

Updated Draft Environmental Impact Assessment Report

Highway 400 to Highway 404 Link (Bradford Bypass)

Ontario Ministry of Transportation

60636190

July 13, 2023

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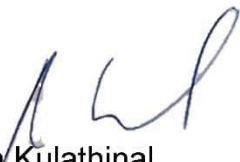


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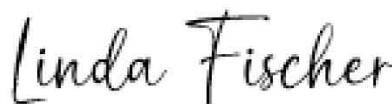


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This Updated Draft Environmental Impact Assessment Report is available for public review and consultation between July 13, 2023, and August 14, 2023, through the Project Website (www.bradfordbypass.ca) in accordance with Ontario Regulation 697/21, Section 20.

Revision History

Rev #	Revision Date	Revised By:	Revision Description
1	June 1, 2023	AECOM	Draft Environmental Impact Assessment Report
2	July 13, 2023	AECOM	Updated Draft Environmental Impact Assessment Report

Executive Summary

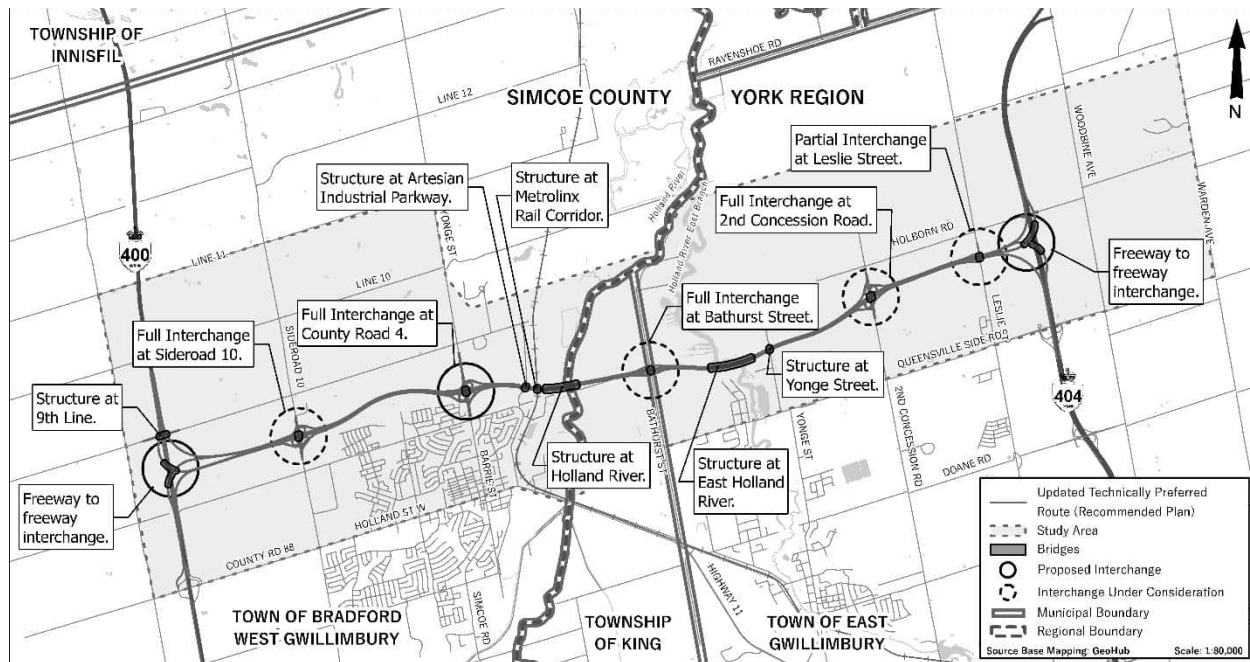
The Ontario Ministry of Transportation (the Ministry) has retained AECOM Canada Ltd. (AECOM) to undertake a Preliminary Design and project-specific assessment of environmental impacts for the proposed Highway 400 to Highway 404 Link (Bradford Bypass). The Bradford Bypass (the project) is being assessed in accordance with Ontario Regulation 697/21 (the Regulation) (October 7, 2021). The Ministry previously completed a Route Planning and Environmental Assessment Study for the Bradford Bypass that received subsequent approval in 2002.

The Bradford Bypass is a proposed 16.3 kilometre, controlled-access freeway that will extend from Highway 400 between 8th Line and 9th Line in Bradford West Gwillimbury, will cross a small portion of King Township, and will connect to Highway 404 between Queensville Sideroad and Holborn Road in East Gwillimbury. There are proposed full and partial interchanges, as well as grade separated crossings at intersecting municipal roads and watercourses, including the Holland River and Holland River East Branch. This project also includes the design integration for the replacement of the 9th Line structure on Highway 400, which will accommodate the proposed future ramps north of the Bradford Bypass corridor. The Ministry is considering an interim four-lane configuration and an ultimate eight-lane design for the Bradford Bypass. The interim condition will include two general purpose lanes in each direction and the ultimate condition will include four lanes in each direction (one high-occupancy vehicle lane and three general purpose travel lanes in each direction). The interim and ultimate designs are being reviewed as the project progresses. Should the footprint change or be modified in any way, a review of the changes shall be undertaken, and an addendum to the Report will be prepared to reflect the changes, impacts, mitigation measures, and any commitments to future work.

In accordance with the Regulation, an Environmental Impact Assessment Report is required to be prepared. The purpose of this Draft Environmental Impact Assessment Report (this Report) is to document the evaluation of alternatives considered for this project, present the Updated Technically Preferred Route (Recommended Plan), and document the environmental impacts, proposed mitigation measures and environmental commitments.

The Study Area for the project is within Simcoe County (Town of Bradford West Gwillimbury) and Regional Municipality of York (Township of King and Town of East Gwillimbury). This Study Area was identified for assessment of potential impacts of the project in the 2002 Approved Environmental Assessment. The Study Area and Updated Technically Preferred Route are shown on **Figure ES-1** below.

Figure ES-1: Bradford Bypass Study Area



Study Process

The Preliminary Design and project-specific assessment of environmental impacts for the Bradford Bypass is being undertaken in accordance with the Regulation. The Regulation provides a defined framework for the proponent to follow the assessment and decision-making surrounding the potential environmental impacts of the project.

This Report has been prepared in accordance with Section 20(2) of the Regulation and contains the information outlined in **Table ES-1**.

Table ES-1: Draft Environmental Impact Assessment Report Contents in Accordance with Ontario Regulation 697/21: Bradford Bypass Project

Regulation Section	Requirement	Report Section
Section 20(2)(1)	A statement of the purpose of the Bradford Bypass Project and a summary of background information relating to the Bradford Bypass Project.	Section 1
Section 20(2)(2)	The final description of the updated technically preferred route from the environmental conditions report and from the Class Environmental Assessment process, if applicable, in accordance with clause 16 (3) (b).	Section 4
Section 20(2)(3)	The assessment and comparison of at least two potential alternative alignment options for the Bradford Bypass Project that are within the updated technically preferred route as set out in paragraph 2, and the selection of a preferred alignment.	Section 3
Section 20(2)(4)	A map showing the preferred alignment and the updated technically preferred route.	Section 1 and Section 4
Section 20(2)(5)	A description of the local environmental conditions at the updated technically preferred route.	Section 2
Section 20(2)(6)	The assessment and comparison of at least two potential alternatives to the design options for each of the components of the preferred alignment for the Bradford Bypass Project, and a selection of the preferred design from those options, taking into account the comparisons.	Section 3
Section 20(2)(7)	A description of all studies, including the studies set out in sections 21 to 24, undertaken in relation to the Bradford Bypass Project, which must set out, <ul style="list-style-type: none"> i. a summary of all data collected or reviewed, and ii. a summary of all results and conclusions. 	Section 5
Section 20(2)(8)	The proponent’s assessment and evaluation of the impacts that the preferred alignment and preferred design for the Bradford Bypass Project might have on the environment, and the proponent’s criteria for assessment and evaluation of those impacts.	Section 5
Section 20(2)(9)	A description of any measures proposed by the proponent for mitigating any negative impacts that the preferred alignment and preferred design for the Bradford Bypass Project might have on the environment.	Section 5
Section 20(2)(10)	A description of the means the proponent proposes to use to monitor and verify the effectiveness of the mitigation measures proposed under paragraph 9, including a plan to make the results of the monitoring and verification available on the Project website.	Section 5
Section 20(2)(11)	A description of any municipal, provincial, federal or other approvals or permits that may be required for the Bradford Bypass Project.	Section 6
Section 20(2)(12)	A consultation record, including, <ul style="list-style-type: none"> ■ a description of the consultations carried out with Indigenous communities, in accordance with the Indigenous Consultation Plan prepared under section 15, and with other interested persons, ■ a list of the Indigenous communities and interested persons who participated in the consultations, ■ summaries of the comments submitted by Indigenous communities and interested persons, ■ a summary of discussions that the proponent had with Indigenous communities, and copies of all written comments submitted by Indigenous communities, ■ a description of what the proponent did to respond to concerns expressed by Indigenous communities and interested persons, and ■ any commitments made by the proponent to Indigenous communities and interested persons in respect of the Bradford Bypass Project. 	Section 7

Existing Environmental Conditions

Section 2 describes the natural, socio-economic and cultural aspects of the existing environment as well as transportation and engineering aspects within the Study Area. Information on the following environmental components is provided in the sections below.

Natural Environment:

- Terrestrial ecosystems (**Section 2.1.1**)
- Fish and fish habitat (**Section 2.1.2**) and Appendix A
- Stormwater and drainage (**Section 2.1.3**)
- Groundwater and hydrogeology (**Section 2.1.4**)
- Fluvial geomorphology (**Section 2.1.5**), and
- Erosion and sedimentation overview risk assessment (**Section 2.1.6**).

Social and Economic Environment:

- Land use and property (**Section 2.2.1**)
- Agriculture (**Section 2.2.2**)
- Noise and vibration (**Section 2.2.3**)
- Air quality (**Section 2.2.4**)
- Contamination, waste and excess materials management (**Section 2.2.5**)
- Climate change (**Section 2.2.6**)
- Human health (**Section 2.2.7**), and
- Snowdrift (**Section 2.2.8**).

Cultural Environment:

- Archaeology (**Section 2.3.1**), and
- Built heritage and cultural heritage landscapes (**Section 2.3.2**).

Engineering and Transportation

- Traffic and transportation (**Section 2.4.1**)
- Geotechnical studies (**Section 2.4.2**), and
- Utilities (**Section 2.4.3**).

Alternatives Evaluation

Section 3 of this Report presents the evaluation of alignment and design alternatives to the Technically Preferred Route as set out in the conceptual design identified in **Exhibit 5-1** in Section 5 of the 2002 Approved Environmental Assessment, and the evaluation of design alternatives for each of the components of the Updated Technically Preferred Route. An overview of these alignment alternatives and a summary of the evaluation was presented at Public Information Centre #2 on November 24, 2022. The preferred alternative at each location has been incorporated into the overall design, representing the Updated Technically Preferred Route presented in **Section 4** of this Report and is to be carried forward through Detail Design.

For each of the alternatives, the Project Team used a reasoned argument (trade-off) method of evaluation to identify the advantages and disadvantages to select the design refinements and alternatives for the project.

Alignment alternatives evaluated as part of this project include the following:

- An alignment shift between 10th Sideroad and County Road 4, and
- An alignment shift from Bathurst Street to east of Yonge Street, including the crossing over the Holland River East Branch.

Design alternatives evaluated as part of this project include the following:

- Freeway-to-freeway interchanges at Highway 400 and Highway 404
- Minor alignment refinements west of Leslie Street to address access requirements for Hydro One utilities
- Interchange configurations at 10th Sideroad, Bathurst Street, 2nd Concession Road and Leslie Street
- Highway profile refinements affecting overpasses and underpasses where the highway will cross municipal roads and railways, and
- Interchange locations.

Table ES-2 below summarizes the preferred alternative chosen for each location and the rationale for the selection. Further details on the evaluation of alternatives are provided in **Section 3**.

Table ES-2: Summary of the Preferred Alternatives and Rationale for the Selection

Location	Preferred Alternative	Key Rationale for Selection of the Preferred Alternative
Alignment Shift 10th Sideroad to County Road 4	Alternative 2 Realignment to the north featuring a 1700 metre curve that transitions to 1300 metres to tie back into the 2002 Approved Environmental Assessment alignment at County Road 4.	<ul style="list-style-type: none"> Minimizes impacts to a sensitive archaeological site Mitigates design impacts to the County Road 4 Early Works Meets the Ministry’s geometric standards, and Mitigates potential impacts to current and future land uses.
Alignment Shift Holland River East Branch	Alternative 2 Realignment 150 metres to the south, featuring back-to-back 2200 metre radius curves that tie back into the 2002 Approved Environmental Assessment alignment at Yonge Street.	<ul style="list-style-type: none"> The anticipated impact to the meandering river is less than other alternatives for both temporary and permanent impacts from the construction and placement of bridge piers. There is a slight offset to these benefits as there are increases in encroachment into natural areas compared to the Base Case, which will be considered through mitigation strategies in collaboration with Regulatory Agencies as the design is refined Alternative 2 has substantially less permanent in-water footprint impacts relative to the 2002 Approved Environmental Assessment Design (Base Case). Commitments from the 2002 Approved Environmental Assessment to mitigate impacts to adjacent properties are met Alternative 2 results in a constant horizontal bridge curvature, which is simpler in design, fabrication, and construction than Alternative 3.
Highway 400 Freeway-to-Freeway Interchange	Alternative 3 525 metre Radius (Bradford Bypass to Highway 400 Southbound Ramp) with Lanes to County Road 88.	<ul style="list-style-type: none"> Provides connectivity to County Road 88 from both Highway 400 and Bradford Bypass Consistent ramp radii Property Requirements less than Alternatives 1 and 2 (similar to Alternative 4), and Minimizes environmental impacts.
Highway 404 Freeway-to-Freeway Interchange	Alternative 1 Extend Two Lane Ramp from Bradford Bypass Eastbound Ramp to Queensville Sideroad Ramp.	<ul style="list-style-type: none"> Provides the best connectivity to Queensville Sideroad from Bradford Bypass and maintains existing access from Highway 404 Provides preferred connectivity within the region, and Smallest footprint, minimizing environmental impacts.
Alignment Shift Hydro One Towers West of Leslie Street	Alternative 2 Northern Realignment of Both Eastbound and Westbound Lanes West of Leslie Street	<ul style="list-style-type: none"> Avoids conflict with and costly relocation of existing hydro towers Provides the best opportunities for maintaining access to hydro towers Avoids undesirable utility maintenance access roads in the highway median Minimizes potential impacts to environmental and cultural resources, and Minimizes property impacts.
10th Sideroad Interchange	Alternative 1 Parclo A4 Interchange	<ul style="list-style-type: none"> Provides a highly recognizable interchange with access in all directions Highest traffic capacity with lowest vehicle conflicts, and Opportunities for future carpool lot.
Bathurst Street Interchange	Alternative 1 Diamond Interchange	<ul style="list-style-type: none"> Smallest footprint and lowest environmental area of disturbance Adjustments to access to Albert’s Marina and potential for connectivity to the Hochreiter Access, subject to discussions with municipalities and property owners, and Accommodates traffic operation considerations for farm vehicles/operations.
2nd Concession Road Interchange	Alternative 1 Parclo A4 Interchange	<ul style="list-style-type: none"> Provides a highly recognizable interchange with access in all directions Highest traffic capacity with lowest vehicle conflicts, and Opportunities for future carpool lot.
Leslie Street Interchange	Alternative 1 Partial Diamond	<ul style="list-style-type: none"> Lowest environmental and property impacts Provides access westerly to/from Leslie Street with well performing interchange operations, and Avoids a significant heritage resource.

Location	Preferred Alternative	Key Rationale for Selection of the Preferred Alternative
Overpasses and Underpasses	<p>Overpasses:</p> <ul style="list-style-type: none">■ 9th Line (Highway 400)■ Artesian Industrial Parkway■ Metrolinx Rail■ Yonge Street■ 2nd Concession Road, and■ Leslie Street. <p>Underpasses:</p> <ul style="list-style-type: none">■ 10th Sideroad■ Professor Day Drive (Not precluding future municipal initiatives)■ County Road 4 (Ministry Early Works)	<ul style="list-style-type: none">■ Profile optimizations (cut and fill balance)■ Flexibility for future road extensions, and■ Avoids impacts to existing railway line.
Interchange Locations	<ul style="list-style-type: none">■ 10th Sideroad■ County Road 4■ Bathurst Street■ 2nd Concession, and■ Leslie Street.	<ul style="list-style-type: none">■ Accommodates municipal requests and considerations■ Allows for construction phasing strategies to meet traffic demands without precluding a location■ Early integration and consideration of environmental impacts to the design, and■ Best satisfies the study objective to improve connectivity of the Study Area between Highway 400 and 404, facilitating improved traffic operations and movement of goods.

Updated Technically Preferred Route

The Updated Technically Preferred Route builds on the design identified in the 2002 Approved Environmental Assessment and the Preliminary Design Preparatory Work (2019 – 2020) completed in advance of the Preliminary Design and is presented in **Section 4** of this Report.

The interim Bradford Bypass will be comprised of a four-lane cross section featuring two general purpose lanes in each direction, and the ultimate eight-lane cross section will be widened towards the highway median within the already established right-of-way footprint for the corridor and will be comprised of three general purpose lanes and one High-Occupancy Vehicle lane in each direction.

Considerations for carpool lots at 10th Sideroad, County Road 4, and 2nd Concession Road were recommended to be carried forward for further assessment during subsequent Detail Design phases of the project.

The freeway provides bridge crossings at seven existing roads, one existing rail line, crossings at the Holland River and Holland River East Branch and includes an additional flood relief crossing, for a total of 11 mainline bridge crossings. Additionally, the freeway-to-freeway interchanges at Highway 400 and Highway 404 require a total of seven ramp bridges, including two new ramp bridges over 9th Line and the replacement of the existing Highway 400 over 9th Line bridge as well.

Appendix B of this Report provides the overall Roll Plan for the Updated Technically Preferred Route.

Environmental Impacts and Mitigation Measures

In accordance with Sections 20(8) and 20(9) of the Regulation, **Section 5** describes the potential impacts, mitigation measures and monitoring activities to verify the effectiveness of mitigation measures associated with the project for the studies listed above.

The assessments above have been prepared based on the Updated Technically Preferred Route described in **Section 4**. Following Preliminary Design, the project will be completed according to the design standards, the impact assessment will be updated, and mitigation and monitoring measures prescribed in this Report and environmental reports prepared for this project will be carried forward to subsequent Detail Design phases of the project. Consultation with Regulatory Agencies to obtain permits, approvals or authorizations as required, will also be continued in subsequent Detail Design phases of the project.

Permits and Approvals

Section 6 provides a description of the federal, provincial, conservation authority and/or municipal permits that may be required for the project. Permit and approval requirements will be confirmed during the subsequent Detail Design phase of the project.

Consultation Process

The consultation process followed for this project is described in **Section 7** of this Report and a Record of Consultation is included in **Appendix C**. The consultation process follows consultation and engagement strategies outlined in the Bradford Bypass Consultation Plan (AECOM, 2021) and the Indigenous Consultation Plan (Ministry of Transportation, 2022).

The Project Team has followed the requirements outlined in the Regulation and the Consultation Plans noted above. The Project Team has implemented the following engagement and consultation activities to reach Indigenous communities, public stakeholders, municipalities, and government agencies and provide them with the opportunity to submit comments and feedback for consideration by the Project Team:

- Project Website (www.bradfordbypass.ca)
- Project Telephone Line (1-877-247-6036)
- Project Contact List
- Emails via the Project Team email address (ProjectTeam@bradfordbypass.ca)
- Mailings/notifications (via physical mail and/or email)
- Newspaper advertisements
- Distributions of brochure notifications (copy of the Ontario Government Notice) through Canada Post Neighbourhood Mail to residences and businesses within 500 metres of the entire Bradford Bypass Study Area (approximately 13,500 notices at the time of Study Commencement in September 2020)
- Public Information Centre #1 (held virtually in April and May 2021)
- Preliminary Design Interchange Consultation Event (held virtually between April and May 2022)
- Public Information Centre #2 (held virtually in November 2022)
- Engagement and consultation with Indigenous communities, further outlined in **Section 7**
- Meetings and correspondence with Regulatory Agencies and municipalities, and
- Correspondence with technical stakeholders, local community groups and property owners.

The Notice of Publication of the Draft Environmental Impact Assessment Report was issued to the public on May 25, 2023 through a variety of media (Project Website, registered mail, newspapers, and mail drop via Canada Post to nearby addresses). The Draft Environmental Impact Assessment Report was made available for public review on the Project Website from June 1, 2023 to June 30, 2023.

Additional archaeological investigations have been completed to finalize the impact assessments in accordance with Ontario Regulation 697/21 and are included in this Updated Draft Environmental Impact Assessment Report.

The Notice of Publication of the Updated Draft Environmental Assessment Report with completed archaeological studies was issued to the public on **July 6, 2023** through a variety of media (Project Website, registered mail, newspapers, and mail drop via Canada Post to nearby addresses). The Updated Draft Environmental Impact Assessment Report is available for public review on the Project Website from **July 13, 2023**, until **August 14, 2023**.

Table ES-3 lists the changes to this Report since the initial Draft Environmental Impact Assessment Report on June 1, 2023.

Table ES-3: Summary of Changes since June 1, 2023

Section Number	Report Change
General Updates	■ Report title, dates, headers, footers, and page numbers updated throughout Report.
Executive Summary, Consultation Process	■ Dates and wording revised to reflect the Updated Draft Environmental Impact Assessment Report ■ Table ES-3 added with summary of changes since June 1, 2023 added.
Section 1.2.3	■ Table 1-1 updated to include Updated Draft Environmental Impact Assessment Report.
Section 1.4.1	■ Figure 1-2 updated to reflect Updated Draft Environmental Impact Assessment Report review period.
Section 1.4.2.1	■ Dates and wording revised to reflect Updated Environmental Impact Assessment Report.
Section 1.4.2.2	■ Dates and wording revised to reflect Updated Environmental Impact Assessment Report.
Section 1.4.2.3	■ Wording added to include the Notice of Publication of the Updated Draft Environmental Impact Assessment Report.
Section 2.3.1	■ Paragraphs updated and wording revised to reflect the completion of the Stage 2 and Stage 3 Archaeological Assessments ■ Figure 2-13 updated.
Section 5	■ Sentence added to note monitoring requirements in accordance with Ontario Regulation 697/21.
Section 5.3.1.2	■ Subheadings added to note the Summary of Archaeological Assessments from June 1, 2023 and July 13, 2023.

Section Number	Report Change
Section 5.3.1.2.2	■ New section to provide an update to the summary of the archaeological assessments including the completed Stage 2 and Stage 3 recommendations for mitigation measures and monitoring activities.
Section 5.6	■ Table 5-26 updated to include completed Stage 2 and Stage 3 recommendations for mitigation measures and monitoring activities.
Section 7.2	■ Table 7-1 updated to include Notice of Publication of Updated Draft Environmental Impact Assessment Report.
Section 7.5.1	■ Wording added to include the Notice of Publication of the Updated Draft Environmental Impact Assessment Report.
Section 7.6.5	■ Dates and wording revised to reflect Updated Environmental Impact Assessment Report.
Section 7.7.2	■ Table 7-10 updated to include Notice of Publication of Updated Draft Environmental Impact Assessment Report.
Section 7.8	■ Dates and wording revised to reflect Updated Environmental Impact Assessment Report.
Section 8	■ Dates and wording revised to reflect Updated Environmental Impact Assessment Report.

In accordance with Section 26 of the Regulation, the Ministry has established an issues resolution process to attempt to resolve any concerns raised by interested persons and Indigenous communities,

Upon completion of the consultation and issues resolution process for the Draft Environmental Impact Assessment Report, the Ministry shall update this Draft Environmental Impact Assessment Report in accordance with Section 27 of the Regulation. A Notice of Publication of the Final Environmental Impact Assessment Report will be distributed in the same manner as the Notice of Publication of the Draft Environmental Impact Assessment Report and the Notice of Publication of the Updated Draft Environmental Impact Assessment Report. The Final Environmental Impact Assessment Report will be published to the Project Website when available.

Next Steps

The following key project milestones are anticipated:

- Continued Consultation and Issues Resolution Process (as required)
- Final Environmental Impact Assessment Report: Anticipated 2023
- Bradford Bypass Statement of Completion: Anticipated 2023, and
- Preliminary Design for the Bradford Bypass Project Completion: Anticipated 2023.

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Appendices

Appendix A. Fish and Fish Habitat Existing Conditions Tables

Appendix B. Updated Technically Preferred Route Roll Plan

Appendix C. Consultation

C1: Notices and Letters

C2: Meeting Materials

C3: Public Information Centre Materials

C4: Record of Consultation

1. Overview of Undertaking

1.1 Project Overview

The Ontario Ministry of Transportation (the Ministry) has retained AECOM Canada Ltd. (AECOM) to undertake a Preliminary Design and project-specific assessment of environmental impacts for the proposed Highway 400 – Highway 404 Link (Bradford Bypass). The Bradford Bypass (the project) is being assessed in accordance with Ontario Regulation 697/21 (the Regulation) (October 7, 2021).

The Bradford Bypass is part of Ontario's plan to expand highways and public transit across the Greater Golden Horseshoe to fight congestion, create jobs and prepare for the massive population growth expected in the next 30 years. Simcoe County's population is expected to increase to 416,000 by 2031, with the Regional Municipality of York growing to 1.79 million by 2041. The Bradford Bypass has been proposed as a response to this dramatic growth in population and travel demand in the area and the forecasted increase in congestion on key roadways linking Highway 400 to Highway 404.

The project is a new 16.3 kilometre, controlled-access freeway. The proposed highway will extend from Highway 400 between 8th Line and 9th Line in Bradford West Gwillimbury, will cross a small portion of King Township, and will connect to Highway 404 between Queensville Sideroad and Holborn Road in East Gwillimbury. There are proposed full and partial interchanges, as well as grade separated crossings at intersecting municipal roads and watercourses, including the Holland River and Holland River East Branch. This project also includes the design integration for the replacement of the 9th Line structure on Highway 400, which will accommodate the proposed future ramps north of the Bradford Bypass corridor. The Ministry is considering an interim four-lane configuration and an ultimate eight-lane design for the Bradford Bypass. The interim condition will include two general purpose lanes in each direction and the ultimate condition will include four lanes in each direction (one high-occupancy vehicle lane and three general purpose travel lanes in each direction). The interim and ultimate designs are being reviewed as the project progresses. Should the footprint change or be modified in any way, a review of the changes shall be undertaken, and an addendum to the Report will be prepared to reflect the changes, impacts, mitigation measures, and any commitments to future work.

The purpose of this Draft Environmental Impact Assessment Report (this Report) is to document the evaluation of alternatives considered for this project, present the Updated Technically Preferred Route (Recommended Plan), and document the environmental

impacts, proposed mitigation measures and environmental commitments. Upon completion of the Draft Environmental Impact Assessment Report consultation and Issues Resolution Process, the Final Environmental Impact Assessment Report will be prepared and filed to the Project Website.

1.2 Project Background

The Ministry previously completed a Route Planning Study for the Bradford Bypass, and a subsequent Environmental Assessment and Technically Preferred Route were approved in 2002, as described in **Section 1.2.1** and **Section 1.2.2** below.

1.2.1 Route Planning and Environmental Assessment Study (1992 – 1997)

The Environmental Assessment Report that was prepared by McCormick Rankin Corporation, 1997 documented the environmental assessment process for the route selection, right-of-way designation and future commitments for the Highway 400-Highway 404 Link. The original Route Planning Study addressed several transportation needs which were identified in the northern part of York Region and southeastern part of Simcoe County. The identified problems were related to the Ministry's mandate to provide for the safe, efficient movement of people and goods between regions and urban areas.

The analysis of municipal development plans indicated that there will be a continuation of dramatic growth in travel demand, which has been characteristic of Simcoe County and York Region for many years. This growth continues to contribute to congestion on key roadways linking Highway 400 to the extension of Highway 404. At the time of the Route Planning Study and Environmental Assessment, the approved plans to upgrade regional roads were only expected to accommodate a fraction of this travel demand. Alternative transportation solutions to regional road widening alone were therefore warranted. As part of the Route Planning Study and Environmental Assessment, key problem areas included: traffic, road discontinuities, future demand growth implications, and lack of long-term plan. The original study considered need for relief of congestion and protection of property for the future transportation right-of-way.

As a result of the Route Planning Study, the Ministry selected a Technically Preferred Route (Exhibit 5-1 in the 2002 Approved Environmental Assessment) for the project, which is described as a 16.3 kilometre rural four-lane controlled access freeway connecting Highway 400 in Bradford West Gwillimbury to the proposed extension of Highway 404 in East Gwillimbury. The design included freeway-to-freeway interchanges at Highway 400 and Highway 404 (when extended north to Ravenshoe Road in 2014),

recommended a full interchange at both County Road 4 (Bradford West Gwillimbury), and Bathurst Street (King Township/East Gwillimbury), a partial interchange at Leslie Street (East Gwillimbury), and identified two river crossings to convey the freeway over both the Holland River and Holland River East Branch. Grade-separated crossings were identified along the proposed route to minimize conflicts with municipal roads and railways (overpasses or underpasses).

Upon completion of the Environmental Assessment study and consultation period for the Route Planning Study, a Notice of Approval to proceed with the undertaking was issued by the Minister of Environment and Energy (currently the Ministry of the Environment, Conservation and Parks) on August 28, 2002. Fifteen conditions were issued as part of the approvals process. The 2002 Approved Environmental Assessment Report and the approval conditions, aside from Approval Condition #4, have been incorporated into the process set out in the Regulation. The 2002 Approved Environmental Assessment Study Area and Technically Preferred Route are shown on **Figure 1-1**.

As part of this project, a detailed review and update to the environmental conditions described in the 2002 Approved Environmental Assessment has been undertaken. Descriptions of environmental conditions are provided in the Final Environmental Conditions Report (AECOM, 2022), under separate cover. The purpose of the Final Environmental Conditions Report was to provide an update to the description of environmental conditions from the 2002 Approved Environmental Assessment, describe the associated studies undertaken within the Study Area, and identify the proposed changes to the Technically Preferred Route as a result of changes to the environmental conditions. Any updates to the existing conditions which have been further assessed since the posting of the Final Environmental Conditions Report (AECOM, 2022) are provided in **Section 2**. The Final Environmental Conditions Report and the information provided in **Section 2** must be considered collectively to understand the environmental conditions associated with the project.

1.2.2 Preliminary Design Preparatory Work for Design Updates, Environmental Technical Updates and Permission to Enter (2019-2020)

In August 2019, the Ministry approved the re-initiation of design activities for the Bradford Bypass. In advance of the current Preliminary Design assignment, AECOM completed preparatory work relating to updating environmental existing conditions, engineering design and initiated the process for securing Permission to Enter for field investigations.

The engineering design update involved a review of the highway geometrics for the project that were developed as part of the 2002 Approved Environmental Assessment Study. Through the engineering update, alternatives to modify the design in accordance with current Ministry safety and engineering design standards were identified and have been further evaluated in the selection of preferred alternatives, described in **Section 3**.

The environmental technical update consisted of background data collection through secondary source desktop studies to update the technical information related to specific environmental disciplines based on the 2002 Approved Environmental Assessment Study Area, plus a buffer area beyond the Ministry right-of-way limits. The updated disciplines included: Archaeology, Cultural Heritage, Fisheries, Groundwater, Land Use Factors, Terrestrial Ecosystems, and Waste and Contamination. Based on the findings of the update work, an update to the environmental commitments to future work was noted and is being carried forward throughout the Preliminary Design phase.

1.2.3 Preliminary Design and Project-Specific Assessment of Environmental Impacts, 2020 - Present

In September 2020, the Ministry initiated the Preliminary Design and Class Environmental Assessment Study for the Bradford Bypass based on the 2002 Environmental Assessment approved Technically Preferred Route and alignment and began discussions with municipalities to coordinate projects within the Study Area. On October 7, 2021, Ministry of the Environment, Conservation and Parks announced that Ontario Regulation 697/21 came into force. The new regulation exempts the Bradford Bypass and Early Works components from the *Environmental Assessment Act*, on the condition that the proponent (the Ministry) complies with the assessment process detailed therein. Therefore, the Preliminary Design and project-specific assessment of environmental impacts for the Bradford Bypass is proceeding in accordance with Ontario Regulation 697/21. The decision notice on the Environmental Registry of Ontario (<https://ero.ontario.ca/notice/019-1883>) provides further information on Ontario Regulation 697/21. Ontario Regulation 697/21 prescribes project-specific requirements for environmental impacts, including consultation requirements.

Table 1-1 summarizes the activities undertaken as part of the Preliminary Design and project-specific assessment of environmental impacts for the Bradford Bypass Project.

Table 1-1: Preliminary Design and Project-Specific Assessment of Environmental Impacts Activities

Activity/Milestone	Timeline and Status
Notice of Study Commencement	■ Complete: September 24, 2020
Public Information Centre #1	■ Complete: April 22 to May 18, 2021
Ontario Regulation 697/21	■ In Force: October 7, 2021
Draft County Road 4 Early Works Report Public Review Period	■ Complete: January 13 to February 12, 2022
Notice of Publication of Final Early Works Report	■ Complete: March 21, 2022
Preliminary Design Interchange Consultation Event	■ Complete: April 21 to May 5, 2022
Draft Environmental Conditions Report Public Review Period	■ Complete: August 12 to September 16, 2022
Final County Road 4 Early Works Report Addendum	■ Complete: September 6, 2022
Notice of Publication of Final Environmental Conditions Report	■ Complete: October 27, 2022
Public Information Centre #2	■ Complete: November 24, 2022
Ontario Regulation Reports Review	■ Complete: Draft Groundwater Protection and Well Monitoring Plan (March 24, 2023 until April 14, 2023) ■ Complete: Draft Stormwater Management Plan (March 22, 2023 until April 12, 2023) ■ Ongoing: Draft Noise Report
Draft Environmental Impact Assessment Report	■ Complete: June 1 to June 30, 2023
Updated Draft Environmental Impact Assessment Report	■ Ongoing: July 13 to August 14, 2023
Issues Resolution Process	■ Ongoing: Part of the Draft Environmental Impact Assessment Report Review Process (2023)
Final Environmental Impact Assessment Report	■ Anticipated 2023
Statement of Completion	■ Linked to the filing of the Final Environmental Impact Assessment Report and anticipated 2023

1.2.3.1 Early Works at County Road 4

The Ministry is building a grade separated bridge crossing for the Bradford Bypass on County Road 4 (Yonge Street) between the 8th Line and 9th Line (herein referred to as the Early Works). To ensure design coordination and accommodation of the future Bradford Bypass without requiring any future reconstruction, this bridge will include the widening of County Road 4 and construction of a three-metre-wide multi-use path on

behalf of the County of Simcoe. The Early Works construction must be in compliance with all applicable federal and provincial regulatory requirements and legislation.

