper Sight Distance (m)	Approximate Equivalent Sight Distance to Exit Bullnose / Entrance SCL Taper Design Speed (km/h)	Sight Distance to Exit Bullnose / Entrance SCL Taper Design Standard (m)
W-N/S	Single-Lane Exit	30	305	130	280-405	>470	130	370-470
N/S-E	Entrance	40	540	120	465-785	>470	130	370-470
E-N/S	Single-Lane Exit – Inner Loop	30	345	130	280-405	>470	130	370-470
N/S-W	Entrance	40	390	110	465-785	390	130	370-470

Note: ■ Element does not meet standard based on existing 120 kilometres per hour design speed.
■ Element does not meet standard based on 130 kilometres per hour design speed.

Table 4-14: Ramp Terminal Intersections at Palace Road Interchange – Turning Sight Distance

Ramp	Movement	Crossing Road Design Speed (km/h)	Minimum Sight Distance Required (m)	Available Sight Distance (m)	Notes
North Ramp Terminal Intersection – Ramp E-N/S	Left turn from Stop	80	170	110	Looking south
North Ramp Terminal Intersection – Ramp E-N/S	Right turn from Stop	80	145	>145	Looking north
South Ramp Terminal Intersection – Ramp W-N/S	Left turn from Stop	80	170	>170	Looking south
South Ramp Terminal Intersection – Ramp W-N/S	Right turn from Stop	80	145	104	Looking north

Note: ■ Available sight distance does not meet the required sight distance.

Table 4-15: Access Offsets and Sight Distance in the Vicinity of Palace Road Interchange

Location (Address) – Palace Road	Posted Speed (km/h)	Access Type (Residential / Commercial / Other)	Side of Road	Approx. Distance from Ramp Terminal (m)	Offset Standard (m)	Sight Distance Required (m)	Minimum Sight Distance Available (m)
974 County Road 5	60	Residential	East	284	150	85	>85
959 County Rd 5	60	Residential	West	204	150	85	>85
931 County Rd 5	60	Residential	West	58	150	85	>85
824 Palace Rd Entrance 1 – Ticket Fighter	60	Commercial	East	59	150	85	>85
824 Palace Rd Entrance 2 – Ticket Fighter	60	Commercial	East	108	150	85	>85
816 Palace Road	60	Residential	East	179	150	85	>85
802 Palace Road	60	Residential	East	224	150	85	>85

Note: ■ Available sight distance does not meet the required sight distance.
■ Entrance location does not meet the minimum access offset spacing from the ramp terminal intersections.

4.4.2 Structures

The Napanee River Bridge (Site No. 17X-0062/B0) will be replaced to accommodate the future footprint of Highway 401. The existing bridge is located at the intersection of Napanee River and Highway 401 in the Town of Greater Napanee.

Highway 401 / Napanee River Bridge (Site 17X-0062/B0)

The existing structure is a three-span reinforced-concrete rigid frame constructed in 1960. Each of the two exterior spans is 8.382 metres long, measured from the abutment front faces to the pier centrelines. The centre span is 13.716 metres long, measured between the pier centrelines. The bridge is oriented west to east and carries four lanes of Highway 401 traffic over the Napanee River – two lanes in each direction (westbound and eastbound). The bridge abutments and piers are perpendicular relative to the Highway 401 centreline.

The total deck width is 28.753 metres. This consists of two 0.965 metre-wide curbs, two 3.75 metre lanes in each direction, 4.775 metre wide median shoulders on each side of the 0.800 metre wide centre median, and a 1.0 metre wide outside shoulder for the eastbound lanes and a 0.500 metre outside shoulder for the westbound lanes. The north and south barrier walls are respectively 0.430 to 0.450 metres wide and are set back approximately 0.530 metres and 0.510 metres from the fascia.

The superstructure consists of a cast-in-place reinforced-concrete deck of variable depth. The deck is surfaced with a 90 millimetre thick asphalt and waterproofing system. It has a cross-fall of 2% away from the westbound and eastbound direction centrelines. The existing superstructure is supported by conventional reinforced-concrete abutments and two piers. The abutments and piers are founded on two rows of battered steel piles (HP 310x72) driven into dense to very dense grey till. The piles are approximately 15.24 metres long. There are 6 metre long approach slabs at each end of the bridge. The roadway approaches are supported by reinforced-concrete wingwalls at all four bridge quadrants. The wingwalls are also founded on steel piles.

The bridge has undergone rehabilitation work during 1982, 1988, and most recently in 2017. A visual inspection of the existing structure was carried out by AECOM on July 15, 2025. The wearing surface and foundations were in good condition; however, the deck, barriers, and substructure ranged from good to poor with localized cracking, scaling, spalling, and minor delaminations. Embankments were generally good with localized erosion in the northwest quadrant.

4.4.2.1 Adjacent Municipal Roads and Railway Structures

Table 4-16 below provides a summary of the adjacent existing structures within the study limits.

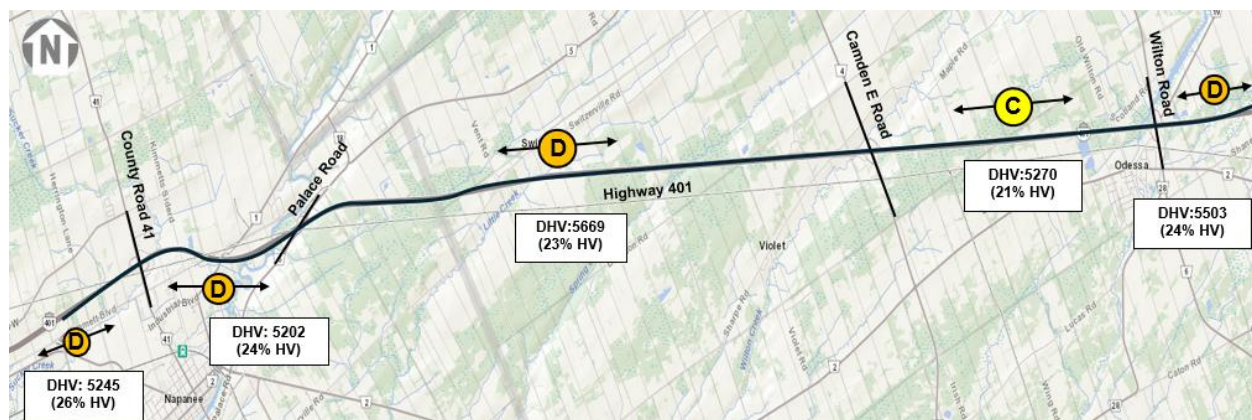
Table 4-16: Adjacent Municipal Roads and Railway Structures

Structure Name	Site No.	Structure Type (Span, Length, Type, Foundations)	Existing Conditions
Palace Road Overpass	17X-0063/B0	The bridges are single-span steel girder structures with a clear span length of approximately 18 metres.	The eastbound and westbound structures underwent major rehabilitation in 1983 and 1988, respectively. A second round of rehabilitation was completed on both structures in 2012, which was limited in scope due to lane and ramp closure restrictions.
Switzerville Rd Underpass	17X-0064/B0	Four span Reinforced cast-in-place concrete T-beam, abutments on piles, piers on spread footings. span=12.2+22.4+22.4+12.2=69.2 metres, width=10.36 metres	The bridge is in overall good condition with a bridge condition index of 75.00. Interior parapet walls have medium scaling on east and west sides and localized spalling on north end post. Girders have localized spalls and concrete patches with shrinkage cracking on approach side of westbound lane. Deck soffit has localized spalls. Abutment walls have a localized delamination on top of north wall. Pier columns have spalls, delaminations and narrow to medium cracks. Slope protection has a small spall at base of north side. Approach curbs have spalls in southeast and southwest.
Newburgh Underpass	17X-0061/B0	Single span rigid frame concrete box girder, spread footing. span=31.1 metres, width=10.36 metres	The bridge is in overall good condition with a bridge conditions index of 70.63. Deck wearing surface has a medium crack along centreline, wide transverse crack at end of approach slab, and sealed and unsealed cracks. Curbs have medium scaling, localized spalls, and medium to wide longitudinal cracks on curb face. Concrete end posts have a medium vertical crack in northeast and loose connection bolts of guiderail. Coating on railing system is peeling in isolated areas. Girders have spalls. Diaphragms have spalls. Deck soffit has debonded concrete patches, localized delaminations, spalling with exposed corroded rebar, and efflorescence-stained cracks. Abutment walls have localized delaminations on north wall. Wingwalls have scaling, spalls, delaminations and crack with efflorescence. Retaining walls have light alkali silica reaction, light to medium scaling, medium cracks, delaminations and spalls with exposed rebar.
Canadian National Railway	17X-0060/B0	Single span steel Through Plate Girders with concrete deck, spread footing. span=33.6 metres, width=5.48 metres	The bridge is no longer in-use with security fencing installed on both ends of the deck. Girders and floor beams have light corrosion and peeling of coating. Concrete encased floor beams have spalls with exposed wire mesh on webs. Deck soffit has efflorescence-stained cracks and spalls. Concrete curbs have light to medium scaling, spalls with exposed rebar and delaminations. Wingwalls have light to medium cracks and alkali aggregate reaction with efflorescence.

4.4.3 Traffic Operations

A Traffic Operational Analysis was undertaken to review existing traffic operations and projected future traffic growth and operations with and without a future widening of Highway 401 and improvements to the Study Area interchanges. Under existing conditions (2024), Highway 401 mainline operations are generally acceptable, with most segments operating at Level of Service D. The only exception is the Camden Road to Wilton Road section in Study Area 2, which operates at Level of Service C. The operations along each segment are illustrated on **Figure 4-7**.

Figure 4-7: Highway 401 Mainline Study Area 2 Existing LOS



For the operational analysis, an hourly volume factor of 12.2% of the Annual Average Daily Traffic was applied. While this factor is higher than the typical observed peak hour proportion, it was selected to represent a conservative design assumption, accounting for potential fluctuations that may occur on certain days of the week. Accordingly, the reported Level of Service reflects a “worst-case” peak hour condition and does not represent the average day-to-day traffic performance.

Collision History

The collision analysis for Highway 401 between Belleville and Kingston, spanning a five-year period, reveals key insights into driver behaviour and road conditions in both the eastbound and westbound directions. Study Area 2 spans 34.5 kilometres from 5 kilometres west of County Road 41 to 8 kilometres west of County Road 38 Interchange. The collision analysis within Study Area 2 covers 29.1 kilometres between Linear Highway Referencing System 47420 offset 8.02 and Linear Highway Referencing System 47440 offset 5.00. In the eastbound direction, there were 233 collisions, with 88% being Property Damage Only, 11% resulting in non-fatal injuries, and two fatalities. In the westbound direction, 286 collisions were recorded, 83% of which were Property Damage Only, with 16% non-fatal injuries, and one fatality.

Key contributing factors in the eastbound direction included speeding too fast for conditions (10%) and loss of control (21%). In the westbound direction, key contributing factors included speeding too fast for conditions (17%) and loss of control (21%). Poor driving behaviours like following too closely also played a role, especially in the westbound direction. The data highlights that drivers misjudge conditions (such as stopping distance, road surface), particularly in adverse conditions, and this is a significant cause of these collisions. For some incidents, no specific factors were identified.

While overall collision rates remained below the provincial average of 0.6 in most sections, specific segments displayed higher collision incidents during certain periods, particularly near interchanges.

4.4.4 Pavement

A pavement engineering desktop study and visual assessment will be completed to assess existing and proposed conditions. Pavement design requirements will be confirmed in a future Detail Design phase.

4.4.5 Electrical

4.4.5.1 Illumination

There is no existing illumination throughout the Study Area, however, partial lighting should be considered as per Ministry of Transportation of Ontario Directive: PLNG-B-05 Ministry Policy for Highway Illumination section 2.1.4, where other freeway interchanges in the vicinity already have partial or full illumination. **Figure 4-8** below illustrates the existing conditions for the Palace Road underpass.

Figure 4-8: Overpass – Palace Road at Highway 401



4.4.5.2 Traffic Signals

There are no existing traffic signals at Palace Road.

4.4.5.3 Road Weather Information System

There is an existing Road Weather Information System on the north side of Highway 401 west bound lanes, approximately 250 metres east of Palace Road. The tower was built as part of Ministry of Transportation of Ontario Contract 2002-0500. The Road Weather Information System is powered via an enclosed circuit breaker mounted on a wooden post approximately 70 metres west of the Road Weather Information System tower. The supply is fed from an existing hydro pole immediately to the north of the power supply.

4.4.6 Utilities

A few existing aerial and underground utilities are located in the vicinity of Highway 401 within the study limits. **Table 4-17** The following existing utilities listed in were identified within the Study Area.

Table 4-17: Existing Utilities

Utility Owner	Utility Information	Location Description
Bell (Telecon)	Overhead Bell	Overhead lines on joint use Hydro One Poles runs parallel to Highway 401 adjacent to municipal property line / Ministry of Transportation of Ontario right of ray on the North side; 500 metres east of the west study limits and splits at 800 metres east, crossing Highway 401 to the south and to the northeast, crossing Palace Road to the northeast of the interchange.
Hydro One Networks Inc.	Overhead Hydro	Overhead lines on joint use Hydro One Networks Inc. poles runs adjacent to Highway 401 adjacent to municipal property line / Ministry of Transportation of Ontario right of way on the south side; 500 metres east of the west study limits and splits at 800 metres east, crossing Highway 401 to the north and to the northeast, crossing Palace Road to the northeast of the interchange.

5. Need for Highway Improvements

In order to advance the replacement of the Napanee River Bridge, a review of existing and future transportation and infrastructure conditions was undertaken with consideration for profile refinements to meet drainage, fluvial geomorphic, and environmental requirements and to accommodate the future eight lanes along Highway 401. The review included consideration of structural requirements, existing and future traffic operations, geometric conditions and deficiencies, collision history, drainage and hydrology, fluvial geomorphology and environmental conditions.

The following sections summarize the identified transportation challenges 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.

5.1 Problems

Based on structural evaluations of the existing structure, traffic operations and a review of geometric deficiencies for the Napanee River Bridge at Highway 401, the following problems were identified:

- The Napanee River Bridge requires replacement to accommodate future highway widening and to address current and future operational and geometric conditions;
- Given the current population, employment forecasts, traffic growth projections, traffic volumes and associated safety and operational concerns, Highway 401 will continue to grow, necessitating the widening of the highway to six lanes in the interim, with an ultimate widening of the corridor to eight lanes; and
- The Palace Road interchange is in close proximity to the Napanee River Bridge and is moving forward to Detail Design with an anticipated construction start in the near future.

5.2 Opportunities

Based on the challenges identified in **Section 5.1**, the following opportunities were determined:

- Develop appropriate replacement strategies to maintain the safe operation of the highway corridor for current and future traffic volumes;

- By establishing the footprint for the future interim and ultimate widening of Highway 401, infrastructure improvements can be implemented efficiently and in a cost-effective manner, minimizing future throw-away work while improving traffic operations; and
- Develop appropriate replacement strategies to maintain the safe operation of the highway corridor for current and future traffic volumes.

6. Alternatives to the Undertaking

Alternatives to the Undertaking' are broad-based alternatives that represent fundamentally different ways of addressing identified transportation needs. These are reviewed early in the process and evaluated based on their ability to address the identified Challenges and Opportunities within the area of Study. **Figure 6-1** summarizes the assessment of the Alternatives to the Undertaking. As described below, the Project Team considered several Alternatives to the Undertaking, including the "Do Nothing" alternative, which was used as a baseline for comparison purposes:

- Do Nothing;
- Transportation Demand Management;
- Improvements to Adjacent Road Systems; and
- Improvements to Provincial Transportation Facility.

6.1 Do Nothing

The 'Do Nothing' alternative maintains the status quo. Under this condition, no Highway 401 improvements or bridge replacements at Napanee River are considered and the highway will generally remain in its present condition. This alternative does not address the future structural needs (the existing Napanee River Bridge cannot accommodate the future highway widening to six and eight lanes or accommodate the Palace Road W-N/S Ramp proposed under the Highway 401 interchange at Palace Road (GWP 4197-13-00 Project) or existing geometric deficiencies of Highway 401.

6.2 Transportation Demand Management

Transportation demand management strategies reduce the overall demand on the highway network by shifting demands to time periods outside of the critical congestion periods and shift demands to alternative modes of transportation. On their own, transportation demand management strategies will not address the identified transportation deficiencies.

6.3 Improvements to Adjacent Road Systems

Improvements to adjacent road systems includes the widening of adjacent regional and municipal roads and regional road networks to increase overall transportation network capacity. This alternative alone will not address the identified transportation deficiencies.

Figure 6-1: Assessment of the Alternatives to the Undertaking

ALTERNATIVES TO THE UNDERTAKING	EVALUATION	RATIONALE
Do Nothing: Maintain "status quo". Under this condition, no replacement of the existing Napanee River Bridge and improvements to Highway 401 are considered. The Study Area will generally remain in its present condition.		This alternative does not address the identified transportation needs and should not be carried forward.
Transportation Demand Management: Transportation Demand Management strategies reduce the overall demand on the highway network by shifting demands to time periods outside of the critical congestion periods and shift demands to alternative modes of transportation.		On their own, Transportation Demand Management strategies will not address the identified transportation deficiencies.
Improvements to Adjacent Road Systems: This alternative includes the widening of adjacent regional and municipal roads and regional road networks to increase overall transportation network capacity.		This alternative alone will not address the identified transportation deficiencies.
Improvements to Provincial Transportation Facility: This alternative proposes the replacement of the existing Napanee River Bridge to accommodate an interim six and ultimate eight lane Highway 401 footprint and improvements to Highway 401.		CARRIED FORWARD Of the alternatives considered, the replacement of the existing Napanee River Bridge and improvements to Highway 401 is the only option to fully address the identified deficiencies.

6.4 Improvements to Provincial Transportation Facility

This alternative includes the replacement of Napanee River Bridge to accommodate an interim six and ultimate eight lane Highway 401 footprint and would align with the proposed modifications to the Palace Road interchange. This alternative also proposes a widening of Highway 401 along with operational and safety improvements to optimize the movement capacity of people and goods on Highway 401 through the corridor. Of the alternatives considered, the replacement of the Napanee River Bridge and the associated Highway 401 improvements (the widening of the Highway 401 corridor) is the only option to fully address the identified deficiencies. This alternative was carried forward for further assessment as part of this Study.

7. Generation, Assessment and Evaluation of Alternatives

Following assessment of the Alternatives to the Undertaking and the decision to carry forward the 'Improvements to Provincial Transportation Facility' alternative, a set of design alternatives was developed to implement the improvements along Highway 401 and the replacement of Napanee River Bridge. These alternatives were developed and assessed for the widening of the Highway 401 cross-section and for the Napanee River Bridge.

7.1 Highway 401 Mainline Alternatives

Highway 401 will require widening to an interim 6-lane and ultimate 8-lane configuration to provide for safe and efficient operations into the future. Based on review of the existing corridor, including adjacent land use and built infrastructure, maintaining the existing Highway 401 centreline along the entire corridor is considered preferable from both a cost and impact perspective. Therefore, alternatives to widen the highway fully to either the north or south sides only, were not considered.

While timelines for future widening of Highway 401 are unknown, six lane cross-section alternatives were developed to implement the Highway 401 widening to an interim 6-lane configuration in advance of an ultimate 8-lane widening. The alternatives were assessed in terms of ease of implementation, constructability and life-cycle cost. For all alternatives, the ultimate 8-lane cross-section is consistent and includes a 7.5 metre urban cross-section with raised median barrier and 4-lanes provided in either direction.

7.2 Napanee River Bridge Replacement

7.2.1 Evaluation Process

A staged evaluation process was used to identify a preferred design for the Napanee River Bridge (17X-0062/B0, two structures) replacement that can accommodate the future footprint of Highway 401 while minimizing environmental and community related impacts. The evaluation process consisted of the following stages.

1. Develop an Evaluation Methodology/Criteria of Design Alternatives

An initial set of alternatives were developed to implement the improvements. These alternatives were then subject to a more detailed set of evaluation criteria based on technical feasibility and high-level environmental factors to establish the advantages and disadvantages of each alternative. These criteria were

grouped into the Natural Environment, Socio-Economic Environment and Cultural Environment categories, as well as Transportation criteria such as traffic operations, safety and constructability. The alternatives were presented for review and comment at Public Information Centre #1 held on March 31, 2026.

2. Evaluation of Design Alternatives

A weighted-score arithmetic evaluation system was used to compare the alternatives using the range of criteria under the categories noted above. The process involved impacts being measured quantitatively and qualitatively and applying a weighted score that led to the selection of a preferred alternative. The process included:

- Identifying evaluation criteria through input received during this Study, the project team's experience in projects of this nature, provincial guidelines and existing Study Area conditions;
- Applying a weight percentage to each factor/criterion, which was based on the project team and stakeholder assessment of the importance of the factor;
- Applying a reasoned argument approach to the evaluation in consideration of the net environmental impacts of each alternative (qualitative assessment) and evaluating alternatives based on the total calculated scores (quantitative assessment); and
- Identifying a Preliminary Preferred Design.

7.2.2 Evaluation Methodology and Criteria

A detailed set of evaluation criteria relevant to this Study was developed and utilized for the evaluation of the Napanee River Bridge alternatives. The criteria used included:

- Environmental (fish & fish habitat, terrestrial ecosystems and fluvial geomorphology);
- Drainage;
- Life Cycle Costs;
- Maintenance and Durability;
- Constructability; and
- Aesthetics.

The alternatives were evaluated utilizing the criteria listed above and a qualitative / argumentative assessment in order to select a preferred alternative.

7.2.3 Evaluation of Alternatives

Three alternatives for Napanee River Bridge were assessed as part of the detailed evaluation provided below in **Table 7-1**. The three alternatives subject to the detailed evaluation included:

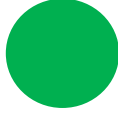
- Alternative 1: One span prestressed concrete NU girders with integral abutments.
- Alternative 2: One span steel plate I-girders with integral abutments.
- Alternative 3: Three span precast concrete box girders with integral abutments.

Alternatives 1 and 2 are equally preferred in the environmental, drainage, constructability and aesthetics categories, while Alternative 1 is more preferred in the life cycle and costs and maintenance and durability categories. Alternative 3 is least preferred in the environmental, drainage, constructability due to requirement for piers to be constructed within the watercourse. Based on the findings of the evaluation, the one span prestressed concrete NU girders with integral abutments (Alternative 1) is the technically preferred alternative for the following reasons:

- **Minimizes impacts to fish and fish habitat** by removing existing piers without introducing new in-water structures, restoring natural river conditions and likely avoiding the need for a *Fisheries Act* authorization.
- **Supports wildlife movement** by providing sufficient dry areas beneath the structure for terrestrial wildlife crossings.
- **Best preserves natural river processes** because it avoids new in-channel work, spans the bankfull channel and erosion zone, maintains floodplain connectivity, and does not constrain sediment transport or channel function.
- **Lowest life-cycle cost** of the three alternatives, Alternative 1 being approximately 13% less expensive than Alternative 2 and 26% less expensive than Alternative 3.
- **Durable and low maintenance design** due to its integral abutment configuration, resulting in fewer long-term inspection and maintenance requirements than the other alternatives.
- **Provides adequate vertical clearance** over the river, avoiding the corrosion concerns associated with Alternative 2.
- **Simpler and lower-risk construction** with the shortest fabrication lead time and minimal in-water works required for abutment construction.
- **Improves aesthetics and river continuity** through a clear-span structure that enhances the visual appeal of the Napanee River while avoiding disruptions to natural flow conditions.

Table 7-1: Evaluation of the Napanee River Bridge Alternatives

Category	Alternative 1: One span prestressed concrete NU girders	Alternative 2: One span steel plate I-girders	Alternative 3: Three span precast concrete box girders	Evaluation Summary / Notable Trade-Offs
Environmental				<p>Fish & Fish Habitat</p> <ul style="list-style-type: none">■ Alternatives 1 and 2 provide no new in-water structures and restores more of the natural habitat conditions to the Napanee River after the existing piers are removed, which benefit fish and their habitat.■ Alternatives 1 and 2 would not likely require an authorization under the <i>Fisheries Act</i> since no new permanent in-water habitat alterations are required and clear-span bridge Best Management Practices can be met.■ Alternatives 1 and 2 would still have temporary impacts and disturbance to fish habitat with the removal of the existing in-water piers, which will require isolation, sediment controls and fish salvage under Ministry of Transportation of Ontario Best Management Practices.■ Alternative 3 does have the potential to reduce riparian area disturbance but it does have the potential for temporary and long-term impacts top fish and their habitat during the removal of the existing piers and the construction of the new piers, which would likely be considered a permanent destruction of fish habitat increasing the likelihood for a <i>Fisheries Act</i> authorization. <p>Terrestrial Ecosystems</p> <ul style="list-style-type: none">■ Alternatives 1 and 2 have the potential to accommodate enough dry areas for wildlife movement/crossings.■ Alternative 3 does not have the span footprint to accommodate enough dry areas for wildlife movement/crossings. <p>Fluvial Geomorphology</p> <ul style="list-style-type: none">■ Alternatives 1 and 2 will avoid new in-channel work (construction of new piers).■ Alternatives 1 and 2 will convey bankfull flow events with no disruption to natural channel function. Both Alternatives span the 100-eat erosion rate and provide a buffer for lateral channel movement. Both Alternatives also preserves floodplain connectivity.■ Alternative 3 requires new in-channel work (construction of new piers).■ The pier placement for Alternative 3 constricts flow as the piers do not span the bankfull channel, which carries the channel forming flow responsible for most sediment transport and shaping of the river. Constraining this flow can disrupt sediment movement, alter erosion and deposition patterns, and interfere with the channel's natural self-maintenance. Alternative 3 also has the potential for debris accumulation at the piers, which may increase scour to the channel bed around the piers.
Drainage				<ul style="list-style-type: none">■ All options satisfy hydraulic requirements.■ Alternative 3 would introduce more opportunities for erosion given the construction of the new piers impacting the flow of the watercourse and potentially eroding the west embankment.
Life Cycle Costs				<ul style="list-style-type: none">■ Alternative 1 has the lowest life cycle cost while Alternative 2 is 13% more expensive and Alternative 3 is 26% more expensive.
Maintenance and Durability				<ul style="list-style-type: none">■ Alternative 1 is a durable structure with less maintenance due to integral abutments configuration. Alternative 1 also provides sufficient vertical clearance.■ Alternative 2 is also a durable structure with less maintenance due to integral abutments configuration but girder ends would require re-coating and fatigue inspections. Lastly, Alternative 2 has less than 2.4 metres of vertical clearance from the water, which may accelerate corrosion of weathering steel.■ Alternative 3 is a durable structure with less maintenance due to integral abutments and piers configuration. However, it would require an inspection of the piers over water. Alternative 3 provides sufficient clearance.

Category	Alternative 1: One span prestressed concrete NU girders	Alternative 2: One span steel plate I-girders	Alternative 3: Three span precast concrete box girders	Evaluation Summary / Notable Trade-Offs
Constructability				<ul style="list-style-type: none">Alternative 1 has the shortest lead time for fabrication of precast girders, formwork is required for deck construction, requires shipment of 44 metre long NU girders, and has minimal in-water works for abutment construction.Alternative 2 has the longest lead time for fabrication of steel plate girders, formwork is required for deck construction, may require girder field splicing and bracing installation and has minimal in-water works for abutment construction.Alternative 3 has intermediate lead time for fabrication of precast girders (slightly longer and larger girders compared to NU girders), minimal formwork is required for deck construction, multiple shipments of short spans are required and has more extensive in-water works for pier construction.
Aesthetics				<ul style="list-style-type: none">Alternative 1 has the deepest substructure, contain open bottom flanges, which are prone to debris accumulation and bird nesting however, an open span structure will improve the visual appeal of the Napanee River without disrupting its natural watercourse.Alternative 2 has a shallower substructure, contain open bottom flanges, which are prone to debris accumulation and bird nesting however, an open span structure will improve the visual appeal of the Napanee River without disrupting its natural watercourse.Alternative 3 has the shallowest superstructure, does not contain the opportunity for debris accumulation, water ponding and bord nesting, but there is a need to overbuild the deck to accommodate the box girder geometry. Further, in-water piers will continue imposing constraints onto the natural flow of the Napanee River and offers less visual appeal.
RECOMMENDATION	✓	✗	✗	-

Legend:



Most Preferred Alternative

Least Preferred Alternative

8. The Recommended Plan

The following sections summarize the proposed replacement of the existing Napanee River Bridge and improvements to Highway 401 within the Study limits, including interim and ultimate widening of Highway 401. The Recommended Plan is summarized below and illustrated in the Preliminary Design plans provided in **Appendix G**. Additional details regarding the recommended improvements are provided in the various technical reports prepared as part of this Study, under separate cover. The most notable components of the Recommended Plan include:

- Replacement of the existing Napanee River Bridge;
- Establish the footprint for the interim widening of Highway 401 from four to six lanes;
- Establish the footprint for the ultimate widening of Highway 401 from six to eight lanes;
- The revision and improvement of the Palace Road Interchange from previous Preliminary Design; and
- Drainage improvements including a new storm sewer system and one stormwater management pond.

8.1 Highway 401

The Recommended Plan for Highway 401 through the Study Area was designed to meet a 130 kilometres per hour design speed per current Ministry of Transportation of Ontario requirements for new highway infrastructure. The Recommended Plan is illustrated in the design plates included in **Appendix G**.

8.1.1 Cross-section

The Recommended Plan for Highway 401 through the Napanee River Bridge Study Area consists of an interim widening from four to six lanes and an ultimate widening to eight lanes. Throughout the project limits, a consistent urban divided cross-section is proposed, incorporating a concrete median barrier, full paved shoulders, and standard 3.75 metre travel lanes.

The Napanee River Bridge replacement will initially tie into the existing four lane Highway 401 cross-section while being designed to accommodate the future cross-sectional requirements.

For the interim condition, Highway 401 will be widened to six lanes, with three lanes provided in each direction. The cross-section includes a 7.5 metre median containing a concrete barrier and offset shoulders, 3.75 metre travel lanes, 3.0 metre right shoulders,

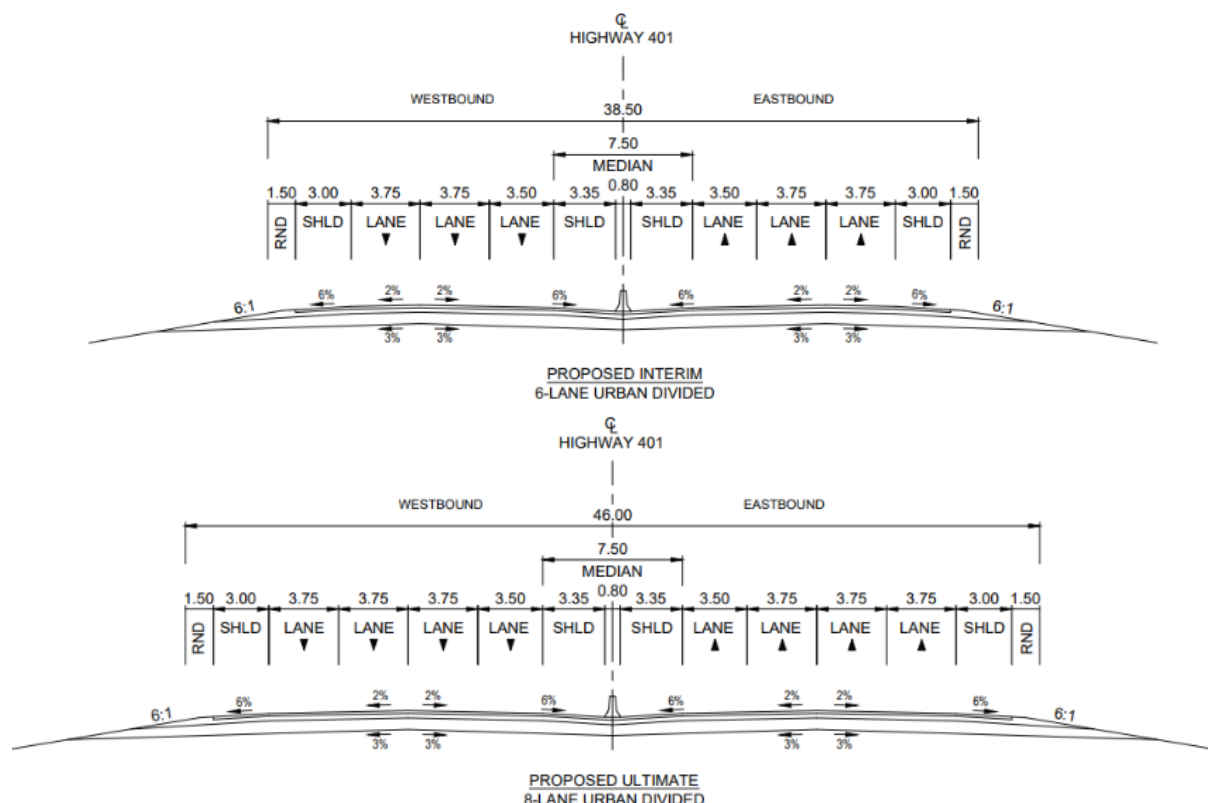
and 3.35 metre left shoulders adjacent to the median. The total platform width is approximately 38.5 metres. This cross-section will be carried continuously through the Napanee River Bridge structure and along the approaches within the study limits.

The ultimate widening of Highway 401 will accommodate eight lanes, with four lanes in each direction. The proposed ultimate cross-section retains the 7.5 metre urban median with concrete barrier and maintains the same shoulder configuration, including 3.35 metre left shoulders and 3.0 metre right shoulders. All travel lanes will remain 3.75 metres wide. The ultimate eight lane configuration results in an overall roadway platform width of approximately 46.0 metres.

The proposed cross-sections have been developed to provide a consistent highway operating environment through the corridor while accommodating future traffic growth, improving safety, and maintaining compatibility with the proposed Napanee River Bridge replacement and associated highway improvements. The interim and ultimate urban divided cross-sections are illustrated in **Figure 8-1**.

While the Recommended Plan protects for both the interim six lane and ultimate eight lane Highway 401 cross-sections, no implementation timeline has been established for either configuration at this time. The bridge replacement and associated highway improvements have been designed to accommodate these future cross-sectional requirements should they be advanced as part of future transportation planning initiatives.

Figure 8-1: Highway 401 Interim 6 lane and Ultimate 8 lane Cross-sections



8.1.2 Horizontal Alignment

The existing Highway 401 horizontal alignment through the Study Area will generally be maintained. Based on the horizontal alignment assessment, two curves will be retained with 1,900 metre radii and widened inside shoulders of 4.4 metre, providing the required 305 metre stopping sight distance and accommodating a 130 kilometers per hour design speed.

8.1.3 Vertical Alignment

Under the proposed design conditions, the vertical alignment of Highway 401 will be increased by approximately 0.1 metre to 2.6 metre between Station 20+250 (680 metres west of the crossing) and Station 10+400 (410 metres east of the crossing). This includes a profile raise of approximately 2.4 metres at the Napanee River Bridge crossing, and approximately 0.7 metres at the roadway low point (Station 20+400), located around 530 metres west of the crossing.

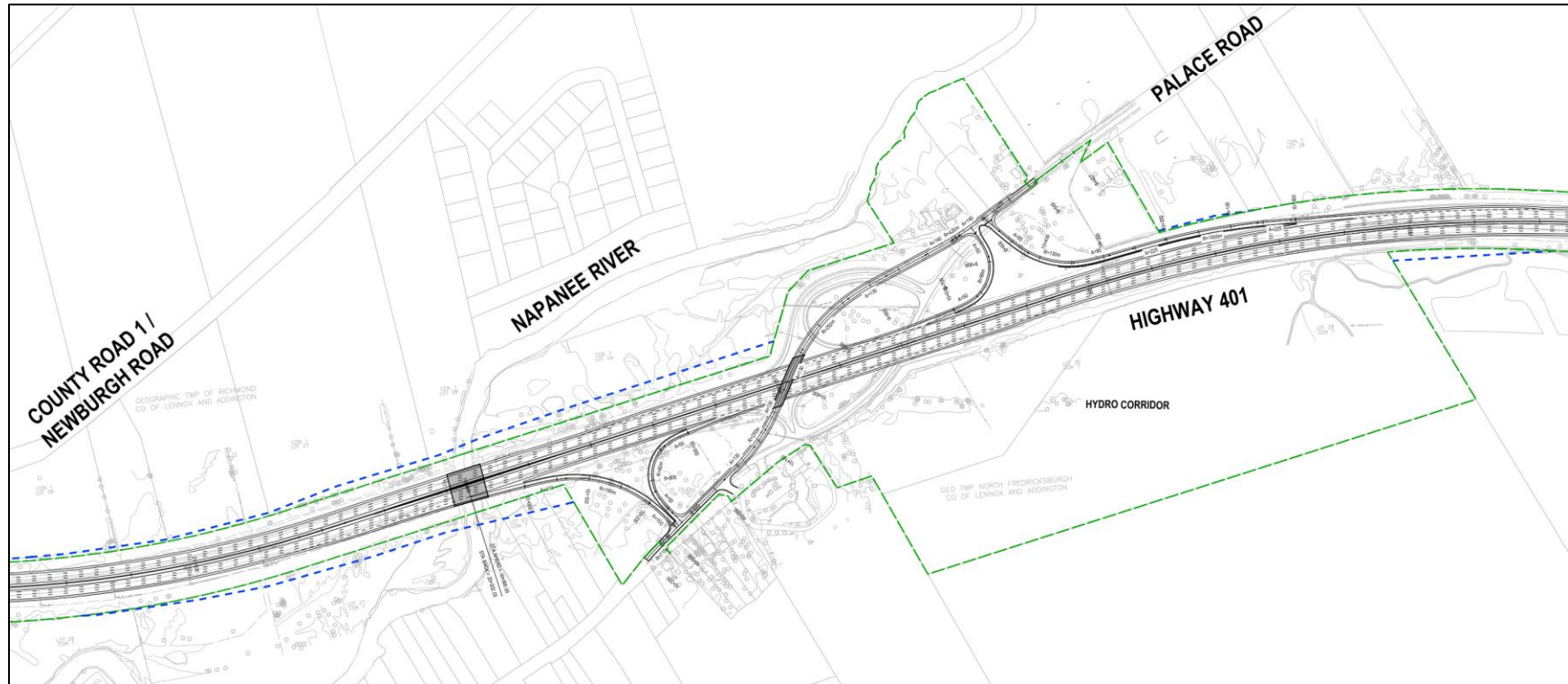
8.2 Napanee River Bridge

The Recommended Plan for the Napanee River Bridge includes a 44-metre-long single span prestressed concrete NU girder structure with integral abutments that satisfies hydraulic and fluvial geomorphology requirements. The bridge will be designed and initially constructed to accommodate a future interim six lane Highway 401 configuration; however, it will initially tie into the existing four lane highway configuration. At this time, no implementation schedule has been identified for the interim six lane configuration. The bridge replacement will require a profile raise along Highway 401 to meet the freeboard water level requirements and will be constructed and staged to the north and south of the existing structure. No pier construction is required and only the removal of existing piers will be required with regard to work below the high-water level mark. The Recommended Plan for Napanee River Bridge is illustrated in **Figure 8-2**.

8.3 Foundations

The proposed Napanee River Bridge replacement will be supported on deep foundations founded in competent glacial till, with steel pipe piles or equivalent deep foundation systems identified as the preferred solution for the site. Geotechnical investigations indicate that the subsurface conditions generally consist of embankment fill, surficial silt and sand deposits, interbedded silt and clay, underlain by dense glacial till and localized limestone bedrock. Spread footings and caissons were assessed during the preliminary design stage but were not recommended due to constructability challenges, groundwater conditions, and potential scour concerns.

Figure 8-2: Recommended Plan for the Napanee River Bridge



The proposed bridge abutments and foundations will be constructed to accommodate the ultimate eight lane widening of Highway 401 during the initial phase of work, minimizing the need for future modifications. Settlement of the widened embankments and raised roadway profile is anticipated and will be addressed through embankment preloading and other ground improvement measures as required. Additional geotechnical investigations and detailed scour assessments will be completed during Detail Design to confirm pile capacities, foundation elevations, settlement mitigation requirements, and long-term performance of the structure.

8.4 Pavement

The proposed improvements will widen Highway 401 from its existing four lane cross-section to an interim six lane configuration and ultimately to eight lanes through the bridge area.

To accommodate the replacement bridge and meet current hydraulic and design requirements, the roadway profile will be raised by approximately 2.4 metres at the Napanee River crossing, with associated approach grading extending beyond the bridge limits.

The bridge deck will consist of a reinforced concrete deck slab surfaced with a waterproofing membrane and asphalt pavement. Buried approach slabs will be provided at each bridge end to improve ride quality and reduce long-term maintenance associated with differential settlement at the bridge approaches. The proposed cross-section has been developed to accommodate both the interim and ultimate highway widening plans while maintaining operational and safety requirements for Highway 401.

8.5 Electrical

8.5.1 Highway and Interchange Illumination

The proposed illumination works for the Napanee River Bridge replacement will be undertaken in accordance with the overall Highway 401 corridor illumination strategy and the applicable Ministry of Transportation of Ontario standards and specifications. Bridge and roadway lighting requirements will be coordinated with the interim six lane and ultimate eight lane widening of Highway 401.

At this stage of design, no continuous illumination has been identified for the Highway 401 mainline within the limits of the bridge replacement project. Illumination requirements will be confirmed during Detail Design based on Ministry of Transportation of Ontario warrants, operational requirements, and coordination with the proposed Palace Road interchange improvement.

Final illumination requirements for the bridge, Highway 401 approaches, ramp terminals, and adjacent municipal road connections will be confirmed during Detail Design in consultation with Ministry of Transportation of Ontario, utility agencies, and applicable stakeholders.

8.6 Utilities

Modifications to the Hydro One Networks Inc. hydro corridor and its supporting infrastructure have been co-ordinated in advance of this Study at the Palace Road interchange. Hydro One Networks Inc's relocation plans at Palace Road were reviewed in consideration of the proposed tower locations for 119, 119A and 118, which is illustrated in **Figure 8-3**. Utility coordination and any required relocations associated with these improvements will be confirmed during Detail Design.

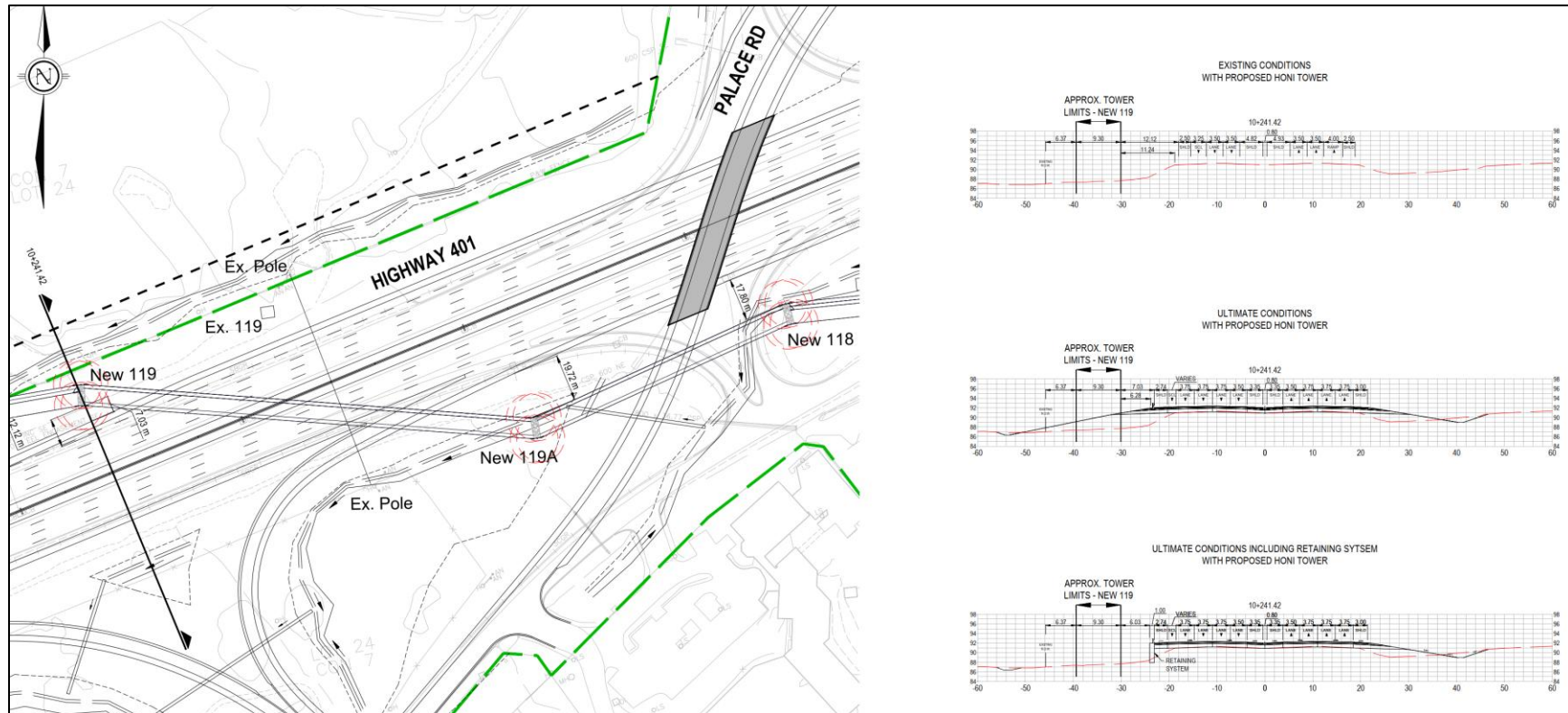
The requirement for utility ducts within the bridge barrier walls will also be reviewed during Detail Design to accommodate potential future electrical, communications, lighting, or intelligent transportation system infrastructure crossing the structure.

8.7 Drainage

The proposed replacement of the Napanee River Bridge will address existing hydraulic deficiencies at the crossing and improve the overall drainage performance of Highway 401. Hydraulic assessments determined that the existing three-span bridge does not satisfy current Ministry of Transportation of Ontario freeboard and clearance requirements under the 100-year design event and associated check flow. As a result, the existing structure will be replaced with twin single-span bridges providing an increased hydraulic opening of approximately 42.8 metre and improved flow conveyance through the crossing.

Hydraulic modelling completed for both the interim six lane and ultimate eight lane configurations confirms that the proposed bridge satisfies Ministry of Transportation of Ontario requirements for freeboard, clearance, and overtopping protection under design flow conditions. In addition, the proposed configuration was assessed under future climate change scenarios and was found to continue meeting the applicable hydraulic performance criteria. The increased bridge opening and raised roadway profile improve conveyance through the crossing while resulting in negligible impacts to upstream and downstream water levels.

Figure 8-3: Hydro One Networks Inc Tower Relocation and Highway 401 Cross-Sections



Highway drainage within the study area will continue to be managed through roadside drainage infrastructure, including ditches, swales, culverts, and associated stormwater management components that will be incorporated as part of the broader Highway 401 improvements. Erosion analyses indicate localized scour potential at the upstream bridge structure during extreme events; however, the proposed deep foundations are expected to remain stable under these conditions. Detailed drainage design, erosion and sediment control measures, and final scour protection requirements will be refined during Detail Design.

8.8 Construction Staging and Traffic Management During Construction

A conceptual construction staging strategy has been developed for the replacement of the Napanee River Bridge and associated Highway 401 widening improvements. The staging approach will be refined during Detail Design and is subject to confirmation of the preferred contract packaging, traffic management requirements, and construction sequencing.

In general, the bridge replacement will be completed while maintaining two lanes of Highway 401 traffic in each direction throughout construction. The proposed twin bridge configuration allows the new structures to be constructed outside the footprint of the existing bridge, enabling traffic to remain on the existing structure during the initial stages of construction. Temporary traffic shifts, reduced shoulder widths, and temporary concrete barriers will be required to facilitate the work.

Construction will generally be undertaken in phases to maintain traffic operations while facilitating bridge replacement and highway widening. Initially, traffic will be maintained on the existing bridge while the outer portions of the new twin bridge structures are constructed. Once these sections are complete, traffic will be shifted onto the newly constructed bridge sections, allowing for the demolition and removal of the existing bridge and substructure.

The remaining portions of the proposed bridge, roadway widening, drainage infrastructure, and associated grading works will then be completed to establish the interim six lane highway configuration. The new bridge foundations and substructure elements will be constructed to accommodate the ultimate eight lane widening, minimizing future disruptions when additional lanes are added. The staging schematics and phasing for the Napanee River Bridge is illustrated in **Figure 8-4** and **Figure 8-5**.