The County Road 4 Early Works Report (AECOM, 2022) was prepared to satisfy the requirements of Section 5 of the Regulation for the proposed works at County Road 4. The County Road 4 Early Works Report summarizes the local environmental conditions within the Early Works Study Area. The Draft County Road 4 Early Works Report was available on the Project Website (www.BradfordBypass.ca/early-works/) from January 13, 2022, until February 12, 2022. Comments received during the public review period of the Draft Early Works Report were incorporated into the Final County Road 4 Early Works Report. The Final County Road 4 Early Works Report and the Early Works Statement of Completion were published on the Project Website on March 21, 2022.

In accordance with the provisions of the Regulation, the Ministry is moving forward with the Detail Design and Construction of the Early Works project which commenced in Fall 2022 and is ongoing.

1.3 Study Area

The 2002 Approved Environmental Assessment Study Area (hereinafter referred to as the Study Area) for the project is located within the Simcoe County (Town of Bradford West Gwillimbury) and Regional Municipality of York (Township of King and Town of East Gwillimbury) as described and set out in the Regulation and the 2002 Approved Environmental Assessment. The Study Area was identified for assessment of potential impacts of the project in the 2002 Approved Environmental Assessment and is shown in grey on **Figure 1-1**.

As part of the update to the existing environment conditions for the project, discipline-specific study areas were developed for the environmental disciplines described in **Section 2**, to account for potential impacts from the project. The Study Areas for each discipline are defined in **Table 1-2**.

Figure 1-1: Bradford Bypass Study Area

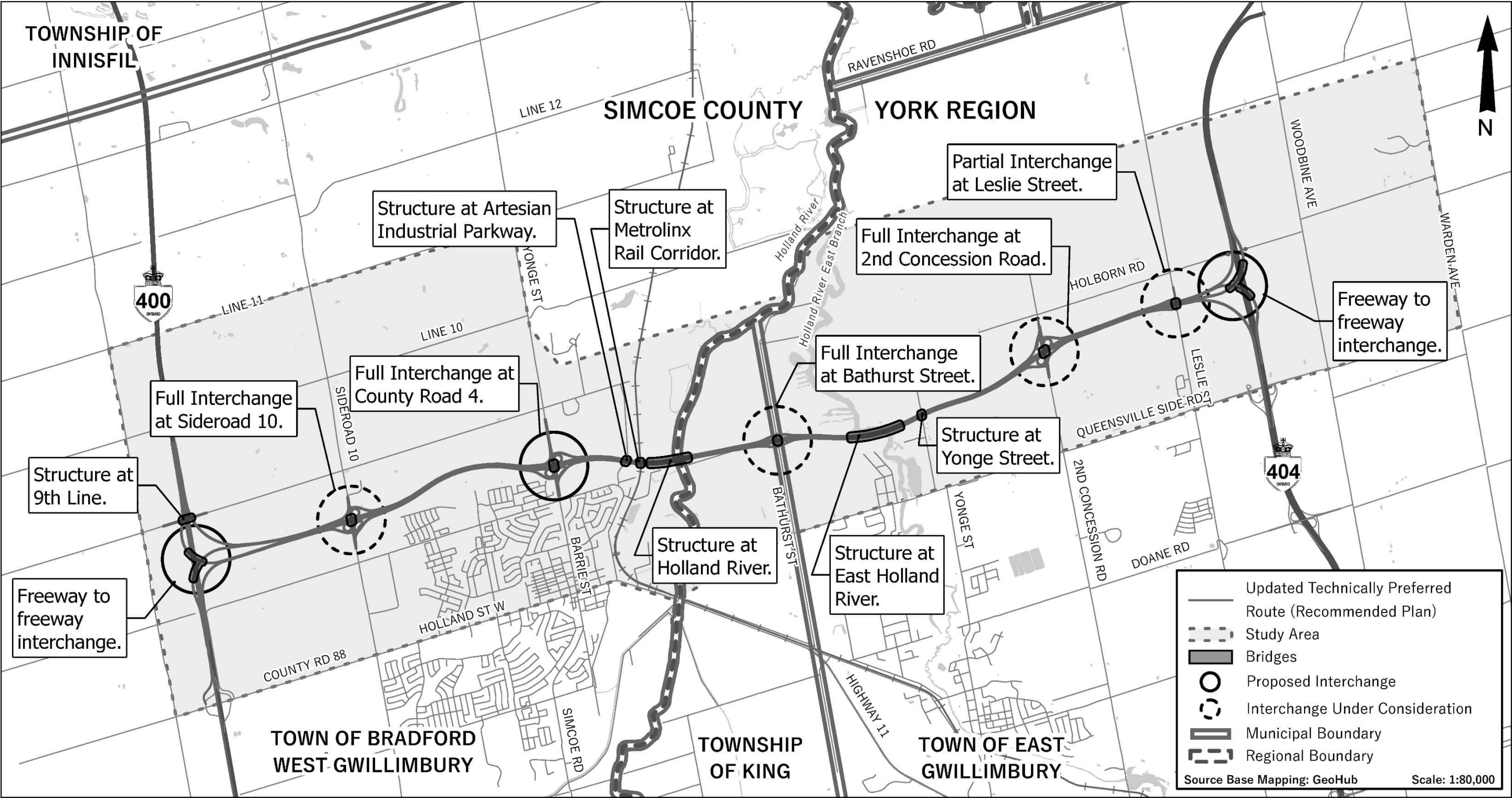


Table 1-2: Study Area Definition by Discipline

Discipline	Study Area Definition Approach
Terrestrial Ecosystems	The Terrestrial Ecosystems Study Area includes the Bradford Bypass 100-metre right-of-way and an additional 120 metre buffer to allow for the identification of adjacent lands as defined by the Natural Heritage Reference Manual (Ministry of Natural Resources and Forestry, 2010). Additional desktop analysis was completed for areas within 120 metres of the general Bradford Bypass Study Area.
Fish and Fish Habitat	The Fish and Fish Habitat Study Area includes the Bradford Bypass right-of-way and a 200-metre buffer downstream and 50 metre buffer upstream. This buffer was developed in accordance with the <i>Pilot Ministry of Transportation/Fisheries and Ocean’s Canada/Ministry of Natural Resources and Forestry Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 4</i> (2020), to assess water features detected through background review and field investigations.
Stormwater and Drainage	The Stormwater and Drainage Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer to assess the existing drainage systems, and propose a stormwater management strategy.
Groundwater	The Groundwater and Hydrogeology Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer to assess physical, geological, and hydrogeological settings.
Water Well Survey	The Water Well Survey Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer to assess private water wells and determine existing water quality and quantity of each property that may be impacted by the project.
Hydrogeology	The Hydrogeology Study Area includes the Bradford Bypass right-of-way to provide a technical assessment and characterization of local geological and hydrogeological conditions, and complete groundwater level monitoring, single well response testing, and groundwater quality sampling for monitoring wells installed in areas of proposed excavation that may be impacted by the project.
Fluvial Geomorphology	The Fluvial Geomorphology Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer. This buffer was developed to include the reaches upstream and downstream of the proposed crossings that may be impacted by the project.
Erosion and Sedimentation	The Erosion and Sedimentation Study Area included the Bradford Bypass right-of-way and a 500-metre buffer to assess the erosion potential where the project will take place.
Land Use and Property	The Land Use and Property Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer. This buffer was developed to identify all lands that are anticipated to be impacted by the project.
Agriculture	The Agriculture Study Area includes the Bradford Bypass right-of-way a 500-metre buffer. This buffer was developed from a variety of data sources, land use official plans and policies, zoning by-laws and other guidelines to characterize the agricultural community and the assessment of impacts both on and in the immediate vicinity of the Bradford Bypass.
Noise and Vibration	The Noise and Vibration Study Area is defined in the Ministry Guide as the area of investigation. The Study Area limits are defined as the area within 600 metres perpendicular to the edge of pavement, extending longitudinally 100 metres along the alignment from end of project pavement.
Air Quality	The Air Quality Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer. This buffer was developed in accordance with the Ministry’s Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions for Provincial Transportation Projects (2020), and to accommodate for the distance within which air quality contaminants from roadways are most likely to be dispersed.
Contamination, Waste and Excess Materials	The Contamination, Waste and Excess Materials Study Area consists of the Bradford Bypass right-of-way and a 500-metre buffer. This buffer was developed to identify and review properties/areas with actual or potential site contamination that may impact future phases of the project.
Climate Change	The Climate Change Study Area includes the Bradford Bypass right-of-way, and was developed based on the Considering Climate Change in the Environmental Assessment Process (Climate Change guide) (Ministry of the Environment, Conservation and Parks, 2017)).
Human Health	The Human Health Scoping Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer. This buffer was developed to capture air quality impacts from diverting traffic loads from municipalities within the right-of-way, and major highways and roads within and close proximity to the right-of-way.
Snowdrift	The Snowdrift Study Area included the Bradford Bypass right-of-way and a three-to-four kilometre distance of fetch to account for the potential snow transport during strong winds.
Landscaping	The Landscaping Study Area includes the Bradford Bypass right-of-way and a 500-metre buffer to identify opportunities to mitigate impacts and/or restore the landscape conditions, where possible, to pre-disturbed conditions for areas affected by the introduction of the proposed Bradford Bypass.
Archaeology	The Stage 1 Archaeological Assessment includes the Bradford Bypass right-of-way and a 500-metre buffer. Following the Stage 1 Archaeological Assessment, the Archaeology Study Area has been further defined, and Stage 2, Stage 3 and potential Stage 4 Archaeological Assessments will be based on the Ministry’s right-of-way.
Built Heritage Resources and Cultural Heritage Landscapes	The Cultural Heritage Study Area includes a Bradford Bypass right-of-way and a 50-metre buffer. The 50-metre buffer was added to either side of the Technically Preferred Route based on an understanding of potential indirect impacts, including the potential for vibration impacts associated with the construction activities and the transportation of construction materials and personnel. The use of a 50-metre buffer was determined to encompass a wide enough buffer zone to define the distance at which there may be potential for indirect impacts resulting from the project.

1.4 Study Process

1.4.1 Ontario Regulation 697/21: Bradford Bypass Project

The project is being assessed in accordance with Ontario Regulation 697/21. The Regulation provides a defined framework for the proponent (the Ministry) to conduct the assessment and decision-making surrounding the potential natural environment, social and economic environment, cultural environment, and engineering impacts of the Bradford Bypass.

The Regulation includes provisions for engagement and consultation with the public, Regulatory Agencies, and Indigenous communities, in addition to the preparation of an Early Works Report, Environmental Conditions Report, and plans for noise, Stage 3 archaeological assessment, stormwater management, groundwater protection and well monitoring, and environmental impact assessment technical discipline reporting.

The Ministry is required to complete all regulatory requirements, such as carrying out engagement and consultation, conducting environmental studies and obtaining permits and approvals for the project. The Regulation does not change the purpose or requirement for completing environmental studies for the project.

The Regulation relieves the Ministry from the requirement to fulfill Condition 4 of the 2002 Approved Environmental Assessment Notice of Approval to prepare a Transportation Environmental Study Report for the Preliminary Design and a Design and Construction Report(s) for the Detail Design of the Bradford Bypass.

As part of the Preliminary Design, the Ministry has undertaken an independent Value Engineering Study in 2022. The Value Engineering Study is an important part of the overall study process, and resulted in refinements to the alternatives that best achieved a balance between cost and benefit while taking into consideration impacts to the environment. The Value Engineering Study reviewed various facets including alignments, freeway interchanges, sideroad interchanges and configurations, and spans over waterways. The decisions resulting from the Value Engineering Study incorporated into the Preliminary Design Study are as follows:

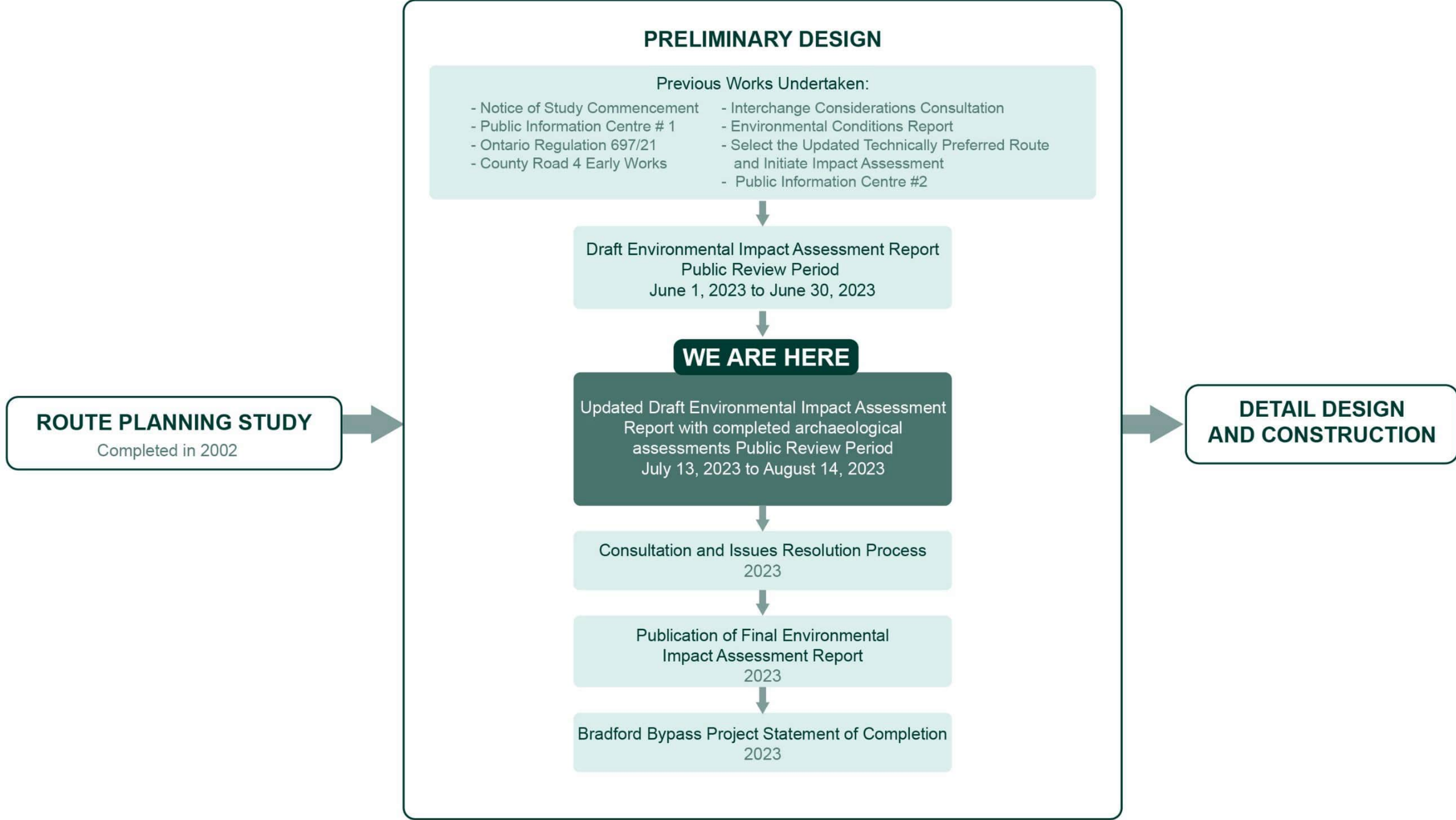
- Include an overpass at 2nd Concession Road
- Include an underpass at 10th Sideroad
- Do not preclude an underpass for the Professor Day Drive extension (future Town of Bradford West Gwillimbury initiative)
- Include an overpass at Bathurst Street

- Include recommended improvements to vertical grades and vertical crest curves (k-values)
- Lower the Bradford Bypass profile in the vicinity of Leslie Street, and
- Combine redundant culverts under the Bradford Bypass at Leslie Street (with Environmental and Technical considerations being met).

The details have been incorporated into the Updated Technically Preferred Route and are summarized in **Section 4** of this Report.

The study process is shown in **Figure 1-2**. Please note that the project timeline noted below is subject to change and will be updated throughout the project, as required.

Figure 1-2: Bradford Bypass Project Study Process



1.4.2 Environmental Impact Assessment Report

1.4.2.1 Draft Environmental Impact Assessment Report

This Report was prepared to satisfy the requirements of Section 20 of the Regulation. This Report builds upon the Final Environmental Conditions Report (AECOM, 2022) and summarizes the environmental impact assessment within the Study Area. The purpose of this Report is to document the evaluation of alternatives considered for this project, present the Updated Technically Preferred Route (Recommended Plan), and document the environmental impacts, proposed mitigation measures and environmental commitments. A description of mitigation measures and monitoring activities is outlined in **Section 5** of this Report and will be carried forward and updated as project planning progresses to subsequent Detail Design phases. A list of any municipal, provincial, federal, or other permits and approvals, applicable legislative frameworks that may be required for the project is summarized in **Section 6**. This list will be updated in subsequent phases as the project progresses, or where there is a change in legislative requirements.

A summary of engagement and consultation carried out with Indigenous communities, Regulatory Agencies and key stakeholders is provided in **Section 7**, along with commitments to further consultation throughout the completion of Detail Design and Construction.

The Draft Environmental Impact Assessment Report was made available to the public, technical stakeholders, elected officials, Indigenous communities, and other interested persons for review on the Project Website from June 1, 2023 to June 30, 2023.

Additional archaeological investigations have been completed to finalize the impact assessments in accordance with Ontario Regulation 697/21 and are included in this Updated Draft Environmental Impact Assessment Report.

The Updated Draft Environmental Impact Assessment Report with completed archaeological studies is available for review on the Project Website from **July 13, 2023**, until **August 14, 2023**. Indigenous communities, interested persons and key stakeholders are encouraged to visit the Project Website (www.BradfordBypass.ca/consultation/) or contact the Project Team by phone or email as listed below to participate in the consultation for the Draft Environmental Impact Assessment Report in accordance with the Regulation Section 26:

- **Website:** www.BradfordBypass.ca/consultation/
- **Email:** ProjectTeam@BradfordBypass.ca
- **Toll-Free Number:** 1-877-247-6036

Anyone with accessibility requirements who would like to participate in this project is encouraged to contact the Project Team as listed above.

Comments will be collected to assist the Ministry in meeting the requirements of the Regulation. This material will be maintained on file for use during the project and may be included in project documentation. Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31. With the exception of personal information, all comments will become part of the public record.

1.4.2.2 Consultation and Issues Resolution Process for the Draft Environmental Impact Assessment Report

Consultation was initially carried out for this project under the Ministry's Class Environmental Assessment for Provincial Transportation Facilities, Group 'A' project. As the Regulation is now in force, the consultation process has been updated to meet the requirements of the Regulation. Further details on the consultation process are summarized in **Section 7** of this Report.

The Notice of Publication of the Draft Environmental Impact Assessment Report was published in the Bradford West Gwillimbury Topic and East Gwillimbury Express newspapers on May 25, 2023. The Notice was also distributed to the Project Contact List through email and admail delivery on May 25, 2023 and posted to the Project Website on June 1, 2023. This broad distribution of notifications is deemed appropriate to promptly bring the notice to the attention of interested persons in the Study Area and is consistent with previous project notifications.

Additional archaeological investigations have been completed to finalize the impact assessments in accordance with Ontario Regulation 697/21 and are included in this Updated Draft Environmental Impact Assessment Report.

The Notice of Publication of the Updated Draft Environmental Assessment Report with completed archaeological studies was issued to the public on **July 6, 2023** through a variety of media (Project Website, registered mail, newspapers, and mail drop via Canada Post to nearby addresses). The Updated Draft Environmental Impact Assessment Report is available for public review on the Project Website from **July 13, 2023**, until **August 14, 2023**.

In accordance with Section 26(1) of the Regulation, the Ministry has undertaken engagement and consultation with Indigenous communities and interested persons throughout the project. As required by section 26(4) of the Regulation, the Final Environmental Impact Assessment Report will include a description of the concerns

raised by Indigenous communities and interested persons in the issues resolution process and the outcome of the process.

1.4.2.3 Final Environmental Impact Assessment Report

Upon completion of consultation and the issues resolution process on the Draft Environmental Impact Assessment Report, the Ministry will update the Draft Environmental Impact Assessment Report to include a description of concerns raised by Indigenous communities and interested persons; a description of what actions may be undertaken with respect to the concerns raised; and include a description of any changes to the Draft Environmental Impact Assessment Report as a result of addressing these concerns (**Section 7**). The updated Environmental Impact Assessment Report will then be issued as Final in accordance with Section 27 of the Regulation. A Notice of Publication of the Final Environmental Impact Assessment Report will be distributed in the same manner as the Notice of Publication of the Draft Environmental Impact Assessment Report and the Notice of Publication of the Updated Draft Environmental Impact Assessment Report. The Final Environmental Impact Assessment Report will be published on the Project Website.

1.4.3 Contents of the Environmental Impact Assessment Report

This Report has been completed in accordance with Section 20(2) of the Regulation and contains the information outlined in **Table 1-3**.

Table 1-3: Draft Environmental Impact Assessment Report Contents per Ontario Regulation 697/21: Bradford Bypass Project

Regulation Section	Requirement	Report Section
Section 20(2)(1)	A statement of the purpose of the Bradford Bypass Project and a summary of background information relating to the Bradford Bypass Project.	Section 1
Section 20(2)(2)	The final description of the updated technically preferred route from the environmental conditions report and from the Class Environmental Assessment process, if applicable, in accordance with clause 16 (3) (b).	Section 4
Section 20(2)(3)	The assessment and comparison of at least two potential alternative alignment options for the Bradford Bypass Project that are within the updated technically preferred route as set out in paragraph 2, and the selection of a preferred alignment.	Section 3
Section 20(2)(4)	A map showing the preferred alignment and the updated technically preferred route.	Section 1 and Section 4
Section 20(2)(5)	A description of the local environmental conditions at the updated technically preferred route.	Section 2
Section 20(2)(6)	The assessment and comparison of at least two potential alternatives to the design options for each of the components of the preferred alignment for the Bradford Bypass Project, and a selection of the preferred design from those options, taking into account the comparisons.	Section 3
Section 20(2)(7)	A description of all studies, including the studies set out in sections 21 to 24, undertaken in relation to the Bradford Bypass Project, which must set out, <ul style="list-style-type: none">i. a summary of all data collected or reviewed, andii. a summary of all results and conclusions.	Section 5
Section 20(2)(8)	The proponent's assessment and evaluation of the impacts that the preferred alignment and preferred design for the Bradford Bypass Project might have on the environment, and the proponent's criteria for assessment and evaluation of those impacts.	Section 5
Section 20(2)(9)	A description of any measures proposed by the proponent for mitigating any negative impacts that the preferred alignment and preferred design for the Bradford Bypass Project might have on the environment.	Section 5
Section 20(2)(10)	A description of the means the proponent proposes to use to monitor and verify the effectiveness of the mitigation measures proposed under paragraph 9, including a plan to make the results of the monitoring and verification available on the Project website.	Section 5
Section 20(2)(11)	A description of any municipal, provincial, federal or other approvals or permits that may be required for the Bradford Bypass Project.	Section 6
Section 20(2)(12)	A consultation record, including, <ul style="list-style-type: none">■ a description of the consultations carried out with Indigenous communities, in accordance with the Indigenous Consultation Plan prepared under section 15, and with other interested persons,■ a list of the Indigenous communities and interested persons who participated in the consultations,■ summaries of the comments submitted by Indigenous communities and interested persons,■ a summary of discussions that the proponent had with Indigenous communities, and copies of all written comments submitted by Indigenous communities,■ a description of what the proponent did to respond to concerns expressed by Indigenous communities and interested persons, and■ any commitments made by the proponent to Indigenous communities and interested persons in respect of the Bradford Bypass Project.	Section 7

1.5 Regulatory Context

1.5.1 Ontario Regulation 697/21: Bradford Bypass Project

On October 7, 2021, Ontario Regulation 697/21 came into effect. As outlined in **Section 1.4.1** the Regulation provides a streamlined assessment process while ensuring continued engagement and consultation with government agencies, Indigenous communities, and members of the public throughout the project.

1.5.2 Provincial Planning

This section provides an overview of provincial policy documents that guide land use, growth, infrastructure planning, trade, tourism and recreation, and environmental protection. The following provincial plans are considered to be applicable to the project.

1.5.2.1 A Place to Grow: Growth Plan for the Greater Golden Horseshoe

A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2020 (Growth Plan) is a long-term plan for Ontario designed to promote economic growth, increase housing supply, create jobs, and build communities that make life easier, healthier, and more affordable for people of all ages. As one of the most dynamic and fast-growing regions in North America, the Greater Golden Horseshoe is a designation for many people and businesses relocating from other parts of Canada and around the world. To accommodate such growth, the plan provides a framework to guide and prioritize infrastructure planning and investments in the Greater Golden Horseshoe, including transportation system planning for moving people and moving goods, to support and accommodate forecasted growth to 2051 and beyond (Province of Ontario, 2020).

The infrastructure framework in the Growth Plan requires that municipalities undertake an integrated approach to land use planning, infrastructure investments, and environmental protection to achieve the outcomes of the Growth Plan.

The Growth Plan supports the planned corridors which are required to meet projected needs, and are identified through the Growth Plan, preferred alignment(s) determined through the Provincial Environmental Assessment Act processes; or identified through planning studies where the Ministry is actively pursuing the identification of a corridor. The Growth Plan policy dictates that in planning for the development of planned corridors and supporting facilities, the Province, other Regulatory Agencies, and municipalities will consider increased opportunities for moving people and goods by rail; separation of modes within corridors; and provide opportunities for inter-modal linkages. The Growth Plan calls for the long-term protection of planned corridors and the co-location of infrastructure in these corridors, where appropriate (Province of Ontario, 2020).

The 2002 Approved Environmental Assessment for the Bradford Bypass is identified on the Growth Plan Schedule 2 – A Place to Grow Concept as ‘Highway Extension’ that crosses the lands designated as Greenfield Area and Greenbelt Area. The Growth Plan defines the ‘Designated Greenfield Area’ as lands within settlement areas but outside of delineated built-up areas that have been designated in an official plan for development and are required to accommodate forecasted growth to the horizon of the Growth Plan. The ‘Greenbelt Area’ is defined as the geographic area identified in Ontario Regulation 59/05 under the Greenbelt Act, 2005.

1.5.2.2 Provincial Policy Statement

The Provincial Policy Statement, 2020 is issued under Section 3 of the Planning Act and provides policy direction on matters related to land use planning and development. The Provincial Policy Statement is premised upon the efficient use of land and infrastructure, the protection of environmental resources, and ensuring sufficient land is available for the development of future employment and residential uses.

Of relevance to the Study Area are policies that relate to transportation systems and infrastructure, long-term economic prosperity, and the protection of natural, cultural, and built heritage. In particular, the Provincial Policy Statement promotes:

- Healthy and active communities by facilitating active transportation and community connectivity (Provincial Policy Statement, 2020, Section 1.5.1)
- The planning for and protection of transportation infrastructure and transit to meet current and projected needs (Provincial Policy Statement, 2020, Section 1.6.8.1)
- Providing safe, energy efficient, integrated, and reliable multimodal transportation systems which facilitate the movement of people and appropriately address projected needs (Provincial Policy Statement, 2020, Section 1.6.7)
- Maintaining or restoring the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems (Provincial Policy Statement, 2020, Section 2.1.2)
- Restricting development and site alteration in, or adjacent to, significant wetlands, woodlands, valley lands, wildlife habitat, and Areas of Natural and Scientific Interest, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions (Provincial Policy Statement, 2020, Sections 2.1.4 and 2.1.5)
- Restricting development and site alteration in habitat of endangered or threatened species except in accordance with Provincial and Federal requirements (Provincial Policy Statement, 2020, Section 2.1.7)

- Restricting development and site alteration in or near sensitive surface or groundwater features such that their features and related hydrological functions will be protected, improved, or restored (Provincial Policy Statement, 2020, Section 2.2.2)
- Conservation of significant built heritage resources and significant cultural heritage landscapes (Provincial Policy Statement, 2020, Section 2.6.1)
- Restricting development and site alteration on lands containing archaeological resources or areas of archaeological potential unless significant archaeological resources have been conserved (Provincial Policy Statement, 2020, Section 2.6.2)
- Restricting development and site alteration on adjacent lands to protected heritage properties, except where the proposed development and site alteration has been evaluated and demonstrated that the heritage attributes will be conserved (Provincial Policy Statement, 2020, Section 2.6.3)
- Promotion of archaeological management plans and cultural plans (Provincial Policy Statement, 2020, Section 2.6.4), and
- Engagement with Indigenous communities and consideration of their interests when identifying, protecting, and managing cultural heritage and archaeological resources (Provincial Policy Statement, 2020, Section 2.6.5).

The Bradford Bypass is consistent with the objectives of the Provincial Policy Statement as it supports the expansion and optimization of a multi-modal transportation system that provides connectivity to existing local and regional transportation infrastructure and supports long-term economic prosperity. The Bradford Bypass will also support areas that are planned for residential and employment growth.

1.5.2.3 Greenbelt Plan 2017

The Greenbelt Plan, 2017, identifies where urbanization should not occur in order to provide permanent protection to the agricultural land base and the ecological and hydrological features, areas, and functions occurring within the Greater Golden Horseshoe landscape (Province of Ontario, 2017). The Greenbelt Plan was introduced in 2005 under the Greenbelt Act, 2005, and includes lands within, and builds upon the ecological protections provided by, the Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan. The Greenbelt Plan, together with the Growth Plan, builds on the Provincial Policy Statement to establish a land use planning framework for the Greater Golden Horseshoe that supports a thriving economy, a clean healthy environment, and social equity (Province of Ontario, 2017).

The Bradford Bypass is located on lands within the Greenbelt Plan 2017; however, the project is permitted under the provisions for infrastructure expansion outlined in Section 4.2.1 of the Greenbelt Plan, 2017, as the project serves the significant growth and economic development expected in southern Ontario (Greenbelt Plan, 2017).

1.5.2.4 Lake Simcoe Protection Plan

The Lake Simcoe Protection Plan was prepared with the objective of protecting, improving and restoring the elements that contribute to the ecological health of the Lake Simcoe watershed (Province of Ontario, 2009). The Plan outlines actions to address the most critical issues affecting the health of the Lake Simcoe including:

- Restoring the health of aquatic life within the Lake Simcoe watershed
- Improving water quality, including loadings of phosphorous to the lake
- Maintaining water quantity
- Improving the health of the ecosystem by protecting and rehabilitating important areas, such as shorelines and natural heritage, and
- Addressing impacts of invasive species, climate change, and recreational activities.

The Lake Simcoe Protection Plan was approved on June 2, 2009, under the Lake Simcoe Protection Act (Province of Ontario, 2009). The Bradford Bypass Study Area traverses through lands within the Lake Simcoe Watershed. The Lake Simcoe Protection Plan contains policies regarding fish and fish habitat, water quality and quantity, stormwater management, and terrestrial ecosystems for development projects within the Lake Simcoe Watershed.

1.5.3 Federal Impact Assessment

In June 2019, the Government of Canada released the Impact Assessment Act, providing an outline for the federal assessment of impacts of major projects and projects on federal lands within Canada. The Impact Assessment Act provides a five-phase process to assessing projects subject to the Impact Assessment Act:

- Planning
- Impact Statement
- Impact Assessment
- Decision-Making, and
- Post Decision.

Projects that meet the definition of designated projects under the Physical Activities Regulations (SOR/2019-285) of the Impact Assessment Act are subject to the Impact Assessment Act.

The Ministry reviewed the Physical Activities Regulations (SOR/2019-285) under the Impact Assessment Act in order to reconfirm the applicability and requirements pertaining to the Bradford Bypass. The Ministry considered the applicability of the Bradford Bypass as a 'Designated Project' pursuant to the Impact Assessment Act. Specifically, Section 51 of the Physical Activities Regulations deems the Impact Assessment Act applies to, "The construction, operation, decommissioning and abandonment of a new all-season public highway that requires a total of 75 kilometres or more of new right-of-way." Section 51 of the Physical Activities Regulations does not apply to the Bradford Bypass as it involves less than 75 kilometres or more of new right-of-way.

The following were also considered in the determination of the Bradford Bypass being subject to the criteria of a Designated Project per the Impact Assessment Act:

- The Updated Technically Preferred Route does not impact or impede on federal lands
- The Updated Technically Preferred Route is not located within a Wildlife Area as defined in the Wildlife Area Regulations
- The Updated Technically Preferred Route is not located within a Marine Conservation Area
- The Updated Technically Preferred Route is not located in a migratory bird sanctuary, as defined in the Migratory Bird Sanctuary Regulations, and
- The Updated Technically Preferred Route is not located on land administered by Parks Canada.

Per review of the applicability of Section 51 of the Physical Activities Regulations and other considerations, the Bradford Bypass does not meet the criteria for a defined 'Designated Project' and, therefore it is not subject to Federal Impact Assessment requirements per the Impact Assessment Act. The Ministry acknowledges that under subsection 9(1) of Impact Assessment Act, the federal Minister of Environment and Climate Change may, by order, designate a physical activity that is not prescribed in the Physical Activities Regulations.

It should also be noted that potential impacts of the project within federal jurisdiction are limited and will be managed through the project-specific assessment of environmental impacts, and federal permits and approvals will be obtained as required. The management and consideration of federal jurisdiction and approvals was initiated during the Route Planning Study as part of the 2002 Approved Environmental Assessment. A

comprehensive engagement and consultation program with local community members, Indigenous communities, municipalities, and stakeholders has been underway since initiation of the Preliminary Design study in 2020 and will continue through project implementation. The Ministry is actively addressing feedback from Indigenous communities and interested persons and will continue to do so throughout the project lifecycle.

1.5.3.1 Impact Assessment Agency of Canada Designation Request and Minister's Decision

In February 2021, the Minister of Environment and Climate Change received a request to designate the Bradford Bypass under subsection 9(1) of the Impact Assessment Act. Under subsection 9(1) of the Impact Assessment Act, the Minister may, by order, designate a physical activity that is not prescribed in the Physical Activities Regulations. The Minister may do this if, in the Minister's opinion, the physical activity may cause adverse effects within federal jurisdiction or adverse direct or incidental effects (resulting from federal decisions), or public concerns related to those effects that warrant the designation. The Ministry reviewed the project in line with the request, responded in March 2021, and posted the responses on the Project Website. In May 2021, the Minister of the Environment and Climate Change determined that the Bradford Bypass proposed by the Ministry does not warrant designation under the Impact Assessment Act and issued the following statement (Government of Canada, 2021):

"The Minister of Environment and Climate Change has considered the potential for the Project to cause adverse effects within federal jurisdiction, adverse direct or incidental effects, public concern related to these effects, as well as adverse impacts on the Aboriginal and treaty rights of the Indigenous peoples of Canada. The Minister also considered the analysis of the Impact Assessment Agency of Canada.

The Minister has reached the decision that the designation of the Project is unwarranted for the following reasons:

- the regulatory review processes that apply to the Project and related consultations with Indigenous peoples provide a framework to address the potential adverse aforementioned effects and public concerns raised in relation to those effects. These include:
 - provincial approvals and permits pursuant to the Environmental Assessment Act, Endangered Species Act, Environmental Protection Act, Ontario Heritage Act, Ontario Water Resources Act, and Safe Drinking Water Act.
 - the Project must comply with relevant provisions of federal legislation, including the Canadian Navigable Waters Act, the Fisheries Act, and the Explosives Act."

The May 2021 decision was upheld in February 2022, following a further request for the project to be reviewed under the Federal Impact Assessment Act. The response on February 11, 2022, from the Impact Assessment Agency of Canada stated that since there are no material changes to the project, there is no basis for the Minister to revise the former Minister's determination. The Bradford Bypass is a non-designated project.

1.5.4 Planning Policies

The Province of Ontario, the County of Simcoe, Regional Municipality of York, Town of Bradford West Gwillimbury, Town of East Gwillimbury and King Township have plans and policies which are relevant to the development of the project. These plans and policies serve as important elements of the planning framework and provide insight into key provincial and municipal objectives, while encouraging strategic transportation development.

The following sections provide an overview of the planning policies relevant to the project.

1.5.4.1 Municipal Planning

1.5.4.1.1 County of Simcoe Official Plan, 2008 (Office Consolidation 2016)

The Official Plan for the County, 2016, is prepared under the Planning Act. The final consolidated text for the Official Plan was approved for the County by the Ontario Municipal Board in December 2016. This Official Plan provides a policy context for land use planning taking into consideration the economic, social, and environmental impacts of land use and development decisions within the County.

The County is expecting continued population growth to the year 2031. Population within the County is projected to increase by 53%, from 272,000 (County of Simcoe, 2016) to 416,000 in 2031.

It is the County's policy that land use planning and development decisions within the County shall be integrated with transportation considerations. The County, along with local municipalities, plan for infrastructure corridors and right-of-way to meet current and projected needs. Where development in 'Planned Corridors' could preclude or negatively affect the use of the corridor for the purposes for which it was identified, the development shall not be permitted. The County will encourage and support the planning, corridor and connectivity protection and the early construction of Provincial Planned Corridors, as a goods movement and transit corridor. The Bradford Bypass has been identified as 'Potential Provincial Corridor' in Schedule 5.5.2 of the Official Plan - Future County Transportation System.

The Bradford Bypass traverses the lands designated as Settlements Area, Agricultural Lands, Greenlands, Highway 400 Employment lands and the Protected Countryside in the Greenbelt Plan. The Official Plan states that where feasible and subject to local municipal policies and By-Laws, infrastructure may be located in any designation of the Official Plan, subject to the requirements of the Greenbelt Plan where applicable, and applicable provincial and federal policy and legislation. Lot creation for infrastructure in the Agricultural designation is discouraged and should only be permitted where the use cannot be accommodated through an easement or right-of-way.

1.5.4.1.2 County of Simcoe Transportation Master Plan, 2014

The County has emerged as a key growth area in the outer ring municipalities surrounding the Greater Toronto and Hamilton Area. Not only is the demand for growth a major challenge facing the County's transportation system, but the recreational communities within and just to the north and west of the County dramatically increase the travel demands on the weekends and particularly during the summer months (County of Simcoe, 2014).

Since the completion of the County's Transportation Master Plan, the County and its local municipalities continue to experience growth in employment and tourism, as well as seasonal and year-round residents. The Transportation Master Plan provided a fundamental framework for the County's planned transportation corridors and systems.

According to the Transportation Master Plan, increasing the supply of transportation infrastructure and services and construction of new transportation facilities will be a strategy direction to address the transportation challenges facing the County. The Transportation Master Plan also refers to the information gathered from the public survey which indicated that 86% of the respondents supported the idea of working with the provincial government to complete new highways, including the Bradford Bypass. In support of implementation, phasing and monitoring of the key Transportation Master Plan strategies, Transportation Master Plan recommended that the County should engage in discussions with the Ministry to move forward in the construction of the Bradford Bypass. Protection of lands for this facility should persist and implementation of a facility in this corridor should continue to be a high priority for the County and the Province as it has been identified as a near-term need to accommodate growth and to facilitate goods movement and future transit movements.

The Transportation Master Plan was updated in 2014 to proceed toward an integrated transportation network with additional focus on transit services and nodes, active transportation amenities, as well as a review of County road design standards, cross-sections, and right-of-way widths. It has been assumed in the updated Transportation Master Plan that the Bradford Bypass will be constructed.

2021 Transportation Master Plan Update

Simcoe County initiated a Transportation Master Plan Update in February 2021, which is currently in Phase 2 of a four-stage study process (County of Simcoe, 2021).

According to the County's website (<https://www.simcoe.ca/dpt/pln/tmp>), the Transportation Master Plan update will:

- Develop a forward-looking plan for the County and expand the multi-modality of the transportation system including driving, transit, cycling, walking and movement of commercial vehicles
- Identify appropriate infrastructure to support and manage growth and address the needs and priorities of both rural and urban communities
- Develop complementary transportation solutions informed by supporting provincial and local policies including the Official Plan update, and
- Provide recommendations on managing a multi-modal transportation system, improving safety, and supporting the development of healthy communities.

The intention of the update is to identify potential transportation improvements for all modes of travel: driving, transit, cycling, walking and goods movement. Updating the Transportation Master Plan will help support the County of Simcoe's vision for its future transportation system and ensure that current issues and growth are responded to with an increased focus on transit, active transportation and the environment.

On October 5, 2021, the County released Phase I of the Transportation Master Plan update. As the County continues to experience population growth and urbanization, this update provides an opportunity to realign transportation policy and investment directions to best meet the varied transportation needs, by considering all modes of travel (County of Simcoe, 2021). The strategic direction for the Transportation Master Plan update consists of three components: the transportation Vision Statement, Goals, and Guiding Principles. The Vision Statement is as follows:

"A safe, efficient and accessible multi-modal transportation system that responds to the County's vast geography, provides the connectivity needed for its growing and changing populations and businesses, and supports community and environmental health."

The Goals follow from and break down the Vision Statement into a set of specific desired outcomes. Specific goals that the Bradford Bypass addresses include providing efficient and safe travel between County communities and to adjacent municipalities via the County road network and supporting the local economy by enabling efficient movement of goods and commercial vehicles.

The Guiding Principles overarch the Vision Statement and act as building blocks for the development of the Transportation Master Plan update. Guiding principles that the construction of the Bradford Bypass addresses include:

- Establishing an efficient and integrated multi-modal transportation network
- Supporting safe and reliable movement of people and goods, and
- Integrative transportation and land use planning.

The Bradford Bypass is a future infrastructure expansion project that will have significant impacts on local roads in Bradford West Gwillimbury and provide placemaking opportunities as a result of reduced traffic (County of Simcoe, 2021). The Bradford Bypass is expected to accommodate the additional travel demand in the County and may relieve congestion on some County roads (County of Simcoe, 2021). In May 2022, the County held a virtual Public Information Centre. Participants were invited to take part in a public opinion survey and submit feedback and comments. The comments are not currently available for public review.

1.5.4.1.3 Regional Municipality of York Regional Official Plan, 2010

The York Region Official Plan, 2010, is prepared under the Planning Act. A Municipal Comprehensive Review was initiated to inform the update to the 2010 Regional Official Plan (York Region, 2019) to accommodate expected growth to approximately 2.02 million people and 990,000 jobs by 2051. The updated Official Plan will guide the Region's growth to the year 2051 and help ensure the Region is building communities where current and future residents of all abilities and ages can live, work and play (York Region, 2019). The draft Official Plan was presented to York Regional Council on November 11, 2021.

The policies outlined in the Official Plan guide the economic, environment and community building decisions to manage growth within the Region. The Official Plan policies include enhancing mobility systems to connect land use and transportation planning (York Region, 2010). Where development in 'Planned Corridors' could preclude or negatively affect the use of the corridor for the purposes for which it was identified, the development shall not be permitted. The Region will encourage and support the planning, corridor and connectivity protection and the early construction of Provincial Planned Corridors, as a goods movement and transit corridor. The Bradford Bypass has been included in the list of corridors and facilities to be protected by local municipalities and the Province in Schedule 7.2.52 in the Official Plan (York Region, 2010).

1.5.4.1.4 York Region Transportation Master Plan, 2022

York Region has prepared the York Region Transportation Master Plan to outline the long-term vision for York Region's transportation network, considering transportation infrastructure needs to support growth and the changing needs (York Region, 2022). The Transportation Master Plan is reviewed every five years to ensure the regional transportation network meets the needs of all its users. By 2051, York Region's population is expected to grow by over two million residents and nearly one million jobs. The 2022 Transportation Master Plan is designed to support this growth (York Region, 2022). The 2022 Transportation Master Plan was approved by York Regional Council on September 29, 2022. Additionally, the York Region Transportation Master Plan, 2022, has been coordinated to align with the York Region Official Plan and the Water and Wastewater Master Plan (York Region, 2022).

The purpose of the Transportation Master Plan is to guide staff in the planning, building, operating and maintaining of a connected transportation network that is safe, sustainable, efficient, reliable and ready for the future (York Region, 2022). The Region uses an activity-based model to analyze travel demand and forecast the impacts of growth on the network. A 2051 base network model was developed using Regional and provincial plans. Plans for additional rapid transit corridors were considered during the planning process for the 2022 Transportation Master Plan (York Region, 2022). The Bradford Bypass has been included in the list of additional rapid transit corridors to be built by 2051 to support York Region's transportation network in Appendix B of the 2022 Transportation Master Plan.

1.5.4.1.5 Town of Bradford West Gwillimbury Official Plan, 2021

The Town of Bradford West Gwillimbury is strategically located along Highway 400 within the County, between the Town of Newmarket and City of Barrie. New growth is transforming the form and layout of Bradford West Gwillimbury. According to the 2016 Census, the Town of Bradford West Gwillimbury's population and employment numbers were approximately 36,700 persons and 10,000 jobs respectively. Growth projections as contained in the 2017 Growth Plan for the Greater Golden Horseshoe and the County Official Plan (Bradford West Gwillimbury, 2021) state that the Town of Bradford West Gwillimbury's population will reach 50,500 people and 18,000 jobs by the year 2031.

The Bradford West Gwillimbury's Official Plan was adopted by Town Council on March 2, 2021 (Bradford West Gwillimbury, 2021) and is focused on sustainability and establishes policies that have a positive effect on the social, economic, cultural, and natural environment of the Bradford West Gwillimbury. The submission and approval of the 2002 Approved Environmental Assessment document for the Bradford Bypass has

been of particular importance and it is Bradford West Gwillimbury's plan to ensure that development in the vicinity of the highway will be compatible with the functioning of the highway and its access points.

Section 3.11.3 of the Bradford West Gwillimbury Official Plan recognizes the Bradford Bypass corridor and indicates that lands within the Bradford Bypass shall only be permitted to be used for their legal existing purposes. Any expansion of use or building shall require a development application and Ministry permit in accordance with the Public Transportation and Highways Improvement Act to ensure there is no adverse impact on the future corridor. Development proposals adjacent to the Bradford Bypass shall, as part of reviewing the application, consult with the Ministry to ensure all appropriate requirements are met (Bradford West Gwillimbury, 2021).

1.5.4.1.6 Town of Bradford West Gwillimbury Transportation Master Plan, 2022

The Town of Bradford West Gwillimbury has updated their 2022 Transportation Master Plan to consider the future community in terms of population, business growth, residential development, commuter needs and land use plans to determine transportation needs for the community (Town of Bradford West Gwillimbury, no date). The 2022 Transportation Master Plan will lay out a guide for sustainable, efficient and safe movement of goods and people, and serve as an evidence-based tool to guide the congestion reduction initiatives within the Town of Bradford West Gwillimbury (Town of Bradford West Gwillimbury, no date).

The Town of Bradford West Gwillimbury published the Notice of Study Completion for the 2022 Transportation Master Plan on August 9, 2022.

Additionally, Official Plan Amendment No. 17 was adopted by the Town of Bradford West Gwillimbury Council on September 26, 2006, which included a new arterial road at Professor Day Drive north of 8th Line. The Town of Bradford West Gwillimbury completed a Municipal Class Environmental Assessment in 2012 for an extension of Professor Day Drive from 8th Line to the 2002 Technically Preferred Route of the Bradford Bypass.

1.5.4.1.7 Town of East Gwillimbury Official Plan, 2022

The Town of East Gwillimbury is located north of Toronto and consists of the communities of Holland Landing, River Drive Park, Sharon, Queensville and Mount Albert. The Town is expected to grow to a resident population of 90,000 with over 30,000 jobs (Town of East Gwillimbury, 2022).

The Town of East Gwillimbury Official Plan was adopted by Town Council on June 21, 2022. It provides direction and a policy framework for managing growth and land use

decisions until 2051, including long term protection of environmental areas, cultural heritage features, historic community identity and rural countryside (Town of East Gwillimbury, 2022).

Section 5.2.3.4 of the Official Plan classifies the Bradford Bypass as a proposed Provincial Controlled Access Highway, and provides functional characteristics and technical requirements for all Controlled Access Highways:

- Serve inter-regional travel demands including goods movement and heavy transport
- To the satisfaction of the Province or any other authority having jurisdiction
- Shall accommodate active transportation facilities, and
- Carpool lots and commuter facilities to be provided at interchanges.

Section 5.2.3.4 also notes that Schedule 8 of the Official Plan will be reviewed following the completion of the project-specific assessment of environmental impacts for the Bradford Bypass to consider any changes to the road network outlined in Schedule 8. Until this review is completed, it is the intent of the Town of East Gwillimbury Official Plan that the Technically Preferred Route for the Bradford Bypass will be maintained and any actions that would impact the Technically Preferred Route are discouraged (Town of East Gwillimbury, 2022).

1.5.4.1.8 Town of East Gwillimbury Transportation Master Plan, 2010

The Town of East Gwillimbury is currently updating their 2010 Transportation Master Plan. The updated Transportation Master Plan will identify the long-term transportation goals of the Town of East Gwillimbury and identify specific solutions that will require further studies (Town of East Gwillimbury, no date). The updated Transportation Master Plan will include:

- Reviewing the short-term action items identified in the Town of East Gwillimbury's 2010 Master Plan. Then providing an update on the York Region's 2016 Transportation Master Plan and outlining its impacts on the Town of East Gwillimbury
- Assessing the current transportation network
- Identifying gaps and opportunities for all travel modes, including the consideration of provincial, regional, and adjacent municipal plans and emerging transportation trends
- Meeting the requirements of Phases One and Two of the Municipal Class Environmental Assessment process by assessing current travel conditions;

the impacts of growth and defining these issues in a problem and opportunity statement; identifying and evaluating alternative solutions to address the problem and opportunity statement; and selecting a preferred alternative for a sustainable, multimodal transportation network that decreases auto dependency and is accessible to all

- Reaching out to the public and stakeholders through public engagement process
- Identifying policies that support the recommended multimodal network
- Manage travel demand in peak periods. Including Travel Demand Management. Transit-oriented development policies, traffic safety and calming and community-oriented traffic control policies
- Establishing detailed action, implementation and monitoring plans for transportation network initiatives that are carried through to a “project ready” mode, and
- Provide input to the Town’s Official Plan and Development Charges Background Study.

1.5.4.1.9 Township of King Official Plan, 2019

The Township of King is located within York Region, just north of the Greater Toronto Area consisting of the villages of King City, Nobleton and Schomberg. The Township of King Official Plan establishes a policy framework that accommodates expected population growth to 34,900 by the year 2031 (Township of King, 2019). The Township of King Official Plan establishes a comprehensive set of policies to guide growth and development, land use, environmental conservation and restoration, advance economic development activities, promote heritage conservation, and guide infrastructure, while emphasizing the Townships unique character and heritage (Township of King Official Plan, 2019).

Section 8.5.4 of the Official Plan states that any expansion of use or building shall require a development application and Ministry permit in accordance with the Public Transportation and Highways Improvement Act to ensure there is no adverse impact on the future Bradford Bypass corridor. Development proposals adjacent to the Bradford Bypass shall, as part of reviewing the application, consult with the Ministry to ensure all appropriate requirements are met (Township of King, 2019).

1.5.4.1.10 King Township Transportation Master Plan, 2020

King Township updated their 2015 Transportation Master Plan to reflect continued growth in its communities, changes to policies across multiple levels of government, and

to continue to be responsive to travel needs within King Township by a variety of modes of transportation (King Township, 2020). The purpose of the Transportation Master Plan update was to incorporate updated population and employment forecasts to the year 2031.

The objectives of the updated Transportation Master Plan are to:

- Plan transportation infrastructure that accommodates all users of all abilities
- Promote alternative modes of transportation to the private vehicle to address the impacts on climate change
- Create sustainable and comfortable streets that are safe for pedestrians and cyclists, and
- Provide a road classification system to guide future planning and capital works.

2. Environmental Conditions and Engineering Studies

In accordance with Section 20(2)5 of the Regulation, this section describes the natural, socio-economic, and cultural aspects of the existing environment present within the Study Area. The purpose of characterizing the existing environmental conditions is to establish a baseline condition to use for the assessment of preliminary potential impacts and proposed mitigation measures, described in **Section 5**.

Information on the following environmental components is provided in the sections below and, where applicable, is supplemented with supporting detailed technical reports and/or data (under separate cover):

Natural Environment: Section 2.1

- Terrestrial ecosystems: **Section 2.1.1**
- Fish and fish habitat: **Section 2.1.2**
- Stormwater and drainage: **Section 2.1.3**
- Groundwater and hydrogeology: **Section 2.1.4**
- Fluvial geomorphology: **Section 2.1.5**, and
- Erosion and sedimentation risk overview assessment: **Section 2.1.6**.

Social and Economic Environment: Section 2.2

- Land use and property: **Section 2.2.1**
- Agriculture: **Section 2.2.2**
- Noise and vibration: **Section 2.2.3**
- Air quality: **Section 2.2.4**
- Contamination, waste, and excess materials management: **Section 2.2.5**
- Climate change: **Section 2.2.6**
- Human health: **Section 2.2.7**, and
- Snowdrift: **Section 2.2.8**.

Cultural Environment: Section 2.3

- Archaeology: **Section 2.3.1**, and
- Built heritage and cultural heritage landscapes: **Section 2.3.2**.

Engineering Studies: Section 2.4

- Traffic and transportation: **Section 2.4.1**
- Geotechnical: **Section 2.4.2**, and
- Utilities: **Section 2.4.3**.

2.1 Natural Environment

Natural environment studies have been completed to document and assess existing natural environment features, outline the preliminary description of potential impacts of the project on the natural environment, outline a description of potential measures to mitigate those impacts and identify applicable municipal, provincial, federal, or other regulatory approvals or permits associated with the natural environment that may be required for the project.

The sections below summarize the existing environmental conditions for the following aspects of the natural environment:

- Terrestrial Ecosystems
- Fish and Fish Habitat
- Stormwater and Drainage
- Groundwater and Hydrogeology
- Fluvial Geomorphology, and
- Erosion and Sedimentation Overview Risk Assessment.

2.1.1 Terrestrial Ecosystems

The terrestrial ecosystem study examines the following aspects of the natural environment. This information was updated in 2019 and continued through the current Preliminary Design.

- Designated Natural Areas
- Vegetation Community and Plant Inventory
- Wildlife and Wildlife Habitat
- Species at Risk, and
- Significant Wildlife Habitat.

The following sections outline the background and describe the existing environmental conditions within the Study Area.

2.1.1.1 Background

The 2002 Approved Environmental Assessment included a detailed description of terrestrial ecosystems environmental conditions and commitments that were carried forward and considered as project planning progresses.

As part of the preparatory work for the re-initiation of the Bradford Bypass in 2020, AECOM generated a Terrestrial Ecosystems Existing Conditions Report (AECOM, 2020), which provided a description of existing terrestrial ecosystems environmental conditions.

Since the completion of the 2002 Approved Environmental Assessment and the 2020 Preliminary Design preparatory work, several changes have occurred associated with terrestrial ecosystems including applicable legislation and environmental conditions. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.1.1 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.1.1.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed a Terrestrial Ecosystem Existing Conditions and Impact Assessment Report (AECOM, March 2023). Key details and findings regarding terrestrial ecosystems are summarized in the sections below.

2.1.1.2.1 Designated Natural Areas

Natural features and areas identified for protection in the Provincial Policy Statement and other legislation (e.g., Greenbelt Act, 2005) are collectively referred to as 'designated natural areas'. These include, but are not limited to, Areas of Natural and Scientific Interest, significant wetlands, Environmentally Significant/Sensitive Area, etc. These may be identified by the planning authority (e.g., province, municipality, conservation authority).

A summary of designated natural areas identified within the Study Area through the background review are provided in **Table 2-1** below.

Table 2-1: Designated Natural Areas within the Study Area

Area Type	Designated Natural Areas	Location Within Study Area
Environmentally Significant / Sensitive Areas	Holland Marsh Environmentally Significant Area (Lake Simcoe Region Conservation Authority)	Encompasses sections of wooded areas and agricultural land between Yonge Street and 2 nd Concession Road.
Wetlands	Holland Marsh (BW5) Provincially Significant Wetland	Located along the western bank of the Holland River
	Holland Marsh Wetland Complex Provincially Significant Wetland	Located along the Holland River and Holland River East Branch.
	Maskinonge River Wetland Complex Provincially Significant Wetland	Located west of Highway 404. The Provincially Significant Wetland is mapped along the banks of the Maskinonge River.
	Unevaluated Wetlands	Nineteen unevaluated wetlands are present within the Study Area between Highway 400 and Highway 404 including three large (>5 hectares) unevaluated wetlands present between the Holland River and Holland River East Branch.
Policy Areas	Deer Wintering Areas (Ministry of Natural Resources and Forestry)	Stratum 2 Deer Wintering Areas are present within large portions of the wooded areas present between the Holland River and Holland River East Branch and along the east bank of the Holland River East Branch. Another Stratum 2 Deer Wintering Area is present in the wooded area between 2 nd Concession Road and Leslie Street.
	Greenbelt Plan - Protected Countryside	Includes the majority of land between the Holland River to Highway 404 with the exception of some agricultural fields located east and west of 2 nd Concession Road and Leslie Street.
	Lake Simcoe Region Conservation Authority Natural Heritage System (2018) - Core Features	Natural Heritage System Core and associated 30 metres buffer encompass all forested natural areas in the Study Area. Farmland present between the Holland River and Holland River East Branch, portions of farmland found west of 2 nd Concession Road and land east of Highway 404 adjacent to the Maskinonge River have been classified as Targeted Areas for Natural Heritage System Enhancement.
	York Region Official Plan (2019) – Regional Greenlands System	Regional Greenlands System present between the Holland River and Holland River East Branch extending east of Yonge Street. Included in wooded area between 2 nd Concession Road and along the Maskinonge River.
	County of Simcoe Official Plan (2016) – Greenlands	Wooded and wetland areas between Highway 400 and the Holland River
	Town of East Gwillimbury Official Plan – Natural Heritage System - Core Areas and Supporting Areas	Wooded and natural areas present between Bathurst Street and Highway 404.
	Town of Bradford West Gwillimbury Official Plan – Natural Areas	The Holland River and wetland areas associated with the Holland Marsh Complex Provincially Significant Wetland and Holland Marsh (BW5) Provincially Significant Wetland.
	Township of King Official Plan – Natural Heritage System	Natural areas present between the Holland River and Bathurst Street.

2.1.1.2.2 Vegetation and Vegetation Communities

In Ontario, vegetation communities are delineated according to the Ecological Land Classification system (Lee et al., 1998). The Ecological Land Classification system provides methods for identifying and mapping vegetation communities in a way that can be used for land use planning.

Field investigations completed in support of the Preliminary Design confirmed that vegetation communities within the Study Area include deciduous, coniferous, and mixed forests (FOD, FOC & FOM), plantations (CUP), cultural woodlands, thickets and meadows (CUW, CUT, CUM), wetlands and open water communities (MAM, MAS, SAF and OAO) as well as coniferous and deciduous swamps (SWC and SWD) and swamp thickets (SWT).

One rare vegetation community (Dry – Fresh Hickory Deciduous Forest [FOD2-3], S3S4) was identified within the Study Area, west of County Road 4 outside of the proposed right-of-way. No other rare vegetation communities were identified within the Study Area during field investigations.

Additionally, field investigations noted areas where wetland vegetation communities associated with the Holland River and Holland River East Branch extended beyond the existing Provincially Significant Wetland boundaries of the Holland Marsh (BW5) Provincially Significant Wetland and the Holland Marsh Wetland Complex Provincially Significant Wetland. This includes the wetland communities present between the Holland River and Artesian Industrial Parkway and communities between the Holland River East Branch and Bathurst Street.

The Bradford Bypass Project Team has been working closely with the Ministry of Natural Resources and Forestry throughout the project. The Ministry of Natural Resources and Forestry clarified that Land Information Ontario is the authoritative source for Provincially Significant Wetland information. Following this clarification, the Project Team updated the Provincially Significant Wetland information documented in the Terrestrial Impact Assessment Report (AECOM, March 2023) and has been incorporated into this Report. The details of the updated changes are documented in **Table 5-1 in Section 5.1.1.1.1.**

Evaluated and unevaluated wetlands are shown on Designated Natural Areas **Figure 2-1** below.

Figure 2-1: Designated Natural Areas Within the Terrestrial Ecosystems Study Area

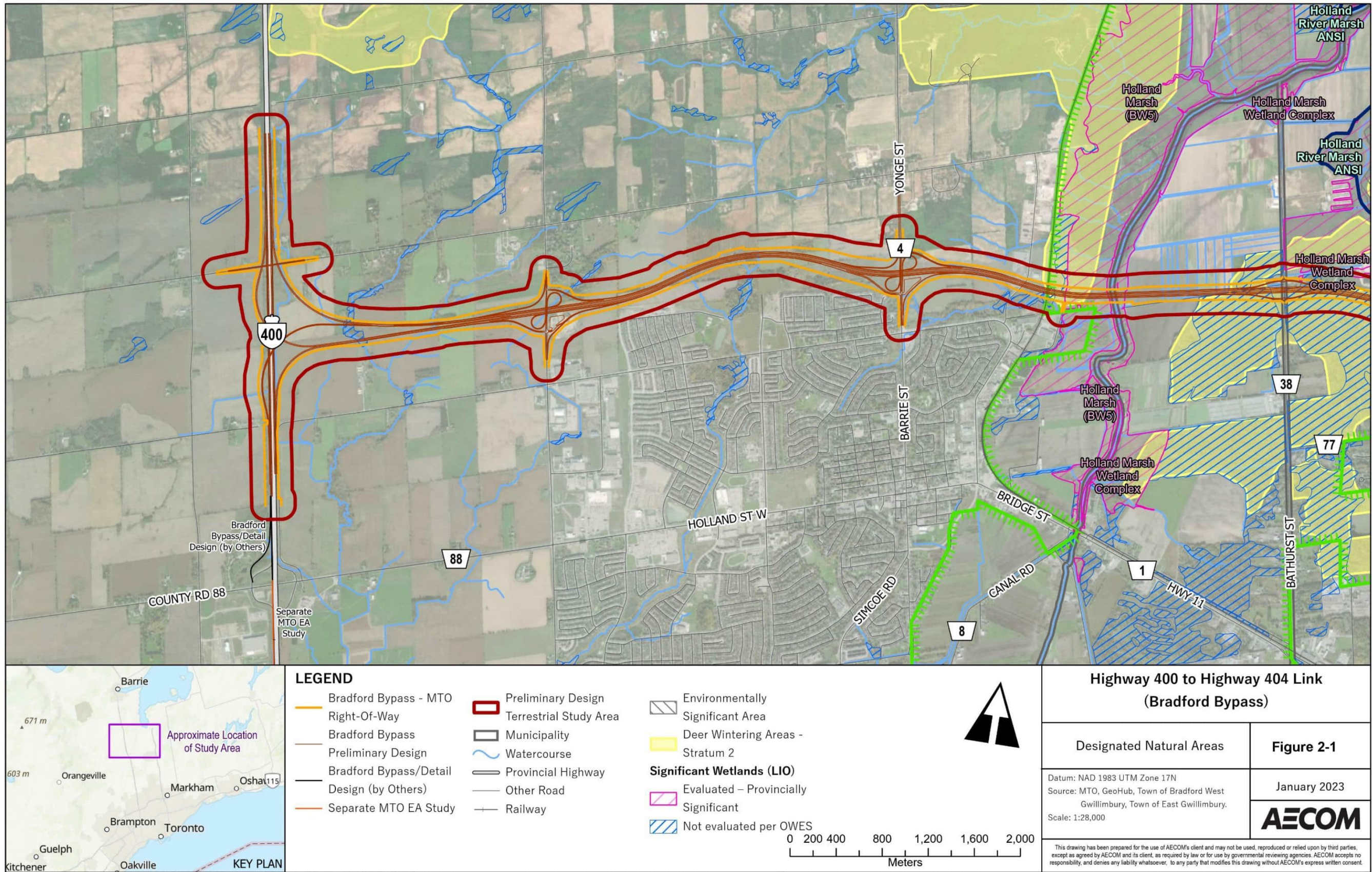
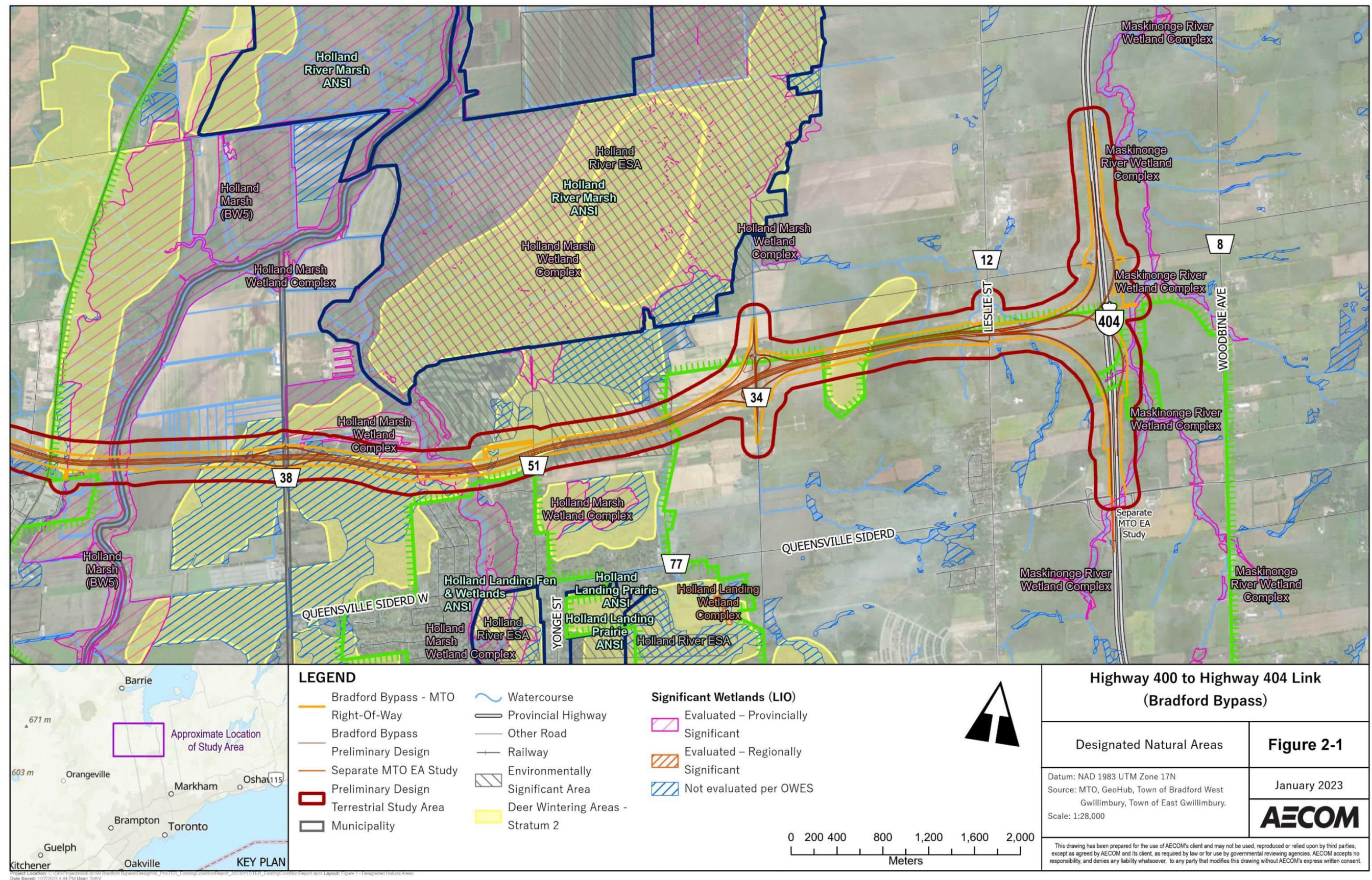


Figure 2-1: Designated Natural Areas Within the Terrestrial Ecosystems Study Area



2.1.1.2.3 Wildlife and Wildlife Habitat

Wildlife surveys were completed to develop an understanding of species composition, abundance and habitat use of wildlife within the Study Area. A total of six amphibian species were heard calling during night call surveys. Species recorded included the following:

- American Toad (*Anaxyrus americanus*)
- Gray Treefrog (*Hyla versicolor*)
- Green Frog (*Lithobates clamitans*)
- Spring Peeper (*Pseudacris crucifer*)
- Northern Leopard Frog (*Lithobates pipiens*), and
- Wood Frog (*Lithobates sylvaticus*).

A total of 63 species were observed over two rounds of point count surveys. Of these, breeding evidence was confirmed for the following species:

- Black-capped Chickadee (*Poecile atricapillus*)
- Eastern Meadowlark (*Sturnella magna*)
- Mallard (*Anas platyrhynchos*), and
- Yellow Warbler (*Dendroica petechia*).

Black-capped Chickadee, Eastern Meadowlark, Mallard and Yellow Warbler are species that are protected under the MBCA. Eastern Meadowlark (BBS-01), Black-capped Chickadee (BBS-06) and Yellow Warbler (BBS-09) were observed during surveys. Recently fledged mallards were observed at breeding bird station BBS-15.

The following Species at Risk and/or Species of Conservation Concern were observed during breeding bird surveys:

- Barn Swallow (*Hirundo rustica*)
- Bobolink (*Dolichonyx oryzivorus*)
- Eastern Meadowlark (*Sturnella magna*)
- Eastern Wood-pewee (*Contopus virens*), and
- Wood Thrush (*Hylocichla mustelina*).

During field investigations, any evidence (e.g., observation, scat, tracks, calls, etc.) of wildlife and their associated habitat and habitat usages were documented in the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report (AECOM, March 2023). A total of five mammals, 21 birds, five insects, two amphibians and two

reptiles were observed. Of these, two Species of Conservation Concern were recorded. The remaining species are designated as Secure or Apparently Secure in Ontario.

Further detail on wildlife and wildlife habitats is included in Section 3.3 of the Draft Terrestrial Ecosystems Existing Conditions and Impact Assessment Report (AECOM, 2023).

2.1.1.2.4 Species at Risk

Species at Risk are defined as species that are listed as Threatened, Endangered or Extirpated, provincially. These species, as well as their habitat, are afforded protection under the Endangered Species Act. Species listed as Special Concern under the Endangered Species Act are considered Species of Conservation Concern and are addressed through the Significant Wildlife Habitat screening exercise

Through this assessment, 12 Species at Risk (Threatened or Endangered) were determined to have high or medium potential to occur in the Study Area based on candidate habitat presence within the Study Area and are summarized in **Table 2-2** below.