Figure 8-4: Napanee River Bridge Construction Staging

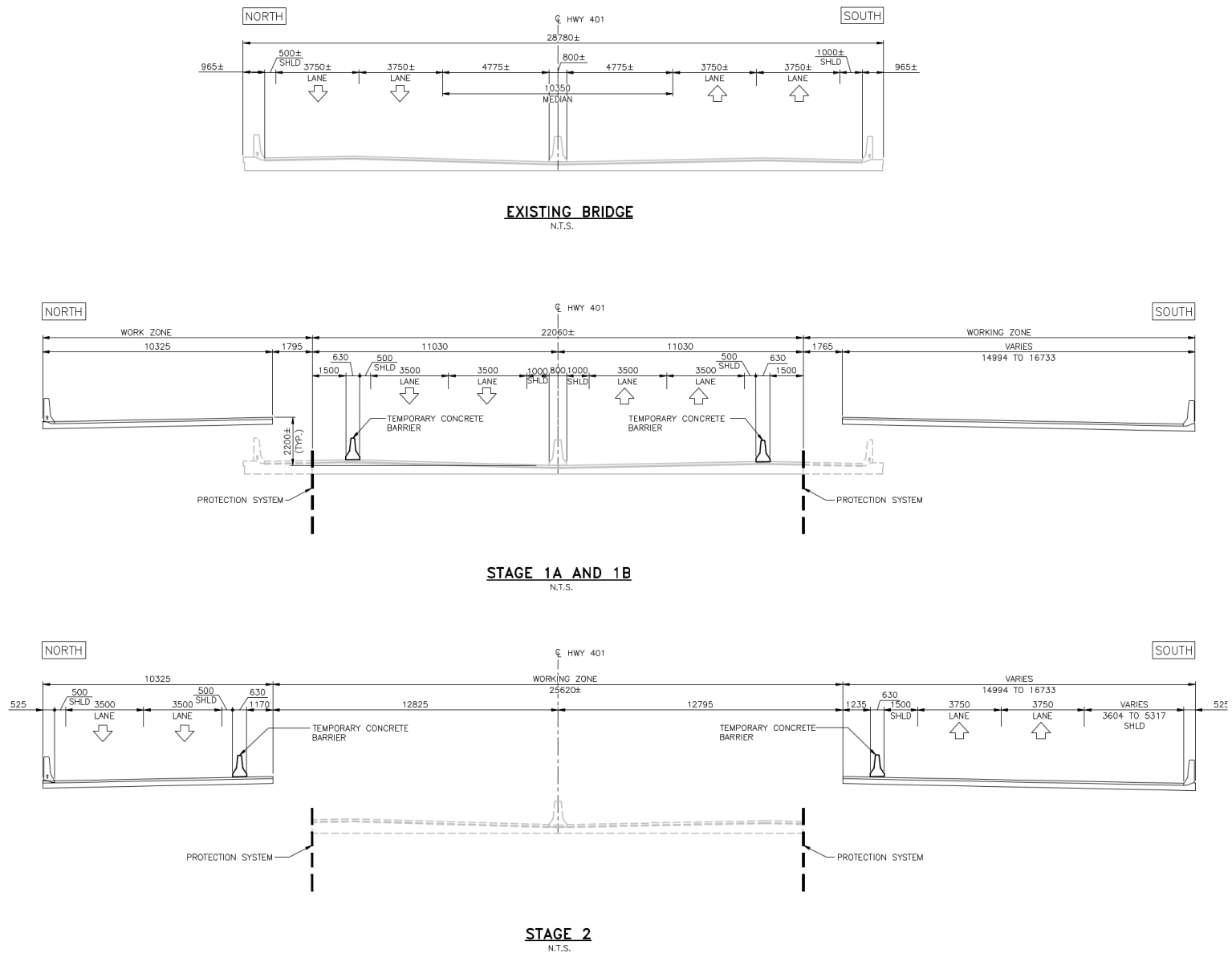
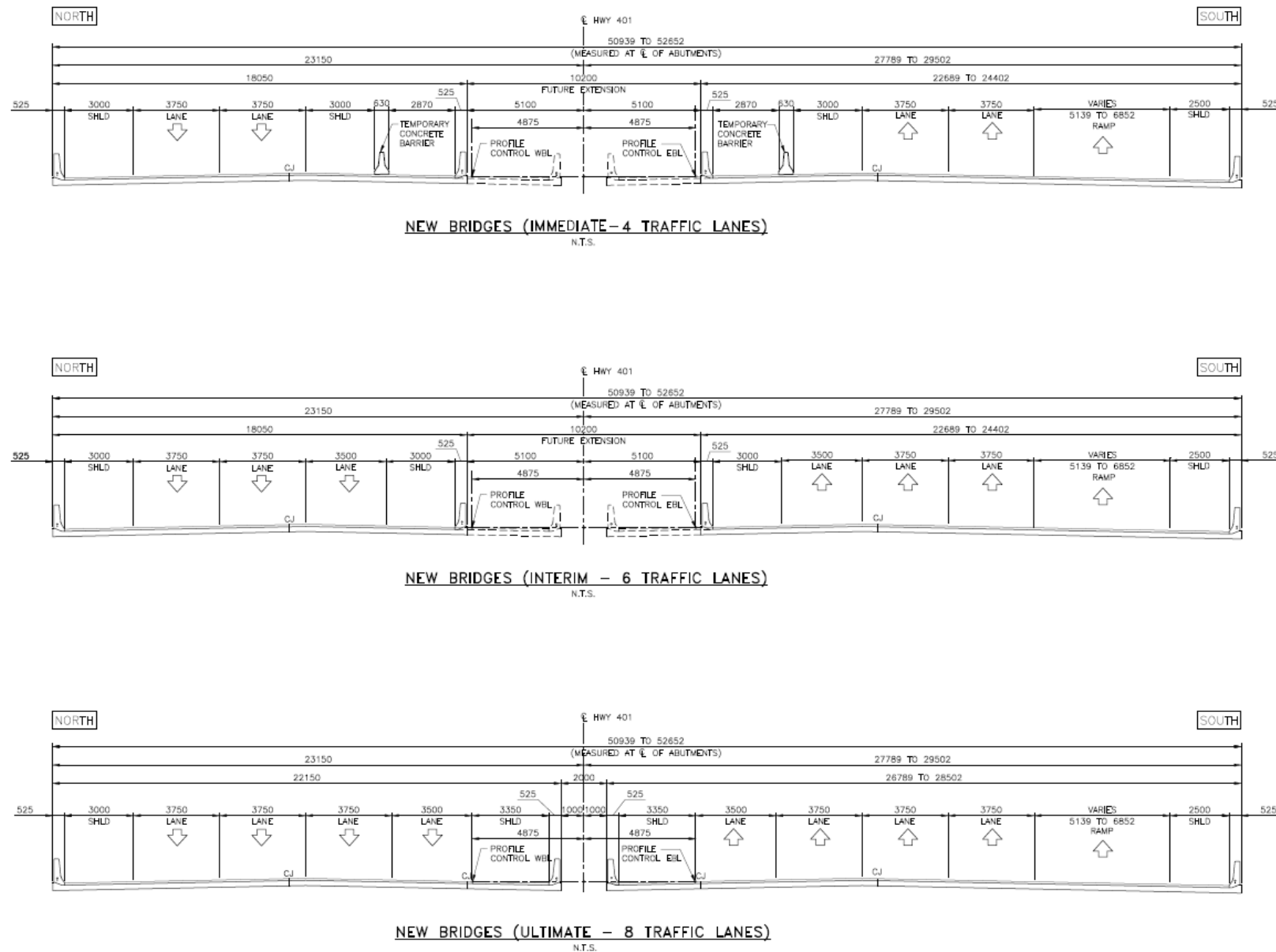


Figure 8-5: Napanee River Bridge Phasing



Temporary drainage measures, erosion and sediment control measures, and any required flow diversion works will be implemented throughout construction to manage runoff and protect the Napanee River. In-water work will be coordinated with applicable fisheries timing windows and environmental requirements. Temporary works within the watercourse are anticipated to include localized flow restrictions or cofferdams to facilitate bridge construction and demolition activities.

Construction of the interim bridge replacement and associated highway improvements is anticipated to occur over approximately four construction seasons, including embankment preloading requirements and environmental restrictions associated with in-water work. Traffic staging, environmental protection requirements, and construction sequencing will be further refined during Detail Design.

9. Environmental Impacts, Mitigation Measures and Commitments

The following sections outline the direct and indirect environmental (natural, socio-economic and cultural) impacts associated with the Recommended Plan for improvements to the Highway 401 corridor and at the Napanee River Bridge (Site 17X-0062/B0) within the Study Area, as identified in **Section 8**. This section also describes the mitigation measures that will be implemented to avoid or minimize the potential impacts associated with the Recommended Plan. Mitigation includes planning decisions, design features, construction requirements and construction constraints. The mitigation measures and commitments outlined in this report will be further refined in the Detail Design stage. Specific environmental controls based on these detailed mitigation measures will then be included in the contract documents to address specific environmental and operational concerns during the preparation of the contract documents in the Detail Design stage.

9.1 Natural Environment

These sections describe potential impacts and proposed mitigation measures to the natural environment, based on the existing conditions described in **Section 4**. These impacts and mitigation measures will be reviewed and refined during the Detail Design stage.

9.2 Fish and Fish Habitat

A Fish and Fish Habitat Impact Assessment in accordance with the *Environmental Reference for Highway Design* (MTO, 2013) and the *Environmental Guide for Fisheries* (MTO, 2025) was completed for the Recommended Plan to identify any potential constraints with the proposed activities and to recommend general mitigation measures to avoid harm to fish and fish habitat. Mitigation measures will be further refined during Detail Design.

This Impact Assessment is based on the current preliminary design for the Napanee River Bridge, identified within the *Napanee River Bridge Drainage Report* (AECOM, June 2026) as well as the Drainage Report for *Highway 401 / Palace Road Interchange* (AECOM, 2019).

9.2.1 Summary of Proposed Culvert Works

All culverts within the existing interchange will be removed and replaced with new culverts in new locations to accommodate the reconfiguration as described below:

- Four new culverts will be installed beneath the Palace Road realignment section;
- Two new culverts will be installed underneath new ramps N/S-E and W-N/S, respectively;
- One new culvert will be installed under the new Ramp N/S-W;
- One culvert will be removed due to feasibility and constructability issues. Two new ditches will be designed to accommodate the flows originally passing through this culvert. Upon removal of the culvert, the flow will be diverted to a new ditch grading westerly along south of Highway 401 from the existing culvert to a new culvert. The diverted flows will be conveyed through two of the proposed culverts mentioned above and will drain into a new ditch that runs along southwest of new Ramp W-N/S and ultimately discharge to the Napanee River. The ditches will be designed to convey the 100 year diverted flows; and
- Design new ditches in the northeast, southwest and northwest quadrants and regrade/realign the existing ditches along new Ramp E-N/S to convey the flows to/from new culverts based on the proposed road alignment (AECOM, 2019b).

Project activities were assessed against the *Environmental Guide for Fisheries – Best Management Practices Manual* (MTO, 2025) to determine which can be addressed by best management practices as per Step 3 in the 2025 Fisheries Protocol. Application of best management practices requires adherence to the Operational Constraints and Protection Measures identified in each best management practices. Certain conditions and provisions are outlined in each best management practices (such as work must be completed within the allowable in-water work timing window, etcetera.), which must be met in order to remain in compliance. Applicable notification procedures are required for the use of best management practices.

Where best management practices for Temporary Watercourse Crossings and Riparian Vegetation Maintenance in Existing Right of Way apply, the work at these locations can proceed. The mitigation measures stipulated in the best management practices must be implemented to comply. As the Project progresses, best management practices should be reassessed to confirm their continued applicability. A Ministry of Transportation of

Ontario Project Notification Form and Submission Package will be prepared for submission to the Ministry of Transportation of Ontario Regional Environmental Section.

Note: As indicated, the planned reconfiguration of the Highway 401 interchange at Palace Road as identified as the Technically Preferred Plan in the preceding *Highway 401 Interchange Improvements at Palace Road Class Environmental Assessment and Preliminary Design Study Transportation Environmental Study Report* (AECOM, March 2019) has been previously approved and is not part of this Study. However, watercourses not previously evaluated in the preceding Palace Road Preliminary Design have been incorporated into the current assessment.

9.2.2 Summary of Potential Impacts to Fish and Fish Habitat

The proposed activities associated with the work described in **Section 9.2.1** that did not meet the requirements listed under the Ministry of Transportation of Ontario Routine Works or Fisheries Best Management Practices, have been assessed to determine the potential impacts to fish and fish habitat. In addition to the culvert works, the Napanee River Bridge replacement, including widening, removal of existing piers, and bank protection below the high-water mark, which falls outside the scope of Ministry of Transportation of Ontario Routine Works or Fisheries Best Management Practices, has been assessed for the potential impacts on fish and fish habitat. Proposed works for the Napanee River Bridge can be found in **Table 9-1** below.

Proposed works with the greatest potential to affect fish and fish habitat include removal of existing bridge piers, construction of new single-span bridges over the Napanee River including riparian vegetation removal, and bank protection works below the high-water mark. These activities do not qualify as Ministry of Transportation of Ontario Routine Works or applicable best management practices and were therefore assessed under Step 4 of the Fisheries Protocol. The assessment concluded that all activities could avoid death of fish and harmful alteration, disruption, or destruction of fish habitat. A suite of site-specific mitigation measures is recommended, including strict adherence to in-water work timing windows (July 16 to March 14), isolation of in-water work areas, fish rescue and relocation, erosion and sediment control, invasive species management, and habitat rehabilitation using natural channel design principles where feasible. All work within the Palace Road interchange should be performed in dry conditions. Where necessary, temporary bypass pumping shall be implemented to maintain downstream flow.

Table 9-1: Summary of Proposed Works in or near Fish Habitat

Waterbody ID/ Crossing # / Station	Fish Habitat	Existing Type	Existing Bridge Width	Existing Bridge Span	Existing Clearance	Proposed Type	Proposed New Structure ID	Proposed Bridge Width	Proposed Bridge Span	Proposed Clearance (metres)	Proposed Work
WC-13 / 17X-0062/B0 (EBL)	Direct	Three-span Cast in place concrete	28.8 metres	30.5 metres	5.7 metres	Single Span Concrete	17X-0062/B1	28.5 metres	44.0 metres	6.0 metres	<div>■ Removal of existing three-span bridge, including piers</div> <div>■ Construction of a single span concrete bridge and associated abutments</div> <div>■ Bank protection measures</div>
WC-13 / 17X-0062/B0 (WBL)	Direct	Three-span Cast in place concrete	28.8 metres	30.5 metres	5.7 metres	Single Span Concrete	17X-0062/B2	22.2 metres	44.0 metres	6.4 metres	<div>■ Removal of existing three-span bridge, including piers</div> <div>■ Construction of a single span concrete bridge and associated abutments</div> <div>■ Bank protection measures</div>

The harmful alteration, disruption, or destruction of fish habitat potential for the bridge related works was reviewed. The placement of approximately 100 metres squared of rock protection below the 2-year high water mark, along with the removal of approximately 453 metres squared of riparian vegetation to accommodate the new bridge, will result in localized and permanent habitat alteration resulting from placement of the rock protection and destruction of riparian habitat. The effects are limited in scale and magnitude, and occur within a reach characterized by abundant, non-limiting instream habitat and low-quality riparian cover dominated by maintained grasses. As such, the affected features are not limited within the systems and do not support critical life stages for sensitive fish species. Additionally, there will be a temporary disruption of fish habitat for the removal of the existing piers, which will result in a gain of approximately 60 metres squared of fish habitat. Therefore, these changes are not expected to result in a harmful alteration, disruption, or destruction of fish habitat. The design, construction methods, and impact assessment should be re-evaluated during the Detail Design phase of the Project.

The following summarizes the potential negative impacts on fish and fish habitat that may result from activities associated with the proposed works described in the previous sections.

Land-based Activities

- Use of industrial equipment may result in alterations to contaminant concentrations from fuel or fluid leaks. An increase in sediment may result from increased erosion potential where industrial equipment has exposed and loosened soils. Cleaning or maintenance of structures may result in changes to contaminant and sediment concentrations if wash water can enter a waterbody.
- Vegetation clearing may result in alterations to sediment concentrations, and habitat structure and cover because of increased erosion potential and sediment deposition. Changes in food supply and nutrient concentrations may result from the loss of external inputs with a reduction in riparian vegetation. The use of herbicides may result in changes to contaminant concentrations.
- Grading may result in alterations to sediment concentrations and habitat structure and cover because of increased erosion potential and sediment deposition.
- Excavation may result in changes to bank stability, increasing the erosion potential and sediment concentrations.

In-water Activities

- Placement of material or structures in water can result in changes to the channel or shoreline morphology, aquatic macrophytes, and substrate composition. This can lead to changes in sediment concentration, habitat structure and cover, food supply, nutrient concentrations, and may result in direct or indirect impacts to fish and fish habitat.

- Removal of aquatic vegetation may result in changes in dissolved oxygen concentrations, food supply, nutrient concentrations, habitat structure and cover, sediment concentrations or contaminant concentrations because of the release of sediment, nutrient inputs, habitat, and light penetration.
- Use of industrial equipment below the high-water mark could result in impacts to fish and fish habitat as well as alterations to sediment concentrations from the release of sediment or an increase in contaminant concentrations from equipment fluid leaks.
- The installation of in-water work isolation measures may result in incidental entrainment and potential death of fish and limit access for fish to habitats.
- Any dewatering and pumping of isolated in-water work areas could displace or kill fish and change access to and composition of habitat features. Alterations to flows could increase erosion and scour potential and result in alterations to temperatures and concentrations of sediment, food, contaminants, or nutrients, and using water extraction pumps could result in death of fish by entrainment in pumps and machinery.
- Improper management of wastewater can result in a change in water temperature, change in migration access to habitat, change of dissolved oxygen concentration, changes in nutrient concentrations, change in contaminant concentrations and introduction of pathogens, disease vectors, and exotics.
- Alterations to flows could increase erosion and scour potential and result in alterations to temperatures and concentrations of sediment, food, contaminants, or nutrients.
- Changes to fish passage could result in changes in water chemistry/temperature and flow alternation, which may lead to incidental entrainment, impingement or mortality of resident species and changes to habitat access.
- Structure removals could result in changes to channel morphology or shoreline morphology and habitat structure or cover.
- Invasive species were identified within the Study Area within the right of way, most notably Flowering Rush in the Napanee River. Flowering Rush mainly spreads vegetatively through rhizomes via fragmentation or rhizome bulblets. It can spread by human activities, where rhizome bulblets and fragments are accidentally transported on equipment (Simkovic, 2020). Work taking place where this species occurs should follow the best management practices for their management and control to prevent further spread of the invasive plant, such as those pertaining to material management and cleaning machinery of organic debris that could transfer seeds, etcetera. (Simkovic, 2020 & Halloran, et al., 2013).

9.2.3 Proposed Mitigation Measures

The following section provides a summary of proposed mitigation measures to avoid or mitigate potential impacts to fish and fish habitat. Although mitigation measures presented below are anticipated to be generally applicable for proposed works, the efficacy of these mitigation measures to negate or avoid impacts will be further assessed during Detail Design.

In accordance with Steps 4 and 6 of the *Environmental Guide for Fisheries* (MTO, 2025), a Request for Review or other review documentation may need to be developed and submitted to the Fisheries and Oceans Canada Fish and Fish Habitat Protection Program for those activities where the risk of harmful alteration, disruption or destruction is possible (such as construction methods for pier removal). Pending Detail Design and construction methods, activities should be re-evaluated during Detail Design to confirm whether or not review by the Fisheries and Oceans Canada Fish and Fish Habitat Protection Program is required.

Operational Constraints

- An Access Management Plan shall be created to limit access to waterbodies and banks to protect riparian vegetation and to minimize bank disturbance.
- Minimize duration of in-water work.
- Conduct in-stream work during low flow periods to allow work in water to be isolated from flows.
- Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation and allow for proper re-stabilization and re-vegetation as appropriate prior to winter
- In-water work below the high-water mark and work on watercourse banks shall be carried out during the appropriate in-water work timing window of **July 16 to March 14** (no in-water work is permitted from **March 15 to July 15**).

Management Practices and Controls

- Isolated in-water work areas must be cleared of fish prior to the commencement of work. Fish must be released unharmed downstream. Intakes of pumps and hoses for de-watering of in-water work areas shall be screened to avoid impingement and/or entrainment of fish (as per OPSS.PROV 182).
- All planned vegetation removals are anticipated to occur within property owned by the Ministry and largely within the highway right of way. Some select removals may also be required on areas adjacent to the right of way where Ministry of

Transportation of Ontario will seek Permission to Enter and Construct. Trees not designated for removal will be protected by fencing installed prior to vegetation removal and construction (as per OPSS. PROV 801).

- The Contractor shall develop and implement an Erosion and Sediment Control Plan to contain/isolate exposed soils, stockpiled materials, and unstable areas in the work zone to prevent the release of sediment to all waterbodies and ensure the work site is stabilized prior to removal of ESC measures following construction (as per OPSS. PROV 804 and OPSS. PROV 805). Site-specific Erosion and Sediment Control Plans should be developed for each watercourse crossing where work is proposed within 30 metres of a watercourse following Department of Fisheries and Oceans Interim Standard: Planning for land-based erosion and sediment control (DFO, 2026b).
- Design and implement an in-water work area isolation plan to maintain clean flow around the work area where in-water work is proposed (as per OPSS. PROV 804, OPSS. PROV 805, and OPSS. PROV 517). The design shall:
 - Use only clean materials free of particle matter for temporary cofferdams;
 - Manage flow withdrawal and discharge to prevent erosion and the release of sediment to a waterbody; and
 - Ensure work zones are stabilized against high flows at the end of each workday.
- As per OPSS. PROV 182, any fish isolated in the work area shall be transferred (using appropriate capture, handling, and release techniques to prevent harm and minimize stress) downstream or away from the construction area following the Department of Fisheries and Oceans Canada Interim Standard: Fish capture and relocation (DFO, 2026c). A Licence to Collect Fish for Scientific Purposes shall be obtained prior to the start of any fish relocation works. Fish screens shall be used to avoid entrainment of fish in pumps or hoses following Department of Fisheries and Oceans Canada's Interim Standard: Water intake end-of-pipe fish screens (DFO, 2026a).
- Design and implement a work area containment plan to isolate all above-water work to prevent the release of sediment or other contaminants to a waterbody (as per OPSS. PROV 517). The design shall include regular inspection, repair, removal, and disposal of isolation measures and materials. Work zones should be clearly delineated before work to avoid unintentional intrusions into nearby natural areas.
- Where possible, organic material barriers (fibre roll barrier, sediment log, coir rolls, etcetera) shall be used in the drainage ditches to mitigate sediment transport (as per OPSS. PROV 804).

- Materials used or generated during construction (such as organics, soil, woody debris, temporary stockpiles, construction debris, etcetera) shall be stored and managed in a way that prevents their release of these materials to a waterbody. This shall include storing materials a safe distance from a waterbody (such as greater than 30 metres from any watercourse) and/or isolation measures (as per OPSS.PROV 182 and OPSS.PROV 180).
- Dewatering operations shall be managed to prevent erosion or the release of sediment-laden water to a waterbody (as per OPSS.PROV 805).
- Any sediment or deposited material that requires removal during drainage work shall not be allowed to enter any waterbody (as per OPSS.PROV 510).
- A Spills Management Plan shall be prepared and shall include materials, instructions, education, and emergency numbers. The plan shall be kept onsite at all times, communicated to work crews and be properly implemented in the event of accidental spills (Spill Prevention and Response Contingency Plan as per OPSS.PROV 100, OPSS.PROV 180, OPSS.PROV 182 and O. Reg 224/07).
- Operate, store, and maintain equipment and associated materials in a manner and at a distance that prevents the entry of any deleterious substance from entering a waterbody (as per OPSS.PROV 182). Any part of equipment entering the waterbody or operating from the bank shall be cleaned, free of fluid leaks and in good working condition.
- The Contractor shall refer to and incorporate mitigation and obtain permits associated with wildlife, access management, erosion and sediment control, and invasive species.

Rehabilitation

- Stabilize any portion of the bed of a waterbody disturbed during construction to pre-construction conditions (or better). This shall include substrates (as per OPSS.PROV 182 and OPSS.PROV 1005).
- Stabilize the banks of a waterbody that have been disturbed during construction to pre-construction conditions or better (as per OPSS.PROV 182 and OPSS.PROV 804). This shall include riparian vegetation or stone material, temporary measures, and the avoidance of hard engineering.
- Stabilize and re-vegetate soils exposed or disturbed during construction, including new or cleaned-out ditches (as per OPSS.PROV 182).

Monitoring

- Should any Species at Risk be uplisted throughout the Project and require registration under the *Species Conservation Act* and/or Authorization under the *Fisheries Act*, the construction and post-construction monitoring shall incorporate all necessary requirements associated with the applicable registration(s) and authorization(s).
- In-water and near-water work shall be monitored to ensure mitigation measures are properly implemented, functioning, maintained and repaired as needed, and removed following construction (as per OPSS.PROV 182).
- Erosion and sediment control monitoring shall be completed in accordance with Ministry of Transportation of Ontario Non-Standard Special Provisions (OPSS.PROV 804, OPSS.PROV 805, and SP805F01).

9.2.4 Environmental Provisions

The following Ontario Provincial Standard Specifications (OPSS) and Ministry of Transportation of Ontario Standard Practices are recommended for evaluation and inclusion as the Project moves into Detail Design:

- OPSS.PROV 801 – Protection of Trees
- OPSS.PROV 802 – Topsoil
- OPSS.PROV 803 – Vegetative Cover
- OPSS.PROV 804 – Temporary Erosion Control
- OPSS.PROV 805 – Temporary Sediment Control
- OPSS.PROV 825 – Placement of Aggregates in Waterbodies
- OPSS.PROV 517 – Dewatering and Temporary Flow Passage Systems
- OPSS.PROV 1005 – Material Specification for Aggregates - Waterbody
- OPSS.PROV 206 – Grading
- OPSS.PROV 201 – Clearing, Close Cut Clearing, Grubbing, and Removal of Surface and Piled Boulders
- OPSS.PROV 511 – Rip-Rap, Rock Protection, and Granular Sheeting
- OPSS.PROV 539 – Temporary Protection Systems
- OPSS.PROV 510 – Removal

- Environmental Protection During Work in Watercourses and on Watercourse Banks in accordance with OPSS.PROV 182
- Temporary Erosion and Sediment Control Measures in accordance with OPSS.PROV 804 and OPSS.PROV 805 and Erosion and Sediment Control in accordance with MTO Non-Standard Special Provisions (OPSS.PROV 804, OPSS.PROV 805 and SP805F01)
- Management of Excess Materials in accordance with OPSS.PROV 180
- General Environmental Protection
- Operational Constraint – Maintenance of Existing Drainage
- Spill Prevention and Response Contingency Plan in accordance with Ministry of Transportation of Ontario OPSS.PROV 100
- Timing of in-water Work in accordance with SSP101F23

9.2.5 Potential Fish Habitat Enhancement or Offsetting Opportunities

Low flow conditions were observed in the Napanee River, which is considered a larger, more hydraulically complex system in the geographical area. Under these conditions, refuge pools are often used by fish in these systems to survive until water levels rise and/or a rain event occurs that allows them to seek out more permanent habitat. However, as these conditions were observed within the watercourse and not limited to within the right of way / crossing structure, measures such as low-flow channels and refuge pools, etcetera at the crossing structures would not improve fish passage and are therefore not recommended for consideration at this time. A potential impediment to fish passage was observed in WC-14a, as seen in **Figure 4-2**, where woody debris caused the stream to split into chutes and created cascade-like features. Review of impacts and potential opportunities to enhance fish habitat in this area will be reviewed during Detail Design.

Eroded banks were observed in the right of way along the Napanee River (WC-13) that could be stabilized (where feasible) with stone and/or plantings to eliminate further scouring and sedimentation into the watercourses. River stone should be used below the 2-year highwater mark, while plantings can also be incorporated to further stabilize and naturalize the riparian lands, while also providing shade to the watercourse features. Stone details (type, size, and placement) and planting details (species, density, and placement) will be determined during Detail Design and will be detailed in associated construction drawings. Refer to the *Fluvial Geomorphic Assessment* (AECOM, June 2026) for more details.

Waste material and other anthropogenic debris were observed throughout the Project Limits, including ditches, watercourses, and inside culverts. Waste material can be hazardous to wildlife and can interrupt fish passage with sufficient debris. It is recommended that efforts are made throughout the Project Limits to remove the accumulated waste material.

9.3 Fluvial Geomorphology

A *Fluvial Geomorphic Assessment* (AECOM, September 2026) of the Napanee River Bridge crossing was undertaken for the Project. The purpose of the Fluvial Assessment was to assess the existing crossing structure in the Study Area and to provide recommendations on structure spans.

9.3.1 Summary of Potential Impacts

Lateral erosion in the Napanee River reach is expected to be higher than other reaches, as it belongs to a large watercourse experiencing widening likely due to higher peak flows from increased runoff due to urbanization. Widening of the watercourse was seen in the field, but there were no significant changes in the planform in the historical imagery analysis.

The banks were easily delineated from imagery, however, there were not enough areas or meanders within the reach appropriate for measuring erosion. The meanders downstream of the reach were used as surrogate meanders to measure a 100-year erosion rate of 12.94. 10% of the meander belt width was calculated as 25.77 metres, though this is higher than expected for a 32 metre-wide watercourse. Given the width, surficial geology, and active erosion, included in **Table 9-2**, the expected erosion rate would be closer to 5 to 8 metres. As there was some evidence of erosion, but the reach was still in regime and had no significant planimetric changes in the historical imagery, an erosion rate of 5 metres was used as a more appropriate 100-year erosion rate.

Velocities and shear stresses were taken from the hydraulic model for the proposed bridge design, having a span of 44 metres. Overall, the results indicate very minor localized changes in the predicted grain size transported and entrained under the proposed flow conditions compared to existing conditions. All changes are very minor and indicate that the proposed alignment is unlikely to significantly change the grain size transported and entrained compared to existing conditions. The existing and proposed conditions for a range of flow events and the implications for predicted grain size entrained and transported are provided in the *Fluvial Geomorphic Assessment* (AECOM, September 2026), available under separate cover upon request.

Table 9-2: 100-Year Erosion Rate Considerations

Surficial Geology	Historical Summary	RGA Rating	Meander Amplitude	Evidence of Active Erosion?	Hydraulic Regime	Approximate Width from DEM (m)	Bankfull Width from Cross Section (m)	100-Year Erosion Rate (m) based on MNR, Table 3 (2002)	100-Year Erosion Rate (m) based on Mapping	10% MBW (m)	100-Year Erosion Rate (m)
Fine-textured massive to well laminated glaciolacustrine deposits, Paleozoic bedrock, and till	No significant changes to channel planform since 1962. Urbanization has occurred in the area	In Regime	Relatively straight. Wide ~70 metre wide gentle meanders	Bank erosion and bed scour	Permanent	31.79	Could not be collected in the field – Too deep and wide	5 – 8	12.94 +/- 3	25.77	5.00 Selected as an appropriate erosion rate due to no significant changes in channel planform and because the crossing is located over a relatively straight portion of the reach. Erosion was observed but the reach still had an in regime RGA rating.

9.3.2 Proposed Mitigation Measures

The following recommendations for the Napanee River Bridge have been provided based on the comprehensive fluvial geomorphic investigation undertaken for the Project.

- A wider crossing will reduce/eliminate flow constriction and reduce erosion;
- A low flow channel should be installed through the crossing to maintain water flow and ecosystem health during lower flow periods;
- A pierless bridge design is recommended to reduce interference with flow and therefore sediment transport;
- Current crossing is over a relatively straight section of the reach and is aligned perpendicular to Highway 401. Therefore, the orientation is appropriate; and
- The fluvial assessment showed that any changes to current sediment transport and entrainment conditions are likely to be minor with this new design.

The recommended crossing span for the Napanee River Bridge crossing is 41.8 metres. The current proposed bridge is a single-span design with a span of 44 metres, with a 42.8 metre opening between the abutment faces. As this design includes a pierless bridge, where existing abutments will be removed from the watercourse, it is expected to have reduced interference with flow and therefore natural sediment transport processes. The recommended crossing span is also wider than the suggested crossing recommendation of 41.8 metres, outlined in the *Fluvial Geomorphic Assessment* (AECOM, September 2026), available under separate cover upon request. As a result, the proposed design is adequate from a geomorphological perspective based on this fluvial geomorphic assessment.

9.4 Hydrogeology

9.4.1 Potential Impacts

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

- Changes to recharge/discharge regimes resulting from the increase of pavement surface, the disturbance of the ground surface, ground clearing and compaction;

- Potential release of contaminants such as fuel during construction activities and the release of road de-icing agents, which could impact the groundwater aquifer and groundwater-dependent water bodies;
- Application of commercial fertilizers during seeding activities to re-establish vegetative cover; and
- Potential 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.

9.4.1.1 Groundwater Recharge and Discharge

The most significant difference associated with water balance with Project construction will be the removal of vegetation and the installation of the impervious surfaces (concrete and/or asphalt roadway surfaces). Impervious surfaces reduce infiltration of the surface runoff water into underlying soils, while vegetation removal eliminates the plant transpiration from the evapotranspiration component of the natural water balance. Together, these practices are expected to 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, soil compaction during roadbed preparation prior to road surfacing activities will reduce soil porosity and permeability, further limiting groundwater recharge to the overburden and bedrock aquifers systems. Impacts to groundwater recharge are expected to be greatest in elevated areas where permeable deposits, such as sand and gravel, are removed, compacted, or covered by impervious surfaces.

Based on the nature of this Project, there will be an increase in the amount of pavement surfaces. 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.

9.4.1.2 Construction below Groundwater Table and Dewatering

Cuts and excavations that intercept the water table have the potential to capture and redirect groundwater flow in the shallow aquifer system. Excavations below the water table in areas underlain by fine-textured soils will release a limited quantity of groundwater, as most groundwater is retained in the soil matrix. In these areas, seepage into excavations would be minimal and dewatering may not be needed. More significant impacts would occur when excavating within 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 and abutments 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 per Ontario Regulation 387/04 (water taking regulation) and Ontario Regulation 63/16 (water taking registration regulation), the dewatering activities might need to be registered as “prescribed activities” when the estimated construction dewatering volumes exceed 50,000 litres per day (50 metres cubed per day).

On July 1, 2025, Ontario Regulation 63/16 was amended by Ontario Regulation 66/25 to (amongst other things) remove the existing volumetric cap on daily water-takings for construction dewatering that may be filed with the Ministry of the Environment, Conservation and Parks’ Environmental Activity and Sector Registry (400,000 litres per day per dewatering location) through the revocation of current Clause 7(5).

Given the recent regulatory changes, it is recommended that water-taking permitting for Project-related construction dewatering be addressed through a filing on the Ministry of the Environment, Conservation and Parks’ Environmental Activity and Sector Registry by the Ministry of Transportation of Ontario.

9.4.1.3 Likelihood of Release of Contaminants

9.4.1.3.1 Fuel Spills

There is a potential of accidental spill/release of fuels during highway construction work. Spills onto fine-textured soils (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 risk of groundwater contamination is generally greater for shallow overburden aquifers when compared to deep bedrock aquifers. The potential for contamination also increases in areas characterized by coarse-textured soils, shallow groundwater tables, and proximity to surface water bodies, where contaminants may migrate more readily through the subsurface. To minimize potential impacts, spill prevention and response plans should be developed and implemented throughout the construction period.

9.4.1.3.2 Road De-icing

Paved surfaces increase runoff into roadside ditches carrying de-icing agents (road salt) and can affect the underlying groundwater system through infiltration. The Ministry of Transportation of Ontario and the Contractor should implement relevant best management practices as well as Salt Management Plan for road salt application during winter weather conditions.

9.4.1.3.3 Commercial Fertilizer

As part of Project construction, there will be exposed earth surfaces, which will require seeding to re-establish vegetative cover. Nitrogen is known as a common chemical of concern in commercial fertilizer. When fertilizer is applied to the land as part of re-establishing vegetative cover, it may result in a release of nitrogen to groundwater or surface water.

9.4.1.3.4 Potential Water Well Impacts

There are no active municipal water supply wells located within the Groundwater Assessment Project Study Area (herein referred to as the 'Project Study Area'). A total of fifty-five (55) water wells, which include wells for commercial, domestic and livestock use as well as wells containing no data and classified as 'unknown' were identified within the Project Study Area following a review of the Ministry of the Environment, Conservation and Parks' well records. Figure 7 of Appendix C, the *Groundwater Assessment Report* (AECOM, July 2026), available under separate cover upon request, shows the location of these water wells. The presence of the water wells has not been visually confirmed in the field.

Based on the nature of the Project, excavations may be required for the construction of highway and bridge structure foundations. If significant excavations and groundwater dewatering are required for the highway work, potential impacts to the water wells located in the vicinity will be possible.

Potential groundwater impacts resulting from the Project construction activities are expected to be greatest for private water well users with the following conditions:

- Water wells of shallow depth and/or large diameter in areas where road and bridge construction work is being performed below the shallow water table. Groundwater seeping into the excavation has the potential to impact groundwater resources as groundwater will have to be pumped out during excavation. This action may lower the water table, temporarily reducing water supply to local wells, particularly shallow water wells;

- Should water wells be drilled/bored/dug in shallow aquifers, road and bridge construction activities have the potential to adversely impact shallow aquifers through disturbing contaminated soils, or handling and management practices (such as spills of fuel, lubricants, etcetera); thus, introducing contaminants that could enter the groundwater system and impact nearby water wells; and
- Water wells closest to the area of construction, as road construction activities have the potential to physically impact water wells due to vibration and shock.

9.4.2 Proposed Mitigation Measures

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

- 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);
- The Ministry of Transportation of Ontario and the Contractor should implement relevant Best Management Practices as well as Salt Management Plan for road salt application during winter weather conditions;
- Minimize commercial fertilizer usage and runoff by following the Ministry of Transportation of Ontario prescribed Best Management Practices and Ontario Provincial Standard Specification (OPSS.PROV 804);
- It is recommended that groundwater samples be collected for laboratory testing from monitoring wells installed during the Detail Design stage of the Project. Confirmatory sampling is recommended to be completed by the Contractor both prior to and during active dewatering to assess ongoing water quality as construction progresses to ensure compliance with the relevant discharge quality standard(s) and to identify any trends in the data that may arise; and
- If excavations and groundwater dewatering are required during Project construction:
 - 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 Environmental Activity and Sector Registry if the amount of water taking exceeds 50 metres cubed per day. On July 1, 2025, Ontario Regulation 63/16 was amended by Ontario Regulation 63 66/25 to (amongst other things) remove the existing volumetric cap on daily water-takings for construction dewatering that may be filed upon

Ministry of the Environment, Conservation, and Parks Environmental Activity and Sector Registry (400,000 litres per day per dewatering location) through the revocation of current Clause 7(5). Given the recent regulatory changes, it is recommended that water-taking permitting for Project-related construction dewatering be addressed through a filing on Ministry of the Environment, Conservation, and Parks' Environmental Activity and Sector Registry by the Ministry of Transportation of Ontario during Detail Design; and

- A door-to-door water well survey may be required to confirm the presence and/or absence of the water wells in the vicinity (500 metre radius) of the dewatering locations to establish baseline conditions. A Groundwater Monitoring and Water Well Protection Program shall be developed to monitor and mitigate potential impacts to the water wells in the vicinity of the dewatering locations. The requirement for this program will be reviewed during Detail Design.
- Any groundwater monitoring wells or water wells within the Study Area, if no longer in use or in the construction zone, or any other unregistered water wells (if encountered) shall be properly decommissioned as per the Ontario Wells Regulation (R.R.O. 1990, Regulation 903) to avoid the creation of potential pathways for surficial contamination to get to the underlying aquifers. The requirement for this will be reviewed during Detail Design.

9.5 Terrestrial Ecosystems

9.5.1 Summary of Potential Impacts

The potential impacts associated with the Project include the loss or degradation of vegetation communities, wildlife habitat, Significant Wildlife Habitat, and Species at Risk habitat. The Project may also result in disturbance to wildlife, including Species at Risk and Species of Conservation Concern, through increased noise levels and construction activities. In addition, construction activities have the potential to cause injury or mortality to wildlife, including Species of Conservation Concern and Species at Risk. For Preliminary Design purposes, community impacts were determined using a 120-metre buffer around the Project Limits. Future design updates in the Detail Design phase of the Study will further refine the amount and areas of habitat and vegetation removal with the potential to reduce impacts. Potential terrestrial ecosystem impacts were assessed for both the construction and operational phases of the Project and are described in the sections below.

9.5.1.1 Designated Natural Areas, Vegetation Communities and Plants

Impacts to natural areas, vegetation communities and plants are anticipated to be limited to the areas adjacent to the existing Ministry of Transportation of Ontario right of way, and existing Napanee River Bridge. Areas adjacent to highways are typically already highly disturbed due to past construction, ongoing maintenance, mowing, soil compaction, and exposure to pollutants such as road salt and vehicle emissions. As a result, vegetation communities in these locations are often dominated by tolerant, common, or non-native species rather than sensitive or high-quality natural habitats. Given the already altered condition and reduced ecological integrity of these environments, incremental impacts associated with the Project Limits are expected to be limited. However, the acquisition of new properties by Ministry of Transportation of Ontario may result in localized vegetation clearing within previously undisturbed or less disturbed areas, which could lead to the removal of existing vegetation communities and associated plant species within those lands.

Construction Phase

- **Loss of and/or damage to vegetation and ecological land classification communities and Designated Areas:** Total area (hectares) of each vegetation community anticipated to be removed in the Limits of Proposed Work are summarized in **Table 9-3** below. Of the total 74.48 hectares of vegetation communities in the Study Area, 13.86 hectares are anticipated to be cleared within the Project Limits.
- **Indirect loss of and/or damage to vegetation communities:** Incidental intrusion into the adjacent vegetation communities surrounding the Project Limits may occur.
- **Fill and sediment transport from disturbed areas to undisturbed areas:** During grubbing or grading of the site, fill and sediment runoff from the active construction area may enter adjacent, undisturbed vegetation communities and adjacent watercourses, if not appropriately controlled.
- **Soil or water contamination:** Oil, gasoline, grease and other substances from construction equipment, materials, storage and handling may enter vegetation communities and adjacent watercourses, if not appropriately managed.
- **Dust accumulation:** Vegetation clearing, including grubbing and grading activities, may result in increased dust generation due to soil disturbance, removal of vegetative cover, and increased exposure of soils. Construction activities such as the operation of heavy equipment, site traffic, and stockpiling of materials may contribute to localized airborne dust deposition on adjacent vegetation communities. Elevated dust accumulation may temporarily impair air quality and alter surface soil conditions within areas adjacent to the Project limits.

Table 9-3: Vegetation Removal by Ecological Land Classification Community in Study Area

Ecological Land Classification	Ecological Land Classification Code	Ecological Land Classification Description	Total Area (hectares) in Study Area	Total Impacted Area (hectares) in Project Limits
Cultural Meadow	CUM1	Mineral Cultural Meadow Ecosite	4.30	1.25
Cultural Meadow	CUM1-1	Dry – Moist Old Field Meadow Type	7.62	4.34
Cultural Plantation	CUP3-2	White Pine Coniferous Plantation Type	5.12	0.14
Cultural Thicket	CUT1	Mineral Cultural Thicket Ecosite	3.60	1.52
Cultural Woodland	CUW	Cultural Woodland	0.61	-
Cultural Woodland	CUW1	Mineral Cultural Woodland Ecosite	4.37	0.31
Cultural Woodland	CUW1-1	Red Cedar Cultural Woodland Type	11.98	1.03
Forest	FOC2-1	Dry – Fresh Red Cedar Coniferous Forest Type	1.80	-
Forest	FOD5-1	Dry – Fresh Sugar Maple Deciduous Forest Type	2.55	0.55
Marsh	MAM1	Bedrock Meadow Marsh Ecosite	0.43	0.38
Marsh	MAM2	Mineral Meadow Marsh Ecosite	1.15	0.75
Marsh	MAM2-2	Reed-canary Grass Mineral Meadow Marsh Type	3.83	0.68
Swamp	SWD2-2	Green Ash Mineral Deciduous / Swamp Type	10.44	1.75
Open Water	OA0	Open Water (Inclusions)	3.14	0.29
Anthropogenic Communities	AGR	Agricultural	12.50	0.40
Anthropogenic Communities	CU	Cultural (Manicured)	1.04	0.47
Total Area	-	-	74.48	13.86

- **Introduction or spread of invasive species:** Invasive species can outcompete and displace native plants, leading to the formation of monocultural stands that negatively affect the vegetation community structure and function. Vegetation clearing and grubbing or grading and movement of construction equipment may perpetuate the establishment of invasive species in new areas, including beyond the Study Area, and further spread in already established areas if control measures are not implemented. Phragmites was present throughout the Study Area, which could be easily spread.

Operational Phase

- **Edge impacts on woodlands:** Increased fragmentation, altered micro-climates (increased light and wind exposure), and increase in human activity may result in reduced ecological connectivity within the greater landscape leading to greater instances of invasive species, noise, and light pollution on vegetation communities adjacent to the Ministry of Transportation of Ontario right of way.
- **Soil and water contamination:** Oil, gasoline, grease, road salt and other materials from highway usage may result in contaminants entering adjacent vegetation communities if not appropriately managed.
- **Changes in drainage patterns:** Increased permanent impervious surfaces (paved roadway and shoulders) and compacted subgrades may reduce infiltration capacity and increase surface runoff volumes. These long-term alterations to grading and drainage may modify local drainage patterns, potentially resulting in localized ponding on the roadway surface and increased erosion potential within adjacent roadside ditches and downstream drainage features.

The potential impacts on Designated Natural Areas, vegetation and plants described above are anticipated to be negligible and further reduced if appropriate mitigation measures, described below in **Section 9.5.2**, are implemented.

9.5.1.2 Wildlife and Wildlife Habitat

The vegetation in the right of way adjacent to the existing bridge is already highly disturbed but may provide habitats for various wildlife including Species of Conservation Concern and / or birds protected under the *Migratory Birds Convention Act*. Migratory birds, including Species at Risk, may also use the existing bridge for nesting. The potential impacts to wildlife and wildlife habitat as a result of the proposed works are described as follows:

Construction Phase

- **Disturbance or displacement of migratory birds and destruction of their nests:** Vegetation removal has the potential to disturb or displace nesting birds, including Species of Conservation Concern and/or species protected under the *Migratory Birds Convention Act* and destroy their active nests where there are trees or shrubs or where suitable ground cover occurs if activities are conducted during the overall bird nesting period of April 1 to August 31.
 - Treed habitats (FOD, SWD) may host nest cavities of Pileated Woodpecker, a Schedule 1 species under the Migratory Birds Regulations. Removal of trees with nest cavities may result in the destruction of Pileated Woodpecker nests.
- **Loss of and/or damage to wildlife habitat, including Species at Risk:** Vegetation removal may result in the direct or indirect loss of general wildlife habitat and candidate Significant Wildlife Habitat.
- **Disturbance to turtle wintering habitat:** Candidate turtle wintering habitat in the Napanee River may be disturbed if in-water works occur between **October 31 to April 1**.
- **Incidental wildlife injury or mortality:** Wildlife, including Species at Risk and Species of Conservation Concern, may enter the construction work area and become susceptible to accidental injury or mortality associated with construction machinery and equipment if not mitigated. In addition, wildlife may be injured or killed by increased vehicular use during construction phases.

Operational Phase

- **Disturbance to wildlife from lighting, noise and vibration during operation:** Operation of the new bridge and interchange and associated roadway infrastructure may contribute to increased disturbance to wildlife through a combination of sensory impacts, including noise, vibration, and human activity. These factors can alter wildlife behaviour, movement patterns, and habitat use, potentially leading to avoidance of areas near the roadway and contributing to habitat fragmentation or increased collision risk. While the expansion of the bridge, Highway 401 lanes, and off-ramps will slightly increase the overall roadway footprint, the Project is not anticipated to result in a substantive change in disturbance levels relative to existing baseline conditions.
- **Wildlife mortality through vehicle collisions (large mammals):** The existing Highway 401 already represents a source of wildlife-vehicle collisions in the Study Area. While expansion of the off-ramps will slightly increase the physical footprint of roadway infrastructure, the Project is not anticipated to result in a substantive

change to traffic volumes, speeds, or patterns relative to baseline conditions. As a result, no measurable increase in deer mortality beyond existing baseline conditions is expected.

- Adverse impacts to wildlife and wildlife habitat can be minimized, provided avoidance and mitigation measures, described below in **Section 9.5.2**, are implemented.