Table 2-2: Species at Risk Identified with High or Medium Potential to Occur within the Study Area

Taxa	Common Name	Scientific Name	Endangered Species Act Status ¹	Species at Risk Act Status ¹	Probability of Occurrence	Confirmed or Candidate Habitat
Bird	Bobolink	<i>Dolichonyx oryzivorus</i>	Threatened	Threatened	High	Confirmed Both Bobolink and Eastern Meadowlark require large areas of grassland habitat to carry out their life process and are often found nesting in agricultural settings such as pastures and hayfields (McCracken et al., 2013). Bobolink was observed incidentally within a fallow field located directly east of 2 nd Concession Road during the first round of the 2021 breeding bird surveys. The field was noted to be mowed during the second round of surveys, with Bobolink no longer present. All agricultural fields present within the Study Area may provide future opportunities for nesting depending on the crop selection in a given year (i.e. lightly grazed pastures, young hayfields or alfalfa fields).
	Chimney Swift	<i>Chaetura pelagica</i>	Threatened	Threatened	Medium	Candidate Chimney Swift is a species that prefers to nest and roost in vertical cavities and has become adapt to using humanmade structures such as chimneys for these activities (committee on the Status of Species at Risk in Ontario, 2020). Buildings with potentially suitable chimneys for nesting and roosting may be present within the Study Area. Foraging habitats in the form of cultural meadows, marshes and open or shallow water are also present within the Study Area.
	Eastern Meadowlark	<i>Sturnella magna</i>	Threatened	Threatened	High	Confirmed Both Bobolink and Eastern Meadowlark require large areas of grassland habitat to carry out their life process and are often found nesting in agricultural settings such as pastures and hayfields (McCracken et al., 2013). Confirmed breeding habitat was identified during field investigations within the cultural meadow adjacent to Highway 400 and 9 th Line during the 2021 breeding bird surveys. In 2020, seven Eastern Meadowlark were observed incidentally in the same cultural meadow community where Bobolink was observed in 2021, directly east of 2 nd Concession Road. However, Eastern Meadowlark was not observed in the area during the 2021 breeding bird surveys. All agricultural fields present within the Study Area may provide future opportunities for nesting depending on the crop selection in a given year (i.e. lightly grazed pastures, young hayfields or alfalfa fields).
	Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	S4B	Threatened	Medium	Candidate The Eastern Whip-poor-will nests on the ground in areas with a mix of open and forested areas, including mature deciduous, coniferous and mixed forest communities (Ministry of the Environment, Conservation and Parks, 2019a). Candidate habitat within the Study Area was noted in the cultural thicket, plantation, woodland and meadow communities east of County Road 4, in the coniferous forest community (FOC4) located between 2 nd Concession Road and Leslie Street, the cultural woodland community west of Yonge Street and in the cultural woodland community adjacent to Highway 404. Targeted crepuscular bird surveys will be completed during Detail Design.
	Least Bittern	<i>Ixobrychus exilis</i>	Threatened	Threatened	Medium	Candidate In Ontario the Least Bittern prefers large cattail marshes with open pools and channels for hunting (Ministry of the Environment, Conservation and Parks, 2016). Suitable vegetation communities for Least Bittern were observed along the banks of the Holland River where large continuous areas of cattail marsh communities were present. Targeted surveys (i.e., call playback surveys) required to confirm species presence/absence will be completed during Detail Design.

Taxa	Common Name	Scientific Name	Endangered Species Act Status ¹	Species at Risk Act Status ¹	Probability of Occurrence	Confirmed or Candidate Habitat
Mammals	Little Brown Myotis	<i>Myotis lucifugus</i>	Endangered	Endangered	Medium	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 within proximity of suitable roosting habitat are present in the Study Area. Little Brown Myotis forages over water, rivers, and open areas within forests (e.g., gaps, edges; Committee on the Status of Endangered Wildlife in Canada, 2013). Targeted surveys for Species at Risk bats (i.e., acoustic monitoring) will be completed during Detail Design.
	Eastern Small-footed Myotis	<i>Myotis leibii</i>	Endangered	-	Medium	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. Deciduous forest and buildings within the Study Area provide potentially suitable habitat for this species. Targeted surveys for Species at Risk bats (i.e., acoustic monitoring) will be completed during Detail Design.
	Northern Long-eared Myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered	Medium	Candidate This species is associated with forest habitats, roosting under loose bark or in tree cavities (Humphrey and Fotherby, 2019). Deciduous forests within the Study Area provide potentially suitable habitat for this species. Targeted surveys for Species at Risk bats (i.e., acoustic monitoring) will be completed during Detail Design.
	Tri-colored Bat	<i>Perimyotis subflavus</i>	Endangered	Endangered	Medium	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 with suitable roosting habitat were present. Targeted surveys for Species at Risk bats (i.e., acoustic monitoring) will be completed during Detail Design.
Plant	Black Ash	<i>Fraxinus nigra</i>	Endangered	Threatened	High	Confirmed Black Ash grows in open, moist to wet communities such as swamps, bogs, and riparian areas. The species is considered widespread throughout Ontario but is under threat due to the spread of Emerald Ash Borer, an invasive pest species that targets ash species (Committee on the Status of Endangered Wildlife in Canada, 2018). Black Ash was observed in the Study Area during field investigations. Any moist forest, wooded swamp or swamp thicket community where black ash has not already been observed should be considered candidate habitat for Black Ash.
	Butternut	<i>Juglans cinerea</i>	Endangered	Endangered	High	Confirmed Butternut trees were observed in the Study Area during field investigations. Butternut trees usually grows 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). Any cultural thicket, cultural woodland or forest community where Butternut trees have not already been observed should be considered candidate habitat.
Reptile	Blanding's Turtle	<i>Emydoidea blandingii</i>	Threatened	Threatened	Medium	Candidate Blanding’s Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of aquatic plants. It is not unusual though, to find them hundreds of metres from the nearest waterbody, especially while they are searching for a mate or travelling to a nesting site (Ministry of the Environment, Conservation and Parks, 2019). Wetland communities that provide suitable habitat for Blanding’s Turtle were observed along the Holland River and Holland River East Branch. Targeted surveys for Blanding’s Turtle will be completed during Detail Design.

Note: 1. THR – Threatened, END – Endangered, ESA – Endangered Species Act (2007), SARA – Species at Risk Act (2002)

2.1.1.2.5 Significant Wildlife Habitat

The Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E (Ministry of Natural Resources and Forestry, 2015b) outline recommended criteria, based on science and expert knowledge, for identifying Significant Wildlife Habitat within Ecoregion 6E, which encompasses the Study Area. The schedules include a description of the wildlife habitat, indicator wildlife species, and criteria used for determining significance. Significant Wildlife Habitat is divided into four broad categories, which are described as:

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

The preliminary Significant Wildlife Habitat screening exercise identified several preliminary Significant Wildlife Habitat types within the Study Area. Field investigations, including Ecological Land Classification, botanical inventories, and breeding bird surveys further refined this total to nine candidate Significant Wildlife Habitat and six confirmed Significant Wildlife Habitat (including confirmed habitat for Species of Conservation Concern described in **Table 2-3**).

Species noted to potentially occur within the Study Area based on suitable habitat and recent occurrence records are summarized in **Table 2-3**.

While confirmed Deer Wintering Areas are in close proximity to both banks of the Holland River East Branch, this section of river is unlikely to provide conditions suitable to be considered Significant Wildlife Habitat. This is largely based upon the residential and commercial developments present both north and south of the alignment. Additionally, the alignment intersects the northern extent of the Wintering Area to the west and the southern extent of the Wintering Area to the east of the river with little habitat present directly north or south of the respective areas in which deer would be traveling to or from particularly for seasonal movement. The proposed right-of-way intersects the centre portion of the third Deer Wintering Area present in the Study Area with no suitable movement corridor habitat present adjacent to the feature in the Study Area.

Further detail with regards to seasonal concentration areas, rare vegetation communities, specialized habitats for wildlife, habitat for species of conservation concern considered significant wildlife habitat, and animal movement corridors can be found in the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report (AECOM, March 2023).

Refer to **Section 5.1.1** for details on the terrestrial ecosystems impacts, mitigation and monitoring requirements.

Table 2-3: Species of Conservation Concern Identified with Medium or High Potential to Occur within the Study Area

Taxa	Common Name	Scientific Name	S-Rank ¹	Endangered Species Act Status ²	Probability of Occurrence	Confirmed During Field Investigations
Amphibian	Western Chorus Frog (Great Lakes / St. Lawrence – Canadian Shield population)	<i>Pseudacris maculata</i>	S4	No Status	Medium	No
Birds	Barn Swallow	<i>Hirundo rustica</i>	S4B	Special Concern	High	Yes (Species was observed but habitat was not confirmed)
	Common Nighthawk	<i>Chordeiles minor</i>	S4B	Special Concern	Medium	No
	Eastern Wood-pewee	<i>Contopus virens</i>	S4B	Special Concern	High	Yes
	Wood Thrush	<i>Hylocichla mustelina</i>	S4B	Special Concern	High	Yes
Insects	Monarch	<i>Danaus plexippus</i>	S2N, S4B	Special Concern	High	Yes
Reptile	Northern Map Turtle	<i>Graptemys geographica</i>	S3	Special Concern	Medium	No
	Snapping Turtle	<i>Chelydra serpentina</i>	S4	Special Concern	Medium	No

Notes: 1. S2 – Imperilled, S3 – Vulnerable, S4 – Apparently, S#B/S#N – Breeding/Non-breeding
2. SC – Special Concern, ESA – Endangered Species Act (2007)

2.1.2 Fish and Fish Habitat

The fisheries study examines the fish and fish habitat within the Study Area, with a focus on where watercourses and waterbodies intersect with the project. The fisheries information was updated in 2019 and continues to be updated through the current Preliminary Design.

The following sections outline the background and describes the existing environmental conditions within the Study Area.

2.1.2.1 Background

The 2002 Approved Environmental Assessment included a detailed description of fish and fish habitat environmental conditions and commitments that were carried forward and considered in later stages as project planning progresses.

As part of the preparatory work for the re-initiation of the Bradford Bypass in 2020, AECOM conducted a Fish and Fish Habitat Existing Conditions Report (AECOM, 2020, under separate cover), which provided a description of existing fish and fish habitat environmental conditions.

Since the completion of the 2002 Approved Environmental Assessment and the 2020 Preliminary Design preparatory work, several changes have occurred associated with fish and fish habitat including applicable legislation and environmental conditions. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.1.2 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

The assessments of the water features described herein were conducted in accordance with the Interim Environmental Guide for Fisheries (the Guide) (Ministry of Transportation, 2020a) and the Pilot Ministry of Transportation/Fisheries and Oceans Canada/Ministry of Natural Resources and Forestry Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 4 (the Protocol) (2020b). This includes a step-by-step process to identify regulatory review and/or notification requirements.

2.1.2.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed a Fish and Fish Habitat Existing Conditions and Impact Assessment Report (AECOM, April 2023). Key details and findings regarding fish and fish habitat are summarized in the sections below.

AECOM ecologists conducted a detailed fish and fish habitat assessment of the water features in the vicinity of the Study Area between September 14 to 18, 2020 (i.e., the summer assessments), with spring field investigations occurring over multiple days in June 2021. Field investigations were also completed in the Spring of 2022 (May 19 and June 9) due to changes to the Fish and Fish Habitat Study Area that required further review for potential fish habitat. Due to some of the precipitation that occurred prior to the Spring 2022 field investigations, some of the assessed sites may have had higher than normal water levels at the time of investigation. Fisheries assessments were conducted in accordance with the requirements under the 2020 Protocol. Fisheries ecologists visited the sites to document existing habitat conditions to assist in determining whether the proposed works may result in a Harmful Alteration, Disruption or Destruction, or the death of fish, and therefore requires a Request for Review by Fisheries and Oceans Canada and potentially a *Fisheries Act Authorization* in subsequent design phases.

Through the background information review, consultation with Ministry of Natural Resources and Forestry, and fish habitat and fish community assessments, it was determined that 17 watercourses were permanent features that provided direct fish habitat, five were intermittent features that provided direct fish habitat, six were intermittent and provided indirect habitat, and two were ephemeral and provided indirect habitat. Of the remaining 21 aquatic features, 20 were ephemeral and did not provide habitat, and one was permanent and did not provide habitat. Critical Habitat (Species at Risk Act) was not identified at any site. C17-A-1 and C20-A-1 act as migratory corridors for fish to reach upstream spawning habitats and are specialized habitats that fish use for spawning and nursery. These two crossings, as well as C16-A-1, are also mapped spawning habitats for muskellunge species.

Crossing IDs for the known proposed structure/culvert locations along each watercourse at the time of producing this Report are shown in **Table 2-4** below.

Fish and fish habitat existing conditions at each anticipated crossing location based on Template D2A and Template D2B of the Guide (Ministry, 2020) are provided in **Appendix A** of this Report. Existing fish and fish habitat conditions are shown on **Figure 2-2**.

Table 2-4: Location of Works (Template D1)

Watercourse ID	Crossing ID	Highway/Road	Municipality	Latitude	Longitude
WC-1	C10-A-A	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.133927°	-79.638582°
	C10-A-B	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.129274°	-79.637276°
	C10-A-C	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.125713°	-79.636883°
	C10-A-1	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.122177°	-79.634429°
	C10-A-2	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.118484°	-79.635116°
	C10-A-3	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.116431°	-79.634575°
	C10-A-4	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.114536°	-79.634565°
WC-1b	C10-A-5	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.110519°	-79.632596°
WC-1c	C10-A-6	Highway 400	Town of Bradford West Gwillimbury, County of Simcoe	44.101572°	-79.631328°
WC-2	C10-B-1	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.121003°	-79.630461°
	C10-B-2	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.120526°	-79.628956°
	C10-C-1	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.120417°	-79.627337°
	C10-C-2	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.119435°	-79.625691°
WC-3	C11-A-1	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.121319°	-79.618249°
WC-4	C11-A-2	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.120782°	-79.617640°
WC-5	C12-A-1	10 th Sideroad	Town of Bradford West Gwillimbury, County of Simcoe	44.123593°	-79.606432°
	C13-A-1	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.128109°	-79.591681°
WC-6	C14-A-1	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.130816°	-79.584746°
Pond 1	NA	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.129027°	-79.578595°
WC-7	NA	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.133675°	-79.560263°
WC-8	C16-A-2	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.131662°	-79.559019°
	C16-A-3	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.131120°	-79.553062°
WC-9	C16-A-4	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.129915°	-79.567524°
WC-9	CR-4	Younge Street	Town of Bradford West Gwillimbury, County of Simcoe	44.128678°	-79.568377°
	C16-A-1	Bradford Bypass ROW	Town of Bradford West Gwillimbury, County of Simcoe	44.129915°	-79.567524°
WC-10	C17-A-1	Hochreiter Road	Township of King, Regional Municipality of York	44.131257°	-79.545499°
WC-11	C17-B-1	Hochreiter Road	Township of King, Regional Municipality of York	44.131718°	-79.544525°
WC-12	C17-C-1	Hochreiter Road	Township of King, Regional Municipality of York	44.132377°	-79.540511°
WC-13	C17-D-1	Hochreiter Road	Township of King, Regional Municipality of York	44.132613°	-79.539937°
WC-14	C17-E-1	Hochreiter Road	Township of King, Regional Municipality of York	44.132690°	-79.539389°
WC-15	C17-F-1	Hochreiter Road	Township of King, Regional Municipality of York	44.132838°	-79.538915°
WC-16	C18-A-1	Hochreiter Road	Township of King, Regional Municipality of York	44.133081°	-79.537902°
WC-17	C18-B-1	Hochreiter Road	Township of King, Regional Municipality of York	44.133289°	-79.536953°
WC-19	C18-C-1	Hochreiter Road	Township of King, Regional Municipality of York	44.133415°	-79.535066°
WC-20	C18-D-1	Hochreiter Road	Township of King, Regional Municipality of York	44.134016°	-79.533702°
WC-22	C18-E-1	Hochreiter Road	Township of King, Regional Municipality of York	44.133577°	-79.532906°
WC-23	C18-F-1	Bathurst Street	Township of King, Regional Municipality of York	44.135175°	-79.527994°
	C18-G-1	Hochreiter Road	Township of King, Regional Municipality of York	44.134314°	-79.528906°
WC-24	C18-H-1	Bathurst Street	Town of East Gwillimbury, Regional Municipality of York	44.135727°	-79.527618°
WC-25	C20-A-1	Bradford Bypass right-of-way	Town of East Gwillimbury, Regional Municipality of York	44.136164°	-79.512821°
	C20-B-1	Bradford Bypass right-of-way	Town of East Gwillimbury, Regional Municipality of York	44.137107°	-79.510612°

Watercourse ID	Crossing ID	Highway/Road	Municipality	Latitude	Longitude
WC-26	C22-A-1	Bradford Bypass right-of-way	Town of East Gwillimbury, Regional Municipality of York	44.142065°	-79.487982°
WC-27	C23-A-1	2 nd Concession Road	Town of East Gwillimbury, Regional Municipality of York	44.146607°	-79.478361°
WC-28	C24-A-1	Bradford Bypass right-of-way	Town of East Gwillimbury, Regional Municipality of York	44.150477°	-79.462309°
WC-29	C25-A-1	Bradford Bypass right-of-way	Town of East Gwillimbury, Regional Municipality of York	44.151120°	-79.457208°
WC-30	C25-B-1	Leslie Street	Town of East Gwillimbury, Regional Municipality of York	44.152108°	-79.453980°
WC-31	C25-C-1	Bradford Bypass right-of-way	Town of East Gwillimbury, Regional Municipality of York	44.153147°	-79.449299°
WC-32	C25-A-2	Highway 404	Town of East Gwillimbury, Regional Municipality of York	44.150441°	-79.440710°
	C26-A-1	Highway 404	Town of East Gwillimbury, Regional Municipality of York	44.151264°	-79.439485°
WC-33	C27-A-1	Highway 404	Town of East Gwillimbury, Regional Municipality of York	44.152139°	-79.438638°
WC-34	C28-A-1	Highway 404	Town of East Gwillimbury, Regional Municipality of York	44.140960°	-79.437545°

Figure 2-2: Fish and Fish Habitat Existing Conditions

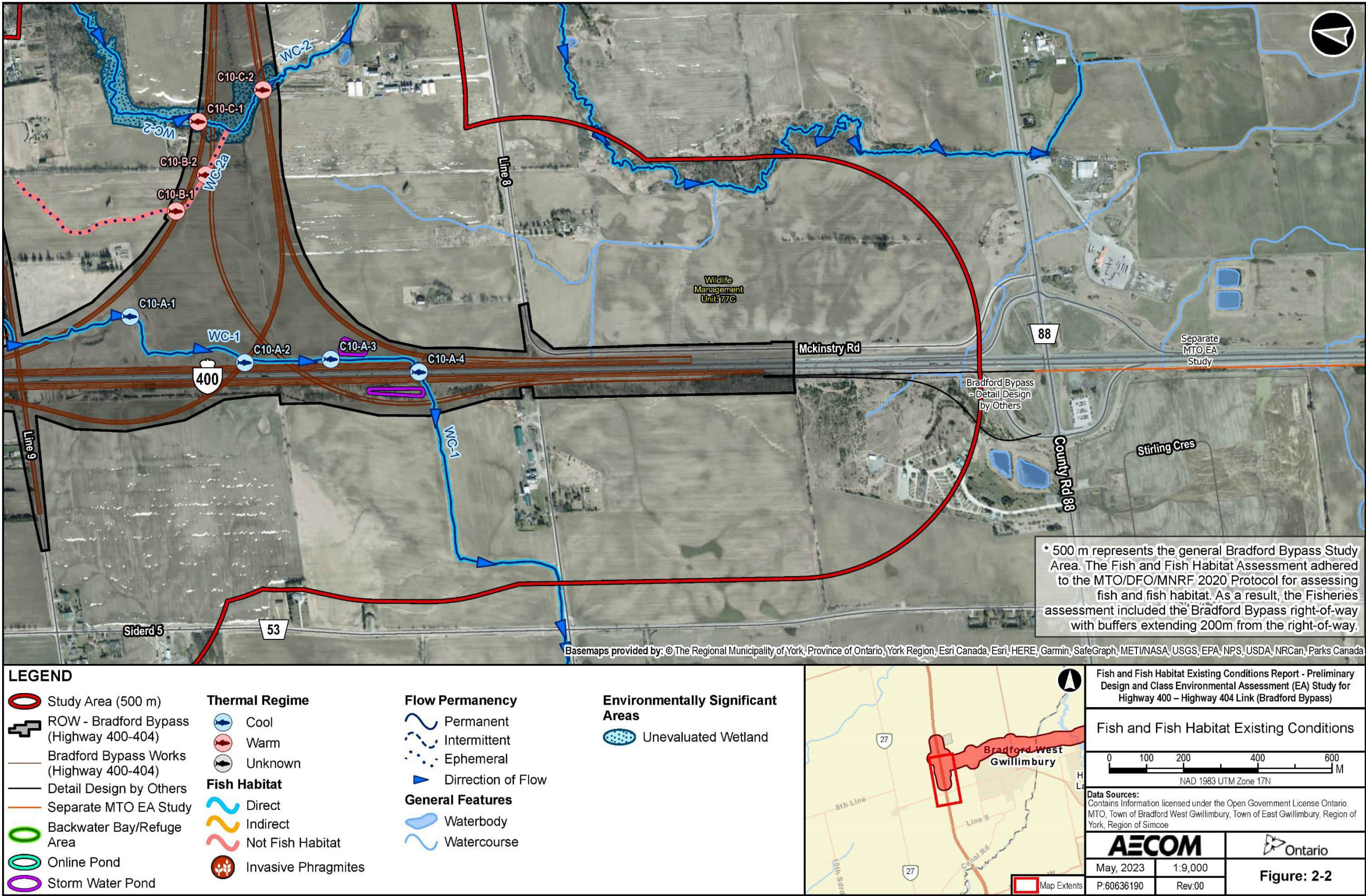


Figure 2-2: Fish and Fish Habitat Existing Conditions

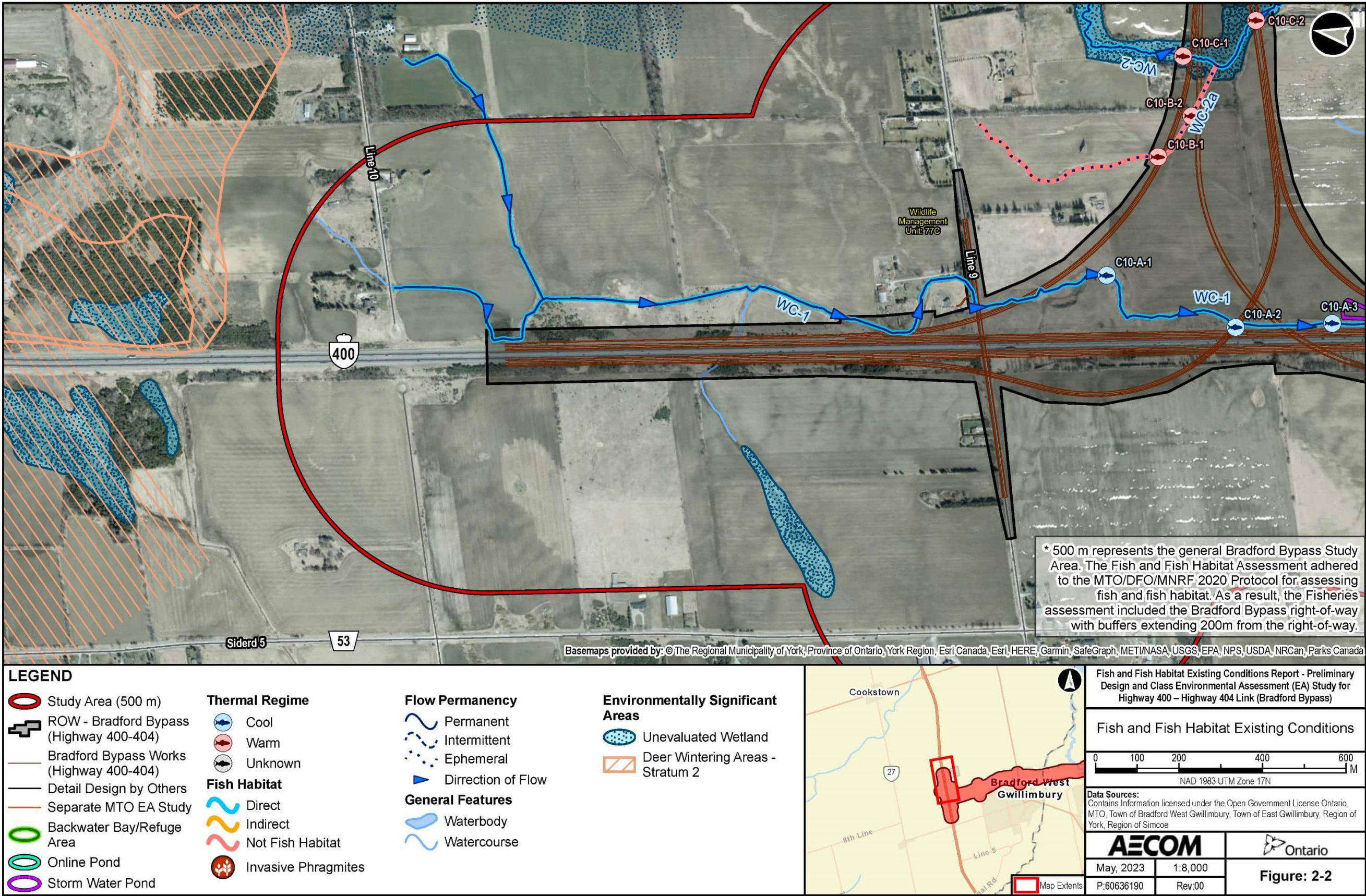


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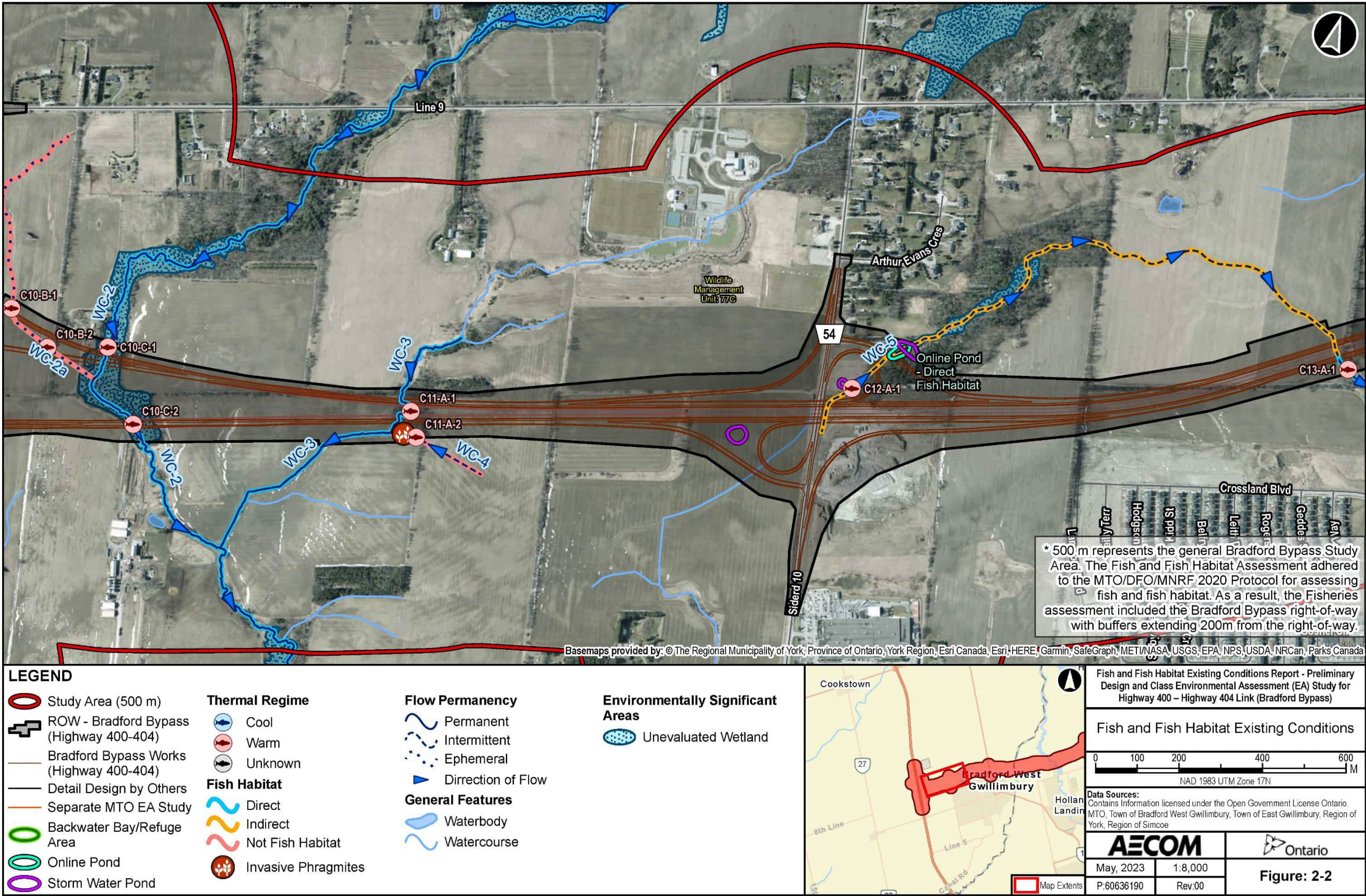


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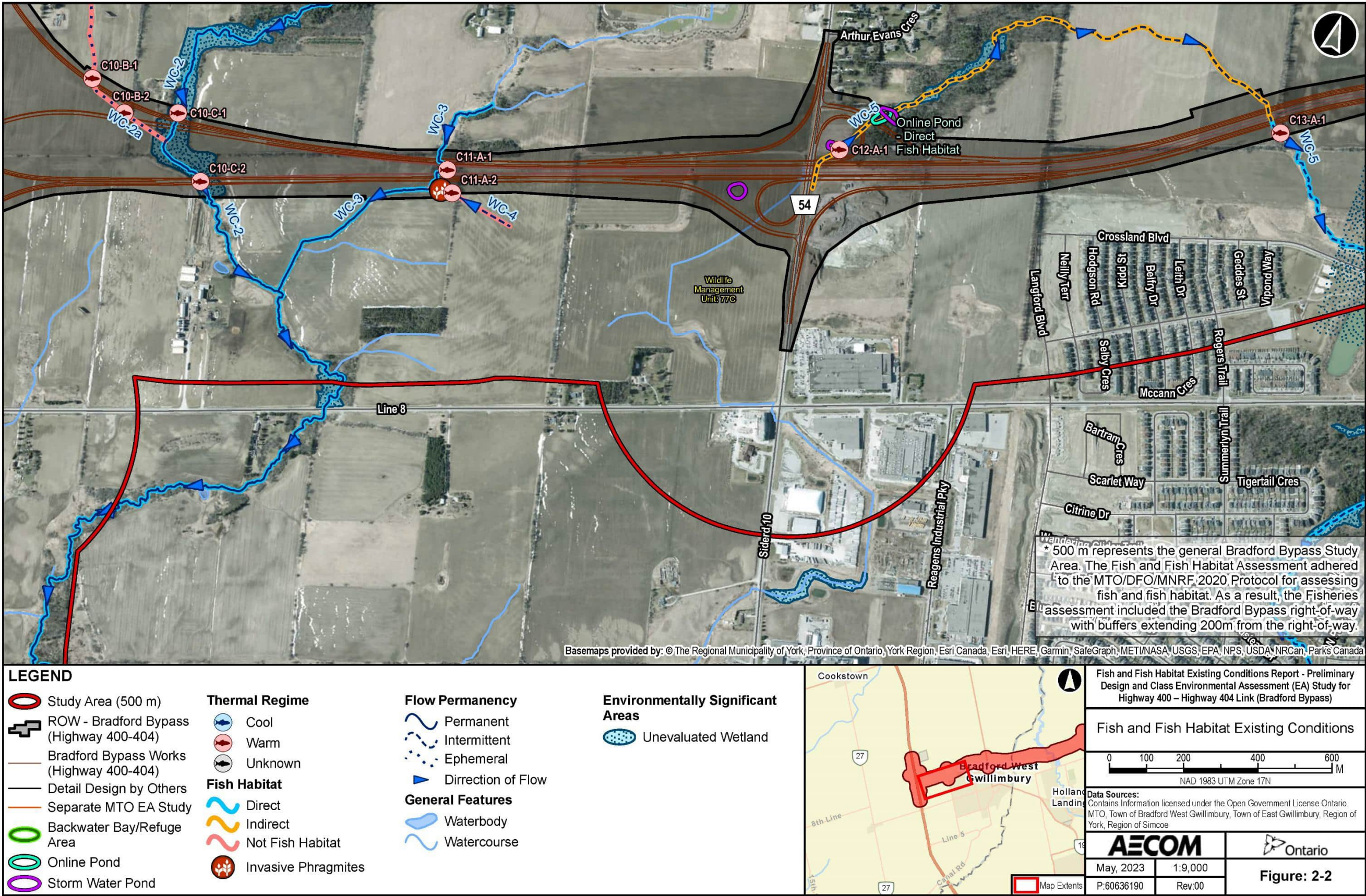


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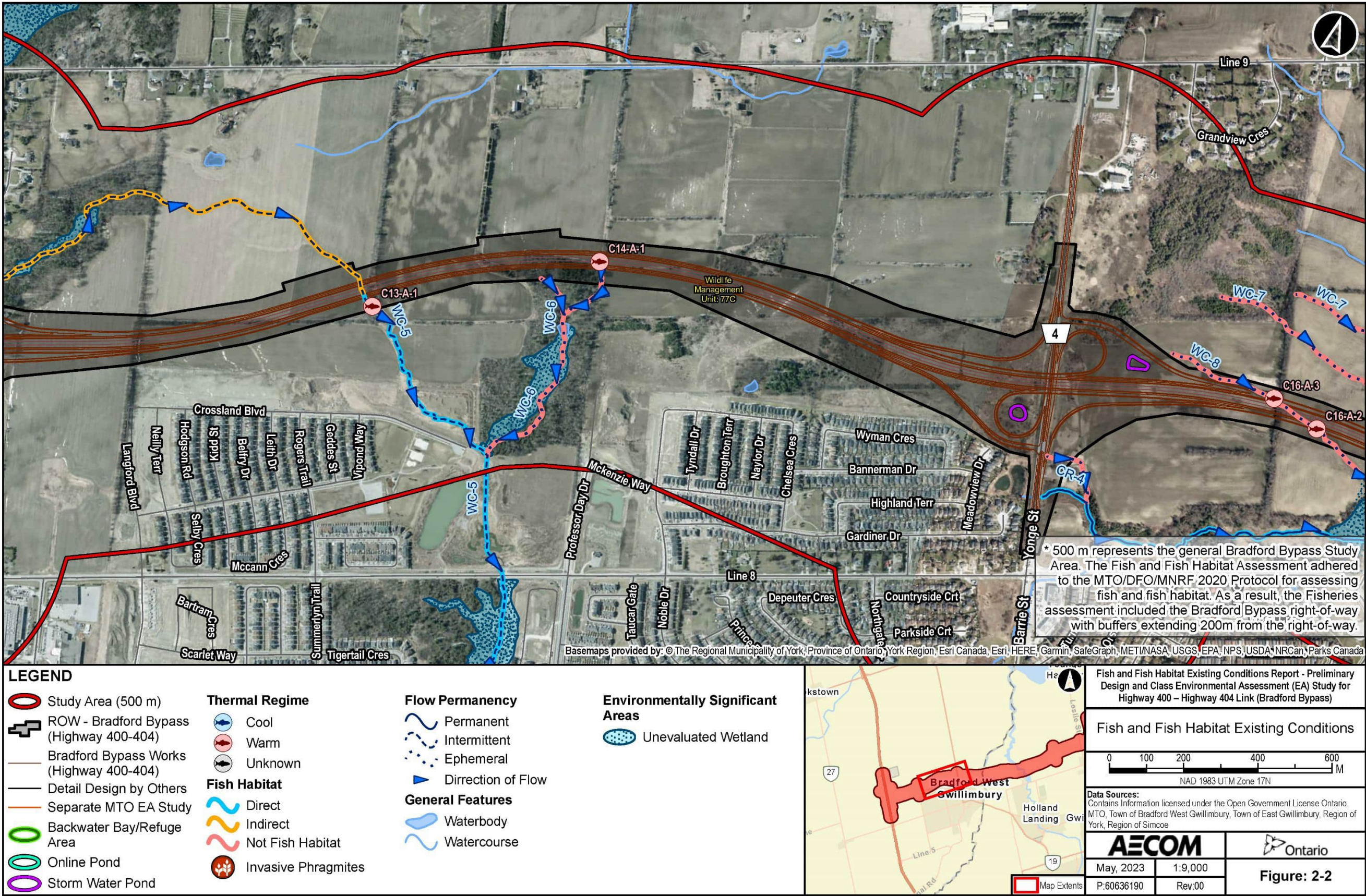


Figure 2-2: Fish and Fish Habitat Existing Conditions

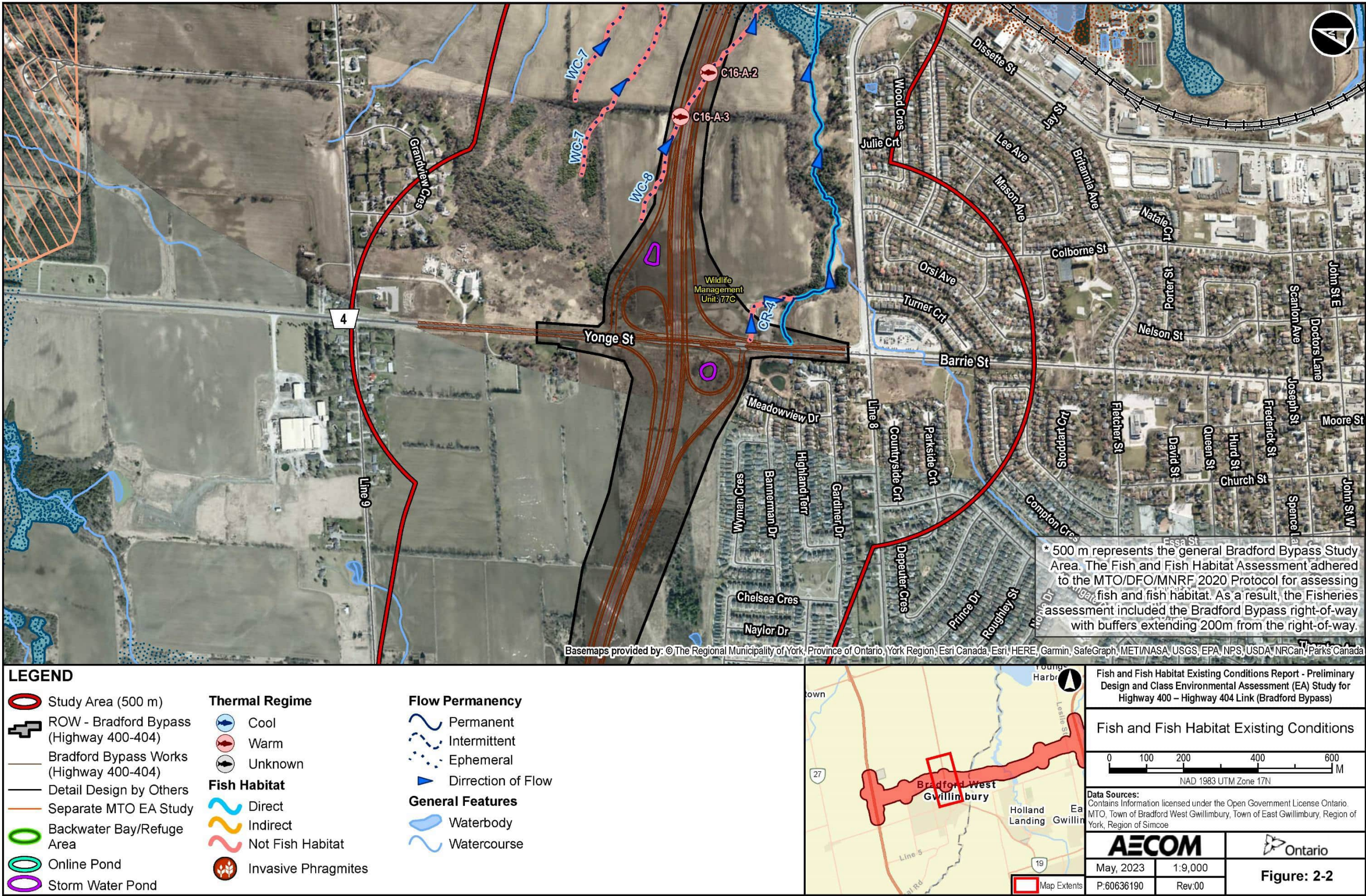


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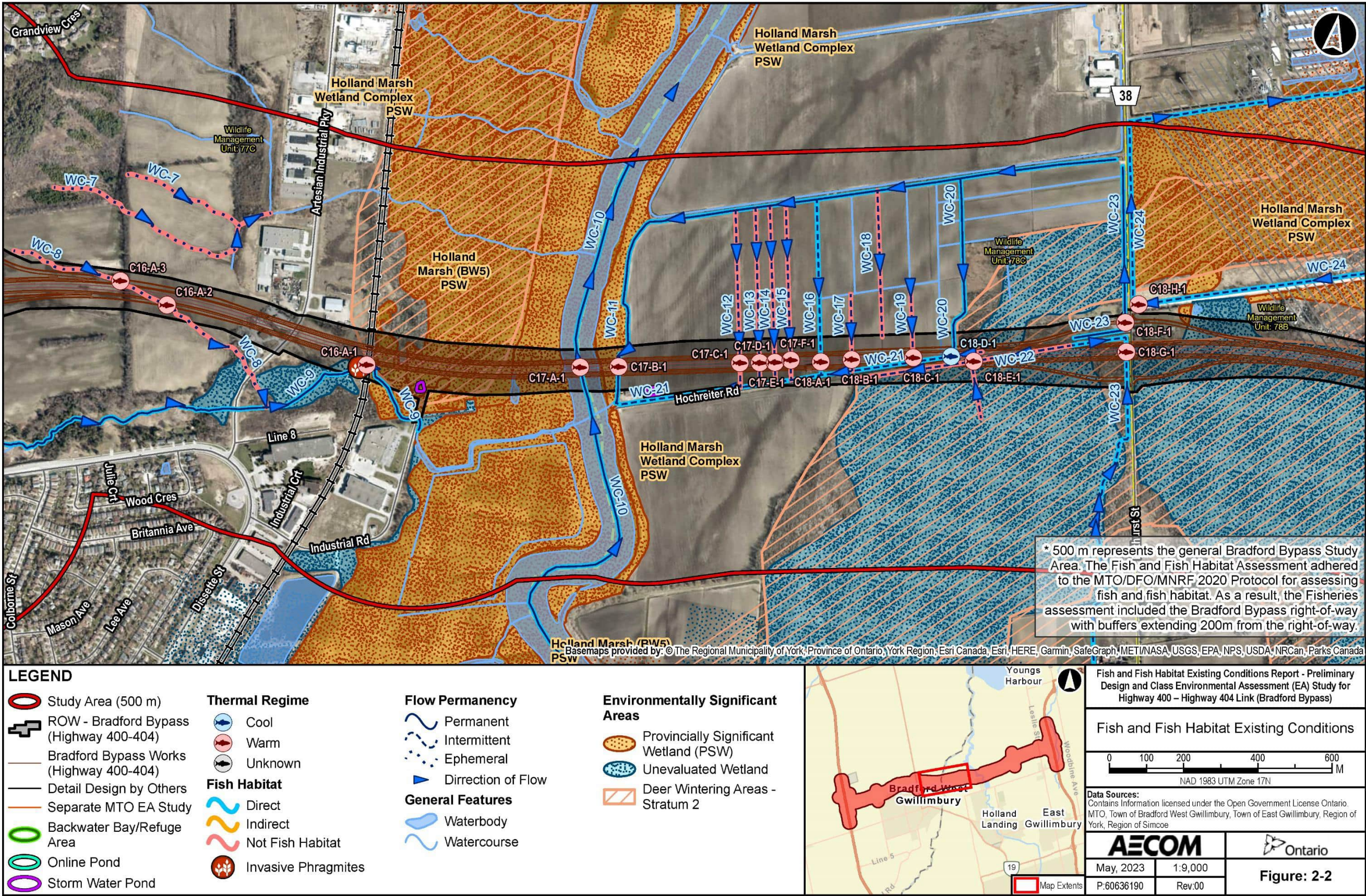


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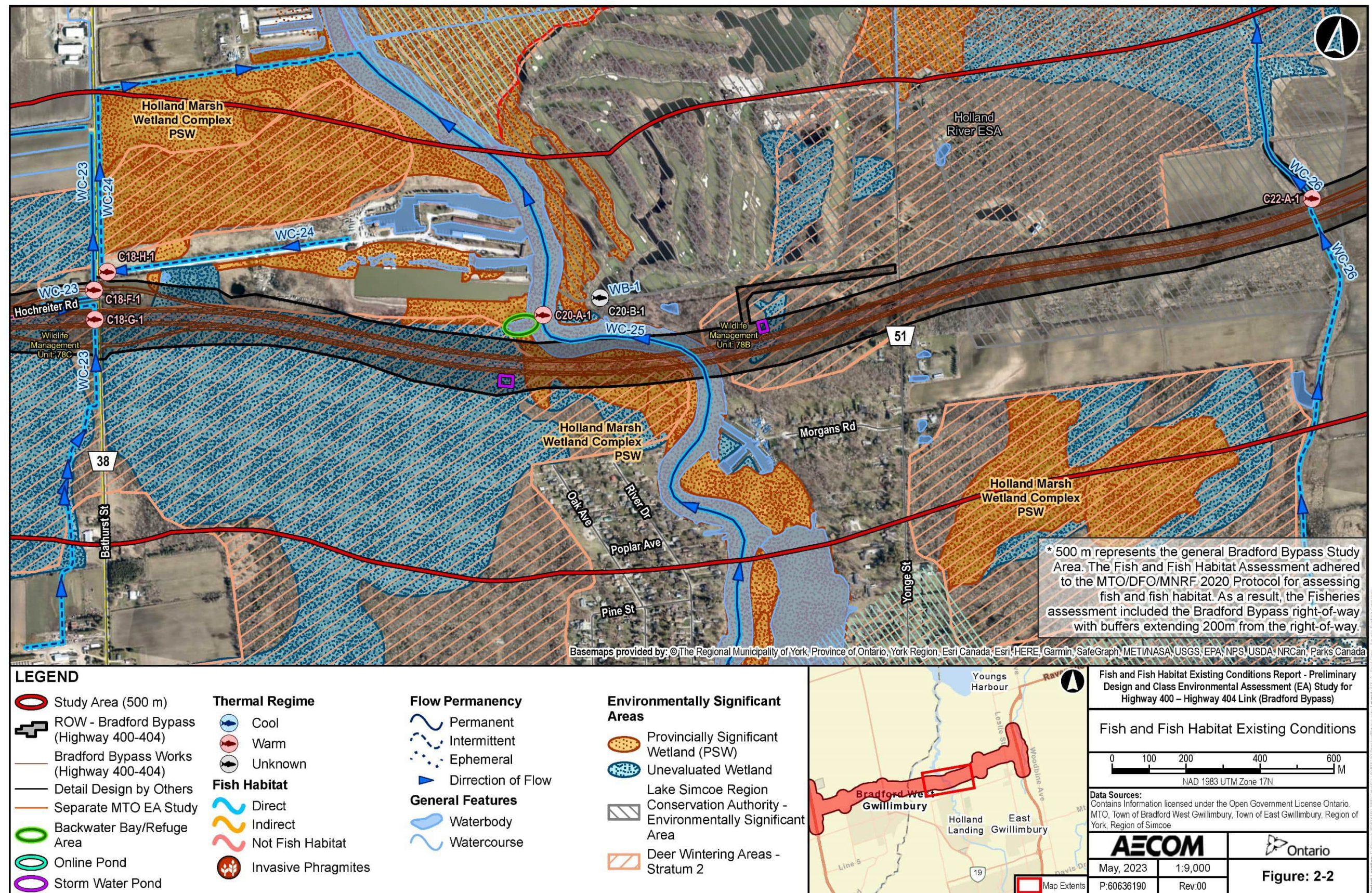


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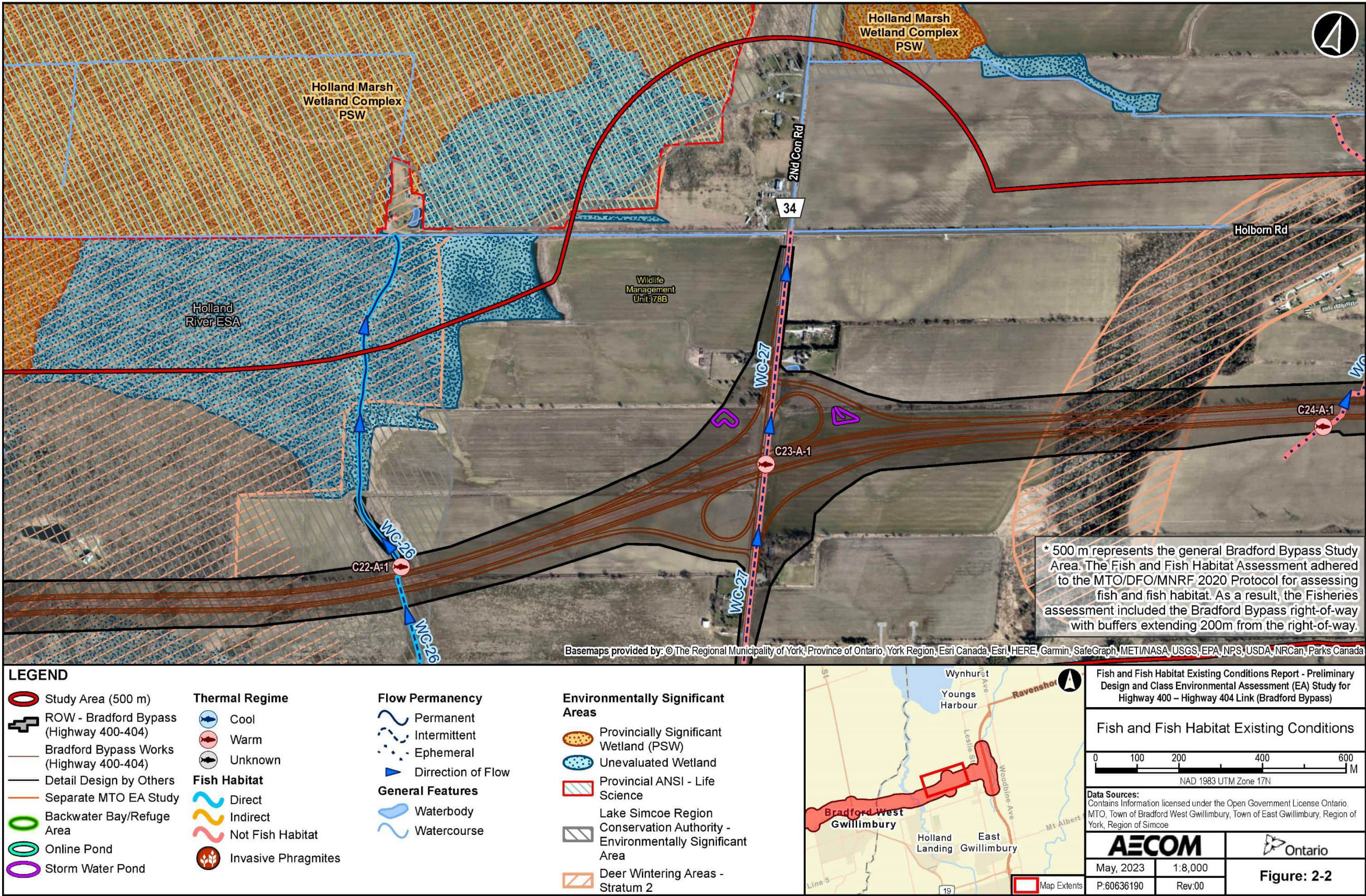


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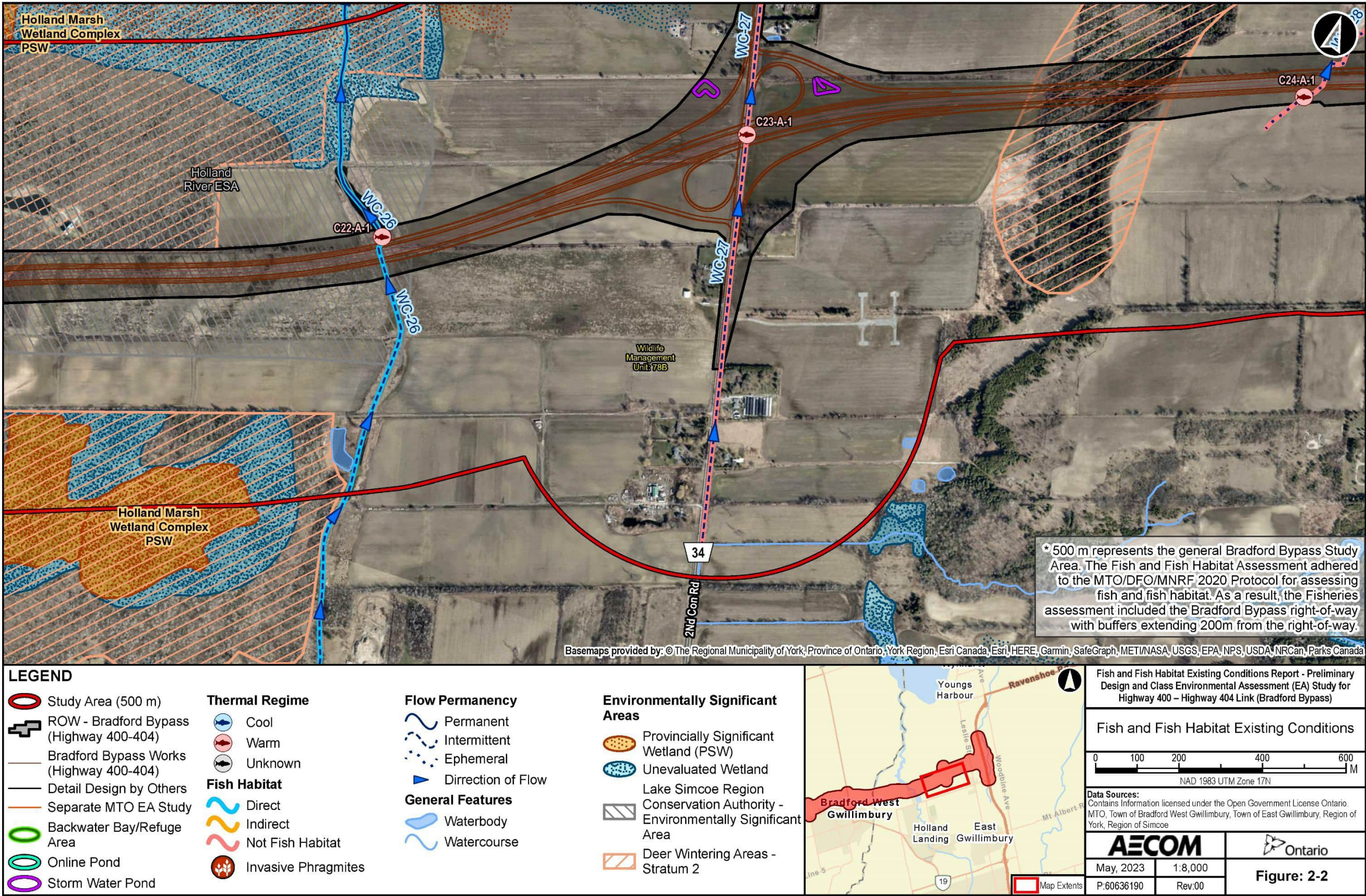


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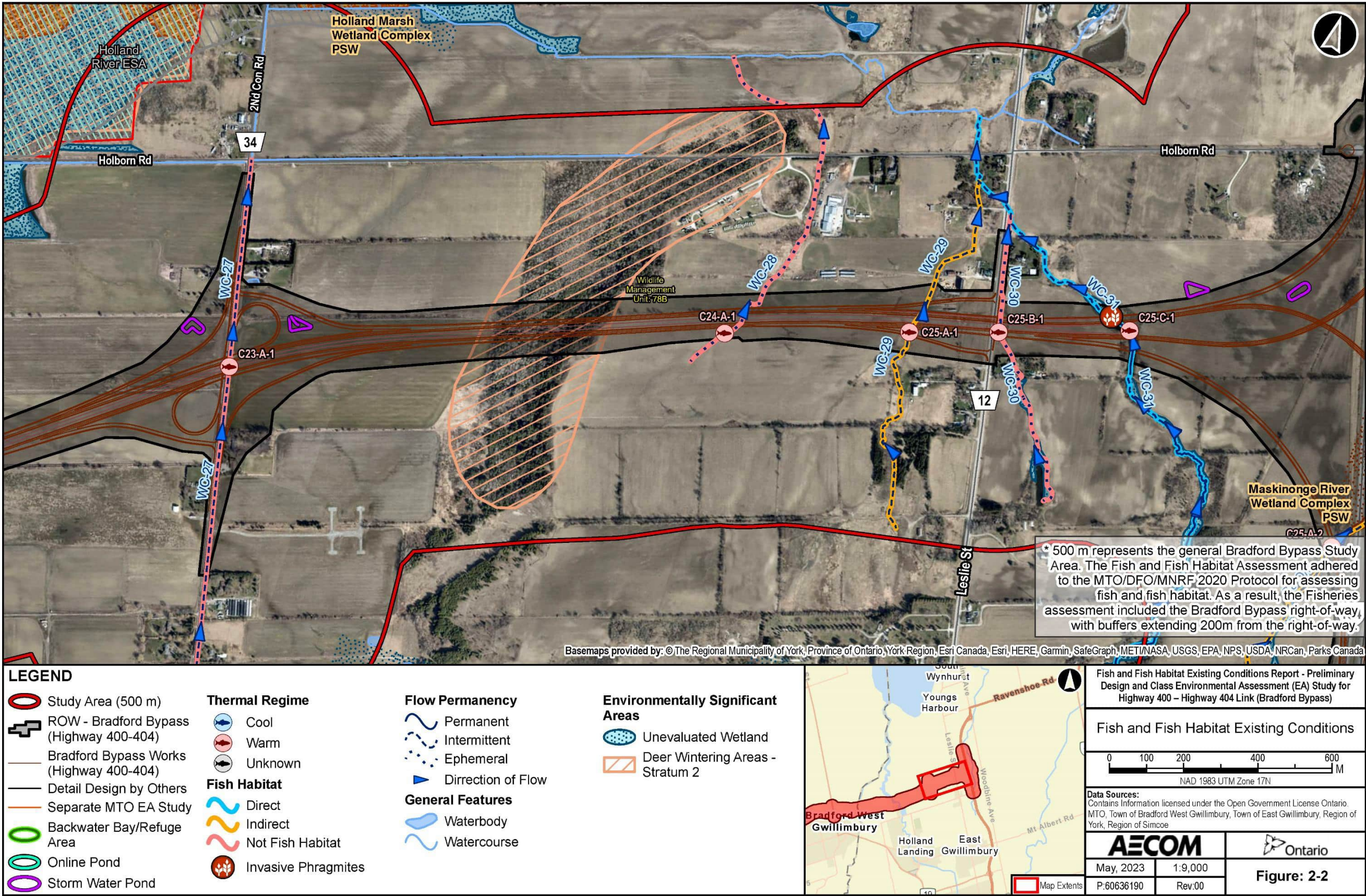


Figure 2-2: Fish and Fish Habitat Existing Conditions

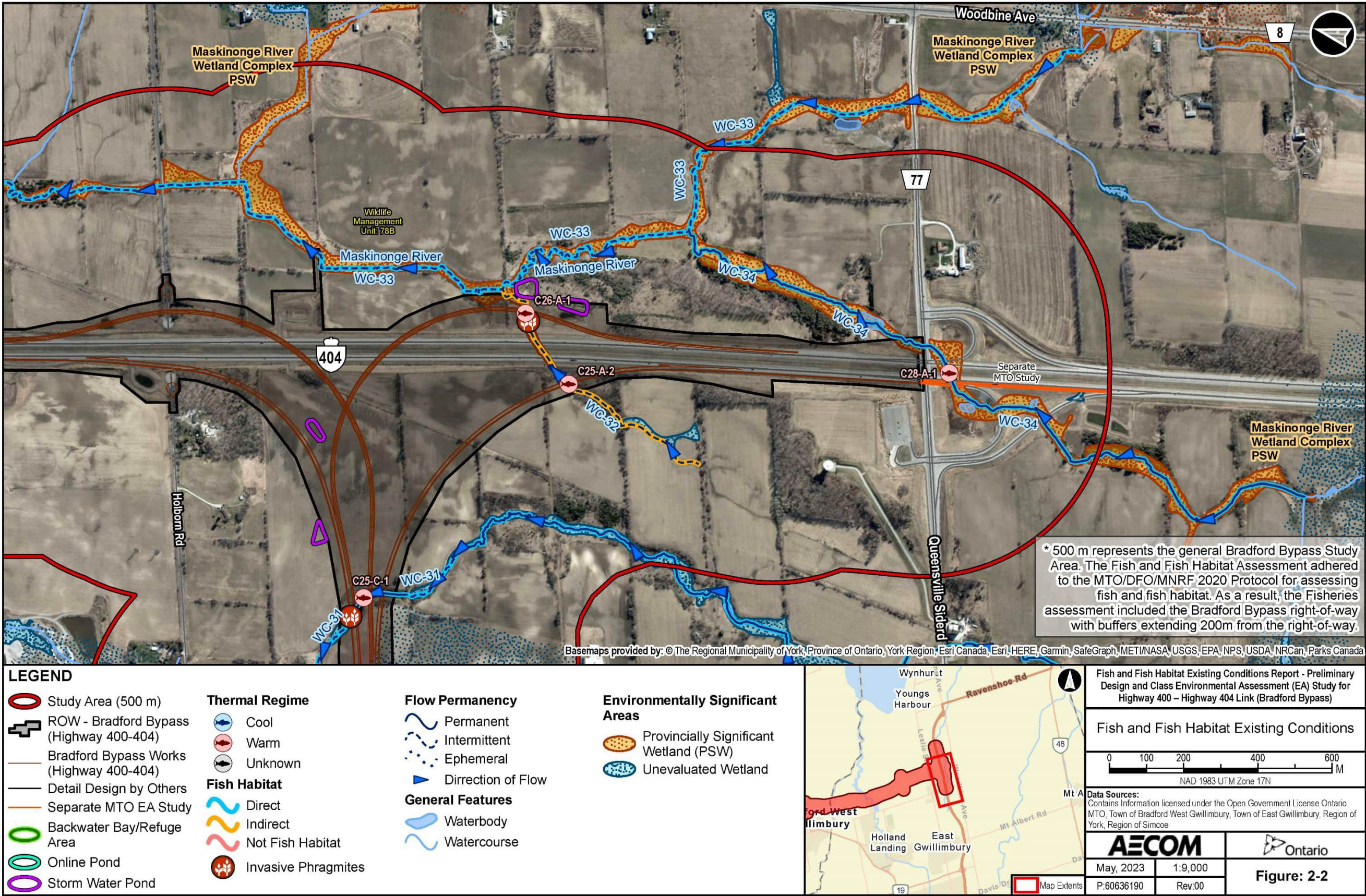
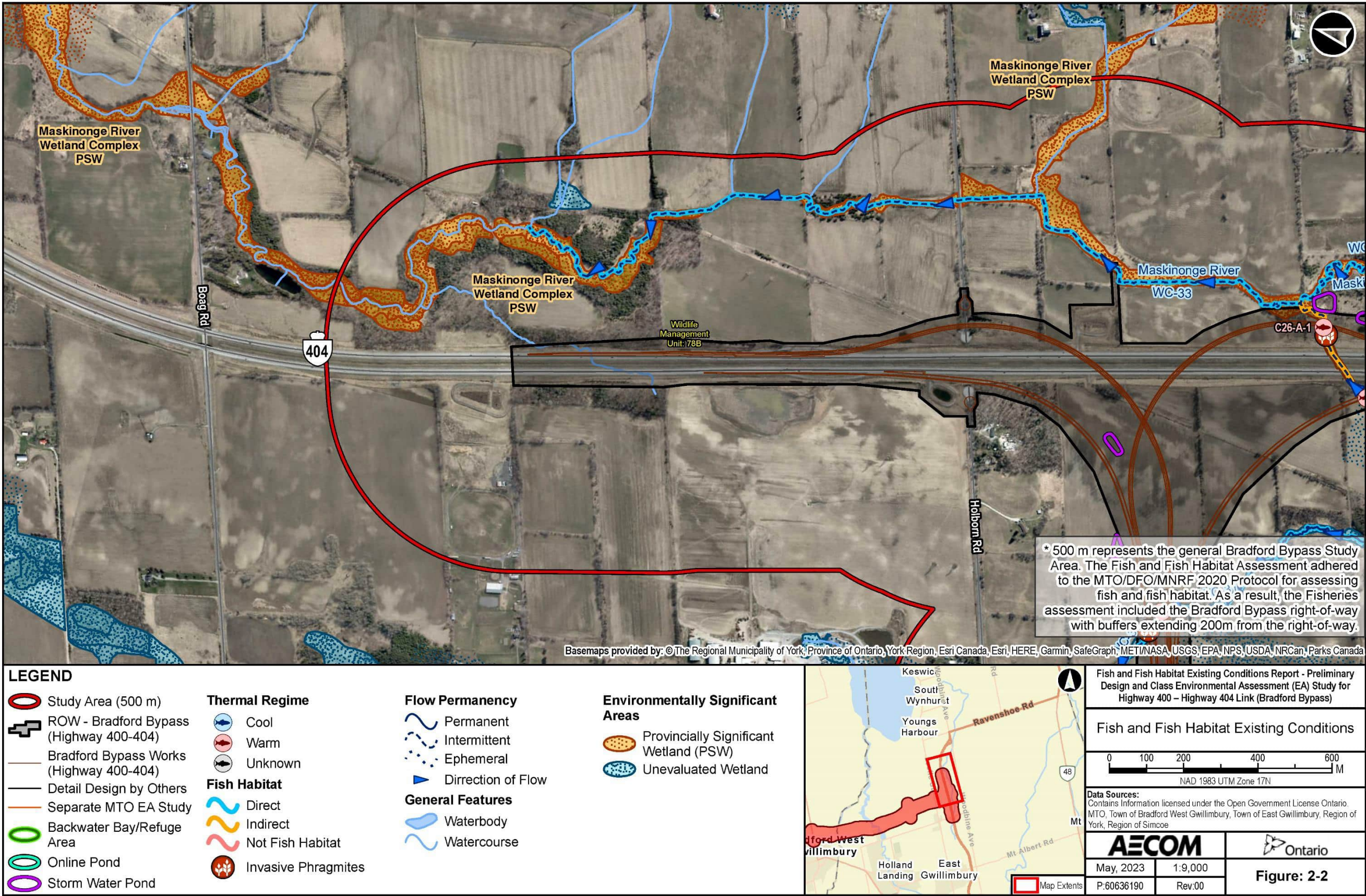


Figure 2-2: Fish and Fish Habitat Existing Conditions



Fifty-one crossings were assessed across 34 watercourses, as part of the fish and fish habitat impact assessment. All the crossings that contain fish habitat in the East Holland River Subwatershed, West Holland River Subwatershed and the Maskinonge Subwatershed support warmwater fish communities. Only the crossings in the Innisfil Creek Subwatershed support coolwater fish communities. The East and West Holland River crossings (20-A-1 and 17-A-1, respectively), as well as C16-A-1, are known spawning habitat for muskellunge species.

In total, 31 proposed culverts across 23 of the assessed fisheries crossings have been identified that may require in-water works such as a like-for-like culvert replacement, grading, culvert extension, new culvert installation, watercourse realignment, and new bridge construction in either direct or indirect fish habitat.

Information request letters were submitted on December 4, 2019, to the Midhurst and Aurora District Ministry of Natural Resources and Forestry offices, the Lake Simcoe Region Conservation Authority, the Nottawasaga Valley Conservation Authority and the Ministry of Environment, Conservation and Parks to obtain/confirm fisheries data associated with the watercourses within the Study Area as part of the preparatory works to Preliminary Design (*Fish and Fish Habitat Existing Conditions Report, Highway 400 – Highway 404 Link, W.O. # 19-2001*; AECOM, 2020). The information requests included the following:

- Watercourse names and crossing locations
- Watercourse classifications
- Habitat information/location
- Fish community data
- Absence/presence of any vulnerable species and/or critical habitat
- In-water work timing window
- Ministry of Natural Resources and Forestry management objectives
- Groundwater discharge areas, and
- Benthic invertebrate data.

A similar request was submitted to the Ministry of Environment, Conservation and Parks with regards to confirming the presence/absence of any aquatic Species at Risk records within the Study Area, and the response received on December 16, 2019, did not confirm the presence of any aquatic Species at Risk in the Study Area. It was noted in discussion with William Treaties First Nations on December 1, 2022, that they had observed both American Eel (*Anguilla rostrata*; Endangered Species Act – Endangered, Species at Risk Act – Not at Risk) and Northern Sunfish (*Lepomis peltastes*; Endangered Species Act – Special Concern, Species at Risk Act – Special Concern) in the Holland River.

Subsequently, the Project Team consulted with the Ministry of the Environment, Conservation and Parks, in March 2023 and was advised that the Ministry of Environment, Conservation and Parks records have no documented observances of the American Eel or Northern Sunfish in the Study Area. They also noted that the Northern Sunfish is a species of special concern and does not have a permitting status with the Ministry of the Environment, Conservation and Parks, and therefore would not be reported.

No records of aquatic Species at Risk that are afforded protection under the Species at Risk Act or Endangered Species Act are known to occur in the watercourses where culverts are anticipated to be installed. The presence or absence of Species at Risk will be re-confirmed in subsequent design phases.