9.5.1.3 Species at Risk

Candidate bat Species at Risk habitat and confirmed habitat for Eastern Meadowlark was present in the Study Area. Potential impacts to Species at Risk and their habitats include:

Construction Phase

- **Removal of candidate bat Species at Risk habitat and possible disturbance, mortality or injury:** A total of 3.91 hectares of candidate bat Species at Risk habitat identified within the Cultural Woodland (CUW1), White Pine Coniferous Plantation Type (CUP3-2), Dry-Fresh Sugar Maple Deciduous Forest Ecosite (FOD5), Dry-Fresh Sugar Maple Deciduous Forest type (FOD5-1), and Green Ash Mineral Deciduous Swamp Type (SWD2-2) communities are anticipated to be removed. Individual Species at Risk bats may also be inadvertently killed or injured as a result of the removal or accidental damage of potential roost trees if vegetation clearing occurs during the bat roosting season between **March 15 and November 30**.
- **Removal of candidate Red-headed Woodpecker (*Melanerpes erythrocephalus*) habitat:** The same 3.91 hectares of treed habitat noted as candidate bat SAR habitat above may also provide candidate habitat for Red-headed Woodpecker. If vegetation removal occurs between **April 1 and August 31**, individual Red-headed Woodpecker, their nests and young may be incidentally killed or harmed by vegetation clearing activities.
- **Removal of confirmed Eastern Meadowlark habitat and possible disturbance, mortality or injury:** The Project Limits overlaps approximately 3.45 hectares of confirmed Eastern Meadowlark habitat, and 0.12 hectares of candidate habitat. If vegetation removal occurs between **April 1 and August 31**, individual Eastern Meadowlark, their nests and young may be incidentally killed or harmed by vegetation clearing activities.
- **Removal of candidate Loggerhead Shrike habitat and possible disturbance, mortality or injury:** The Project Limits overlaps approximately 2.54 hectares of candidate Loggerhead Shrike habitat. If vegetation removal occurs between **April 1 and August 31**, individual Loggerhead Shrike, their nests and young may be incidentally killed or harmed by vegetation clearing activities.

- **Removal of candidate Black Ash and candidate Butternut habitat.** Vegetation clearing may result in the removal of 1.75 hectares of candidate Black Ash habitat, and 0.86 hectares of Butternut habitat. No Butternut or Black Ash were observed in the Study Area, although targeted surveys were not conducted.
- **Indirect disturbance of bat activity due to construction lighting:** The lights along the highway are already directed downwards and away from natural areas, which is a mitigation measure to reduce impacts to bat species. Given the highway is already well lit for safety requirements, the increase in luminescence is not anticipated to significantly change baseline lighting conditions. While bats may be temporarily disturbed or modify their behaviour as a result of the lighting change from baseline, it is likely they will be able to adapt to the new lighting levels over time and no adverse impacts are anticipated.
- **Removal of candidate Blanding's Turtle habitat and possible disturbance, injury or mortality:** The Napanee River provides candidate Blanding's Turtle habitat. In-water work may impact overwintering Blanding's Turtle if conducted between **November 1** and **March 31**. Blanding's Turtles are known to travel long distances between habitats, resulting in potential encounters with construction activities, machinery, and site traffic if not mitigated.

Operational Phase

- **Species at Risk Wildlife Road Mortality:** Injury or mortality of wildlife, including bat and bird Species at Risk, may occur as a result of vehicle collisions during movement, foraging, or migration, particularly where individuals cross or travel along the roadway from adjacent suitable habitats. While some risk of road mortality is inherent to existing roadway conditions, the Project is not anticipated to result in a measurable increase in this risk. The Project is not expected to substantially alter existing traffic patterns, volumes, or roadway conditions; therefore, wildlife–vehicle collision risk is expected to remain consistent with current baseline conditions.

Adverse impacts to Species at risk can be minimized, provided avoidance and mitigation measures, described below in **Section 9.5.2**, are implemented.

9.5.2 Proposed Mitigation Measures

Proposed mitigation and avoidance measures for the potential impacts on specific terrestrial features, as identified in the previous section, are described below. To assist in mitigating potential impacts, the following Ministry of Transportation of Ontario Provisions should be utilized, at a minimum:

Vegetation

- OPSS.PROV 201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders.
 - Vegetation removal, grading and soil compaction should be kept to a minimum. Further analysis of the required limits of work should be completed during the Detail Design phase to assess if impacts to certain vegetation communities located within the proposed right of way can be avoided.
- OPSS.PROV 801: Construction Specification for the Protection of Trees.
 - Trees not designated for removal will not be damaged and will be protected from flooding and sediment deposits from construction operations. Construction materials and earth will not be stockpiled within the dripline of any tree not designated for removal. Barriers for tree protection will be installed at the dripline of trees or woodlot edges within the work area.
- OPSS.PROV 803: Construction Specification for Vegetative Cover.
 - To the extent feasible, affected areas shall be re-seeded and re-vegetated and restored to pre-disturbance conditions, using native species appropriate for the community type disturbed.
 - Seeded mixes that include Common Milkweed (*Asclepias syriaca*) and native flowering plants should be used to rehabilitate or restore areas of herbaceous vegetation temporarily disturbed during proposed works.
- Nssp - Invasive and Noxious Vegetation Spraying and Cutting.
- Description of controlling the spread of invasive and noxious vegetation. Soil from areas impacted by invasive and noxious vegetation shall not be stockpiled for reuse. Debris and invasive and noxious vegetation material attached to the outside surfaces of equipment is prohibited from entering the working area. Equipment coming on site shall be inspected for debris, and if present debris shall be completely removed and shall be collected and managed as specified.
- Nssp - Invasive and Noxious Vegetation Disposal and Burial.
- Contractors shall provide a *Phragmites Management Plan* that addresses procedures including treatment and disposal methods, and equipment cleaning protocols. Soil from areas impacted by Phragmites shall not be stockpiled on site for reuse. Excavated Phragmites material must be securely contained, to ensure seeds or other viable plant parts do not escape while on route to the disposal site.
 - All machinery, construction equipment and vehicles arriving on-site should be in clean condition (free of fluid leaks, soils containing seeds of plant material

from invasive species) and be inspected and washed in accordance with the Clean Equipment Protocol for Industry (Halloran et al., 2013) prior to arriving and leaving the construction site in order to prevent the spread of invasive species to other locations.

- Access routing and construction staging should be planned to align with the existing road and disturbed areas in the right of way in order to reduce the extent of disturbance in vegetation communities.

Soil Management

- **Access** OPSS.PROV 180: General Specification for the Management of Excess Materials.
 - Construction material should be stored within an authorized location, and any soil stockpiles should only be located within a suitable sediment fenced and protected location.
- If stockpiles of gravel and sandy substrates, or the removal of these substrates in the vicinity of turtle habitat are required during the active turtle season (**April 1 to October 15**), turtle exclusion fencing should be installed in accordance with the Reptile and Amphibian Exclusion Fencing Best Management Practices (MECP, 2025) around stockpiles or area of disturbance prior to April 1. Fencing should be installed immediately after stockpiles are created if after April 1.
- Stockpiles should be maintained in accordance with the Best Management Practices for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario (MNRF, 2017). The slope of stockpiles should be maintained at 70 degrees or less to discourage *Migratory Birds Convention Act* species from nesting. Alternatively, exclusion methods such as geotextiles, plastic covers or tarps can be used to cover stockpiles to prevent nesting.
- Maintain the outermost limit of soil storage locations (including any grading activities or access disturbance) outside of the driplines of forests and with a minimum setback of 30 metres from the edges of wetlands and fish habitat watercourses.

Sedimentation and Contamination

- OPSS.PROV 506: Dust Suppressant.
 - To mitigate dust deposition, a dust suppressant (water) must be applied to areas of exposed soils to reduce dust generation during construction.
- OPSS.PROV 182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks.

- OPSS.PROV 804 and OPSS.PROV 805: Construction Specification for Temporary Erosion and Sediment Control Measures.
 - Erosion and sediment control measures should be installed in accordance with the Project's associated Erosion and Sediment Control Plan.
 - Erosion and sediment control measures should be installed outside of forest driplines and at a minimum of 30 metres setback from the limits of wetlands and watercourses. Erosion and sediment control measures should be installed along the limits of work.
- OPSS.PROV 517 – Dewatering and Temporary Flow Passage Systems: Design and implement an in-water work area isolation plan to maintain clean flow around the work area where in-water work is proposed (as per OPSS.PROV 804, OPSS.PROV 805 and OPSS.PROV 517). The design shall:
 - Use only clean materials free of particle matter for temporary cofferdams.
 - Manage flow withdrawal and discharge to prevent erosion and the release of sediment to a waterbody.
 - Ensure work zones are stabilized against high flows at the end of each workday.
 - A Spills Management Plan should be prepared and shall include materials, instructions, education and emergency numbers. The Plan should be kept onsite at all times, communicated to work crews and be properly implemented in the event of accidental spills.
- Special Provision 199S56 Control of Emissions During Structural Work.
- Watercourse banks disturbed by any activity associated with the Project should be immediately stabilized to prevent erosion and/or sedimentation, and re-vegetated with native species suitable for the site.

Wildlife Habitat

- NSSP: Operational Constraint – Migratory Bird Protection:
 - Schedule vegetation removal to occur outside of the overall bird nesting period of **April 1 to August 31** to avoid disturbance to breeding migratory birds including species at risk and/or damage/destruction of their nests. If vegetation removal must occur within this time period, active nest searches must be conducted prior to vegetation removal by a qualified biologist within 'simple habitats' (such as manicured lawn) or if minor vegetation clearing is required, to ensure that no active nests of breeding migratory birds or bird Species at Risk are destroyed, in order to prevent contravention of the *Migratory Birds Convention Act* and/or *Species at Risk Act*.

- Potential nesting features such as bridges, culverts and other structures were present within the Study Area. These structures are likely to be affected by construction and may provide suitable nesting habitat for *Migratory Birds Convention Act* and/or *Species at Risk Act* protected birds (Barn Swallow [*Hirundo rustica*]) in the future. As such, it is recommended that potential nesting structures be examined to confirm the presence or absence of migratory bird nests prior to the commencement of construction activities if during the active nesting season (**April 1 to August 31**). If birds are observed nesting in, under or on the structure prior to or during replacement, a qualified biologist should be consulted to determine the appropriate steps taken to reduce impacts to wildlife and avoid a potential contravention of the *Migratory Birds Convention Act*. Recommended mitigation may include the installation of bird exclusion netting, or timing restrictions to avoid disturbance during the active nesting period.
- Wildlife Crossings and Wildlife Exclusion Fencing – The Highway 401 is a known barrier to wildlife movement in the Study Area. The Napanee River riparian corridor that runs north-south under the Napanee River Bridge may serve as a natural crossing location for wildlife, including White-tailed Deer. There is currently no wildlife fencing adjacent to the crossing, and the installation of such fencing could help direct animals toward this location and thus reduce wildlife-vehicle collisions. Incorporating terrestrial shelves into the design of the Napanee River Bridge could enhance dry crossing opportunities, particularly for small or medium mammals, given dry shoulders become submerged during periods of high water. Additional improvements, such as providing natural cover beneath the structure and extending the bridge to the longest feasible span, may further increase terrestrial crossing opportunities. Wildlife crossing design enhancements, and any associated fencing, will need to consider the species for which it is designed, and should be completed during Detail Design phase.
- For areas adjacent to natural heritage features (woodlands and wetlands), conduct construction activities during daylight hours for increased visibility (avoid wildlife strikes) and to avoid light pollution impacts during the night, whenever possible.
- If during construction any wildlife are observed within the Limits of Work:
 - Under no circumstances will any wildlife be knowingly harmed, harassed or otherwise disturbed. If an animal is encountered, it will be permitted to move away on its own.
 - If wildlife is observed within the work area, a Qualified Biologist or environmental monitor will determine if there is a concern about the significance of the species observed.

- If the species is identified as Species at Risk:
 - A Qualified Biologist shall contact Ministry of the Environment, Conservation, and Parks immediately to determine next steps. In accordance with the *Species Conservation Act*, no Threatened or Endangered species can be handled or relocated without the proper approvals/permitting and authorization from Ministry of the Environment, Conservation, and Parks unless handling is considered necessary to address an imminent risk to human health and safety or to the animal. In that case, the Qualified Biologist shall document the circumstances and ensure any actions taken are consistent with applicable legislative requirements.
- If the species is not identified as a Species at Risk:
 - The species will be permitted to move away on its own. If it does not move, a Qualified Biologist shall be contacted for guidance.
 - If the animal is injured or orphaned, a Qualified Biologist will be notified to transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the Ministry of Natural Resources or a member of the College of Veterinarians of Ontario.
 - For Species of Conservation Concern (Snapping Turtle [Chelydra serpentina]) or other non-Species at Risk wildlife, it may be appropriate to request that a Qualified Biologist move the species for the safety of both the onsite personnel and the species.
 - If any non-Species at Risk amphibians or reptiles are unearthed during their hibernation, a Qualified Biologist will be notified to transport the animal to a suitable wildlife rehabilitation centre.

Species at Risk

- Special Provision 100S14 Unexpected Species at Risk Occurrence
 - Should Species at Risk be encountered within the work area, construction activities will cease and Ministry of Transportation of Ontario and Ministry of the Environment, Conservation, and Parks will be contacted for next steps.
- Schedule vegetation (trees, shrubs, ground cover) removal to occur outside of the overall bird nesting period of **April 1 to August 31** to avoid disturbance to breeding migratory birds including Species at Risk and/or damage/destruction of their nests
 - Mowing grasses in the areas of meadow habitat in the Ministry of Transportation of Ontario right of way prior to April 1 can deter migratory birds, including Bobolink and Eastern Meadowlark, from nesting during the breeding bird season.

- All vegetation removal within suitable habitat for bat Species at Risk shall occur outside of the bat roosting season between **March 15** and **November 30** and can only proceed upon registration under the *Species Conservation Act*.
- During the bat roosting season between **March 15** and **November 30**, any construction activities within 30 metres of suitable maternity roost habitat will be restricted to daylight hours, when possible, to minimize duration of disturbance.
- If a Butternut or Black Ash is observed within the Study Area, vegetation clearing surrounding the tree(s) will cease, and Ministry of Transportation of Ontario and Ministry of the Environment, Conservation, and Parks will be contacted for next steps. A “qualified Butternut professional” and “qualified Black Ash professional” as defined by the *Species Conservation Act* will be required to assess the health of the tree(s). Targeted surveys for Black Ash and Butternut should be completed during Detail Design.
- Schedule in-water works and dewatering activities outside of the Blanding’s Turtle hibernation period of **November 1** to **April 1** of any year (MNRF, 2015).
- Nocturnal Light Pollution Mitigation:
 - Construction activities should be limited to daylight hours (7 am to 7 pm) to reduce the amount of noise and light disturbance to nocturnal species (such as bats).
 - Avoid the use of high-pressure sodium and Light-emitting Diode lights immediately adjacent to woodlands as these types of lighting have been noted to negatively affect bat activity.
 - Shield any corridor illumination to reduce light spill within bat Species at Risk habitat and any restoration areas. If construction at night cannot be avoided, lights will be pointed away from the wooded areas and suitable habitat to reduce impacts to bat Species at Risk.
- The need for additional plans (wildlife management, wildlife monitoring, ecological restoration, environmental management, Invasive Species management, Ministry Salt Management Plan) to support the proposed works should be determined during Detail Design.
- Species at Risk Awareness training to construction staff, prior to the onset of construction, focusing on species identification and encounter/reporting protocols. Construction personnel will be notified of the presence of the known potential Species at Risk if present, and any new individuals that may be identified during construction, and the required protection measures while it remains active.

Significant Wildlife Habitat

- Temporary reptile and amphibian exclusion fencing will be installed prior to the onset of construction and before the commencement of seasonal amphibian and turtle movements (generally prior to **April 1**), in accordance with the Reptile and Amphibian Exclusion Fencing Best Management Practices (MECP, 2025). Fencing will be implemented where construction activities occur within a minimum of 100 metres of confirmed significant turtle wintering areas or amphibian breeding habitats (such as wetlands or woodlands), with the extent and tie-ins refined based on site-specific conditions. If an active turtle nests or confirmed nesting activity is found, a buffer area will be implemented around the nest or nesting activity. The radius of the buffer will range depending on the species, level of disturbance and landscape context, which will be confirmed by a Qualified Biologist, but will be protected by a minimum of 30 metres surrounding the nest.
- If reptile hibernacula features are incidentally identified during construction activities, work should be completed outside of the reptile overwintering period (**October 31 to April 1**), whenever possible.
- To minimize impacts to Monarch, meadow habitats with Milkweed should be removed in the fall/winter to avoid the Monarch breeding period. Pre-mowing meadow communities prior to **April 1** can also minimize Milkweed growing in the Construction Disturbance Area and attracting Monarchs. Collecting and redistributing Milkweed seed pods where feasible can increase available habitat for Monarch. Any disturbed areas should be re-seeded with a native pollinator mix that includes Milkweed.

Table 9-4 below summarizes anticipated permits and approvals and additional surveys that may be required during the Detail Design phase of the Project.

Table 9-4: Summary of Anticipated Next Steps Permits and Approvals

Level of Government	Legislation	Policies / Regulations	Governing Authority	Anticipated Permit and Approval Requirements
Federal	<i>Migratory Bird Convention Act, 1994</i> (MBCA)	Migratory Birds Regulations (MBR), 2022	Environment and Climate Change Canada	<ul style="list-style-type: none">■ Green Heron, Blue Heron and Pileated Woodpecker are listed under Schedule 1 of the Migratory Birds Regulations and nests are protected year-round unless confirmed abandoned. If a nest of these species is identified within the Limits of Work, removal or destruction may only occur without authorization if Environment and Climate Change Canada has been notified through the Abandoned Nest Registry and has remained unoccupied for a minimum of 36 consecutive months, as prescribed in Schedule 1 of the Migratory Birds Regulations.<ul style="list-style-type: none">• Where the required abandonment waiting period and registry process cannot be accommodated within the Project schedule, a permit under section 70 of the Migratory Birds Regulations (Damage or Danger Permit) would be required prior to the removal or destruction of the nesting cavity, subject to Environment and Climate Change Canada’s permitting criteria.• If warranted, targeted surveys should be completed during Detail Design to confirm there are no Schedule 1 Migratory Birds Regulations bird nests in the Limits of Work.■ Contravention of the <i>Migratory Bird Convention Act</i> is not anticipated provided vegetation removal occurs outside of the breeding bird season (April 1 to August 31).<ul style="list-style-type: none">• Should vegetation removal be required during the active bird nesting season, a nest survey will be conducted by a qualified Avian Biologist no more than 48 hours prior to vegetation removal and should only be considered for simple habitats as defined by Environment and Climate Change Canada (2019) and determined by the qualified Biologist.■ No permit anticipated.
Federal	<i>Species at Risk Act, 2002</i> (SARA)	N/A	Environment and Climate Change Canada	<ul style="list-style-type: none">■ Confirmed habitat for Eastern Meadowlark was identified in the Study Area.■ Contravention of the <i>Species at Risk Act</i> is not anticipated provided any vegetation removal occurs outside of the breeding bird season (April 1 to August 31).<ul style="list-style-type: none">• Should vegetation removal be required during the active bird nesting season, a nest survey will be conducted by a qualified Avian Biologist no more than 48 hours prior to vegetation removal and should only be considered for simple habitats as defined by Environment and Climate Change Canada (2019) and determined by the qualified Biologist.■ No permit anticipated.
Federal	<i>Species Conservation Act, 2025</i> (SCA)	Ontario Regulation 61/26 Ontario Regulation 75/26	Ministry of the Environment, Conservation and Parks	<ul style="list-style-type: none">■ Candidate bat Species at Risk habitat was identified within the Study Area and 3.91 hectares is anticipated to be removed.■ Candidate habitat for Bitternut and Black Ash was identified in the Study Area. Targeted surveys for these species should be completed during Detail Design.■ Registration under the <i>Species Conservation Act</i> is anticipated for removal of bat Species at Risk habitat and potential impacts to Blanding’s Turtle. Registration requires the preparation and implementation of a Conservation Plan, which must demonstrate that:<ul style="list-style-type: none">• Reasonable measures are taken to avoid and minimize impacts to bat Species at Risk and their habitats;• Habitat compensation, restoration, or creation measures are identified where adverse impacts on the species and habitat is unavoidable;• Measures are in place to maintain or improve species viability, including timing restrictions, habitat enhancements, and the provision of alternative roosting opportunities; and• Monitoring and adaptive management commitments are established to confirm the effectiveness of mitigation and compensation measures over time.
Federal	<i>Fish and Wildlife Conservation Act, 1997</i> (FWCA)	Ontario Regulation 666/98	Ontario Ministry of Natural Resources	<ul style="list-style-type: none">■ Wildlife and fish rescues, requiring the collection and transportation of wildlife, may be required around the existing abutments within the Napanee River, and will require an authorization from the Ontario Ministry of Natural Resources (Wildlife Scientific Collection Authorization) to avoid contravention of the <i>Fish and Wildlife Conservation Act</i>. No specially protected raptors nests were identified within the Study Area and therefore no contravention of the <i>Fish and Wildlife Conservation Act</i> is anticipated for specially protected raptors under the <i>Fish and Wildlife Conservation Act</i>.■ A Wildlife Scientific Collection Authorization is anticipated under the <i>Fish and Wildlife Conservation Act</i> for collection and relocation of wildlife during wildlife rescues.

9.6 Socio-Economic Environment

9.6.1 Land Use and Property

There are a few existing businesses and residential dwellings within the Study Area. Existing land use within the Study Area is largely rural with lower density residential lots fronting onto Palace Road south of Highway 401 and larger rural lots fronting onto Palace Road north of Highway 401. Lands designated as Environmental Protection in the Town of Greater Napanee Official Plan Schedule 'C' abut the Napanee River. The Spook Horn Cemetery is situated in the southwest quadrant of the Palace Road interchange, between Highway 401 and Palace Road.

Approximately 2.45 hectares of property abutting the existing right of way is required from a total of 14 property parcels for construction of the Recommended Plan. The majority are edge impacts requiring minor property acquisition. Of the 14 partially impacted properties, two are municipal parcels, 10 are residential and 4 are commercial/businesses.

Efforts have been made to minimize the properties required. Potentially impacted property owners have been notified and consulted with and will continue to be updated during the Detail Design stage regarding the details of the required property taking and property acquisition process. Compensation will be based on the fair market value of the property at the time of acquisition.

The Ministry of Transportation of Ontario will be registering a designation of a proposed highway based on the future needs determined by this planning and preliminary design Study. A designation is a mechanism for the Ministry to provide route/corridor protection as well as impose development control measures along the corridor and on adjoining owners. This type of designation is most often used where lands are still under private ownership, sometimes years in advance of intended property acquisition and construction.

9.6.1.1 Active Transportation

Cycling Route A – Newburgh as part of the Lennox and Addington County Bike Trail system crosses under Highway 401 via Palace Road within the Project area. The Recommended Plan maintains any provisions for active transportation at Palace Road as part of the previously approved environmental assessment and the single span structure allows for recreational use (such as kayaking) at the Napanee River.

9.6.1.2 Municipal Infrastructure

Further coordination with the Town of Greater Napanee is required to accommodate future servicing infrastructure once the municipality completes their Utilities Master Plan to determine preferred future municipal water and wastewater servicing corridors.

9.7 Waste Management and Contamination

9.7.1 Summary of Potential Impacts

The *Contamination Overview Study* completed for this Project identified three areas within the Study Area as having a “high” potential for soil and groundwater contamination. The properties included a former gas station/service centre, a Hydro One construction site with imported fill of unknown quality as well as a site in proximity to the westbound Highway 401 on ramp with imported fill of unknown quality. In addition, five areas within the Study Area were identified as having “medium” potential for soil and groundwater 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, unless the results of the historical records review suggested a higher potential.

In addition to the properties rated high or medium due to site activities, there were 12 significant spill records, representing 11 spill locations, which are also considered as having “high” potential for soil and/or groundwater contamination. Further information is provided in the *Contamination Overview Study* (AECOM, August 2026), available under separate cover upon request.

9.7.2 Proposed Mitigation Measures

Property Acquisition Environmental Due Diligence: Although the proposed property acquisition parcels for the Project were not identified as having moderate or high contamination potential in the *Contamination Overview Study* (AECOM, August 2026; available under separate cover upon request), future roadway construction requirements may necessitate property acquisition within areas of potential environmental concern. Should property acquisition be required in areas identified as having moderate to high contamination potential, it is recommended that property-specific Phase One Environmental Site Assessments (and, if warranted, Phase Two Environmental Site Assessments) be completed to support the acquisition process.

Road Construction and Management of Excess Soil: With respect to construction activities and management of excess soil, it is recommended that a soil contaminant investigation, where excavation is proposed, be carried out by a qualified environmental

consultant to assess soil quality in support of surplus/excess soil management in areas within or in close proximity to areas of environmentally sensitive areas with moderate to high potential for contamination.

Ontario Regulation 406/19 (On-Site and Excess Soil Management) and the associated document Rules for Soil Management and Excess Soil Quality Standards referenced by Ontario Regulation 406/19 should be followed for soil that is excavated and managed on-site or off-site during construction.