Riparian vegetation removal, like-for-like culvert replacements, and culvert cleanout work can likely follow existing Best Management Practices. All other proposed works were carried to Step 4 of the Fisheries Assessment Process as per the Guide. AECOM Fisheries Biologists certified in the Ministry Registry, Appraisal and Qualification System as Fisheries Assessment Specialists have assessed the potential negative impacts of the proposed work and recommended appropriate mitigation measures to avoid or negate these impacts. Although a permanent alteration of direct and indirect fish habitat is anticipated from the proposed works, mitigation and environmental provisions have been proposed to reduce the impacts to fish habitat and facilitate the restoration and/or improvement of habitat at each proposed crossing. Works proposed that will require further review and consultation with Fisheries and Oceans Canada are outlined in **Table 5-11** in **Section 5.1.2**.

Refer to **Section 5.1.2** for details on the fish and fish habitat impacts, mitigation and monitoring requirements.

2.1.3 Stormwater and Drainage

2.1.3.1 Background

The 2002 Approved Environmental Assessment included a high-level drainage and surface water assessment, description of existing drainage conditions within the Study Area, and made recommendations for mitigation should surface water resources be impacted during further design or construction.

Since the completion of the 2002 Approved Environmental Assessment, several changes have occurred associated with drainage including applicable legislation and environmental conditions. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.1.3 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.1.3.2 Stormwater Management Plan

A Stormwater Management Plan was prepared by AECOM to document the stormwater management strategy that is proposed for the project and address the stormwater management requirements outlined in Section 22 of the Regulation. The Stormwater Management Plan (AECOM, March 2023) includes a summary of the stormwater management criteria, hydrologic and hydraulic assessment of the existing and proposed drainage systems, and the stormwater management strategy applicable to the project.

The existing drainage system along Highway 400, Highway 404 and sideroads includes roadside ditches, transverse and sideroad culverts, catchbasins located along municipal roads and localized ditch inlets that collect water from the ditch inlets, watercourses and roadside ditches.

Runoff generated within the Study Area drains to the three main drainage features that cross the proposed Bradford Bypass alignment.

Runoff from the western portion of the Study Area is conveyed westerly to Penville Creek by the existing culverts located under Highway 400 (EX-CL-400-1, EX-CL-400-2, and EX-CL-400-3). EX-CL-400-4 has been abandoned. These culverts discharge to a tributary of Penville Creek that runs southerly along the east side of Highway 400.

Flows along the tributary drain westerly across the highway through Culvert EX-CL-400-5 to Penville Creek, which is within the Innisfil Creek Watershed and in the jurisdiction of the Nottawasaga Valley Conservation Authority.

Runoff generated within the centre portion of the Study Area, which represents more than 90% of the project drainage areas, drains to the Holland River and Holland River East Branch. These rivers run northerly and ultimately discharge to Lake Simcoe.

Existing Culvert EX-CL-404-2 (4880 millimetres x 3050 millimetres structural concrete) drains an approximate area of 36.35 hectares from an area west of Highway 404 to Maskinonge River, which drains northerly to Lake Simcoe.

The Holland River subwatershed is drained by the Holland River, which flows in a northeast direction into Cook's Bay (Lake Simcoe). The main tributaries of the Holland River include: Ansnorveldt Creek, Glenville Creek, East Kettleby Creek, 400 Creek, Pottageville Creek, South Schomberg River, North Schomberg River, Fraser Creek, Scanlon Creek, William Neeley Creek, Coulson's Creek, and the Holland Marsh and its extensive canal and Municipal Drain system (Lake Simcoe Region Conservation Authority, 2010).

The Holland River East Branch flows generally in a northerly direction into Cook's Bay (Lake Simcoe). The main tributaries of the Holland River East Branch include the Main

Branch, flowing westward from a point west of Musselman's Lake, the Aurora Branch, Wesley Corners Creek, and Bogart Creek (Lake Simcoe Region Conservation Authority, 2010). The Main Branch and the Aurora Branch join north of the Town of Aurora to form the Holland River East Branch and continue to flow north to discharge into Cook's Bay (Lake Simcoe Region Conservation Authority, 2010).

Tributaries of the Maskinonge River begin in agricultural areas in the eastern half of the subwatershed and flow west towards Lake Simcoe. The Maskinonge River's northern and main Branches (closer to Lake Simcoe) are classified as warmwater habitat; however, the more southern tributaries (i.e., within the Study Area) are classified as cold to coolwater (Lake Simcoe Region Conservation Authority, 2010). Geographically, this subwatershed exists in a small portion of the Oak Ridges Moraine, limiting the amount of its tributaries influenced by groundwater and thus coldwater habitat is rare. Land use in the subwatershed is dominated by agriculture with natural areas interspersed throughout (Lake Simcoe Region Conservation Authority, 2010).

Figure 2-3 shows the overall drainage mosaics within the Study Area. Refer to **Section 5.1.3** for details on the stormwater and drainage impacts, and Stormwater Management Plan prepared for the project.

2.1.3.3 Drainage and Hydrology

A Drainage and Hydrology Report (AECOM, May 2023) was prepared to document the hydrologic and hydraulic assessments of the existing and proposed drainage systems, including the conceptual stormwater management strategy and a high-level Erosion and Sediment Control Plan associated with the project.

AECOM staff completed a site inspection on October 13th, 2020, to inspect the existing drainage system along the Bradford Bypass. A second site inspection was carried out on September 15th, 2022, to review in the areas where the new 10th Sideroad and 2nd Concession Road interchanges are proposed. Existing drainage features were evaluated on site, and any drainage issues or concerns were documented.

A hydraulic assessment was undertaken for the existing culverts to determine whether the existing structures could satisfy the design criteria and to identify culvert replacement requirements. The hydraulic analyses were carried out using the hydraulic modelling tool CulvertMaster. Following the results of the hydraulic assessment, the below is noted:

- Culverts EX-CL-400-3, EX-CL-400-6 and EX-CL-1 satisfy all three Design Criteria, Depth Criterion ($HW/D \leq 1.5$), 50-year Freeboard Criterion ($FB \geq 1$ metre), and the Overtopping Criterion (no road overtopping during the 100-year storm)

- Culverts EX-CL-400-1 and EX-CL-400-5 do not satisfy any of the three Design Criteria, Depth Criterion ($HW/D \leq 1.5$), 50-year Freeboard Criterion ($FB \geq 1$ metre), and the Overtopping Criterion (no road overtopping during the 100-year storm)
- Culvert EX-CL-2 satisfy the Depth Criterion ($HW/D \leq 1.5$), and the Overtopping Criterion (no road overtopping during the 100-year storm). The 50-year Freeboard Criterion ($FB \geq 1$ metre) is not satisfied. The provided value is 0.31 metre
- Culvert EX-CL-20 satisfy the Depth Criterion ($HW/D \leq 1.5$), but not the Overtopping Criterion (no road overtopping during the 100-year storm) and the 50-year Freeboard Criterion ($FB \geq 1$ metre)
- Culvert EX-CL-404-2 is an existing structural culvert (4880 millimetres x 3050 millimetres) located along a regulated watercourse by Lake Simcoe Region Conservation Authority. Culvert EX-CL-404-2 is in good condition and is a large size culvert for the drainage area (36.35 hectares)
- Culverts EX-CL-8 and EX-CL-9 were evaluated as part of the County Road 4 Early Works for Bradford Bypass (GWP 2008-21-00), and
- EX-CL-14 (Metrolinx Culvert) does not meet any of the standards with the exception of $HW/D < 1.5$ ratio under the 100-year storm. The provided 100-year $HW/D < 1.5$ value is 1.43.

Refer to **Section 5.1.3** for the stormwater and drainage impacts, and the proposed Stormwater Management Plan prepared for the project.

Figure 2-3: Overall Existing Drainage Mosaic

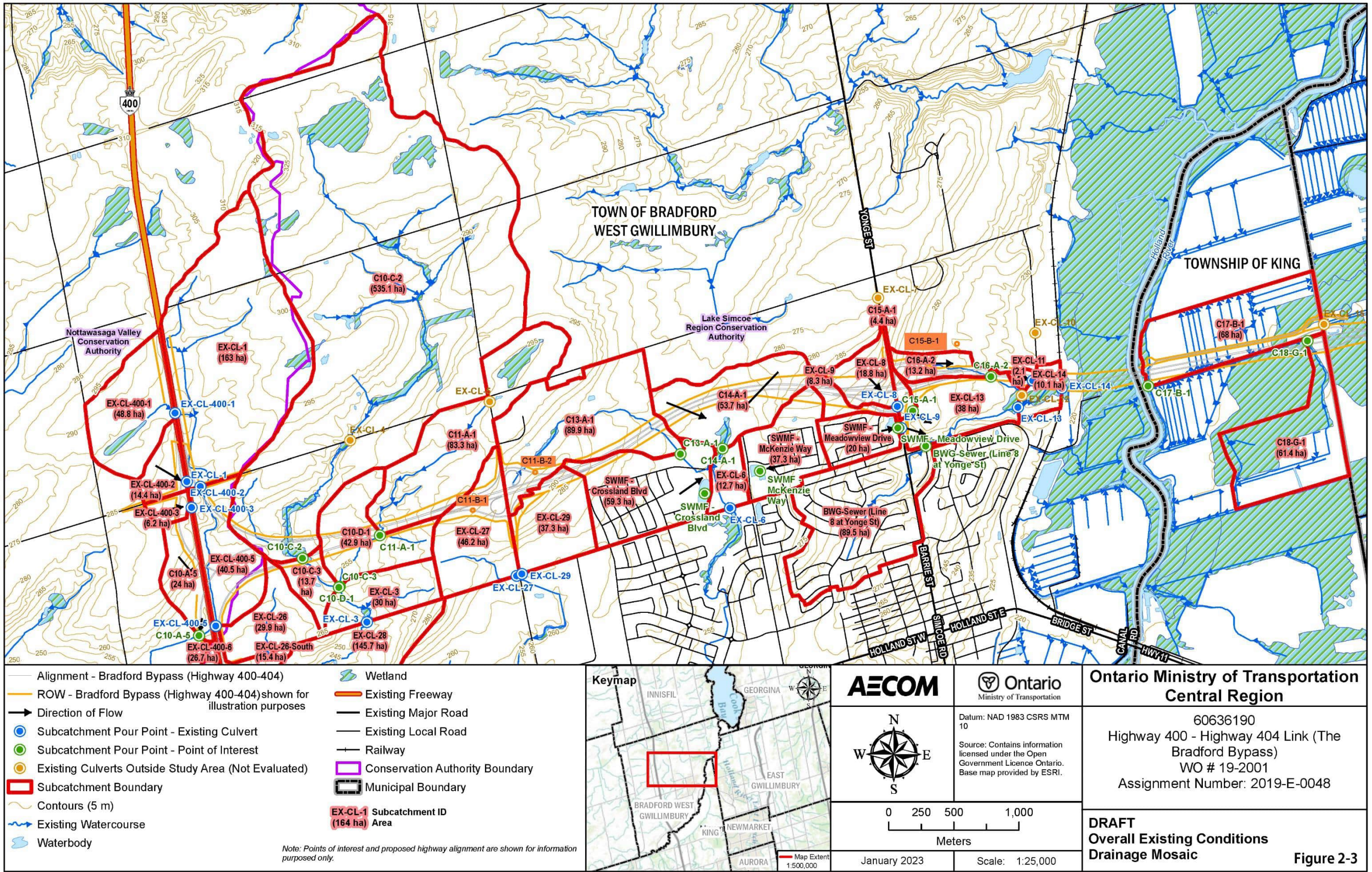


Figure 2-3: Overall Existing Drainage Mosaic

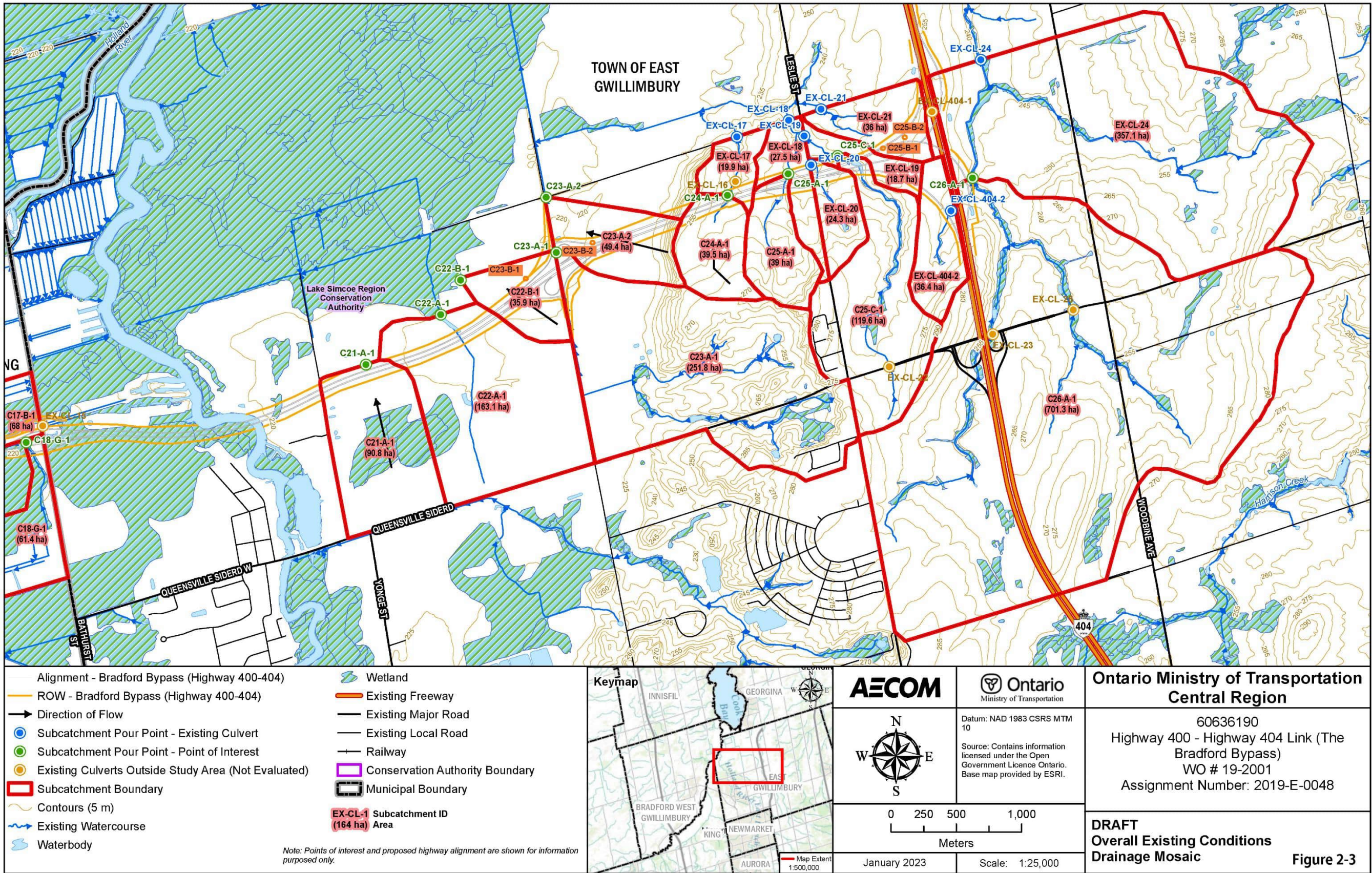


Figure 2-3: Overall Existing Drainage Mosaic

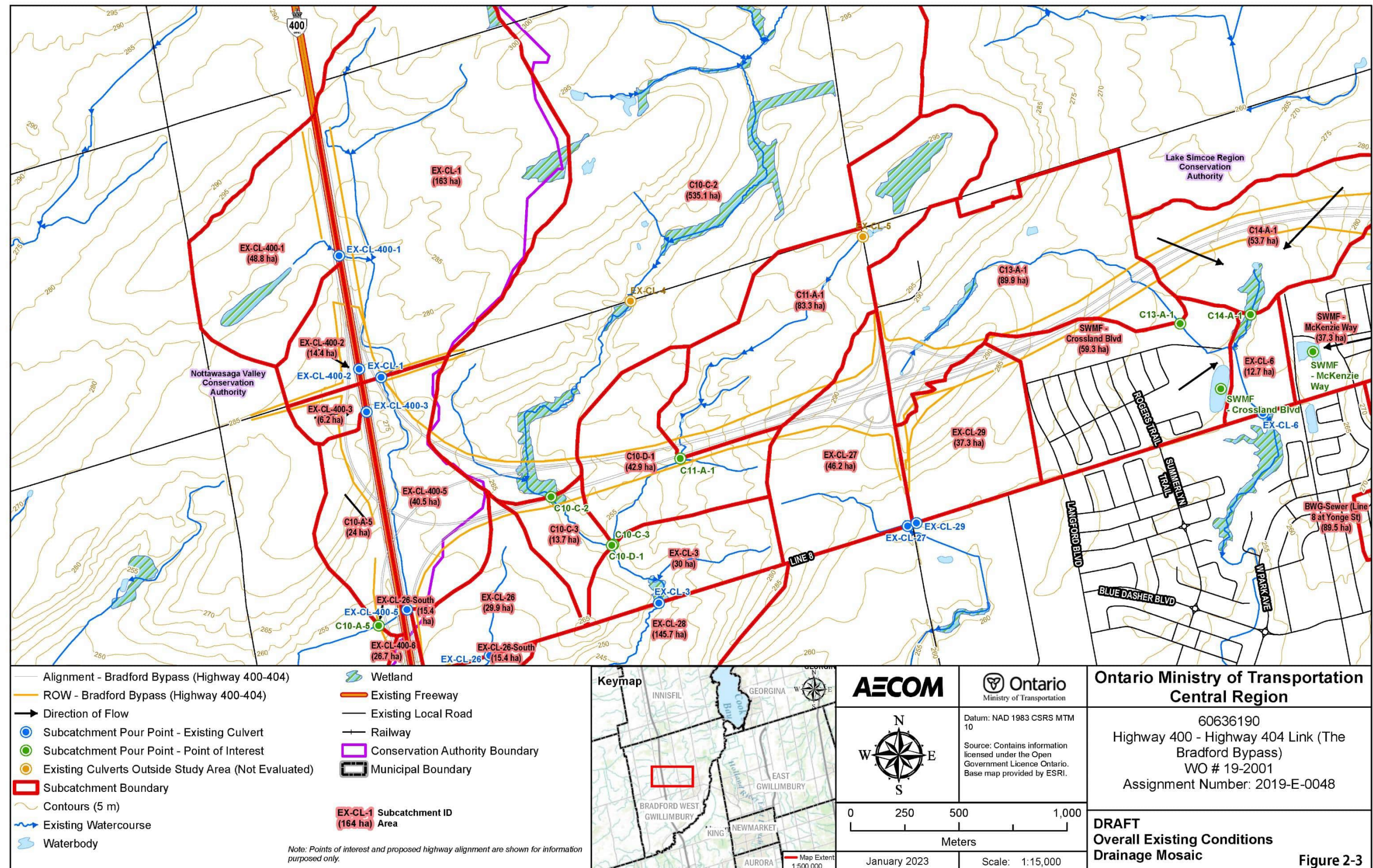


Figure 2-3: Overall Existing Drainage Mosaic

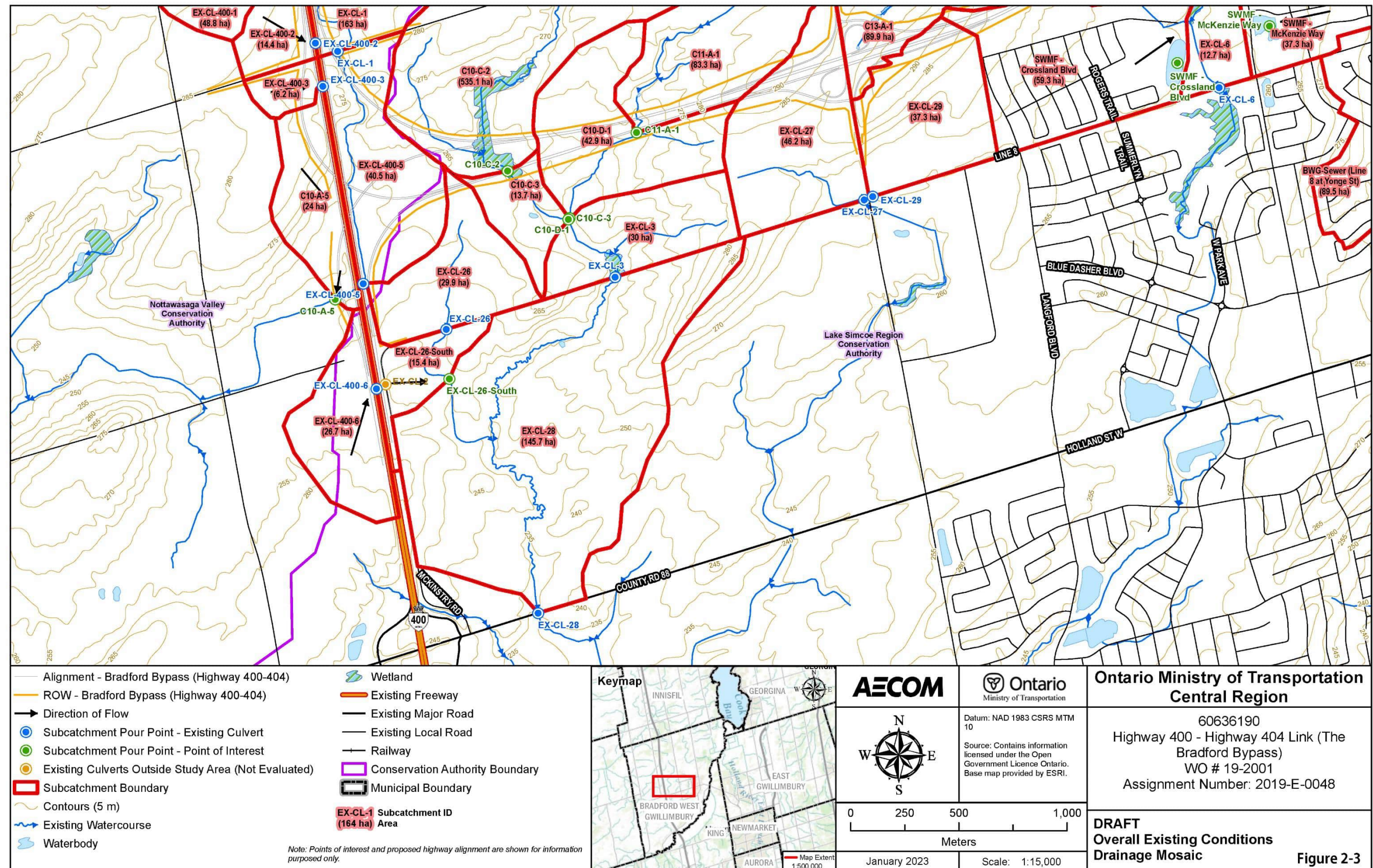


Figure 2-3: Overall Existing Drainage Mosaic

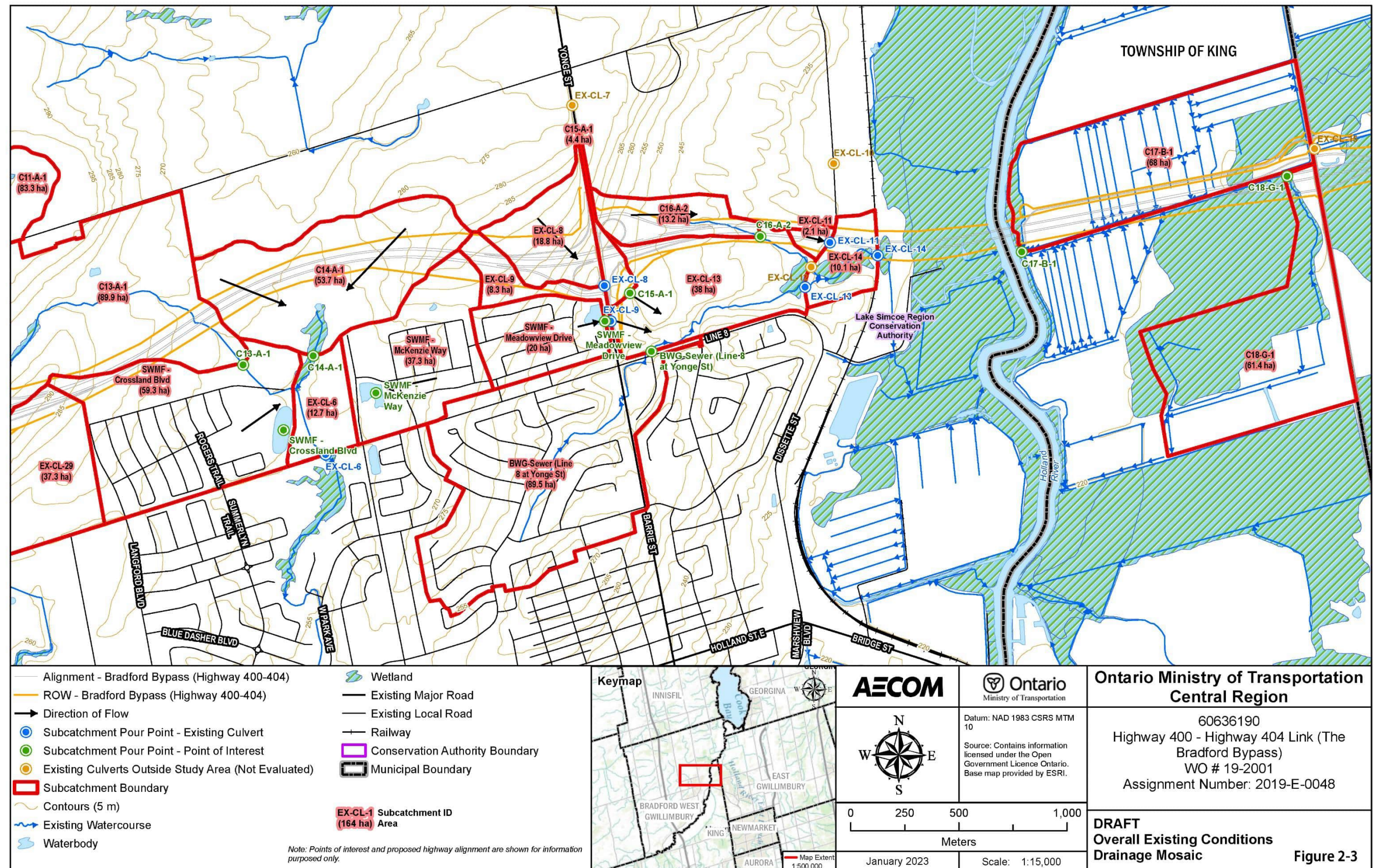


Figure 2-3: Overall Existing Drainage Mosaic

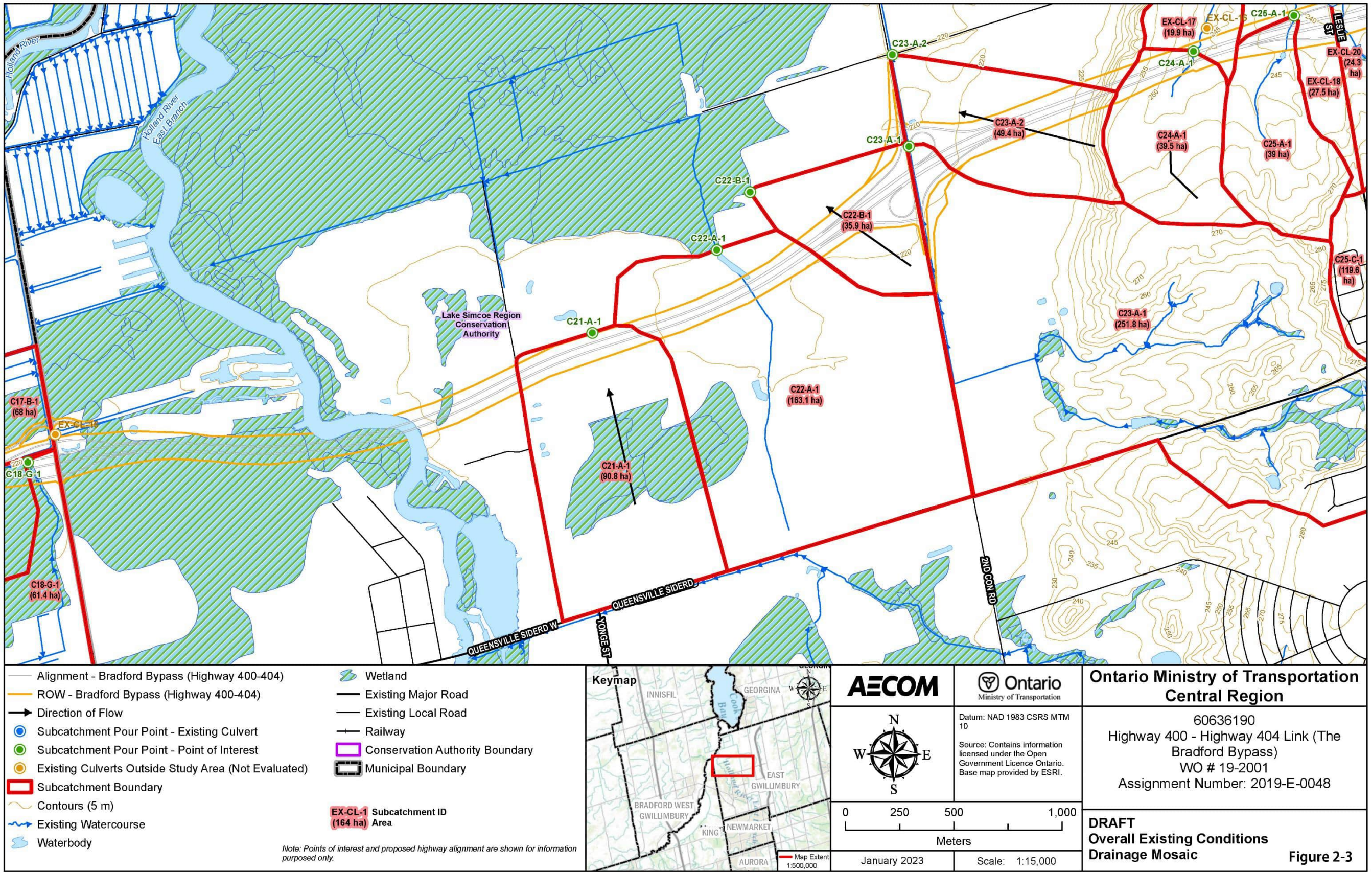
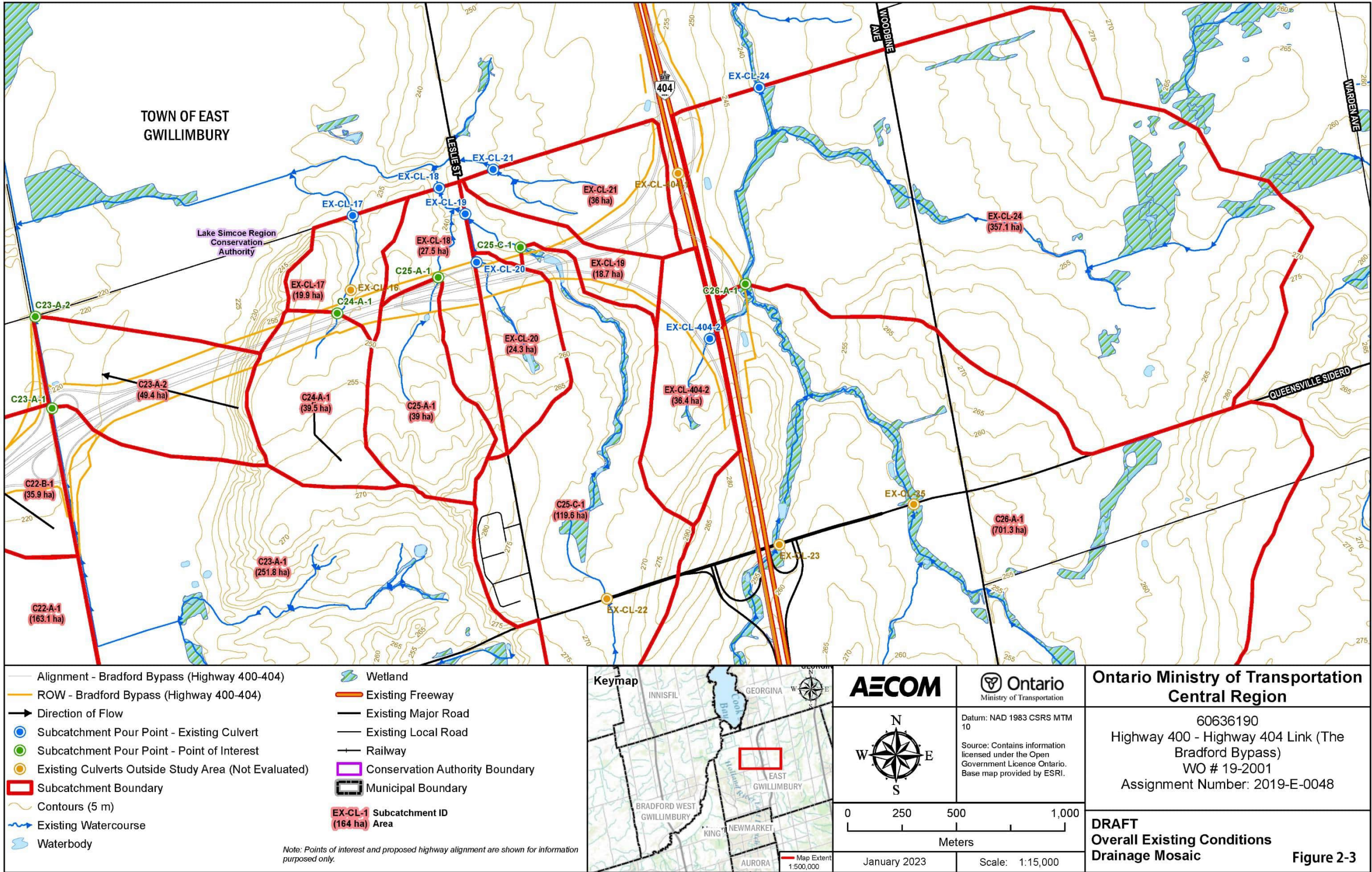


Figure 2-3: Overall Existing Drainage Mosaic



2.1.4 Groundwater and Hydrogeology

2.1.4.1 Background

The 2002 Approved Environmental Assessment included a high-level groundwater assessment, description of the existing groundwater conditions within the Study Area and made recommendations for mitigation should groundwater resources be impacted during further design or construction.

Since the completion of the 2002 Approved Environmental Assessment and the 2020 Preliminary Design preparatory work, several changes have occurred associated with groundwater and hydrogeology including applicable legislation and environmental conditions. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.1.4 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.1.4.2 Groundwater Protection and Well Monitoring Plan

A Groundwater Protection and Well Monitoring Plan was prepared by AECOM in accordance with Section 23 of the Regulation to characterize the local physical and groundwater setting, quantify potential dewatering requirements for construction, assess possible impacts to local water wells and groundwater dependant environmental features, and recommend appropriate monitoring and/or mitigation measures, as required.

2.1.4.2.1 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed a Groundwater Management Plan (AECOM, March 2023). The key groundwater and hydrogeology details are summarized below.

AECOM has completed an initial assessment of the groundwater and surficial soils within the Study Area and documented the review in the Highway 400 to Highway 404 Link (Bradford Bypass) Hydrogeological Data Report (AECOM, 2022), however, a detailed groundwater interference assessment cannot be completed until the freeway alignment is finalized during the subsequent Detail Design phase. All groundwater plans should assume the potential for groundwater interference to be limited to those areas where the deeper road alignment (trenches, ditches, and bridge support structures) will cut 1 metre to 15 metres into the subsurface locally and will extend below the existing groundwater table. In these excavations, a silt and silty clay glacial lacustrine deposit with silt sand seams, areas of sand and gravel or peat may be encountered depending on the area of excavation and require dewatering that would result in the lowering of the surrounding shallow groundwater level. Groundwater interference is considered to result

when water levels in the adjacent residential domestic water wells are lowered by the dewatering process typically undertaken during construction activities to a point that adversely affects the residential water supply.

In the case of this project, potential well interference is anticipated to most likely be limited to shallow drilled or dug wells completed at similar depths to the respective excavation and dewatering depths. These water supply wells could potentially experience lowering of the water levels where they access permeable shallow surficial soils that are under active dewatering. The potential radius of influence from the project needs to be determined during the subsequent Detail Design dewatering assessments for each excavation that extends below the water table.

The pre-construction saturated aquifer thickness value is to be estimated using the inferred water table elevation and the estimated elevation of the aquifer base (aquitard). The calculated radius of influence at each dewatering location shall be summarized and reported on by the subsequent Detail Design designer.

Deep wells completed in the deeper surficial soils (15 metres or deeper), which represent the majority of drilled domestic water wells within the Study Area, are not anticipated to experience any significant interference from dewatering related to the project. However, if it is determined during subsequent Detail Design and Construction that such a potential exists, measures to address this issue should be considered.

Based on a review of nearby domestic water wells, within the Study Area there are potentially 260 domestic, livestock, commercial, industrial, or public water supply wells within the Study Area that could be affected.

In addition, a Water Well Survey was completed for this Preliminary Design study. The Survey considered review of available secondary source information and obtaining primary data from stakeholders within the Study Area regarding their existing water well. The Door-to-Door Water Well Survey provides a baseline for the water wells prior to the proposed construction to determine existing water quality and quantity of each property.

The initial step in the Door-to-Door Water Well Survey involved a review of available project documentation and design information relating to the proposed construction activities and methods, as well as a desktop review of existing published information within a radial distance of approximately 500 metres of the Study Area.

Upon completion of the preliminary desktop review undertaken in 2021, a water well survey form was mailed to all known and listed Property Owners in the Ministry of the Environment, Conservation and Parks database on August 31, 2021. In addition to the water well survey form, a letter was also included which provided an explanation of the water well survey works. The Property Owners that were contacted were requested to

complete the water well survey form and send it back to the Project Team. The water well survey form allowed the Property Owner to confirm groundwater use and to provide basic well information, including the location, type, depth, condition, use, yield, and water quality of any identified wells. A stamped envelope was left at each residence in a conspicuous location (i.e., in mailbox or front door) for completion by the Property Owner and return mailing to AECOM.

The purpose of the initial desktop review and field reconnaissance was to identify, on a preliminary basis to the extent possible, the following:

- General groundwater usage including aquifers, well types and locations
- Location and use of large volume wells, if present, and
- Wells with known quality and/or quantity problems.

For each identified well source where permission to access was obtained from the Property Owner, a baseline well survey/assessment was carried out to document pre-construction conditions (quality and quantity). The scope of each baseline (pre-construction) well survey was developed based on requirements outlined in the following reference documents:

- Ministry, April 2004. Guidelines for Drinking Water Sampling and Testing in Ministry of Transportation Activities, and
- Ministry of the Environment, Conservation and Parks, December 2009. Water Supply Wells – Requirements and Best Management Practices. Chapter 10 – Yield Test.

The baseline survey for each identified well (where accessible) included the following elements, at a minimum:

- Interview with the current Property Owner and/or tenant
- Documentation of well construction details (including well type, diameter, casing material, total depth, stick-up, general condition, co-ordinate location, etc.) in written form and through the collection of digital photographs
- Measurement of the static groundwater level within the well, and
- Collection of a representative raw (untreated) water sample for analysis of general water quality (pH; total hardness; total alkalinity; calcium, magnesium, sodium; potassium; iron, manganese; chloride; sulphate; nitrate [NO₃-N]; nitrite [NO₂-N], ammonia/ammonium [NH₃-N]; electrical conductivity; total dissolved solids [TDS]; total suspended solids [TSS]; tannin and lignins) and microbiological (E. coli, faecal coliforms, total coliforms) parameters.

Variations to the generalized methodology above were made in the field, as required, based on site-specific conditions encountered at each property and/or requests made by individual Property Owners.

Refer to **Section 5.1.4** for details on the groundwater impacts, mitigation and monitoring requirements.

2.1.4.3 Water Well Survey

The Water Well Survey Report (AECOM, April 2023) was prepared to summarize the work undertaken and factual data obtained by AECOM as part of the Preliminary Design assignment to fulfil obligations for the pre-construction assessment of private well supplies in the vicinity of the Study Area.

A Door-to-Door Water Well Survey was completed. A total of 143 properties were identified within a radial distance of approximately 500 metres of the Study Area. Of the 143 Property Owners, input was received from 17 Property Owners or 12% of the identified properties. Refer to **Section 5.1.4.2** for results of the Door-to-Door Water Well Survey, and details on the water well impacts, mitigation and monitoring requirements.

2.1.4.4 Hydrogeology

A Hydrogeological Data Report (AECOM, April 2023) was prepared for the intent of characterizing the local physical and hydrogeological setting, quantifying potential source water protection areas of concern, and determining preliminary groundwater hydraulic conductivity and groundwater quality with the Study Area. It is recommended that the Hydrogeological Data Report be updated based on the data gaps identified during the subsequent Detail Design of the project.

The Hydrogeological Data Report was prepared to provide a technical assessment and characterization of local geological and hydrogeological conditions based on a review of available background information, along with the results of a hydrogeological field investigation program comprised of groundwater level monitoring, single well response testing, and groundwater quality sampling.

The assessment included a review of available reports, mapping, and other published documentation pertaining to the Study Area. Examples of information reviewed included, but was not limited to: physiography, surficial geology, Quaternary geology, and bedrock geology mapping available from Ontario Geological Survey, and the results of recent Geotechnical Investigation completed by Golder/WSP in 2022.

Stemming from the results of the preliminary background information review, a hydrogeological field investigation program was developed and implemented by

AECOM for the project between February and August 2022. Tasks relating to hydrogeological aspects of the investigation program included:

- Development of 13 groundwater monitoring wells installed by Golder/WSP in 2022 as part of a project related geotechnical engineering investigation
- Measurement of groundwater levels within each of the 13 monitoring wells
- Single well response in each of the 13 monitoring wells
- Collection of groundwater samples for laboratory geochemical analysis from all 13 monitoring wells, and
- Evaluation of potential impacts associated with project related dewatering activities related to source water protection areas.

Some of the installed monitoring wells could not be accessed during the hydrogeological investigation due to access issues related to safety concerns due to proximity to major highways, damaged wells after construction or encampments. Two monitoring wells are currently still being assessed.

Additionally, approximately seven monitoring wells were installed after August 2022 by Golder/WSP which are to be assessed during Detail Design. It is expected that each unassessed monitoring well will continue to be monitored and assessed during the subsequent Detail Design phase of the project. Refer to the Hydrogeological Data Report for further details on monitoring well construction details.

The Study Area is bisected in an approximate northeast to southwest direction by a fluvial terrace that serves as a divide between the Schomberg Clay Plains (west) and the Simcoe Lowlands (east) physiographic regions, as described by Chapman and Putnam (1984). A brief discussion of each region is provided below.

The Schomberg Clay Plains encompass three distinct areas near Schomberg, Newmarket, and to the north of Lake Scugog, covering a total area of approximately 1,230 square kilometres. Within the Schomberg and Newmarket areas, the region is characterized generally by a muted drumlinized till plain that is overlain predominantly by a varying thickness of surficial clay (glaciolacustrine) soils. Some of the larger drumlins have escaped complete burial; however, where present, the clay may extend well up their side slopes.

The Simcoe Lowlands border on the shorelines of Lake Simcoe and Georgian Bay and encompass a combined area of approximately 2,850 square kilometres. The component of this region that borders on Lake Simcoe is aptly termed the Lake Simcoe Basin given that approximately half of its area is occupied by the lake's waters. Within the vicinity of the Site, the Simcoe Lowlands present as a broad valley between high morainic hills

that extends generally southwestward over a distance of about 24 kilometres from the present-day limits of Cook's Bay (Lake Simcoe). Historically, this low-lying area represented a shallow southward extension of Lake Simcoe, that is now occupied predominantly by marshland and the meandering channel of the Holland River. Occurrences of peat within the marshland area is common.

Ground surface topography within the Study Area ranges significantly with 283 metres above sea level on the western side (Highway 400), down to 217 metres above sea level within the Holland River Lands and back up to 250 metres above sea level near eastern side (Highway 404), with a total relief of up to about 67 metres, based on a review of ground surface elevations reported upon the various borehole logs. Drainage is primarily towards the Holland River lands towards the Holland River and Holland River East Branch.

Refer to **Section 5.1.4.3** for details on the hydrogeology impacts, mitigation and monitoring requirements.

2.1.5 Fluvial Geomorphology

Fluvial Geomorphology Impact Assessments were prepared by AECOM to characterize geomorphological baseline conditions and provide input to preliminary crossing design and impact assessment for the watercourse reaches upstream and downstream of the proposed crossings.

2.1.5.1 Background

A description of the environmental conditions within the Study Area is included in Section 2.1.5 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.1.5.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed two Fluvial Geomorphological Assessment Reports: Fluvial Geomorphological Assessment - Bradford Bypass Crossings (AECOM, April 2023) and Fluvial Geomorphological Assessment – Holland River Crossings (AECOM, April 2023).

From east to west, the overall Study Area spans the subwatersheds of Maskinonge River, West Holland River, East Holland River, and the Innisfil Creek. The Maskinonge and the Holland River subwatersheds are part of the larger Lake Simcoe watershed and are under the jurisdiction of the Lake Simcoe Region Conservation Authority, while the Innisfil Creek subwatershed is part of the larger Nottawasaga River watershed and is under the jurisdiction of the Nottawasaga Valley Conservation Authority.

Reach breaks within the Study Area were first delineated through a desktop assessment of tributary locations, channel gradient, geology, valley setting, sinuosity and riparian vegetation using Geographic Information System layers. Historical aerial photographs showing each of the reaches in the vicinity of the Study Area taken in 1969, 1981, and 2018 were reviewed to analyze changes in local land use and channel planform in the vicinity of the proposed crossing structures. The reaches were subsequently confirmed in the field.

Field reconnaissance was completed between September 22 and October 1, 2020, and again between May 24 and May 26, 2022, to assess identified reaches within the Study Area. Field work was performed to identify existing geomorphological form and processes located within the Study Area and to verify the results of the desktop assessment.

Key details from the fluvial geomorphological assessments for the Holland River crossings and all other crossings (hereinafter referred to as the Bradford Bypass crossings) are summarized in the sections below.

2.1.5.2.1 Holland River Crossings

The following can be concluded from the fluvial geomorphological assessment and meander belt assessment completed for the Holland River crossings:

- The Rapid Geomorphic Assessment classified both reaches of the Holland River as 'In Regime' indicating that channel morphology is stable and with little evidence of changes to the planform, bed, or banks
- Throughout the reach along Holland River and Holland River East Branch, there was minor evidence of aggradation, widening (for Holland River), and planimetric form adjustment
- The current meander belt width assessment only analyzed the Holland River and Holland River East Branch, whose hydrological regime was categorized as permanent. Both watercourses are also classified as "unconfined"
- The meander belt widths calculated for reaches delineated to the north and south of the proposed crossings within the Holland River and Holland River East Branch range from 161 to 310 metres
- Overall, an average 100-year erosion rate of 24.5 metres or 0.25 metres/year was calculated for the Holland River, and 21.9 metres or 0.22 metres/year for the Holland River East Branch, and
- The final meander belt width predicted for the Holland River is approximately 923.2 metres while the meander belt width predicted for the Holland River East Branch is 987.3 metres.

2.1.5.2.2 Bradford Bypass Crossings

The following can be concluded from the fluvial geomorphological assessment and meander belt assessment completed for the Bradford Bypass crossings:

- A total of 43 features were investigated with 26 features identified as ephemeral and 17 permanent/intermittent features:
 - Defined (intermittent or permanent) features were described and photographed in the field and a Rapid Geomorphic Assessment, cross section, and bank data assessment, were completed as close to the proposed crossing location as possible to help inform crossing structure sizing and to document any evidence of channel instability, and
 - Undefined (ephemeral) channels were described in the field and photographed. Ephemeral features typically have small drainage area and limited seasonal flows. They are not typically strong enough to form defined channel boundaries or to cause erosion within the reach.
- The majority of permanent/intermittent features investigated (17 in total) were found to be “In Regime” and with low erosion risk as per the field investigations and the results of the Rapid Geomorphic Assessment. Only one crossing was found to be in “Transitional or Stressed” conditions and with “Moderate” erosion risk
- The dominant processes occurring within the Study Area include aggradation, widening, and planimetric form adjustment. Only three reaches were characterized as having evidence of degradation
- Eleven of the 17 reaches assessed for this project were noted to be experiencing channel widening. Comparatively, evidence of aggradation was noted at 10 of the 17 permanent/intermittent reaches, and
- A total of 17 intermittent and/or permanent reaches were identified and assessed. Ten of these reaches were classified as unconfined with access to the floodplain, based on desktop background research and field assessment. The remaining seven reaches were assessed as partially confined or confined systems. For these reaches the meander belt which varies longitudinally due to the influence of the confining valley walls.

Figure 2-4 shows the reaches within the Study Area. Refer to **Section 5.1.5** for details on potential impacts and proposed mitigation measures and commitments relating to fluvial geomorphology for the Holland River and Bradford Bypass crossings.

Figure 2-4: Fluvial Geomorphology Reaches

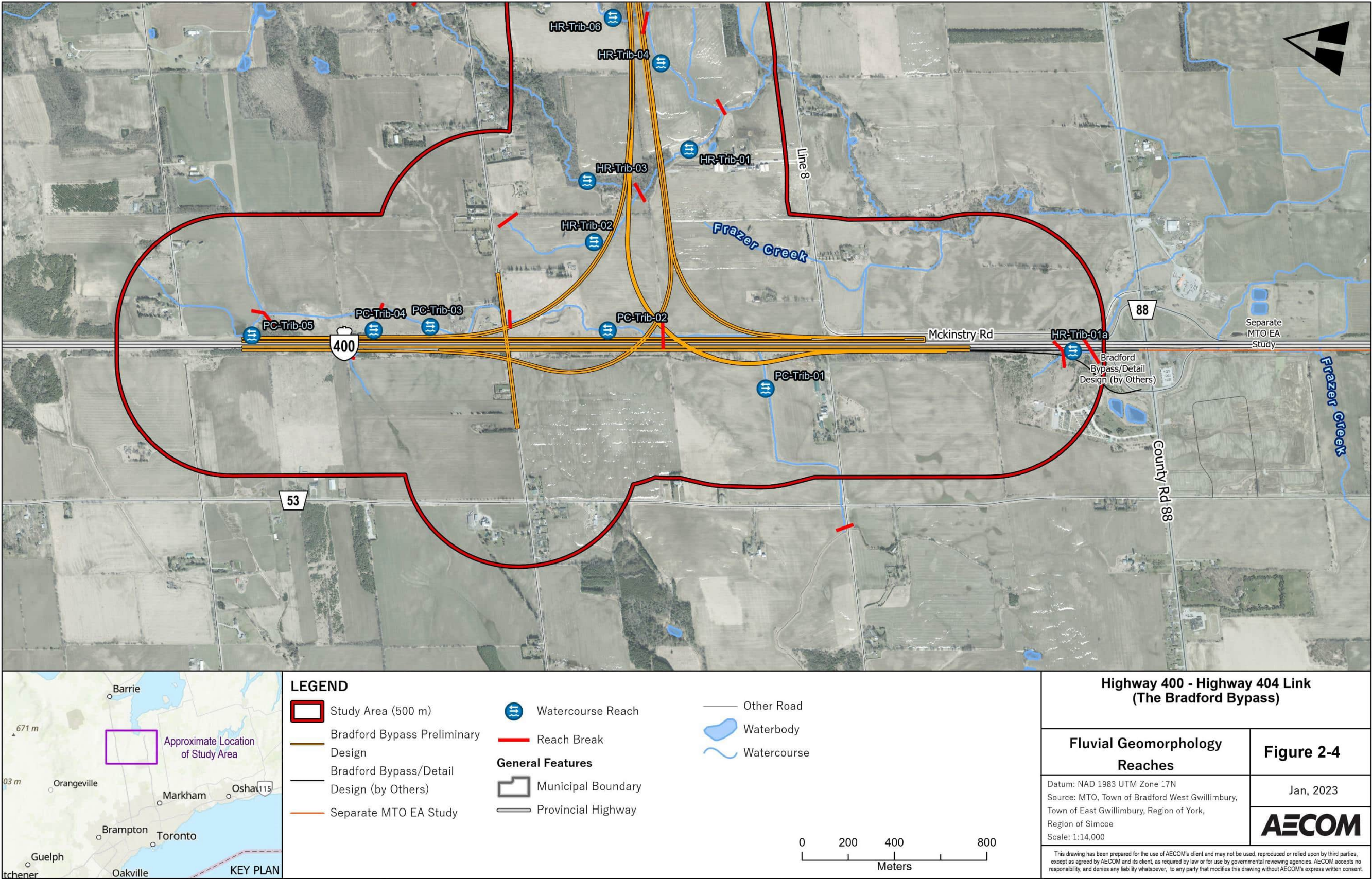


Figure 2-4: Fluvial Geomorphology Reaches

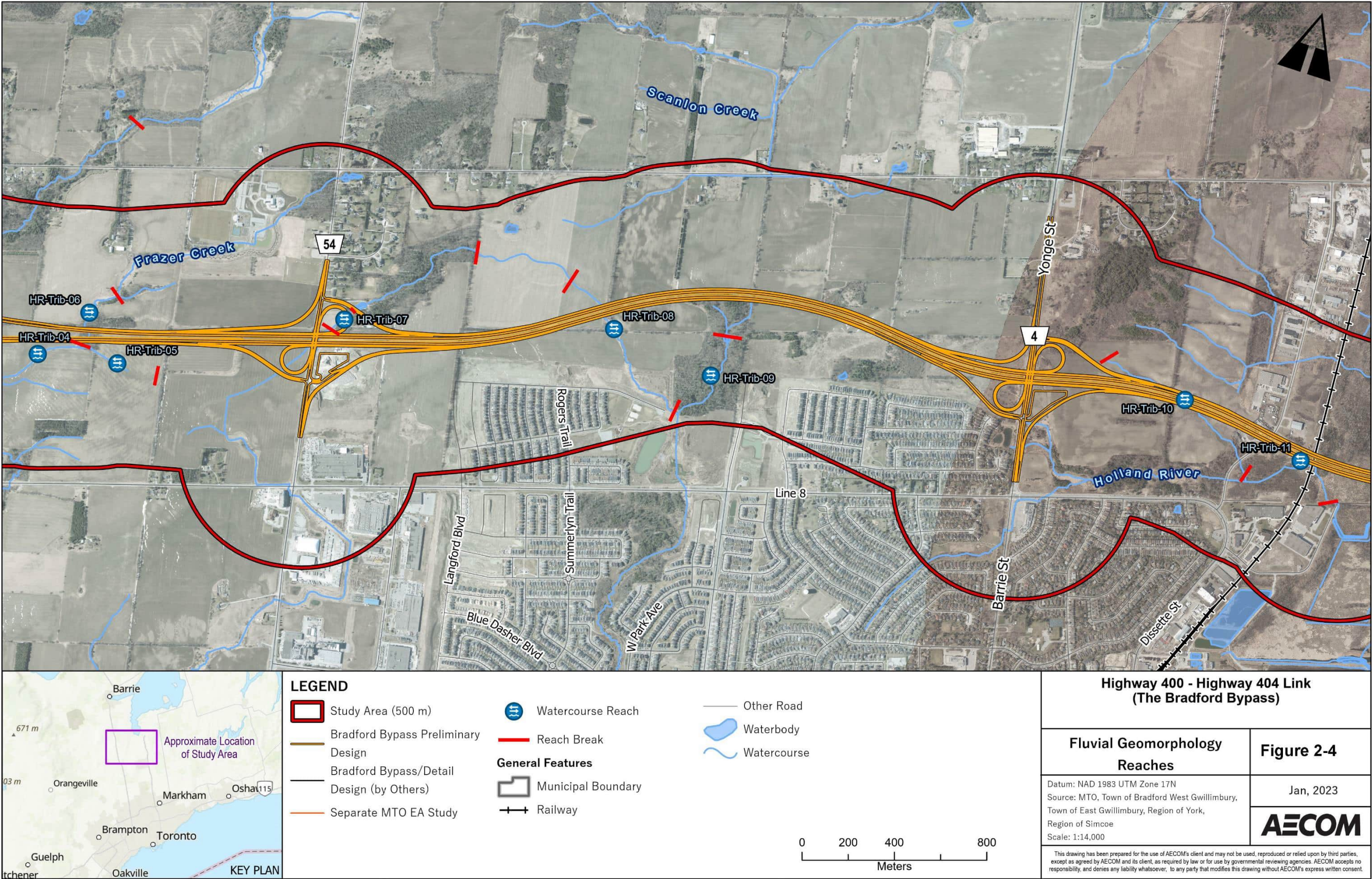


Figure 2-4: Fluvial Geomorphology Reaches

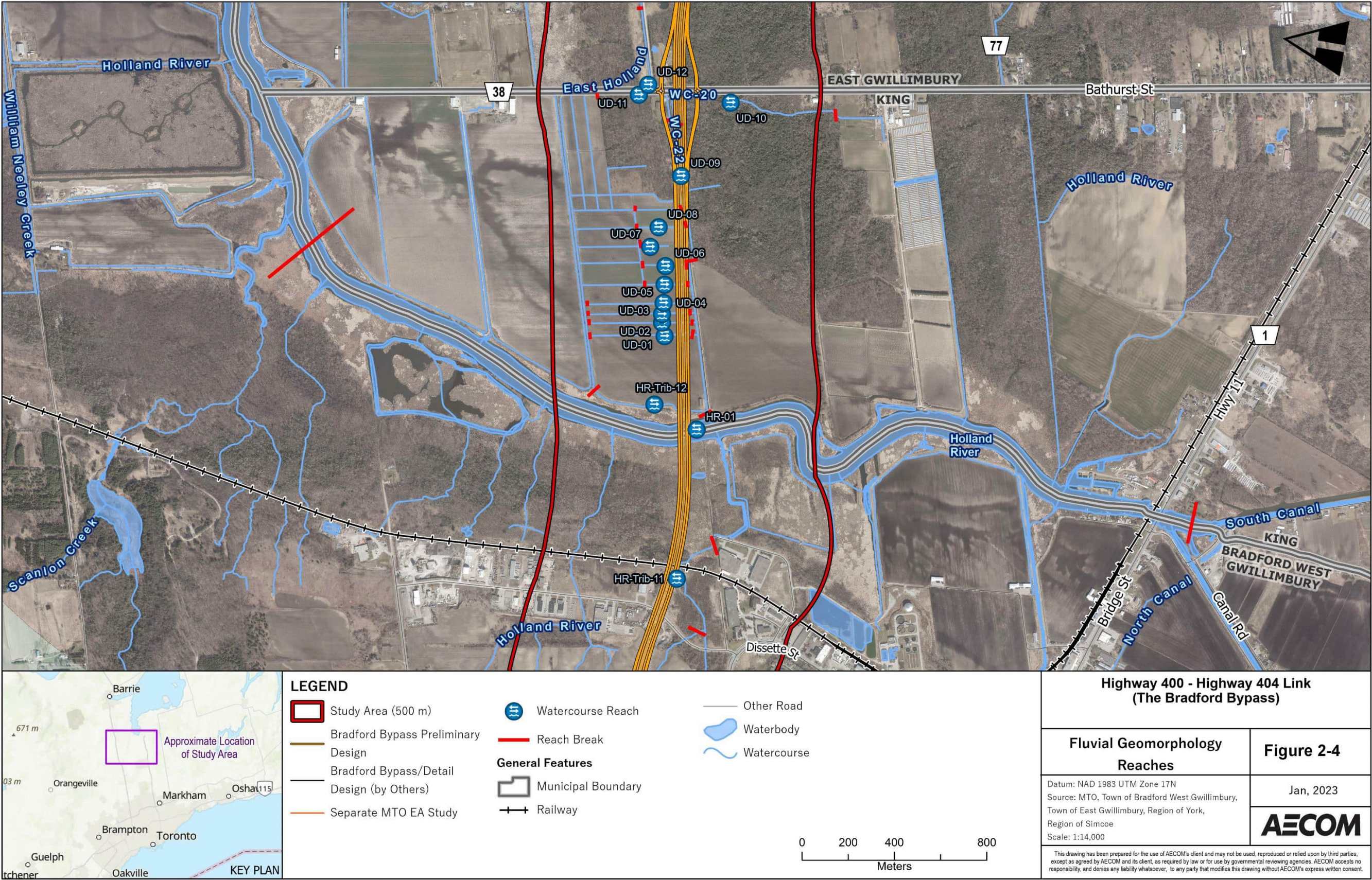


Figure 2-4: Fluvial Geomorphology Reaches

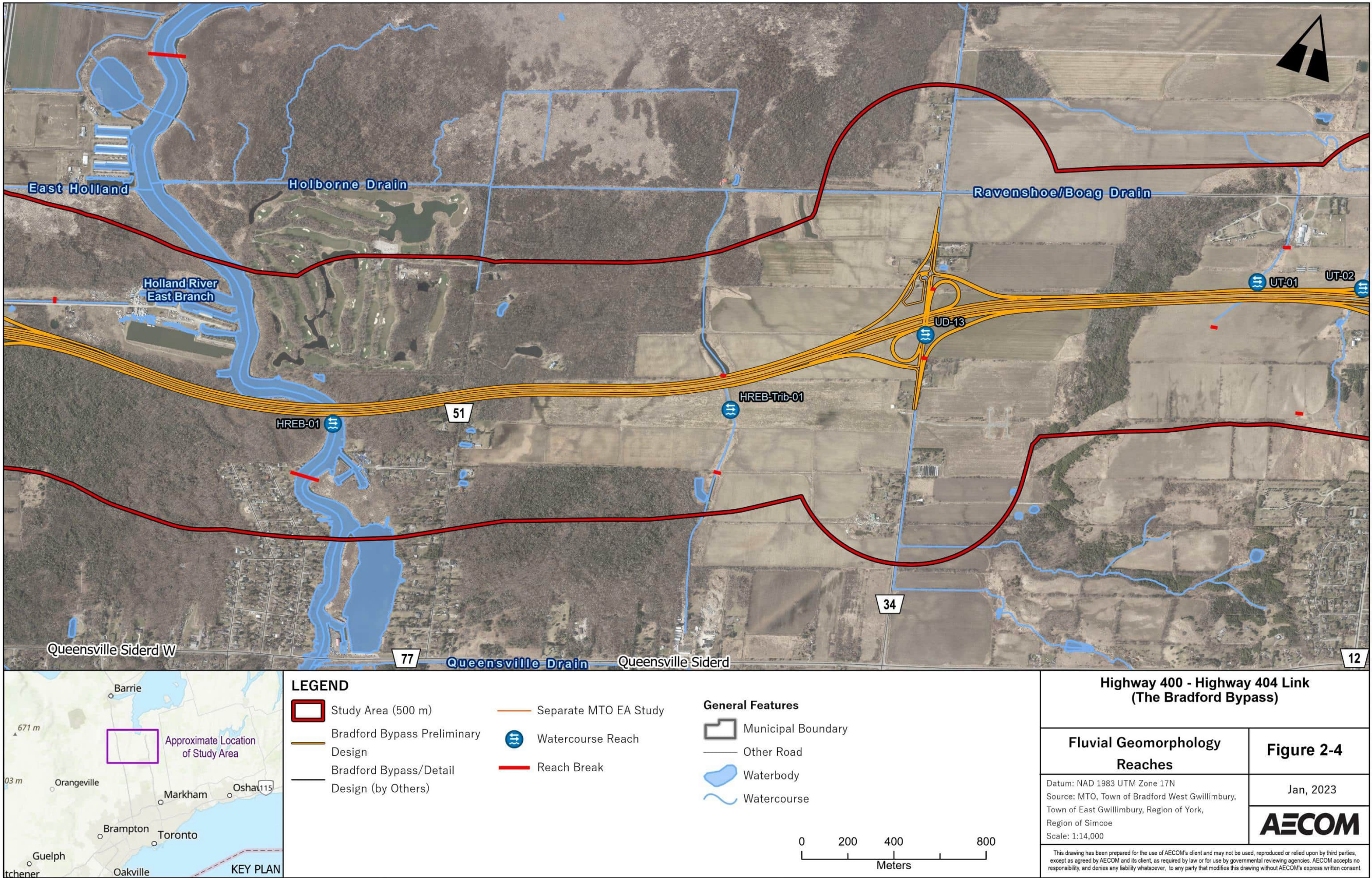
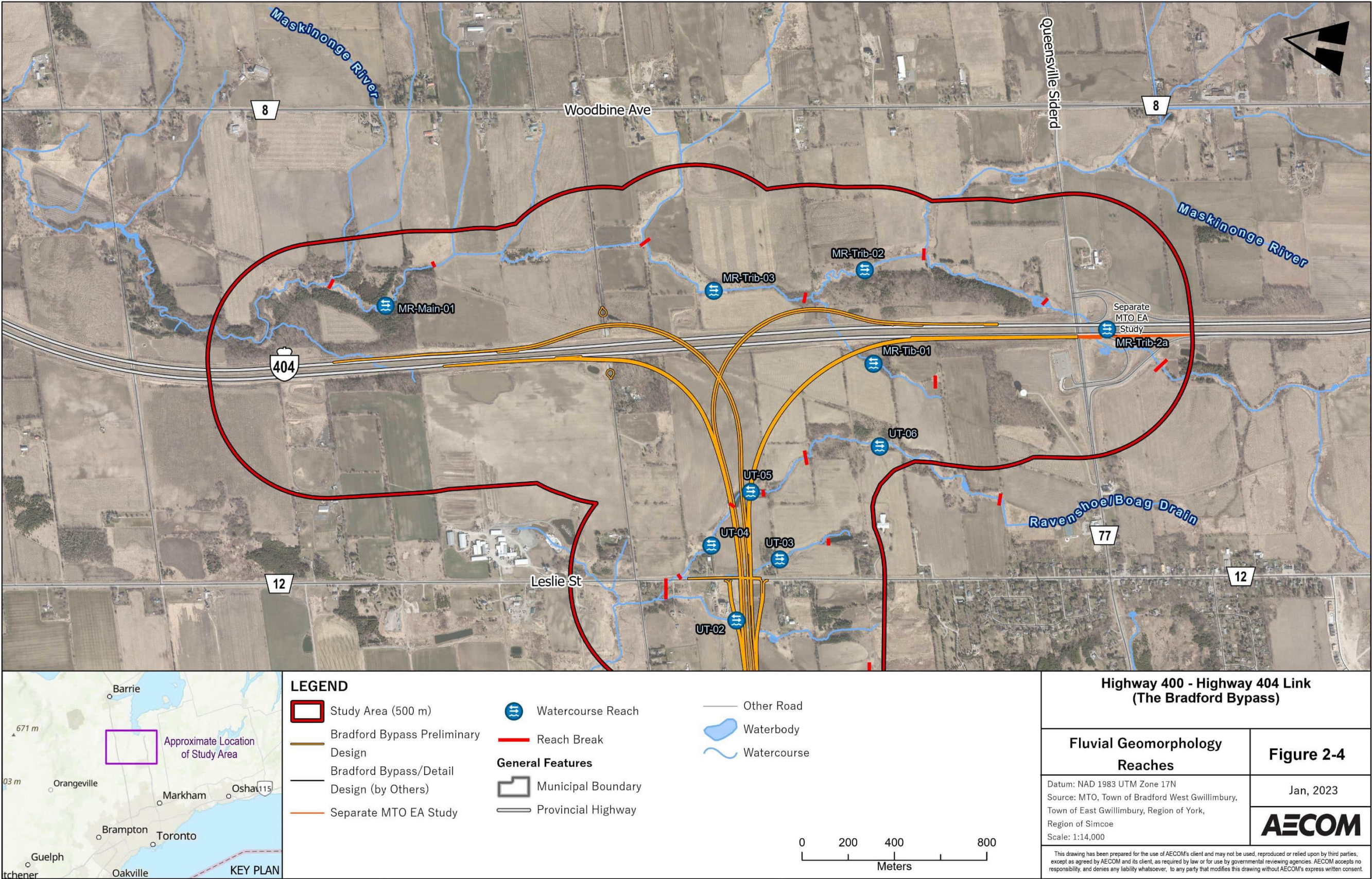


Figure 2-4: Fluvial Geomorphology Reaches



2.1.6 Erosion and Sedimentation Overview Risk Assessment

The purpose of the Erosion and Sedimentation Overview Risk Assessment Report (AECOM, April 2023) is to document the erosion potential within a broad area where the Bradford Bypass works will take place. Based on the Erosion and Sedimentation Overview Risk Assessment requirements included in Ministry's Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects (September, 2015) herein referred to as the Erosion and Sedimentation Overview Risk Assessment Report Guide, the risk for erosion potential is evaluated accounting for the characteristics of a broad area in terms of soils type and erodibility, slopes gradient and length, sensitivity of environmental features, the existing drainage pattern, and the nature of the proposed highway works.

The existing drainage system along Highway 400, Highway 404 and sideroads consists of roadside ditches, transverse and sideroad culverts, catchbasins located along municipal roads and localized ditch inlets that collect water from the ditch inlets, watercourses and roadside ditches.

Runoff generated within the Study Area drains to the three main drainage features that cross the proposed Bradford Bypass alignment, as listed below:

- Runoff from the western portion of the Study Area is conveyed westerly to Penville Creek by the existing culverts located under Highway 400. These culverts discharge to a tributary of Penville Creek that runs southerly along the east side of Highway 400
- Flows along the tributary drain westerly across the highway to Penville Creek, which is within the Innisfil Creek Watershed and in the jurisdiction of the Nottawasaga Valley Conservation Authority, and
- Runoff generated within the center portion of the Study Area drains to Holland River and Holland River East Branch. These rivers run northerly and ultimately discharge to Lake Simcoe.

The Holland River subwatershed is drained by the Holland River, which flows in a northeast direction into Cook's Bay (Lake Simcoe). The main tributaries of the Holland River include: Ansnorveldt Creek, Glenville Creek, East Kettleby Creek, 400 Creek, Pottageville Creek, South Schomberg River, North Schomberg River, Fraser Creek, Scanlon Creek, William Neeley Creek, Coulson's Creek, and the Holland Marsh and its extensive canal and Municipal Drain system (Lake Simcoe Region Conservation Authority, 2010).