9.8 Designated Substance Survey

9.8.1 Summary of Potential Impacts

Based on the results of the *Designated Substance Survey* (AECOM, September 2026) the following findings were made:

- No friable or non-friable asbestos-containing materials were observed as part of the inspection completed.
- According to the Detailed Condition Survey Report Site No. 17X-0062/B0 prepared by the Ministry of Transportation of Ontario (September 2023), the bridge was originally constructed in 1960 and underwent three (3) rehabilitations in 1983, 1988 and 2017. Work completed under the 1988 minor rehabilitation included eastbound lane waterproofing while the 2017 minor rehabilitation included structure rehabilitation, barrier wall patched but not fully replaced, and WBL waterproofing. Therefore, the waterproofing membrane installed along the bridge is not suspected to contain asbestos.
- Prior to or during any scheduled demolition or rehabilitation of the bridge, other suspected materials encountered during the demolition or rehabilitation work can either be sampled and submitted for analysis or otherwise assumed to contain asbestos and treated as such. In accordance with Section 8 of the Ontario Regulation 278/05, the Owner of a Site (the Ontario Ministry of Transportation of Ontario), must treat all unknown and/or suspected insulation materials as though they contain asbestos-containing material unless laboratory analysis confirms non-detect for asbestos content.
- Painted or otherwise coated surface areas were observed. Other potential sources of lead include coated rebar previously inserted and painted during original construction or otherwise coated surfaces along the Designated Substance Survey Site not inspected by AECOM during this project.

- Based on the review completed there are no suspected polychlorinated biphenyls or mercury containing fixtures or equipment observed or otherwise suspected to be present at the Site.
- Other designated substances, including benzene, ethylene oxide, vinyl chloride, arsenic, coke oven emissions, acrylonitrile, and isocyanates were not observed or reported to be present at the Site, and these materials are not expected to be present in any bulk form.
- Based on the results of the inspections completed by AECOM, neither ozone-depleting substances nor mould are expected to be present at the site.

Further information is provided in the *Designated Substance Survey* (AECOM, October 2026), included in available under separate cover upon request.

9.8.2 Proposed Mitigation Measures

The following mitigation is recommended, based on the findings of the *Designated Substance Survey*:

- All suspected or otherwise confirmed asbestos-containing material at the bridge Designated Substance Survey Site that may be disturbed by the bridge replacement work must be removed prior to any other work being completed in the immediate area of that asbestos-containing material. All asbestos-containing material abatement work must be completed in accordance with Ontario Regulation 278/05 of the *Occupational Safety and Health Act* and follow the procedures as described in this report for removing confirmed asbestos-containing materials at the Site. Waste asbestos materials must be disposed of off-site at a licensed landfill in accordance with Ontario Regulation 347, as amended, of the Ontario *Environmental Protection Act*.
- During any scheduled demolition or rehabilitation of the bridge, a contractor must stop any work in the event suspected asbestos-containing material or other unknown and suspected bridge construction and/or insulation materials are encountered that were not already documented in this Designated Substance Survey report completed by AECOM as either asbestos-containing material, non- asbestos-containing material, or remain suspected due to limitations of the Designated Substance Survey work. The Contractor should then contact the Ministry of Transportation of Ontario and AECOM, and either have the newly encountered materials sampled and analyzed for asbestos-containing material or treat as containing asbestos-containing material and take appropriate action based on current applicable legislation and guidelines.

- A qualified contractor must control all Designated Substance Survey Site repair or maintenance activities on site to minimize worker exposure to silica and/or lead dust in accordance with Ontario Regulation 490/09. Legislation regarding exposure to silica under Ontario Regulation 490/09 refers to occupational exposure of silica measured in terms of air quality. As required by Ontario Regulation 490/09, airborne silica concentrations must not exceed a time-weighted average of 0.10 milligrams per cubic metre of silica for quartz / Tripoli. Time-weighted average of 0.05 milligrams of lead per cubic metre for elemental lead, inorganic and organic compounds of lead respectively. Recycling of silica-based materials removed from any work areas should be conducted in accordance with Ontario Regulation 102/94 and Ontario Regulation 103/94 under the Ontario *Environmental Protection Act*.

9.9 Canadian Navigable Waters Act

The *Canadian Navigable Waters Act* includes a list of scheduled waterways within Canada that have been deemed navigable under the Act and that require regulatory approval from Transport Canada prior to the commencement of any work “in, on, over, under, through or across” these waterways. Alternatively, a non-scheduled water (not included on the Act’s schedule) may also still be considered navigable and therefore continues to be protected under the Act. A navigable water is one that the public has a right to use for travel or transport and can include a canal or any other body of water created or altered by construction.

Under the *Canadian Navigable Waters Act*, ‘Minor Works’ may proceed without an application for approval as long as the works comply with legal requirements. For ‘Major Works’, an approval is required for a major work constructed, placed, altered, rebuilt, removed or decommissioned in any navigable water. The application for approval is required whether or not the water is on the Act’s scheduled waters.

The Project Team undertook a preliminary review of the watercourses within the Study Area. It was determined that the Napanee River, although not a scheduled waterway, does have the potential for navigability. The in-water work proposed will need to be reviewed further during Detail Design in the context of the *Canadian Navigable Waters Act* to confirm the steps required to address navigable waters prior to construction.

9.10 Noise

With respect to long term noise; under the *Ministry of Transportation of Ontario Environmental Guide for Noise*, the “noise impact” is defined as the difference between the “No Project” and the “With Project” noise levels during the subject year of assessment (Horizon Year), which is typically 10 years post-construction. The horizon

year of 2044 was used as the basis of this assessment. A total of five Noise Sensitive Areas were assessed for this Project.

9.10.1 Summary of Potential Impacts

Changes in future (2044) noise levels with and without the proposed improvements in place are outlined in Table 9 and 10 of the *Noise Impact Assessment Report* (AECOM, October 2026), available under separate cover upon request. It should be noted that the pavement in the No Project scenario was modeled as the average pavement type (representative of asphalt pavement). The pavement type for the “With Project” scenario had not been determined at the time the report was developed and consequently, the following “With Project” pavement alternatives were modeled:

- Alternative 1 – Asphalt Pavement Type (average pavement type)
- Alternative 2 – Concrete Pavement Type (Portland Cement Concrete) (Traffic Noise Model)

The results of the noise impact assessment indicate that all identified receptors have predicted noise levels below 65 dBA, with overall noise level changes of less than 5 dB in both pavement scenarios. The results of the assessment indicate that the noise levels resulting from the planned improvements do not warrant further investigation into noise mitigation measures at any of the identified receptors.

9.10.2 Proposed Mitigation Measures

Construction noise is temporary in nature and will cease at the end of the construction activities; it can be a cause of disturbance to the surrounding noise sensitive areas. Although Ontario does not have any applicable regulatory noise level limits for construction noise impacts on noise sensitive areas, construction noise disturbance and potential for complaints can be reduced with the implementation of best practices and other noise control measures.

The *Ministry of Transportation of Ontario Environmental Guide for Noise* requires that construction noise be controlled and mitigated. The responsibility of this is typically split between the construction contractor and contract administrator.

The results of the assessment indicate that the noise levels resulting from the proposed improvements do not warrant further investigation into noise mitigation measures at any of the identified receptors.

9.10.2.1 Construction Contractor Requirements

Construction contractor requirements are normally set out in Special Provision No. 199F33 and Special Provision No. 199F31.

Special Provision No. 199F33 is used to:

- Identify the extent of noise sensitive areas;
- Stipulate constraints on construction noise with respect to the Town of Greater Napanee noise control By-laws as follows:
 - While the Ministry does not require a by-law exemption, any work undertaken between 7:00 p.m. and 7:00 a.m. requires a temporary noise permit; submit an application for a permit to the Town of Greater Napanee Clerk or the Clerk's delegate to obtain an exemption from the By-law's prohibitions;
 - The Contractor shall notify nearby residents who may be impacted by nighttime work in advance, as applicable;
- Equipment shall comply with the sound emission standards for construction equipment outlined in Ministry of the Environment, Conservation and Parks publications Noise Pollution Control-115 and Noise Pollution Control-118 (contractor to confirm latest version by contacting Ministry of the Environment, Conservation and Parks), which are the following:
 - Noise Pollution Control-115: Construction Equipment;
 - Noise Pollution Control-118: Motorized Conveyances;
- Where feasible, equipment with broadband backup alarms instead of the tonal backup alarms/beepers shall be utilized;
- Equipment shall be maintained in an operating condition that prevents unnecessary noise, including but not limited to non-defective muffler systems, properly secured components, and the lubrication of moving parts;
- Idling of equipment shall be restricted to the minimum necessary to perform the specified work;
- Stationary equipment shall be located as far away from sensitive locations as feasible.

Special Provision No. 199F31, Environmental Exemptions and Permits, is used to set out notification requirements for operation of construction outside of noise By-law limits.

9.10.2.2 Contract Administrator Requirements

The contract administrator is required to:

- Setup a noise complaint process in accordance with the Ministry of Transportation of Ontario Environmental Guide for Noise.
- Investigate and address noise complaints in accordance with the Ministry of Transportation of Ontario Environmental Guide for Noise.

9.11 Air Quality

The results of the *Air Quality Impact Assessment* (AECOM, September 2026) show that the addition of the proposed Project infrastructure will have an overall lower impact on the sensitive and critical receptors within the Study Area in comparison to Existing Conditions for most contaminants, and a higher impact in comparison to Future No-Build Conditions, depending on where a receptor is located along the modelled roadways.

A general comparison between Future Build, Existing and Future No-Build Conditions is shown in **Table 9-5** to highlight the variance in impacts for all contaminants. The maximum concentrations at the most impacted receptors are presented for each contaminant to compare the impact for each condition.

For detailed Air Quality modelling results and comparison please refer to the *Air Quality Impact Assessment Report* (AECOM, October 2026), available under separate cover upon request.

9.11.1 Summary of Potential Impacts

Potential impacts from the Project to air quality are due primarily to the relocation of the roadways closer to a select number of sensitive receptors. Highway 401 shows an overall increase in traffic volume between Existing and Future Build conditions. Most of the impacts on the sensitive receptors are expected to be concentrated around the exit ramps of eastbound Highway 401 at Palace Road, since the predominant winds are blowing from the west.

In general, a decrease in air quality impact is expected from the Existing Conditions to Future Build Conditions, primarily due to anticipated improvements in vehicle combustion efficiency and retirement of older models from the vehicle fleet as years progress. With the implementation of the project, most Criteria Air Contaminants are expected to be below the respective Provincial and Federal air quality standards and criteria.

Table 9-5: Comparison of Maximum Modelled Concentration (without Background Concentration) for Representative Existing, Future No Build, and Future Build Conditions

Contaminant	Averaging Period (hr)	Existing Conditions (µg/m³)	Sensitive / Critical Receptor	Future No-Build Conditions (µg/m³)	Sensitive / Critical Receptor	Future Build Conditions (µg/m³)	Sensitive / Critical Receptor	% Change from Existing Conditions	% Change from Future No-Build Conditions
NO ₂ ⁽⁶⁾	1	185	SR28	142.3	SR28	140	SR8	-25%	-2%
NO ₂ ⁽⁶⁾	24	102.5	SR5	93.5	SR5	94.5	SR7	-8%	1%
NO ₂ ⁽⁶⁾	Annual	65.7	SR5	37.9	SR5	37.2	SR6	-43%	-2%
CO ⁽⁷⁾	1	3906	SR28	1640	SR28	1562	SR8	-60%	-5%
CO ⁽⁷⁾	8	1259	SR5	533	SR5	604	SR7	-52%	13%
SO ₂ ⁽⁸⁾	1	3.41	SR28	3.29	SR28	3.14	SR8	-8%	-5%
SO ₂ ⁽⁸⁾	10 min	5.63	SR28	5.43	SR28	5.18	SR8	-8%	-5%
SO ₂ ⁽⁸⁾	Annual	0.21	SR5	0.20	SR5	0.19	SR6	-8%	-4%
PM ₁₀ ⁽⁹⁾	24	9.9	SR5	10.5	SR8	13.0	SR7	32%	24%
PM _{2.5} ⁽¹⁰⁾	24	4.78	SR5	4.40	SR5	5.17	SR7	8%	17%
PM _{2.5} ⁽¹⁰⁾	Annual	1.46	SR5	1.34	SR5	1.37	SR6	-6%	2%
Acetaldehyde ⁽¹¹⁾	30 min	6.01	SR28	4.32	SR28	4.14	SR8	-31%	-4%
Acetaldehyde ⁽¹¹⁾	24	0.928	SR5	0.675	SR5	0.715	SR7	-23%	6%
Acrolein ⁽¹²⁾	1	0.483	SR28	0.156	SR28	0.149	SR8	-69%	-4%
Acrolein ⁽¹²⁾	24	0.089	SR5	0.030	SR5	0.033	SR7	-63%	7%
Benzene ⁽¹³⁾	24	1.463	SR5	0.426	SR5	0.456	SR7	-69%	7%
Benzene ⁽¹³⁾	Annual	0.447	SR5	0.130	SR5	0.119	SR6	-73%	-8%
Benzo(a) Pyrene ⁽¹⁴⁾	24	3.85E-03	SR5	1.28E-03	SR5	1.39E-03	SR7	-64%	8%
Benzo(a) Pyrene ⁽¹⁴⁾	Annual	1.19E-03	SR5	3.96E-04	SR5	3.87E-04	SR6	-67%	-2%
1,3-Butadiene	24	0.104	SR5	1.40E-03	CR1	1.58E-03	SR7	-98%	13%
1,3-Butadiene	Annual	0.032	SR5	4.31E-04	CR1	4.94E-04	CR1	-98%	15%
Formaldehyde ⁽¹⁵⁾	24	0.91	SR5	0.511	SR5	0.540	SR7	-41%	6%

Notes: (1) A 32% increase in impacts for the 24-hr averaging period for PM₁₀ between Future Build Conditions and Existing Conditions is primarily due to an increase in traffic amounts from Future Build Conditions (SR7) to Existing (SR5). Similarly, an 8% increase in impacts for the 24-hr averaging period for PM_{2.5} was observed.
(2) For some of the contaminants, an increase in impacts at sensitive receptors from Future No Build to Future Build condition was observed, due the project infrastructure moving closer to a select number of sensitive receptors.

There are three Criteria Air Contaminants with modelled cumulative concentrations at all sensitive receptors above the respective Provincial and/or Federal air quality criteria, specifically the 1-hour and annual averaging period Federal Canadian Ambient Air Quality Standards for Nitrogen Dioxide (NO₂), 24-hour averaging period (Canadian Ambient Air Quality Standards 2030) for PM_{2.5}, and the 24-hour and annual averaging periods (Provincial Ambient Air Quality Criteria) of Benzo(a)pyrene. The maximum results of the modelled cumulative concentrations are shown below:

- NO₂ is at 245% of the Canadian Ambient Air Quality Standards limit for the 1-hr averaging period, and at 188% of the Canadian Ambient Air Quality Standards limit for annual averaging period.
- PM_{2.5} is at 111% of the Canadian Ambient Air Quality Standards (2030) limit for the 24-hr averaging period.
- Benzo(a)pyrene modelled at 34 times the Ambient Air Quality Criteria limit for the 24-hr averaging period and at 52 times the Ambient Air Quality Criteria limit for the annual averaging period.

The exceedances of NO₂ and Benzo(a)pyrene are due to elevated existing ambient air quality concentrations and modelled impacts from the proposed infrastructure. Benzo(a)pyrene exceeds the Provincial ambient air quality criteria prior to including the project contributions.

However, even with these exceedances, when compared to Existing Conditions, the concentrations for NO₂ and Benzo(a)pyrene are expected to decrease in the Future Build Conditions.

9.11.2 Proposed Mitigation Measures

Air quality mitigation measures during the operational phase can include the following:

- Implementation of vegetation along the highway (such as plantings through screening and/or barriers), where feasible, within the Study Area to decrease ground level dispersion of particulates.
 - Several factors such as tree size, age, and species, affect how much they can absorb and should be considered when incorporating this mitigation measure.
- Continued promotion of increased electric vehicle purchase and infrastructure within Ontario.

Prior to commencement of construction, a detailed Construction Air Quality Management Plan will be developed. The Air Quality Management Plan will:

- Define the Project's air quality impact zone and identify all sensitive and critical receptors within this area.
- Assess the requirement for continuous monitoring during Project construction.
- Provide mitigation measures and identify requirements for implementation of these measures.
- Include explicit commitment to implementation of applicable best practices identified Environment Canada's *Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities* (Cheminfo Services Inc., 2005) and the Ministry of the Environment, Conservation, and Parks Technical Bulletin *Management Approaches for Industrial Fugitive Dust Sources*.
- If applicable, include a commitment to follow guidelines on hot mix asphalt outlined in the Ontario Hot Mix Producers Association's Environmental Practices Guide: Ontario Hot Mix Asphalt Plants, Fifth Edition (Ontario Hot Mix Producers Association, 2015).
- Develop a Communications Protocol and a Complaints Protocol in accordance with the Project Agreement.
- Regular reporting on any continuous monitoring reports, to be provided to the Ministry of the Environment, Conservation and Parks for their records.
- The construction related air contaminants of primary concern are in the form of particulate matter, with the fractions of PM_{2.5} and PM₁₀ - particulate matter of less than 2.5 and 10 micron in diameter, respectively. Other contaminants of concern include crystalline silica and oxides of nitrogen.
- Application of threshold "Action Level" triggers for implementation of specific and increasing intensity mitigation activities.
- If continuous monitoring is deemed necessary, on-site meteorological monitoring should be performed in conjunction with real-time continuous monitoring representative of receptor impacts.
- If continuous monitoring is deemed necessary, monitors should be placed both upwind and downwind of construction activities, where possible.
- If continuous monitoring is deemed necessary, baseline monitoring should be performed for a minimum of one week prior to construction activities.
- If continuous monitoring is deemed necessary, siting of the monitors should generally follow the guidelines provided in the Ministry of the Environment, Conservation, and Parks Operations Manual for Air Quality Monitoring in Ontario (2018).

9.12 Landscape Composition

A conceptual Landscape Opportunities Plan was prepared as part of this Project, which makes recommendations for restoration and mitigation where removals are required as part of construction of the Recommended Plan. The Landscape Opportunity and Conceptual Plans are available under separate cover upon request and will be refined during Detail Design based on the breakdown of the individual construction contract and subject to confirmation of vegetation removal requirements.

9.12.1 Summary of Potential Impacts

In areas where vegetation removal is planned, consideration will be given to buffering views of the roadway with appropriate vegetation so that new infrastructure fits into the existing landscape harmoniously. Conversely, views of the surrounding landscape from the highway corridor will be considered during future design stages.

9.12.2 Proposed Mitigation Measures

It is proposed that trees are planted at new woodlot edges and screening buffers at a safe distance from the edge of roadway pavement (minimum 15 metres clear zone).

9.12.2.1 General Mitigation Measures

Preliminary Landscape design was developed to identify opportunities for landscaping enhancement and protection and/or restoration treatment of the existing landscape features and areas disturbed by road construction.

There are 5 types of Landscape treatment proposed in preliminary design:

1. Reforestation – Areas close to existing forests and within intersection loops
2. Forest Edge restoration – At the disturbed existing forest edges
3. Screening – Areas adjacent to residential properties
4. Shrub grouping – Within intersection loops
5. Napanee River Slope Restoration – Adjacent to Napanee River Bridge

Proposed species are native and are selected in coordination with adjacent vegetation communities. Seed mixes are selected in coordination with OPSS.PROV 803.

Monitoring by an Environmental Inspector will be undertaken to observe, inspect, and ensure proper installation and maintenance of mitigation measures during construction and post construction.

Where possible, side slopes will not exceed 3:1 (horizontal: vertical) unless there is an engineering rationale. Where conditions require slopes greater than 3:1 the application of bonded fibre matrix is required as an additive to hydroseeding slurry of seed application to help maintain a stable slope and minimize erosion until seed becomes established. Inclusion of bonded fibre matrix additive will be considered for slopes less than 3:1 where volumes of overland flow and general runoff may warrant additional protection.

Establish a Tree Protection Zone through the installation of tree protection fencing which follows standard arboricultural procedures (per OPSS.PROV 801).

The following are basic precautions and procedures related to tree management during construction:

- Areas within the dripline of trees designated for preservation are not to be used for any type of storage (such as storage of debris, construction material, surplus soils, and construction equipment). Trenching or tunneling for underground services shall not take place within the Tree Protection Zone or dripline of trees designated for preservation within or adjacent to the construction zone.
- No grade changes shall occur within the Tree Protection Zone. Where grade changes may occur, either as a cut or fill situation, precautions to preserve the tree may be undertaken prior to the placement of fill or excavation activities.
- Trees to be preserved shall not have any rigging cables or hardware of any sort attached or wrapped around them. Potential contaminants shall not be dumped or flushed within the Tree Protection Zone or where they may come into contact with the feeder roots of the trees.
- Ensure that the Contractor takes every precaution to prevent damage to trees or shrubs. This includes protecting crown and root systems from damage, preventing compaction and contamination resulting from the construction. Any damage to trees such as broken limbs, damage to roots, or wounds to the main trunk or stem systems should be immediately reported to the Contract Administrator so that the damage can be addressed promptly by a Landscape Architect and Certified Arborist, as appropriate.
- In the event that it is necessary during construction to remove limbs, portions of trees or excavate in root zones of trees that are designated for preservation, all operations should be executed carefully and in accordance with proper arboricultural techniques and under the guidance of a Certified Arborist.
- Maintenance and monitoring of any new plant materials for a minimum 2-year warranty period to ensure the establishment of healthy, vigorous plantings at the end of the warranty period. This should include an action plan to replace any plantings that are deemed unacceptable.

- Monitoring of groundcover plantings (seeded areas) to ensure soils exposed during construction have been adequately covered and erosion / sedimentation is not occurring. This should include an action plan for any areas requiring remediation.

9.13 Archaeology

9.13.1 Summary of Potential Impacts

Based on a review of historical, environmental and archaeological context of the Study Area, it was determined that the potential for the recovery of pre- and post-contact Indigenous and 19th century settler archaeological resources within the Study Area is high, based on the presence of the following features:

- Proximity to previously identified archaeological sites within and adjacent the Study Area (seven within 1 kilometre, and three of which are within 50 metres of the Study area: BbGf-28, BbGf-39, BdGf-347, BbGf-48, BbGf-49, BbGf-50, and BbGf-51);
- Distance to water sources (Napanee River);
- Areas of early 19th century colonial settlement (Town of Napanee); and
- Early 19th century transportation routes (Palace Road [County Road 5]).

Figure 9-3 of the draft *Stage 1 Archaeological Assessment Report* (AECOM, October 2026), included in **Appendix E**, illustrates the portions of the Study Area that have been previously assessed and cleared of further archaeological concerns and those that require further study. Other areas are considered disturbed due to deep land alteration and / or being permanently wet and therefore no longer contain archaeological potential.

9.13.2 Proposed Mitigation Measures

Areas identified as disturbed, low lying/wet, or that have been previously assessed and cleared of archaeological concerns will not require further study. However, areas previously assessed and identified for further study may be subject to a Stage 2 test pit survey or a Stage 2 pedestrian survey depending on location in accordance with the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). Please refer to the draft *Stage 1 Archaeology Assessment Report* (AECOM, October 2026) included in **Appendix E** for further details.

The following next steps are recommended:

- A Stage 2 Archaeology Assessment for areas identified as retaining archaeological potential and impacted by the proposed Project must be

conducted by a licensed archaeologist and must follow the requirements set out in Section 2.1 of the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011), including:

- A standard test pit survey at 5 metres intervals is to be conducted in all areas that will be impacted by the Project where ploughing is not feasible (such as woodlots, overgrown areas, manicured lawns).
- No impacts to the bed of any water bodies are anticipated. However, if any changes are made and impacts may occur to the bed of any water bodies, a marine archaeological checklist should be completed, which may result in the recommendation that a marine Archaeology Assessment be undertaken.
- Should additional land outside of the current Study Area be included as part of the Project development plan, the standard requirements for Archaeology Assessments to be conducted prior to land disturbance remain in place. Additional Archaeology Assessment(s) must be conducted by a licensed archaeologist and follow the requirements set out in *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).
- With regard to the **Spook Horn Cemetery**, at the time of the development of the Stage 1 Archaeological Assessment for this Study, True North Archaeological Services has conducted a separate Stage 1-3 Archaeological Assessment where the boundaries of the cemetery have been determined. As the True North Archaeological Services Stage 1-3 Archaeological Assessment report is still a draft and has not been accepted by the Ministry of Citizenship and Multiculturalism, its recommendations cannot be relied upon or carried forward at this time. Accordingly, all areas outside of the Stage 3 Mechanical Topsoil Removal area and the previously assessed area along the eastern boundary continue to retain archaeological potential and should remain subject to Stage 2 Archaeological Assessment where future development impacts are anticipated, unless and until the Stage 1-3 Archaeological Assessment report is formally accepted by the Ministry of Citizenship and Multiculturalism.

9.14 Cultural & Built Heritage Resources

The *Cultural Heritage Resource Assessment Report* (AECOM, October 2026; **Appendix F**) includes a preliminary assessment of the potential impacts from the proposed Study activities. The report includes recommendations, mitigations and next steps to conserve existing and potential Built Heritage Resources and Cultural Heritage Landscapes within the Study Area.

The Recommended Plan avoids direct impacts to all potential Built Heritage Resources/ Cultural Heritage Landscapes, except for Cultural Heritage Landscape 5 (Napanee River). As such, the following mitigation measures and next steps are recommended:

- Generally, the Project should be planned to avoid negative impacts to all potential Built Heritage Resources and Cultural Heritage Landscapes. Construction activities and staging should be suitably planned and undertaken to avoid heritage attributes wherever possible and to avoid unintended negative impacts to identified Built Heritage Resources and Cultural Heritage Landscapes. Avoidance measures may include, but are not limited to erecting temporary fencing, establishing buffer zones, issuing instructions to construction crews to avoid the potential Built Heritage Resources and Cultural Heritage Landscapes, etcetera. The Project Team should explore strategies to avoid or mitigate potential impacts to potential Built Heritage Resources and Cultural Heritage Landscapes identified in Cultural Heritage Resource Assessment Report.
- To ensure all potential Built Heritage Resources and Cultural Heritage Landscapes listed in Table 3 of the *Cultural Heritage Resource Assessment Report* (AECOM, October 2026) within and adjacent to the final design are not adversely indirectly impacted by mechanical vibration during construction, a vibration assessment should be developed by a qualified engineer prior to construction. Should this vibration assessment determine that the structures or landscape features within the potential Built Heritage Resources and Cultural Heritage Landscapes will be subject to adverse impacts due to vibration, a vibration monitoring plan should be prepared by a qualified engineer and implemented to lessen vibration impacts related to construction.
- Should there be further refinements to the Cultural Heritage Resource Assessment Report Study Area, a Qualified Person should reassess potential impacts and identify any additional mitigation requirements.
- **Cultural Heritage Landscape 5 (Napanee River)** is anticipated to experience minimal direct adverse impacts as a result of the bridge replacement. Mitigation measures will focus on minimizing disturbance, maintaining vegetation continuity, and incorporating Indigenous perspectives into design. Further resource-specific mitigation measures and next steps include:
 - The Project should be planned in a manner that minimizes direct and indirect impacts to the **Cultural Heritage Landscape 5**. Wherever possible, bridge infrastructure should be set back from the riverbanks,

avoiding encroachment on the natural landscape. Bridge infrastructure placement should:

- Maintain continuity of riverbank vegetation.
 - Minimize physical disturbance within the river corridor.
- Engage with relevant Indigenous communities throughout the Project. Confirm their interest in participating, and provide opportunities for meaningful involvement, including participation in field investigations where appropriate. Engagement should also seek to identify and understand any potential impacts to Aboriginal and Treaty rights. Relevant Project documentation, including the Archaeological Assessment Report and the Transportation Environmental Study Report, should be shared with participating Indigenous communities to support informed input. The Project Team will remain available to meet with interested communities throughout the Study process and will carefully consider all information received, including Indigenous Knowledge and/or possible community concerns.
 - Construction staging areas should be designed to maximize the distance from the river to prevent accidental adverse impacts. Any staging areas built in natural areas along the river should be fully removed and the land returned to pre-construction conditions.
 - Where avoidance is not feasible and infrastructure must be located near riverbanks, restoration measures shall be implemented through a site-specific Landscape Plan, developed in coordination ecological specialists, and relevant regulatory agencies, as appropriate, and informed by this report and applicable natural heritage studies to support both ecological and cultural heritage landscape objectives.
 - All required archaeological assessments will be completed prior to construction in accordance with provincial standards and guidelines. Appropriate mitigation will be undertaken through licensed archaeological investigation and reporting.

9.15 Summary of Environmental Impacts, Mitigation and Commitments to Future Work

The proposed mitigation measures and commitments to future work to address specific concerns associated with the Recommended Plan are listed in **Table 9-6**.

Table 9-6: Summary of Environmental Impacts, Mitigating Measures and Commitments to Future Work

Summary of Environmental Impacts, Mitigation Measures and Commitments from this Transportation Environmental Study Report To be Confirmed During Detail Design

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
1.0 Fish and Fish Habitat	1.1	<p>Land-based Activities:</p> <ul style="list-style-type: none">■ The use of industrial equipment increases the potential of contaminant concentrations from fuel or fluid leaks.■ Changes in food supply and nutrient concentrations may result from the loss of external inputs with a reduction in riparian vegetation. The use of herbicides may result in changes to contaminant concentrations.■ Excavation, grading, and vegetation clearing during construction works may result in alterations to sediment concentrations and habitat structure and cover because of increased erosion potential and sediment deposition. <p>In-water Activities</p> <ul style="list-style-type: none">■ Placement and / or alteration of material or structures in water can result in changes to the channel or shoreline morphology, aquatic macrophytes, and substrate composition. This can lead to changes in sediment concentration, habitat structure and cover, food supply, nutrient concentrations, and may result in direct or indirect impacts to fish and fish habitat.■ Removal of aquatic vegetation may result in changes in dissolved oxygen concentrations, food supply, nutrient concentrations, habitat structure and cover, sediment concentrations or contaminant concentrations because of the release of sediment, nutrient inputs, habitat, and light penetration.■ Use of industrial equipment below the high-water mark could result in impacts to fish and fish habitat as well as alterations to sediment concentrations from the release of sediment or an increase in contaminant concentrations from equipment fluid leaks.■ The installation of in-water work isolation measures may result in incidental entrainment and potential death of fish and limit access for fish to habitats.■ Any dewatering and pumping of isolated in-water work areas could displace or kill fish and change access to and composition of habitat features. Alterations to flows could	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of Natural Resources■ Fisheries and Oceans Canada■ Quinte Conservation Authority	1.1.1	<p>Operational Constraints:</p> <ul style="list-style-type: none">■ An Access Management Plan shall be created to limit access to waterbodies and banks to protect riparian vegetation and to minimize bank disturbance.■ Minimize duration of in-water work.■ Conduct in-stream work during low flow periods to allow work in water to be isolated from flows.■ Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation and allow for proper re-stabilization and re-vegetation as appropriate prior to winter■ In-water work below the high-water mark and work on watercourse banks shall be carried out during the appropriate in-water work timing window of July 16 – March 14 (no in-water work is permitted from March 15 – July 15). <p>Management Practices and Controls:</p> <ul style="list-style-type: none">■ Isolated in-water work areas must be cleared of fish prior to the commencement of work. Fish must be released unharmed downstream. Intakes of pumps and hoses for de-watering of in-water work areas shall be screened to avoid impingement and/or entrainment of fish (as per OPSS.PROV 182).■ All planned vegetation removals are anticipated to occur within property owned by the Ministry and largely within the highway right of way. Some select removals may also be required on areas adjacent to the right of way where Ministry of Transportation of Ontario will seek Permission to Enter and Construct. Trees not designated for removal will be protected by fencing installed prior to vegetation removal and construction (as per OPSS.PROV 801).■ The Contractor shall develop and implement an Erosion and Sediment Control Plan to contain / isolate exposed soils, stockpiled materials, and unstable areas in the work zone to prevent the release of sediment to all waterbodies and ensure the work site is stabilized prior to removal of erosion and sediment control measures following construction (as per OPSS.PROV 804 and OPSS.PROV 805). Site-specific Erosion and Sediment Control Plans should be developed for each watercourse crossing where work is proposed within 30 metres of a watercourse following Department of Fisheries and Oceans Interim Standard: Planning for land-based erosion and sediment control (DFO, 2026b).■ Design and implement an in-water work area isolation plan to maintain clean flow around the work area where in-water work is proposed (as per OPSS.PROV 804, OPSS.PROV 805, and OPSS.PROV 517). The design shall:<ul style="list-style-type: none">• Use only clean materials free of particle matter for temporary cofferdams,• Manage flow withdrawal and discharge to prevent erosion and the release of sediment to a waterbody, and• Ensure work zones are stabilized against high flows at the end of each workday.■ As per OPSS.PROV 182, any fish isolated in the work area shall be transferred (using appropriate capture, handling, and release techniques to prevent harm and minimize stress) downstream or away from the construction area following the Department of Fisheries and Oceans Canada Interim Standard: Fish capture and relocation (DFO, 2026). A Licence to Collect Fish for Scientific Purposes shall be obtained prior to the start of any fish relocation works. Fish screens shall be used to avoid entrainment of fish in pumps or hoses following Department of Fisheries and Oceans Canada’s Interim Standard: Water intake end-of-pipe fish screens (DFO, 2026).

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
		<p>increase erosion and scour potential, resulting in alterations to temperatures and concentrations of sediment, food, contaminants, and nutrients. Using water extraction pumps could result in death of fish by entrainment in pumps and machinery.</p> <ul style="list-style-type: none">■ Improper management of wastewater can result in a change in water temperature, change in migration access to habitat, change of dissolved oxygen concentration, changes in nutrient concentrations, change in contaminant concentrations and introduction of pathogens, disease vectors, and exotics.■ Changes to fish passage could result in changes in water chemistry/temperature and flow alternation, which may lead to incidental entrainment, impingement or mortality of resident species and changes to habitat access.■ Structure removals could result in changes to channel morphology or shoreline morphology and habitat structure or cover.			<ul style="list-style-type: none">■ Design and implement a work area containment plan to isolate all above-water work to prevent the release of sediment or other contaminants to a waterbody (as per OPSS.PROV 517). The design shall include regular inspection, repair, removal, and disposal of isolation measures and materials. Work zones should be clearly delineated before work to avoid unintentional intrusions into nearby natural areas.■ Where possible, organic material barriers (fibre roll barrier, sediment log, coir rolls etcetera.) shall be used in the drainage ditches to mitigate sediment transport (as per OPSS.PROV 804).■ Materials used or generated during construction (organics, soil, woody debris, temporary stockpiles, construction debris, etcetera) shall be stored and managed in a way that prevents their release of these materials to a waterbody. This shall include storing materials a safe distance from a waterbody (greater than 30 metres from any watercourse) and/or isolation measures (as per OPSS.PROV 182 and OPSS.PROV 180).■ Dewatering operations shall be managed to prevent erosion or the release of sediment-laden water to a waterbody (as per OPSS PROV 805).■ Any sediment or deposited material that requires removal during drainage work shall not be allowed to enter any waterbody (as per OPSS.PROV 510).■ A Spills Management Plan shall be prepared and shall include materials, instructions, education, and emergency numbers. The plan shall be kept onsite at all times, communicated to work crews and be properly implemented in the event of accidental spills (Spill Prevention and Response Contingency Plan as per OPSS.PROV 182, OPSS.PROV 100, OPSS.PROV 180, and Ontario Regulation 224/07).■ Operate, store, and maintain equipment and associated materials in a manner and at a distance that prevents the entry of any deleterious substance from entering a waterbody (as per OPSS.PROV 182). Any part of equipment entering the waterbody or operating from the bank shall be cleaned, free of fluid leaks and in good working condition.■ The Contractor shall refer to and incorporate mitigations and obtain permits associated with wildlife, access management, erosion and sediment control, and invasive species. <p>Rehabilitation:</p> <ul style="list-style-type: none">■ Pre-construction conditions (or better). This shall include substrates (as per OPSS.PROV 182 and OPSS.PROV 1005).■ Stabilize the banks of a waterbody that have been disturbed during construction to pre-construction conditions or better (as per OPSS.PROV 182 and OPSS.PROV 804). This shall include riparian vegetation or stone material, temporary measures, and the avoidance of hard engineering.■ Stabilize and re-vegetate soils exposed or disturbed during construction, including new or cleaned-out ditches (as per OPSS.PROV 182). <p>Monitoring:</p> <ul style="list-style-type: none">■ Should any Species at Risk be uplisted throughout the Project and require registration under the <i>Species Conservation Act</i> and/or Authorization under the <i>Fisheries Act</i>, the construction and post-construction monitoring shall incorporate all necessary requirements associated with the applicable registration(s) and authorization(s).■ In-water and near-water work shall be monitored to ensure mitigation measures are properly implemented, functioning, maintained and repaired as needed, and removed following construction (as per OPSS.PROV 182).■ Erosion and sediment control monitoring shall be completed in accordance with Ministry of Transportation of Ontario Non-Standard Special Provisions (OPSS. PROV 804, OPSS.PROV 805, and SP805F01).

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
1.0 Fish and Fish Habitat	1.2	Notification and Approvals: <ul style="list-style-type: none"> ■ Potential for the death of fish or harmful alteration, disruption or destruction of fish habitat, in contravention of the Fisheries Act (1985). 	<ul style="list-style-type: none"> ■ Ministry of Transportation of Ontario ■ Ministry of Natural Resources ■ Fisheries and Oceans Canada 	1.2.1	<ul style="list-style-type: none"> ■ Complete and submit a Project Notification Form to the Ministry of Transportation of Ontario Regional Environmental Section for fisheries-related activities in accordance with the 2025 Fisheries Protocol, including works completed under applicable Ministry of Transportation of Ontario best management practices and works that do not meet best management practices conditions. ■ Confirm fisheries review requirements during Detail Design through the preparation and submission of a Request for Review to Fisheries and Oceans Canada, if required, in accordance with the 2025 Fisheries Protocol.
2.0 Fluvial Geomorphology	2.1	<ul style="list-style-type: none"> ■ The Napanee River reach exhibits active channel widening and elevated lateral erosion potentially associated with higher peak flows from increased runoff due to urbanization; however, the analysis indicated no significant planform change. An erosion rate of 5 metres was used as a 100-year erosion rate. ■ Depending on the final configuration of the proposed replacement bridge, sediment entrainment and transport processes may be impacted due to alterations to the crossing. ■ Hydraulic modelling predicts minor, localized changes in sediment transport and entrainment under the proposed conditions, with no significant change when compared to existing conditions. 	<ul style="list-style-type: none"> ■ Ministry of Transportation of Ontario ■ Fisheries and Oceans Canada ■ Quinte Conservation Authority 	2.1.1	<ul style="list-style-type: none"> ■ A wider crossing will reduce / eliminate flow constriction and reduce erosion. ■ A low flow channel should be installed through the crossing to maintain water flow and ecosystem health during lower flow periods. ■ A pierless bridge design is recommended to reduce interference with flow and therefore sediment transport. ■ Current crossing is over a relatively straight section of the reach and is aligned perpendicular to Highway 401. Therefore, the orientation is appropriate. ■ The fluvial assessment showed that any changes to current sediment transport and entrainment conditions are likely to be minor with this new design.
3.0 Groundwater	3.1	<ul style="list-style-type: none"> ■ Changes to recharge/discharge regimes resulting from the increase of pavement surface, the disturbance of the ground surface, ground clearing and compaction. ■ Potential release of contaminants such as fuel during construction activities and the release road de-icing agents which could impact the groundwater aquifer and groundwater-dependent water bodies. ■ Application of commercial fertilizers during seeding activities to re-establish vegetative cover. ■ Potential 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. 	<ul style="list-style-type: none"> ■ Ministry of Transportation of Ontario ■ Ministry of the Environment, Conservation and Parks ■ Ministry of Natural Resources ■ Quinte Conservation Authority ■ Municipalities 	3.1.1	<ul style="list-style-type: none"> ■ 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). ■ The Ministry of Transportation of Ontario and the Contractor should implement relevant best management practices as well as Salt Management Plan for road salt application during winter weather conditions. ■ Minimize commercial fertilizer usage and runoff by following the Ministry of Transportation of Ontario prescribed best management practices and Ontario Provincial Standard Specification (OPSS.PROV 804). ■ It is recommended that groundwater samples be collected for laboratory testing from monitoring wells installed during the Detail Design stage of the Project. Confirmatory sampling is recommended to be completed by the Contractor both prior to and during active dewatering to assess ongoing water quality as construction progresses to ensure compliance with the relevant discharge quality standard(s) and to identify any trends in the data that may arise. ■ If excavations and groundwater dewatering are required during project construction: <ul style="list-style-type: none"> • 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 Environmental Activity and Sector Registry if the amount of water taking exceeds 50 metres cubed per day. On July 1, 2025, Ontario Regulation 63/16 was amended by Ontario Regulation 63 66/25 to (amongst other things) remove the existing volumetric cap on daily water-takings for construction dewatering that may be filed upon Ministry of the Environment, Conservation, and Parks Environmental Activity and Sector Registry (400,000 litres per day per dewatering location) through the revocation of current Clause 7(5). Given the recent regulatory

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
					<p>changes, it is recommended that water-taking permitting for Project-related construction dewatering be addressed through a filing on Ministry of the Environment, Conservation, and Parks' Environmental Activity and Sector Registry by the Ministry of Transportation of Ontario during Detail Design; and</p> <ul style="list-style-type: none">• A door-to-door water well survey may be required to confirm the presence and/or absence of the water wells in the vicinity (500 metre radius) of the dewatering locations to establish baseline conditions. A Groundwater Monitoring and Water Well Protection Program shall be developed to monitor and mitigate potential impacts to the water wells in the vicinity of the dewatering locations. The requirement for this program will be reviewed during Detail Design.• Any groundwater monitoring wells or water wells within the Study Area, if no longer in use or in the construction zone, or any other unregistered water wells (if encountered) shall be properly decommissioned as per the Ontario Wells Regulation (R.R.O. 1990, Regulation 903) to avoid the creation of potential pathways for surficial contamination to get to the underlying aquifers. The requirement for this will be reviewed during Detail Design.
4.0 Terrestrial Ecosystems	4.1 Designated Natural Areas, Vegetation Communities and Plants	<p>Construction Phase:</p> <ul style="list-style-type: none">■ Loss of and/or damage to vegetation and Ecological Land Classification communities and Designated Natural Areas.■ Indirect loss of and/or damage to vegetation communities.■ Fill and sediment transport from disturbed areas to undisturbed areas.■ Soil or water contamination.■ Dust accumulation resulting from grubbing and grading activities and vegetation clearing.■ Introduction or spread of invasive species. <p>Operational Phase:</p> <ul style="list-style-type: none">■ Edge impacts on woodlands.■ Soil and water contamination.■ Changes in drainage patterns.	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of Natural Resources■ Ministry of the Environment, Conservation and Parks■ Quinte Conservation Authority	4.1.1	<ul style="list-style-type: none">■ OPSS.PROV 201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders.<ul style="list-style-type: none">• Minimize vegetation clearing, grading, and soil compaction to the extent feasible during Detail Design and construction. Refine limits of work during Detail Design to avoid or minimize impacts to vegetation communities within the right of way.■ OPSS.PROV 801: Construction Specification for the Protection of Trees.<ul style="list-style-type: none">• Protect trees designated for retention during construction. Install tree protection barriers at the dripline or woodlot edge, prevent flooding and sediment accumulation around retained trees, and do not stockpile materials or soil within the dripline.■ OPSS. PROV 803: Construction Specification for Vegetative Cover.<ul style="list-style-type: none">• Restore disturbed areas with native vegetation appropriate to the affected community type, including seed mixes containing Common Milkweed (<i>Asclepias syriaca</i>) and other native flowering species where herbaceous vegetation is temporarily disturbed.■ NSSP - Invasive and Noxious Vegetation Spraying and Cutting.■ Prevent the introduction and spread of invasive and noxious vegetation during construction. Soil and vegetation from invasive-infested areas shall not be stockpiled for reuse, and construction equipment shall be inspected and cleared of vegetation and debris prior to entering the work area.■ NSSP - Invasive and Noxious Vegetation Disposal and Burial.■ Phragmites Management Plan:<ul style="list-style-type: none">• Prepare and implement a Phragmites Management Plan that includes treatment, disposal, and equipment cleaning procedures. Do not stockpile Phragmites-contaminated soils for reuse and securely contain excavated Phragmites material during transport and disposal to prevent its spread.• Inspect and clean construction equipment and vehicles before entering and leaving the site in accordance with the Clean Equipment Protocol for Industry to prevent the introduction and spread of invasive species.■ Access routing and constructions staging be planned to align with the existing road and disturbed areas in the right of way in order to reduce the extent of disturbance in vegetation communities.■ Sedimentation and Contamination:<ul style="list-style-type: none">• Maintain OPSS.PROV 506: Dust Suppressant.<ul style="list-style-type: none">– To mitigate dust deposition, a dust suppressant (water) must be applied to areas of exposed soils to reduce dust generation during construction.

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
					<ul style="list-style-type: none">• OPSS.PROV 182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks.• OPSS.PROV 804 and OPSS.PROV 805: Construction Specification for Temporary erosion and sediment control measures.<ul style="list-style-type: none">– Erosion and sediment control measures should be installed in accordance with the Project's associated Erosion and Sediment Control Plan.– Erosion and sediment control measures should be installed outside of forest driplines and at a minimum of 30 metres setback from the limits of wetlands and watercourses. Erosion and sediment control measures should be installed along the limits of work.• OPSS.PROV 517 – Dewatering and Temporary Flow Passage Systems: Design and implement an in-water work area isolation plan to maintain clean flow around the work area where in-water work is proposed (as per OPSS.PROV 804, OPSS.PROV 805 and OPSS.PROV 517). The design shall:<ul style="list-style-type: none">– Use only clean materials free of particle matter for temporary cofferdams.– Manage flow withdrawal and discharge to prevent erosion and the release of sediment to a waterbody.– Ensure work zones are stabilized against high flows at the end of each workday.– A Spills Management Plan should be prepared and shall include materials, instructions, education and emergency numbers. The Plan should be kept onsite at all times, communicated to work crews and be properly implemented in the event of accidental spills.• Special Provision 199S56 Control of Emissions During Structural Work.• Watercourse banks disturbed by any activity associated with the Project should be immediately stabilized to prevent erosion and/or sedimentation, and re-vegetated with native species suitable for the site.
4.0 Terrestrial Ecosystems	4.2 Wildlife and Wildlife Habitat	<p>Construction Phase:</p> <ul style="list-style-type: none">■ Disturbance or displacement of migratory birds and destruction of their nests.■ Loss of and/or damage to wildlife habitat, including Significant Wildlife Habitat.■ Disturbance to turtle wintering habitat.■ Incidental wildlife injury or mortality. <p>Operational Phase:</p> <ul style="list-style-type: none">■ Disturbance to wildlife from lighting, noise and vibration during operation.■ Wildlife mortality through vehicle collisions (large mammals).	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of the Environment, Conservation and Parks■ Environment and Climate Change Canada	4.2.1	<ul style="list-style-type: none">■ NSSP: Operational Constraint – Migratory Bird Protection:<ul style="list-style-type: none">• Schedule vegetation clearing outside the migratory bird nesting period (April 1 to August 31). Where clearing must occur during the nesting period, a qualified biologist must conduct nest surveys and implement measures to avoid impacts to active nests in accordance with the <i>Migratory Birds Convention Act</i> and <i>Species at Risk Act</i>.• Inspect bridges, culverts, and other structures with nesting potential prior to construction activities occurring during the nesting period. Where active nests are identified, implement mitigation measures, as determined by a qualified biologist, such as exclusion measures or timing restrictions to avoid disturbance.■ Wildlife Crossings and Wildlife Exclusion Fencing:<ul style="list-style-type: none">• Evaluate wildlife crossing opportunities and wildlife exclusion fencing during Detail Design to improve wildlife connectivity and reduce wildlife-vehicle collisions in the vicinity of the Napanee River crossing.• Consider crossing enhancements, including terrestrial shelves, natural cover beneath the bridge, and the longest feasible bridge span. Refine crossing and fencing design based on target species and site-specific conditions during Detail Design.■ For areas adjacent to natural heritage features (such as woodlands and wetlands), conduct construction activities during daylight hours for increased visibility (such as avoid wildlife strikes) and to avoid light pollution impacts during the night, whenever possible.■ If during construction any wildlife are observed within the Limits of Work:<ul style="list-style-type: none">• Under no circumstances will any wildlife be knowingly harmed, harassed or otherwise disturbed. If an animal is encountered, it will be permitted to move away on its own.• If wildlife is observed within the work area, a Qualified Biologist or environmental monitor will determine if there is a concern about the significance of the species observed.

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
					<ul style="list-style-type: none">• If the species is identified as Species at Risk:<ul style="list-style-type: none">– A Qualified Biologist shall contact Ministry of the Environment, Conservation, and Parks immediately to determine next steps. In accordance with the <i>Species Conservation Act</i>, no Threatened or Endangered species can be handled or relocated without the appropriate approvals, permits, or authorizations, unless necessary to address an imminent risk to human health and safety or the animal. Document any such actions and ensure compliance with applicable legislation.• If the species is not identified as Species at Risk:<ul style="list-style-type: none">– The species will be permitted to move away on its own. If it does not move, a Qualified Biologist shall be contacted for guidance.– If the animal is injured or orphaned, a Qualified Biologist will be notified to transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the Ministry of Natural Resources or a member of the College of Veterinarians of Ontario.– If any non-Species at Risk amphibians or reptiles are unearthed during their hibernation, a Qualified Biologist will be notified to transport the animal to a suitable wildlife rehabilitation centre.– For Species of Conservation Concern (a Snapping Turtle [<i>Chelydra serpentina</i>]) or other non-Species at Risk wildlife, it may be appropriate to request that a Qualified Biologist move the species for the safety of both the onsite personnel and the species. <p>■ Reptile and Amphibian Exclusion Fencing:</p> <ul style="list-style-type: none">• Install temporary exclusion fencing in accordance with Ministry of the Environment, Conservation, and Parks (2025) best management practices to prevent reptiles and amphibians from entering construction areas. Implement fencing near confirmed turtle wintering and amphibian breeding habitat and protect active turtle nests with species-appropriate buffers as determined by a Qualified Biologist (minimum 30 metres).• If reptile hibernacula features are incidentally identified during construction activities, work should be completed outside of the reptile overwintering period (October 31 to April 1), whenever possible. <p>■ To minimize impacts to Monarch, Remove Milkweed-containing meadow habitat outside the Monarch breeding period, or pre-mow prior to April 1 where feasible to discourage habitat use within the construction area. Restore disturbed areas using native pollinator seed mixes containing Common Milkweed (<i>Asclepias syriaca</i>) and other native flowering species. Where feasible, collect and redistribute Milkweed seed pods to support habitat restoration.</p> <p>■ Soil Management:</p> <ul style="list-style-type: none">• Access OPSS.PROV 180: General Specification for the Management of Excess Materials.<ul style="list-style-type: none">– Construction material should be stored within an authorized location, and any soil stockpiles should only be located within a suitable sediment fenced and protected location.• If stockpiles of gravel and sandy substrates, or the removal of these substrates in the vicinity of turtle habitat are required during the active turtle season (April 1 to October 15), turtle exclusion fencing should be installed in accordance with the Reptile and Amphibian Exclusion Fencing best management practices (MECP, 2025) around stockpiles or area of disturbance prior to April 1. After April 1, fencing should be installed immediately after stockpiles are created.• Stockpiles should be maintained in accordance with the best management practices for the Protection, Creation and Maintenance of Bank Swallow Habitat in Ontario (MNRF, 2017). The slope of stockpiles should be maintained at 70 degrees or less to discourage <i>Migratory Birds Convention Act</i> species from nesting. Alternatively, exclusion methods such as geotextiles, plastic covers or tarps can be used to cover stockpiles to prevent nesting.• Maintain the outermost limit of soil storage locations (including any grading activities or access disturbance) outside of the driplines of forests and with a minimum setback of 30 metres from the edges of wetlands and fish habitat watercourses.

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
4.0 Terrestrial Ecosystems	4.3 Species at Risk	<p>Construction Phase:</p> <ul style="list-style-type: none">■ Removal of candidate bat Species at Risk habitat and possible disturbance, mortality or injury.■ Removal of candidate Red-headed Woodpecker (<i>Melanerpes erythrocephalus</i>) habitat.■ Removal of confirmed Eastern Meadowlark habitat and possible disturbance, mortality or injury.■ Removal of candidate Loggerhead Shrike habitat and possible disturbance, mortality or injury.■ Removal of candidate Black Ash and candidate Butternut habitat.■ Indirect disturbance of bat activity due to construction lighting.■ Removal of candidate Blanding’s Turtle habitat and possible disturbance, injury or mortality. <p>Operational Phase:</p> <ul style="list-style-type: none">■ Species at Risk Wildlife Road Mortality.	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of the Environment, Conservation and Parks	4.3.1	<ul style="list-style-type: none">■ In line with Special Provision 100S14 (Unexpected Species at Risk Occurrence), suspend construction activities in the immediate area of any Species at Risk observation and notify Ministry of Transportation of Ontario and Ministry of the Environment, Conservation and Parks for direction prior to resuming work.■ Schedule vegetation removal outside of the bird nesting period of April 1 to August 31 to avoid disturbance to breeding migratory birds including Species at Risk and/or damage/destruction of their nests.<ul style="list-style-type: none">• Pre-mow meadow habitat within the Ministry of Transportation of Ontario right of way prior to April 1, where feasible, to discourage nesting by Bobolink, Eastern Meadowlark, and other grassland birds.■ Vegetation removal within suitable bat Species at Risk habitat outside the bat roosting season (March 15 to November 30) and in accordance with applicable Species Conservation Act requirements. Restrict construction activities within 30 metres of suitable maternity roost habitat to daylight hours, where feasible, during the roosting season.■ Conduct targeted Butternut and Black Ash surveys during Detail Design. If either species is identified within the work area, vegetation clearing should be suspended in the vicinity of the tree(s), notify Ministry of Transportation of Ontario and Ministry of the Environment, Conservation and Parks, and undertake assessments by qualified professionals as required under the <i>Species Conservation Act</i>.■ Schedule in-water works and dewatering activities outside of the Blanding’s Turtle hibernation period of November 1 to April 1 of any year (MNR, 2015).■ Nocturnal Light Pollution Mitigation:<ul style="list-style-type: none">• Construction activities should be limited to daylight hours (7 am to 7 pm) to reduce the amount of noise and light disturbance to nocturnal species (such as bats).• Avoid the use of high-pressure sodium and Light-emitting Diode lights immediately adjacent to woodlands.• Shield any corridor illumination to reduce light spill within bat Species at Risk habitat and any restoration areas. If construction at night cannot be avoided, lights will be pointed away from the wooded areas and suitable habitat.■ The need for additional plans (wildlife management, wildlife monitoring, ecological restoration, environmental management, Invasive Species management, Ministry Salt Management Plan) to support the proposed works should be determined during Detail Design.■ Provide Species at Risk awareness training to construction personnel prior to construction, including species identification, encounter/reporting protocols, and applicable protection measures for known or newly identified Species at Risk within the work area.
5.0 Land Use and Property	5.1	<ul style="list-style-type: none">■ Property Impacts / Acquisitions	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario	5.1.1	<ul style="list-style-type: none">■ 2.45 hectares of property beyond the existing right of way are required from a total of 14 property parcels for construction of the Recommended Plan. Compensation will be provided at market value.■ 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.

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
6.0 Waste Management and Contamination	6.1	<ul style="list-style-type: none"> Three properties/areas within the Contamination Overview Study Area have been identified as having a “high” potential for soil and groundwater contamination. There were 12 significant spill records, representing 11 spill locations, which are also considered as having “high” potential for soil and/or groundwater contamination. 	<ul style="list-style-type: none"> Ministry of Transportation of Ontario Ministry of the Environment, Conservation and Parks 	6.1.1	<ul style="list-style-type: none"> Property Acquisitions Environmental Due Diligence: Complete property-specific Phase One Environmental Site Assessments for property acquisitions within areas of potential environmental concern exhibiting moderate to high contamination potential. Complete Phase Two Environmental Site Assessments, where warranted by Phase One Environmental Site Assessment findings, to support property acquisition and future construction. Road Construction and Management of Excess Soil: Conduct soil contaminant investigations, where excavation is proposed, within or adjacent to areas of potential environmental concern exhibiting moderate to high contamination potential. Investigations shall be completed by a qualified environmental consultant to characterize soil quality and support excess soil management. Manage excavated soil in accordance with Ontario Regulation 406/19 (On-Site and Excess Soil Management) and the associated Rules for Soil Management and Excess Soil Quality Standards for all soil excavated, reused, transported, or disposed of during construction.
7.0 Designated Substance and Hazardous Material	7.1	<ul style="list-style-type: none"> Disturbance of suspected asbestos-containing materials and lead-containing materials during bridge rehabilitation or demolition may result in the release of hazardous substances, posing risks to worker health and safety, air quality, and the surrounding environment. 	<ul style="list-style-type: none"> Ministry of Transportation of Ontario 	7.1.1	<ul style="list-style-type: none"> Remove asbestos-containing materials that may be disturbed by construction prior to commencing rehabilitation work in the affected area. Complete asbestos-containing material abatement in accordance with Ontario Regulation 278/05 under the <i>Occupational Health and Safety Act</i>. Transport and dispose of asbestos waste materials at a licensed landfill in accordance with Ontario Regulation 347 under the <i>Environmental Protection Act</i>. A qualified contractor must manage repair and maintenance activities involving silica- and lead-containing materials in accordance with Ontario Regulation 490/09 under the <i>Occupational Health and Safety Act</i>. Manage, monitor, recycle, and dispose of silica-containing materials in accordance with applicable occupational exposure limits and Ontario Regulations 102/94 and 103/94 under the <i>Environmental Protection Act</i>. Suspend work in the immediate area if previously unidentified suspected asbestos-containing materials or other suspect hazardous materials are encountered during demolition or rehabilitation activities. Notify the Contract Administrator and retain a qualified professional to assess the material through sampling and analysis or manage it as asbestos-containing material until confirmed otherwise, in accordance with applicable legislation and guidelines. If previously unidentified suspected asbestos-containing materials or other suspected hazardous materials are encountered during demolition or rehabilitation activities, the Contractor must notify the Contract Administrator and retain a qualified professional to assess the material through sampling and analysis or manage it as asbestos-containing material until confirmed otherwise, in accordance with applicable legislation and guidelines.
8.0 Canadian Navigable Waters Act	8.1	<ul style="list-style-type: none"> Potential impacts to the navigability of the Napanee River during construction works. 	<ul style="list-style-type: none"> Transport Canada 	8.1	<ul style="list-style-type: none"> The Project Team undertook a preliminary review of the watercourses within the Study Area. It was determined that the Napanee River, although not a scheduled waterway, holds the potential for navigability and as such, provisions of the <i>Canadian Navigable Waters Act</i> apply to this Project and therefore <i>Canadian Navigable Waters Act</i> approval is required.
9.0 Noise and Vibration	9.1	<ul style="list-style-type: none"> No anticipated noise impacts during the operational phase of the project. Construction noise will be temporary in nature and will cease at the end of the construction activities; it can be a cause of disturbance to the surrounding noise sensitive areas. 	<ul style="list-style-type: none"> Ministry of Transportation of Ontario Ministry of the Environment, Conservation and Parks Construction Contractor Municipalities 	9.1.1	<p>Construction contractor requirements are normally described in:</p> <ul style="list-style-type: none"> Special Provision No. 199F33: <ul style="list-style-type: none"> Identify the extent of noise sensitive areas; Stipulate constraints on construction noise with respect to the Town of Greater Napanee noise control By-laws as follows: <ul style="list-style-type: none"> While the Ministry does not require a by-law exemption, any work undertaken between 7:00 p.m. and 7:00 a.m. requires a temporary noise permit; submit an application for a permit to the Town Clerk or the Clerk’s delegate to obtain an exemption from the By-law’s prohibitions; The Contractor shall notify nearby residents who may be impacted by nighttime work in advance, as applicable;

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
					<ul style="list-style-type: none">• Equipment shall comply with the sound emission standards for construction equipment outlined in Ministry of the Environment, Conservation and Parks publications NPC-115 and NPC-118 (contractor to confirm) which are the following:<ul style="list-style-type: none">– NPC-115: Construction Equipment;– NPC-118: Motorized Conveyances;• Where feasible, equipment with broadband backup alarms shall be utilized;• Equipment shall be maintained in an operating condition that prevents unnecessary noise (non-defective muffler systems, properly secured components, and the lubrication of moving parts;• Idling of equipment shall be restricted to the minimum necessary to perform the specified work;• Stationary equipment shall be located as far away from sensitive locations as feasible.■ Special Provision No. 199F31, Environmental Exemptions and Permits, is used to set out notification requirements for operation of construction outside of noise By-law limits.
10.0 Air Quality	10.1	<ul style="list-style-type: none">■ Vehicle emissions may contribute to elevated concentrations of criteria air contaminants, including nitrogen dioxide (NO₂) and benzo(a)pyrene, at nearby sensitive receptors. While exceedances of applicable air quality criteria are predicted under Future Build Conditions, air quality is expected to improve relative to Existing Conditions due to advancements in vehicle technology and fleet turnover.	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of the Environment, Conservation and Parks	10.1.1	<ul style="list-style-type: none">■ Implementation of vegetation along the highway (such as plantings through screening and/or barriers), where feasible, within the Study Area to decrease ground level dispersion of particulates.■ Continued promotion of increased electric vehicle purchase and infrastructure within Ontario.■ Prior to commencement of construction, a detailed Construction Air Quality Management Plan will be developed and will:<ul style="list-style-type: none">• Define the Project's air quality impact zone and identify all sensitive and critical receptors within this area.• Assess the requirement for continuous monitoring during Project construction.• Provide mitigation measures and identify requirements for implementation of these measures.• Include explicit commitment to implementation of applicable best management practices identified in <i>Environment Canada's Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities</i> and the Ministry of the Environment, Conservation and Parks' <i>Technical Bulletin: Management Approaches for Industrial Fugitive Dust Sources</i> to minimize construction-related air emissions and fugitive dust.• Implement applicable best management practices for hot mix asphalt operations in accordance with the <i>Ontario Hot Mix Producers Association's Environmental Practices Guide: Ontario Hot Mix Asphalt Plants (Fifth Edition)</i> to minimize air emissions and potential nuisance impacts during construction.• Develop Protocols for Communications and Complaints, in accordance with the Project Agreement.• Regular reporting on any continuous monitoring reports, to be provided to the Ministry of the Environment, Conservation, and Parks, for their records.• Implement appropriate dust suppression and emission control measures to minimize the generation of particulate matter (PM_{2.5} and PM₁₀), crystalline silica, and oxides of nitrogen during construction activities.• Application of threshold "Action Level" triggers for implementation of specific and increasing intensity mitigation activities.• Where continuous air quality monitoring is required, undertake baseline monitoring for a minimum of one week prior to construction and conduct real-time monitoring throughout construction activities. Monitoring locations should be established upwind and downwind of the work area, where feasible, and sited in accordance with the Ministry of the Environment, Conservation and Parks Operations Manual for Air Quality Monitoring in Ontario (2018). Meteorological monitoring should also be implemented, where appropriate, to support interpretation of air quality monitoring results.

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
11.0 Landscape Composition	11.1	<ul style="list-style-type: none">■ Changes to the existing landscape due to edge impacts associated with the increased footprint and construction.	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of the Environment, Conservation and Parks■ Municipalities	11.1.1	<ul style="list-style-type: none">■ Tree plantings shall be further addressed based on the Conceptual Landscape Composition Plan.■ A Landscape Architect and/or Certified Arborist shall be consulted to establish appropriate protection measures for the retained trees adjacent to the right of way.■ Establish a Tree Protection Zone through the installation of tree protection fencing following standard arboricultural procedures (per OPSS.PROV 801).■ Implement landscape restoration and enhancement measures.■ Replanting should involve native specie and approved seed mixes compatible with adjacent vegetative communities and applicable standards.■ Monitor and maintain landscape plantings and revegetated areas following construction to ensure successful establishment and long-term stability.
12.0 Archaeology	12.1	<ul style="list-style-type: none">■ Potential disturbance to known and previously unidentified archaeological resources due to the presence of three previously identified archaeological sites within 50 metres of the Study Area, proximity to the Napanee River, early 19th-century settlement associated with the Town of Napanee, and the historic Palace Road (County Road 5) transportation route.	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of Citizenship and Multiculturalism■ Indigenous Communities	12.1.1	<ul style="list-style-type: none">■ Conduct a Stage 2 Archaeological Assessment for areas of archaeological potential that may be impacted by the Project, in accordance with the Standards and Guidelines for Consultant Archaeologists (2011), including test pit surveys at 5 metre intervals where ploughing is not feasible.■ If the project design changes and results in impacts to the bed of a waterbody, complete a marine archaeological checklist and undertake a marine archaeological assessment, if warranted.■ Complete additional archaeological assessments for any lands added to the Project footprint, prior to land disturbance, in accordance with the Standards and Guidelines for Consultant Archaeologists (2011).■ With regard to the Spook Horn Cemetery, at the time of the development of the Stage 1 Archaeological Assessment for this Study, True North Archaeological Services has conducted a separate Stage 1-3 Archaeological Assessment where the boundaries of the cemetery have been determined. As the True North Archaeological Services Stage 1-3 Archaeological Assessment report is still a draft and has not been accepted by the Ministry of Citizenship and Multiculturalism, its recommendations cannot be relied upon or carried forward at this time. Accordingly, all areas outside of the Stage 3 Mechanical Topsoil Removal area and the previously assessed area along the eastern boundary continue to retain archaeological potential and should remain subject to Stage 2 Archaeological Assessment where future development impacts are anticipated, unless and until the Stage 1-3 Archaeological Assessment report is formally accepted by the Ministry of Citizenship and Multiculturalism.
13.0 Built Heritage	13.1	<ul style="list-style-type: none">■ Minimal direct, adverse impacts for Cultural Heritage Landscape 5 (Napanee River), associated with the bridge replacement under the Recommended Plan.	<ul style="list-style-type: none">■ Ministry of Transportation of Ontario■ Ministry of Citizenship and Multiculturalism■ Ontario Heritage Trust	13.1.1	<ul style="list-style-type: none">■ Avoid impacts to Built Heritage Resources and Cultural Heritage Landscapes through construction planning, staging, and implementation of protective measures, including temporary fencing, buffer zones, and contractor awareness and training.■ Complete a vibration assessment prior to construction to evaluate potential impacts on Built Heritage Resources and Cultural Heritage Landscapes. Where adverse vibration impacts are anticipated, prepare and implement a vibration monitoring plan to minimize construction-related impacts.■ Should there be further refinements to the Cultural Heritage Resource Assessment Report Study Area, a Qualified Person should reassess potential impacts and identify any additional mitigation requirements.■ Mitigation measures for potential minimal adverse impacts to the Napanee River should focus on minimizing disturbance, maintaining vegetation continuity, and incorporating Indigenous perspectives into design. Further resource-specific mitigation measures and next steps include:<ul style="list-style-type: none">• The Project should be planned in a manner that minimizes direct and indirect impacts to the Napanee River Bridge. Wherever possible, bridge infrastructure should be set back

Discipline	ID #	Potential Impact	Concerned Agencies	ID #	Mitigation, Protection, Monitoring, and Study Commitments to be carried forward to Detail Design
					from the riverbanks, avoiding encroachment on the natural landscape. Bridge infrastructure placement should: <ul style="list-style-type: none">– Maintain continuity of riverbank vegetation.– Minimize physical disturbance within the river corridor.– Implement construction staging areas away from the Napanee River to prevent adverse impacts. Temporary staging areas built should be removed following construction and the land returned to pre-construction conditions. ■ Where infrastructure is located near the river corridor, implement a site-specific Landscape Plan to restore disturbed areas and maintain the character-defining features and associated natural heritage attributes of the Cultural Heritage Landscape.
14.0 Indigenous Communities	14.1	■ Indigenous Engagement	■ Ministry of Transportation of Ontario ■ Indigenous Communities	14.1.1	■ Engage with interested Indigenous communities throughout the Project lifecycle and provide opportunities for meaningful participation, including future field investigations where appropriate. Engagement should also seek to identify and understand any potential impacts to Aboriginal and Treaty rights. The Project Team should continue to share relevant project documentation with participating Indigenous Communities throughout the Study process and remain available to meet, discuss information received and consider Indigenous Knowledge and community concerns.
15.0 Drainage	15.1	■ The proposed design accommodates peak flows up to the 100-year storm and 130% check flow event without overtopping and satisfies the Ministry of Transportation of Ontario Highway Drainage Design Standards minimum freeboard and clearance requirements of 1.0 metre. ■ Construction activities may result in a minor temporary increase in upstream water surface elevations (approximately 0.03 metres during the 10-year storm event) relative to existing conditions.	■ Ministry of Transportation of Ontario ■ Quinte Conservation Authority	15.1.1	■ A comprehensive Erosion and Sediment Control Plan shall be developed and approved prior to construction to mitigate and minimize the potential for sediment wash-off and to protect the downstream receivers. ■ The required height, elevation and type of cofferdam should be based on the Contractor's means and methods and final staging design. ■ Flow spread analysis needs to be completed during detailed design to ensure all the Ministry of Transportation of Ontario Highway Drainage Design Standards criteria are met. ■ A comprehensive geotechnical investigation during Detail Design is required to understand the soil stratigraphy, estimate the final scour depths and confirm scour countermeasures. ■ To mitigate the potential impact of the proposed works, drainage and stormwater management measures will be implemented during both interim and ultimate conditions. Swales, culverts, and other stormwater management infrastructure will be provided to convey and capture the Highway 401 drainage in accordance with the applicable stormwater management criteria.
16.0 Transportation and Infrastructure	16.1	■ Traffic disruptions and construction staging	■ Municipalities ■ Ministry of Transportation of Ontario	16.1.1	■ Consultation with municipalities, emergency services and potentially affected stakeholders regarding the details of traffic disruptions associated with road closures, access restrictions, detour plans and the development of the construction staging plan.
16.0 Transportation and Infrastructure	16.2	■ Disruptions/damage to utility infrastructure	■ Ministry of Transportation of Ontario ■ Municipalities ■ Utilities	16.2.1	■ All potentially affected utility companies at Palace Road will be contacted to confirm utility impacts and develop a utility relocation plan prior to construction. Mitigate impacts to HONI's relocation plan during Detail Design. ■ If it is necessary to complete utility relocations during construction, the Contractor will be required to co-ordinate the timing of each operation to ensure that they are carried out independently. Special provisions will be included in the contract to address this, and to ensure that care and precautions are taken to safeguard existing utilities from damage.
16.0 Transportation and Infrastructure	16.3	■ Active transportation at municipal crossings	■ Ministry of Transportation of Ontario ■ Municipalities	16.3.1	■ Future municipal active transportation facilities will be reviewed at Palace Road in consultation with the municipalities during Detail Design.

10. Next Steps

Following the 30-day comment period of the Transportation Environmental Study Report, the Ministry of Transportation of Ontario may proceed to Detail Design as outlined in the 2024 Ministry of Transportation of Ontario *Class Environmental Assessment for Provincial Transportation Facilities and Municipal Expressways*.

The Detail Design phase will advance the Recommended Plan to a refined level and an individual contract package for construction will be prepared. Additional field investigations will be completed to provide more data that is specific to the refined design.

10.1 Future Consultation and Commitments

Permits and approvals will be obtained during Detail Design. Any mitigation, monitoring or reporting requirements identified through a permit or approval will be implemented and completed through the construction contract requirements. A summary of the proposed future consultation requirements is provided in **Table 10-1**.

The construction phase is the implementation of the Project. During construction, the Ministry of Transportation of Ontario or Contract Administrator will ensure that the implementation of the mitigation measures and key design features are consistent with the construction contract.

Inspection by Construction Administration staff will occur during construction to make certain that all environmental mitigation and design measures are properly installed and maintained, and additional measures are provided as required for any unanticipated issues that may develop during construction.

Table 10-1: Summary of Future Consultation Requirements

External Agency	Subject of Consultation
Fisheries and Oceans Canada	■ Request for Review Form, or other equivalent review documentation
Transport Canada	■ Further review and confirmation of the applicability of the <i>Canadian Navigable Waters Act</i> during Detail Design
Ministry of Natural Resource	■ Terrestrial Species and Habitat ■ Wildlife timing windows and restrictions
Ministry of Citizenship and Multiculturalism	■ Stage 2 Archaeological Assessment
Ministry of the Environment, Conservation and Parks	■ Terrestrial and/or aquatic Species at Risk species and/or habitat ■ <i>Species Conservation Act</i> authorization/permit

External Agency	Subject of Consultation
Indigenous Communities	<ul style="list-style-type: none"> ■ Stage 2 Archaeological Assessment
Township of Greater Napanee	<ul style="list-style-type: none"> ■ Traffic Management Plan ■ Construction timing ■ Utility relocations ■ Public concerns, as required ■ Cost sharing agreements ■ Construction timing and detour routes ■ Consultation and co-ordination regarding Active Transportation
Emergency service agencies (OPP, Fire, ambulance, Police Services, etcetera)	<ul style="list-style-type: none"> ■ Traffic Management Plan ■ Construction timing
Quinte Conservation	<ul style="list-style-type: none"> ■ Consultation as required
Utility companies	<ul style="list-style-type: none"> ■ Utility relocations as required ■ Construction timing