The Holland River East Branch flows generally in a northerly direction into Cook's Bay (Lake Simcoe). The main tributaries of the Holland River East Branch include the Main Branch, flowing westward from a point west of Musselman's Lake, the Aurora Branch, Wesley Corners Creek, and Bogart Creek (Lake Simcoe Region Conservation Authority, 2010). The Main Branch and the Aurora Branch join north of the Town of Aurora to form the Holland River East Branch and continue to flow north to discharge into Cook's Bay (Lake Simcoe Region Conservation Authority, 2010).

West of the Holland River, the predominant soils along the Bradford Bypass are Loam, Gravelly Loam, and Silty Clay Loam. To the east of Holland River, the predominant soils are Sandy Loam, and Silt Loam. These soil types were obtained from the Soil Survey Map of Simcoe County, Province of Ontario – Soil Survey Report No. 29 and the Soil Survey Map of York County (Regional Municipality of York), Province of Ontario – Soil Survey Report No. 19.

In the areas adjacent to Holland River and Holland River East Branch the predominant soils is muck. These types of organic soils are commonly called peat or muck and are preserved by a high water table.

Slope gradient and slope length were acquired from the Land Information Ontario open access website (<https://www.javacoeapp.lrc.gov.on.ca/geonetwork/srv/en/main.home>) via their Soil Survey Complex layer. The data was compiled by the Ontario Ministry of Agriculture, Food, and Rural Affairs and Agri-Food Canada, in cooperation with the Ministry of Natural Resources and Forestry, from a collection of southern Ontario soil survey data previously mapped between 1920 and 1990. A digital elevation model was also acquired from the Land Information Ontario open access website in order to later calculate slope length using the RUSLE3d method (Mitasova, Brown, Hohmann, and Warren - 2001).

Refer to **Section 5.1.6** for the details on erosion and sediment impacts, mitigation measures and recommendations.

2.2 Social and Economic Environment

Social and economic environment studies have been completed to document and assess existing social and economic environment features, outline the description of potential impacts of the project on the social and economic environment, outline a description of potential measures to mitigate those impacts and identify applicable municipal, provincial, federal or other regulatory approvals or permits associated with the social and economic environment that may be required for the project.

The sections below summarize the existing environmental conditions for the following aspects of the social and economic environment:

- Land Use and Property
- Agriculture
- Noise and Vibration
- Air Quality
- Contamination, Waste and Excess Materials Management
- Climate Change
- Human Health
- Snowdrift, and
- Landscaping.

2.2.1 Land Use and Property

A land use study was undertaken to examine the existing land use, facilities, and future planned or approved development applications applicable to the project. The following sections outline the background and describes the existing environmental conditions within the Study Area.

2.2.1.1 Background

The 2002 Approved Environmental Assessment included a detailed description of land use and property environmental conditions and commitments that were carried forward and considered as project planning progresses.

As part of the preparatory work for the re-initiation of the Bradford Bypass in 2020, AECOM conducted a Land Use Factors Existing Conditions Report (AECOM, 2020), which provided a description of existing land use and property conditions.

Since the completion of the 2002 Approved Environmental Assessment and the 2020 Preliminary Design preparatory work, several changes have occurred associated with land use and property. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.2.1 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.2.1.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed a Land Use Factors Report (AECOM and Municipal

Planning Consultants, March 2023). Key details and findings regarding land use and property are summarized in the sections below.

The land use study builds upon the 2020 Land Use Factors Report (AECOM, 2020), updating the existing land use information considering changes to land use policies and activities since the 2020 report was completed.

2.2.1.2.1 Planning Policies

The land use study undertook a review of the following policies:

Provincial Planning Policies

- Provincial Policy Statement (2014)
- A Place to Grow: Growth Plan for the Greater Golden Horseshoe (2019), and
- Greenbelt Plan (2017).

Municipal Planning Policies

- County of Simcoe Official Plan (Office Consolidation 2016)
- Regional Municipality of York Official Plan (2010, Office Consolidation 2019)
- Town of East Gwillimbury Official Plan (2010, Office Consolidation 2018)
- Town of King Official Plan (Draft 2017), and
- Town of Bradford West Gwillimbury Official Plan (2018).

Bill 23 *More Homes Built Faster Act*, 2022 was passed by government of Ontario in November 2022. At this time, no lands within the Study Area are to be impacted as a result of this passed Bill 23 (November 28, 2022).

2.2.1.2.2 Zoning

Aligned with the policies identified in the Official Plans, each local municipality within the Study Area has a Zoning By-law which determines the permitted uses within each land use zone, and regulates the use of land, buildings and structures within that municipality. **Table 2-5** below lists the zoning information associated with each municipality within the Study Area.

Table 2-5: Zoning Within the Study Area

Zoning By-Law	Zoning Type
Town of East Gwillimbury Zoning By-law 2018-43	<ul style="list-style-type: none"> ■ The lands through which the Bradford Bypass corridor will pass are primarily zoned Rural (RU) in the Town of East Gwillimbury's Zoning By-law (2018-43) ■ The Open Space (OS1) Zone reflects the wetlands and woodlands associated with the Holland River Wetland Complex ■ The Open Space (OS2) zone applies to the Silver Lakes Golf Course and specifically permits that use along with other recreational uses ■ There is an RPS-39 zone south of the golf course that permits residential uses on a lot with a 30 metre frontage ■ The Commercial (C2-96) zone permits the Albert's Marina located on the Holland River, and ■ There is also a Commercial (C2) zone that permits a variety of commercial uses.
King Township Zoning By-law 74-52	<ul style="list-style-type: none"> ■ Lands are zoned Agriculture – Special (AS) and Greenland Natural Heritage System (GNH). The uses permitted would be restricted to agriculture and limited agriculturally related uses, and ■ The By-law permits infrastructure in all zoning types.
Town of Bradford West Gwillimbury Zoning By-law 2010-50	<ul style="list-style-type: none"> ■ Outside of the Bradford Urban Area most of the lands are zoned Agricultural (A). This zone permits typical agricultural uses ■ Lands adjacent to Highway 400 and 10th Sideroad have zoning that permits employment uses, generally Industrial (M1) with specific exceptions ■ Within the Urban Area, much of the lands are zoned Agriculture, Exception 18. This is a site-specific zone that permits the lands to be farmed but does not permit any buildings or structures, essentially 'freezing' the current land uses ■ In the County Road 4 area, much of the lands are zoned Future Development. This zone permits only existing uses and permits minor expansions to those uses ■ Lands south of the corridor have a variety of zones generally reflecting existing land uses ■ The lands south of the corridor and Crossland Boulevard are in Residential (R-1) exceptions zones. The exception provides specific zoning regulations for the residential uses ■ North of Crossland Blvd. the Industrial (M1*10) zone is used. The majority of the lands abutting the corridor maintain a series of Residential (R1) zones, although there are environmentally protected lands zoned Open Space (OS) ■ There is one parcel zoned Residential (R3) on the north side of the 8th Line between County Road 4 and Artesian Industrial Parkway. This zone specifically permits a retirement home that is currently in the development process ■ The industrial subdivision on either side of Artesian Industrial Parkway is in an Industrial (M1) exception Zone to the limit of the railway line, and ■ Easterly from the railway line to the Town limit the lands are in a Natural Heritage System (NHS1) zone.

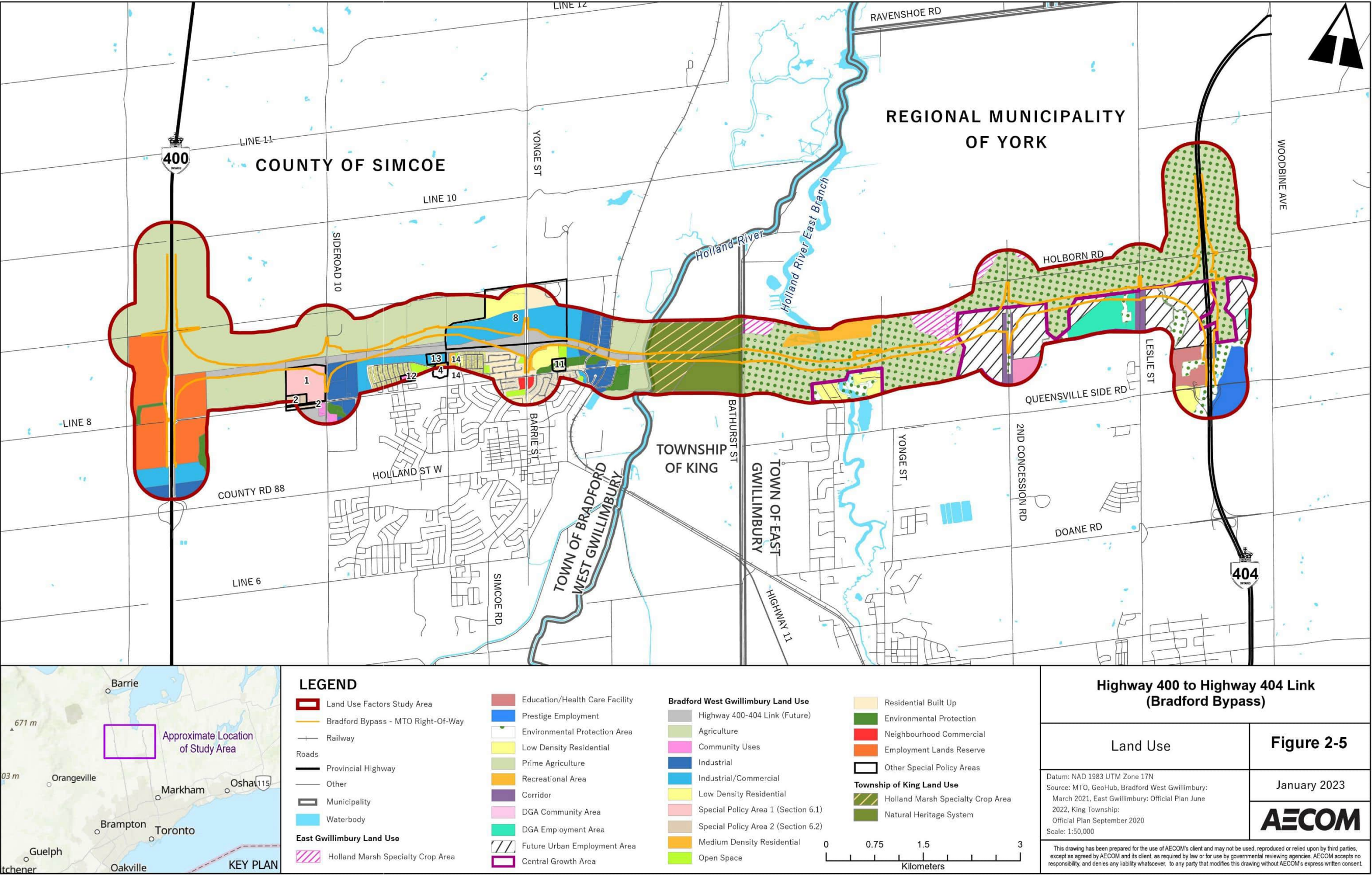
2.2.1.2.3 Existing Land Uses

The existing land uses within the Study Area are predominantly characterized by agricultural lands, green spaces and vacant vegetated lands, as well as residential and commercial/industrial areas. The existing land uses were identified using a desktop review and confirmed during the field visit completed between September 2021 and June 2022.

Land use within the Bradford Bypass corridor itself has been protected since 1993 when the 2002 Approved Environmental Assessment was started. For that reason, there has been little change in land use since that time.

Land uses within the Study Area are shown on **Figure 2-5** below.

Figure 2-5: Land Use Designations Within the Study Area

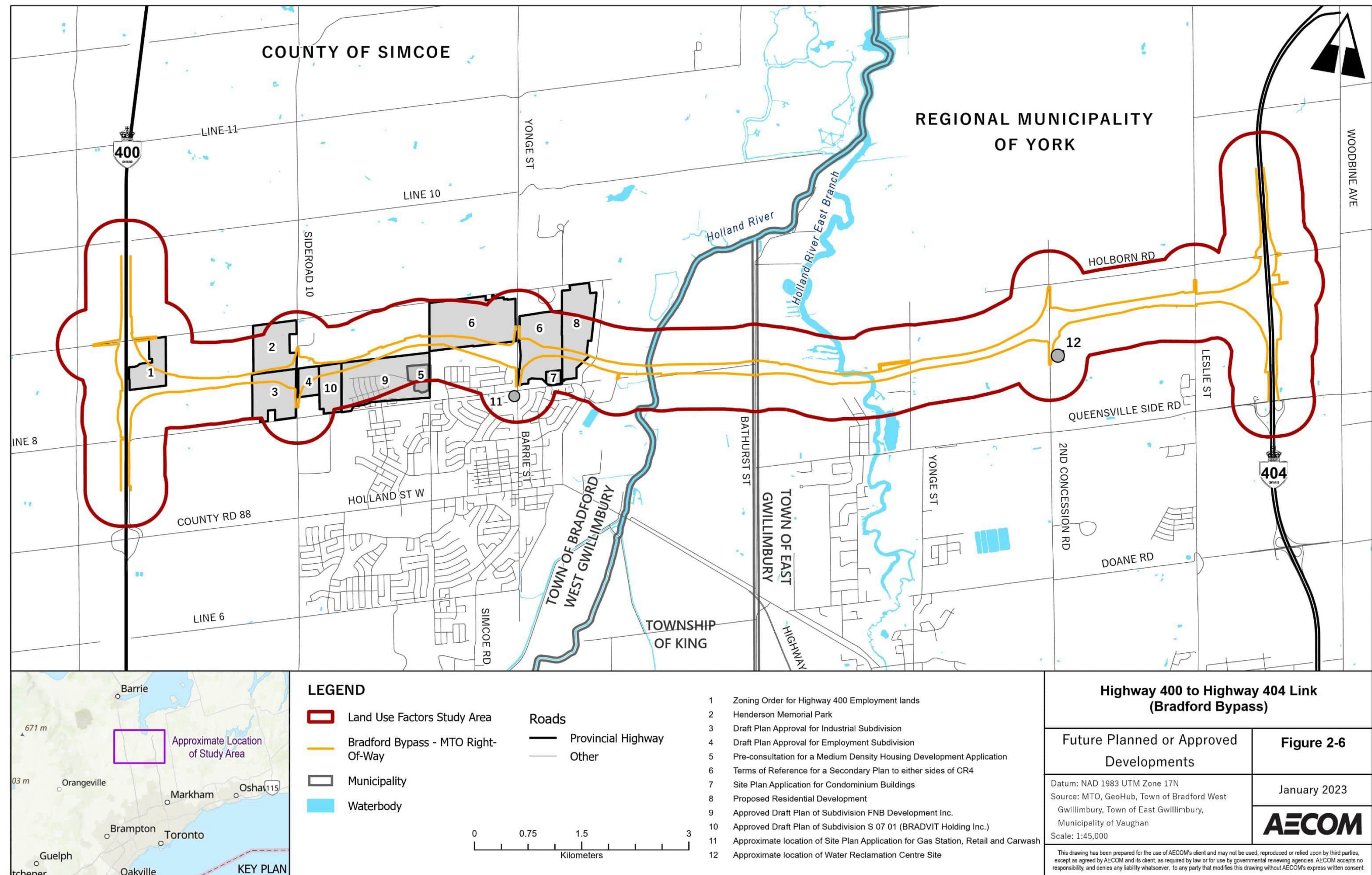


2.2.1.2.4 Future Planned/Approved Developments

The Bradford Bypass has been an Environmental Assessment approved corridor since 2002, and corridor protection has been in place since then. As a result, there are no major planning applications that would affect the corridor itself. However, it is necessary to consider future development and the impacts associated with the corridor on that development. Staff from each of the impacted municipalities were contacted in January 2021 and April and May 2022 to review any applications and development activity within 500 metres of the Bradford Bypass right-of-way. Development applications within the Study Area are shown on **Figure 2-6** below.

Refer to **Section 5.2.1** for details on the land use and property impacts, mitigation and monitoring requirements.

Figure 2-6: Development Applications Within the Study Area



2.2.2 Agriculture

The agriculture assessment examines the existing agricultural land capability, agricultural land use, agricultural investments, and land fragmentation within the Study Area. The following sections outline the background and describe the existing environmental conditions within the Study Area.

2.2.2.1 Background

The 2002 Approved Environmental Assessment included a high-level agricultural assessment, description of agricultural existing conditions within the Study Area, and made recommendations for mitigation should agricultural resources be impacted during further design or construction.

The Preliminary Design preparatory Land Use Factors Existing Conditions Report completed in February 2020 (AECOM, 2020) provided a description of land use environmental conditions within the Study Area, which was reviewed as part of the agricultural existing conditions assessment. Refer to **Section 2.2.1** for updated land use existing conditions within the Study Area.

Since the completion of the 2002 Approved Environmental Assessment and the 2020 Preliminary Design preparatory work, several changes have occurred associated with agriculture. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.2.2 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.2.2.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed an Agricultural Impact Assessment (DBH Soils, April 2023). Key details and findings regarding agricultural lands and resources are summarized below.

The “Classifying Prime and Marginal Agricultural Soils and Landscapes: Guidelines for Application to the Canada Land Inventory in Ontario” defines the Canada Land Inventory classification as follows:

- **Class 1:** Soils in this class have no significant limitations in use for crops. Soils in Class 1 are level to nearly level, deep, well to imperfectly drained and have good nutrient and water holding capacity. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for the full range of common field crops

- **Class 2:** Soils in this class have moderate limitations that reduce the choice of crops, or require moderate conservation practices. These soils are deep and may not hold moisture and nutrients as well as Class 1 soils. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a wide range of common field crops
- **Class 3:** Soils in this class have moderately severe limitations that reduce the choice of crops or require special conservation practices. The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. Under good management these soils are fair to moderately high in productivity for a wide range of common field crops
- **Class 4:** Soils in this class have severe limitations that restrict the choice of crops, or require special conservation practices and very careful management, or both. The severe limitations seriously affect one or more of the following practices: timing and ease of tillage; planting and harvesting; choice of crops; and methods of conservation. These soils are low to medium in productivity for a narrow to wide range of common field crops, but may have higher productivity for a specially adapted crop, and
- **Class 5:** Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible. The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants and may be improved through the use of farm machinery. Feasible improvement practices may include clearing of bush, cultivation, seeding, fertilizing or water control.

The Study Area comprised approximately 69.0 percent Canada Land Inventory capability of Class 1 – 3, with approximately 39.3 percent as Class 1, 0.9 percent as Class 2, and 28.8 percent as Class 3. Approximately 17.7 percent of the Study Area was Class 4 lands, with approximately 1.6 percent as Class 5. The remaining 11.6 percent of the lands were not rated and included organic soils, built up areas, roads and rail lines.

A total of 61 agricultural facilities or areas where facilities are located were identified within the Study Area.

Minimum Distance Separation 1 calculations were not completed for the Agricultural Impact Assessment (DBH Soils, April 2023), as Minimum Distance Separation is not required for an infrastructure project based on the Minimum Distance Separation

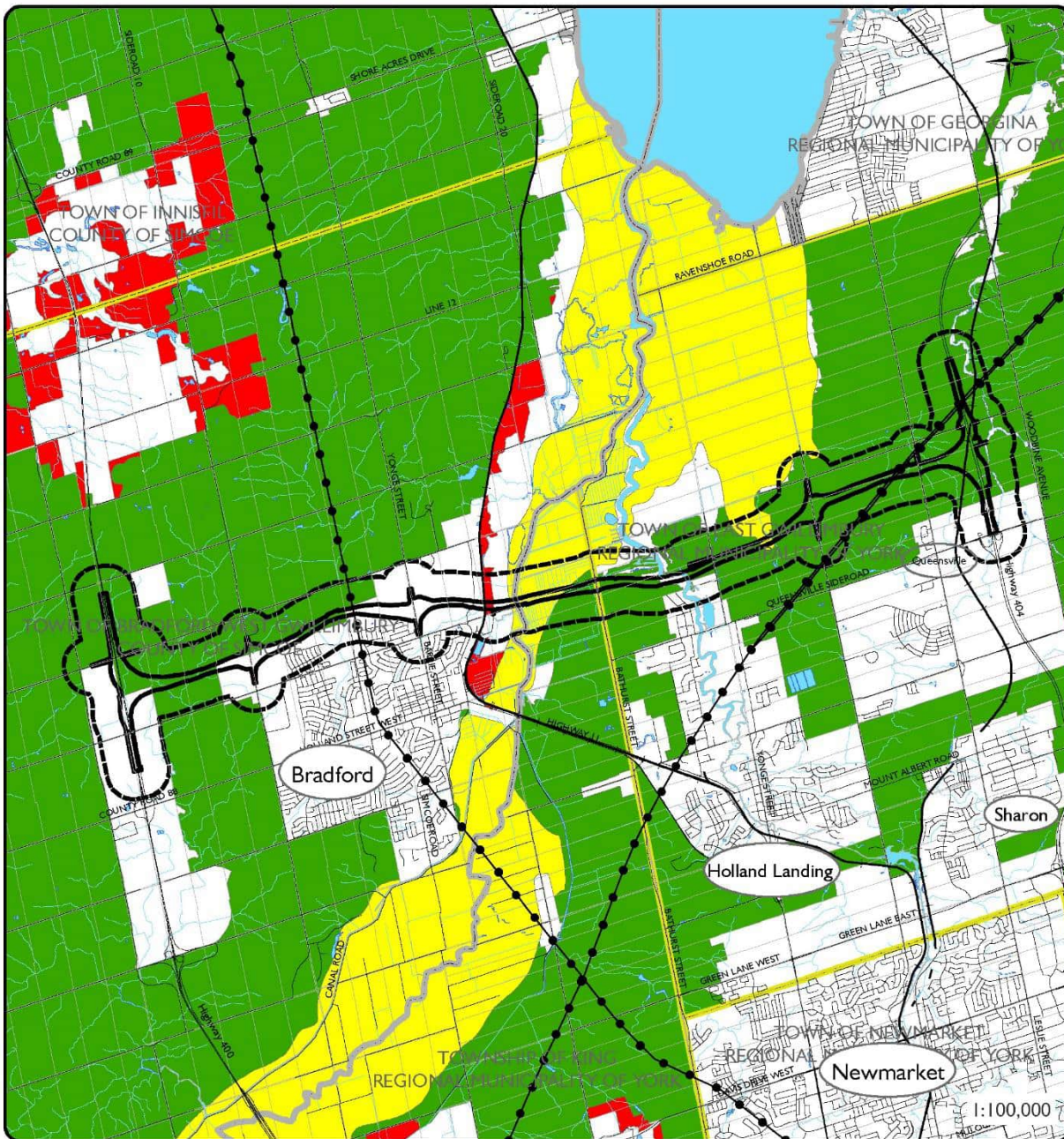
Document – Formulae and Guidelines for Livestock Facility and Anaerobic Digester Setbacks. Publication 853. Ontario Ministry of Agriculture, Food and Rural Affairs (Ontario Ministry of Agriculture, Food, and Rural Affairs, 2016). The Minimum Distance Separation document was reviewed to determine the applicability of the document's use for the Agricultural Impact Assessment (DBH Soils, April 2023).

A review of the online Agricultural System Portal (Ontario Ministry of Agriculture, Food, and Rural Affairs) indicated that there were no nurseries, specialty farms (crop or livestock), frozen food manufacturing, refrigerated warehousing/storage, livestock assets or abattoirs in the Study Area.

The Agricultural System Portal did indicate the presence of vegetable fields, which were also noted in the land use survey. There are no agricultural services within the Study Area. Agricultural services related to crop processing and transportation were noted in the urban areas of Bradford. The closest transportation networks (major roadway) are Highway 400, which is located on the west end of the Study Area, and Highway 404 which is located on the east end of the Study Area.

Agricultural lands and resources are shown on below. Refer to **Section 5.2.2** for details on the agriculture impacts, mitigation and monitoring requirements.

Figure 2-7: Agricultural Land Base within the Study Area



Legend

	Roads (MNRF)		Upper Tier Boundary (MNRF)
	Railway (MNRF)		Lower Tier Boundary (MNRF)
	Utility Line (MNRF)		Water Body (MNRF)
	Water Course (MNRF)	Agricultural Land Base Identification (OMAFRA)	
	Lot Lines (MNRF)		Candidate Area
	Primary Study Area		Prime Agricultural Area
	Secondary Study Area (500 m)		Specialty Crop Area

Figure 2-7

Agricultural Land Base

DBH Soil Services Inc.

January 30, 2023

2.2.3 Noise and Vibration

A Noise Report has been prepared in accordance with Section 24 of the Regulation and identifies Noise Sensitive Areas and considers the future noise impacts and feasibility of noise mitigation measures within the Study Area. The following sections outline the background and describes the existing environmental conditions within the Study Area.

Vibration studies are not required at this Preliminary Design stage. The Project Team continues to receive input from property owners and key stakeholders, and will consider features that may fall within the zone of influence for vibration, within the Study Area. These features include lands adjacent to areas of construction, including buildings and structures that potentially may be impacted by vibrations emanating from construction activities.

Where locations are identified with respect to potential vibration concerns, these locations, and concerns will be documented as commitments and carried forward to subsequent Detail Design phases. Locations and associated mitigation measures may be added, removed or modified as the design advances.

2.2.3.1 Background

The 2002 Approved Environmental Assessment included a high-level assessment of noise, which identified noise sensitive areas and receiver locations, and made recommendations for increased noise levels as a result of the project. A description of the existing noise and vibration conditions within the Study Area is included in the following sections below.

Since the completion of the 2002 Approved Environmental Assessment, several changes have occurred associated with noise and vibration. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.2.3 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.2.3.2 Key Summary of Environmental Conditions

A Noise Impact Assessment Report (AECOM, May 2023) has been prepared to identify noise sensitive areas and provide recommendations for noise mitigation along the Bradford Bypass right-of-way. The Noise Impact Assessment Report (AECOM, May 2023) has been prepared in accordance with the methods and procedures recommended in the Ministry Environmental Guide for Noise, 2022 (the Ministry Guide). Relevant guidelines from the Ontario Ministry of the Environment, Conservation and Parks and local municipal noise control bylaws have also been considered in the assessment.

Under the Ministry Guide, the “noise impact” is defined as the difference between the “No Build” (no project) and the “Build” (with project in place) noise levels during the

subject year of assessment (Horizon Year), which is typically at least 10 years post-construction.

Predicted noise levels are assessed at Noise Sensitive Areas. Land uses classified as “Traditional Noise Sensitive Areas” by the Ministry Guide consist of the following land uses with associated Outdoor Living Areas:

- 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, and has been included in the analysis. The land uses considered noise sensitive when part of a community include:

- 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 (e.g. outdoor basketball courts etc.)
- Municipal parks (excluding golf courses and trails), and
- Places of worship with Outdoor Living Areas.

Additionally, the following land uses would also qualify as an Noise Sensitive Areas, provided that a new freeway/highway corridor or route is planned:

- 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 (e.g. outdoor basketball courts etc.)
- Municipal parks only as part of a community (excluding golf courses and trails), and
- Places of worship with Outdoor Living Areas only as part of a community.

Land uses that do not qualify as noise sensitive by the Ministry Guide, and are not included in the noise assessment, consist of the following:

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

The location of assessment is an outdoor location associated with the representative receptor. Where the future noise level with the proposed improvements in the Outdoor Living Area results in a greater than five dBA increase over the future noise level without the proposed improvements; or the projected noise level is equal to or is greater than 65 dBA, the following must occur:

- Noise control measures investigated within the right-of-way, and
- If a minimum attenuation of five dBA can be achieved in the Outdoor Living Area averaged over first row receivers, the selected measures within the right-of-way are to be implemented.

The Outdoor Living Area can be situated on any side of a noise sensitive area which accommodates outdoor living activities and is generally taken to be the backyard. The assessment location is 3 metres from the building façade, with a height of 1.5 metres above ground level as per the Ministry Guide.

Where predicted noise levels trigger mitigation investigation, the mitigation efforts to be applied for the predicted change in noise level above the ambient and the projected noise level with the proposed improvements are shown in **Table 2-6**.

Table 2-6: Ministry Traffic Noise Criteria

Change in Noise Level Above Future Ambient / Projected Noise Levels with Proposed Improvements	Mitigation Effort Required
< five dB Change AND <65 dBA Overall	■ None
≥ five dB Change OR ≥ 65 dBA Overall	<ul style="list-style-type: none"> ■ Investigate noise control measures on the future Ministry right-of-way ■ Introduce noise control measures within the future Ministry right-of-way and mitigate to ambient if technically, economically, and administratively feasible. ■ Noise control measures, where introduced, should achieve a minimum of five dB attenuation, over first row receivers.

The determination of whether mitigation is provided must be based on the review of technical, economical, and administrative feasibility established by the Ministry:

- Technical Feasibility: Review the constructability of the noise mitigation (i.e. design of wall, roadside safety, shadow effect, topography, achieve a minimum five dBA reduction, ability to provide a continuous barrier)
- Economic Feasibility: Carry out a cost/benefit assessment of the noise mitigation (i.e., determine cost per benefited receiver), and
- Administrative Feasibility: Determine the ability to locate the noise mitigation on lands within public ownership (i.e., provincial, or municipal right-of-way).

Where traffic noise is not the controlling source of noise in the future No Build scenario, background sound levels can be assumed. The assumptions are based on the area classifications defined in Ministry of the Environment, Conservation and Parks' NPC300 Environmental Noise Guideline. The sound levels are:

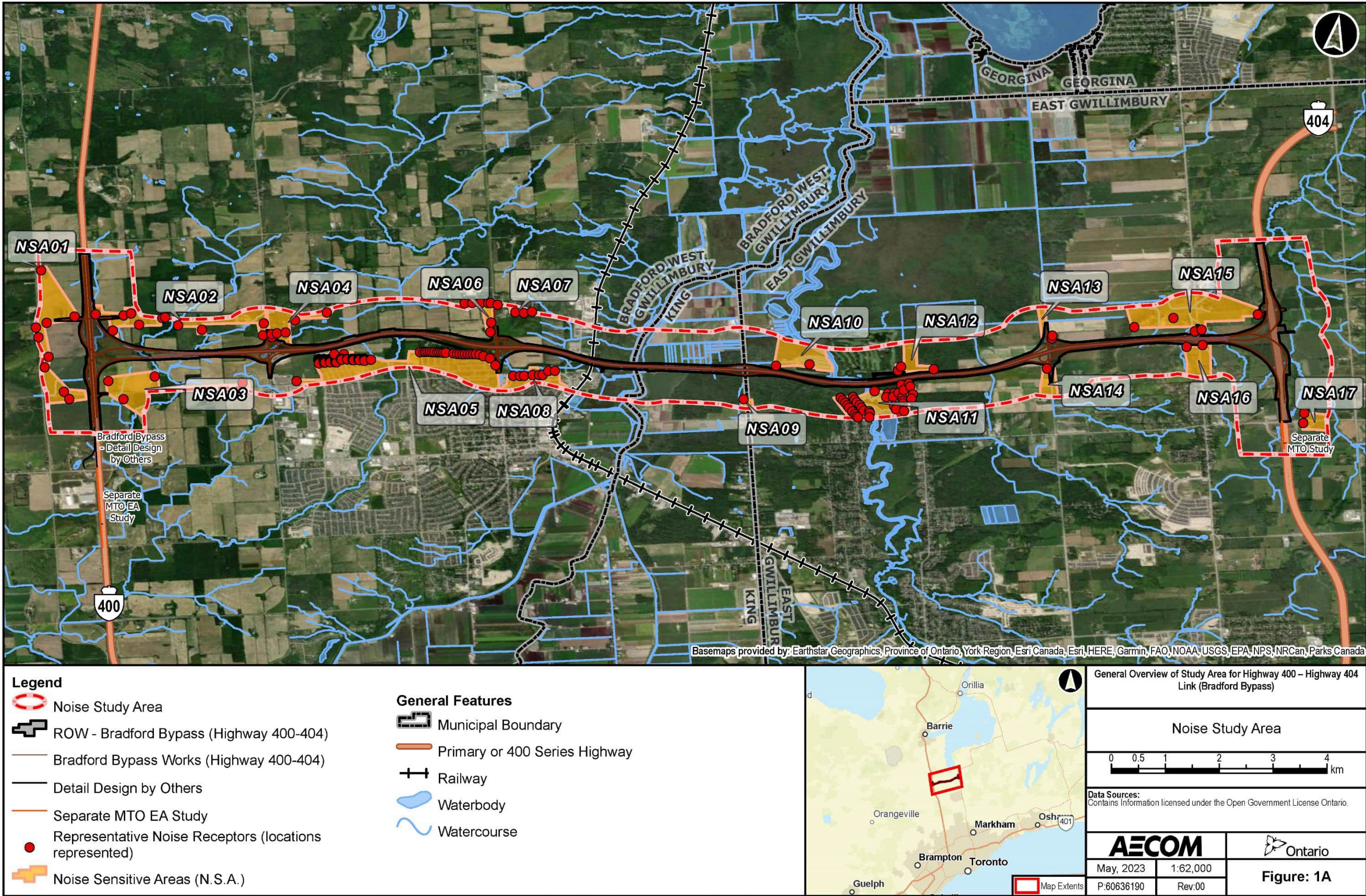
- Class 1 Area (urban) – 50 dBA
- Class 2 Area (suburban) – 45 dBA
- Class 3 Area (rural) – 40 dBA, and
- Class 4 Area (as defined by local land use planning authority) – 55 dBA.

Note that Highway 404 has a concrete road surface, this has been incorporated into the modeling. The posted speed limit of the future highway was assessed at 110 kilometres per hour. Should the posted speed limit change, the noise impacts should be reviewed.

The Study Area for the noise assessment is included in **Figure 2-8** below. **Figure 2-8** also shows the locations of the Noise Sensitive Areas and Representative Noise Receptors.

Refer to **Section 5.2.3** for details on the noise impacts, mitigation and monitoring requirements.

Figure 2-8: Noise Study Area



2.2.4 Air Quality

The air quality existing conditions assessment examines and summarizes the state of existing air quality levels within the Study Area. This includes identifying existing sensitive and critical receptors, and existing industries which may have a contributing impact on local air quality levels.

The following sections outline the background and describes the existing environmental conditions within the Study Area.

2.2.4.1 Background

A description of the air quality environmental conditions within the Study Area is included in Section 2.2.4 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.2.4.2 Key Summary of Environmental Conditions

Following the completion of the Final Environmental Conditions Report in October 2022, an Air Quality Impact Assessment (AECOM, May 2023) has been prepared to determine the impacts of the project on regional air quality and greenhouse gases with the Study Area. **Table 2-7** lists the identified critical receptors within the Study Area. Within this Study Area, a total of 160 sensitive receptors and 20 critical receptors were identified, and are shown on **Figure 2-9** and **Figure 2-10**.

The comparison of background ambient air quality data to relevant ambient air quality criteria/standards are shown in **Table 2-8**.

As noted in red font below in **Table 2-8**, the existing levels of Benzo(a)pyrene was found to exceed the Provincial AAQC in the existing ambient air levels. The exceedance for Benzo(a)pyrene is based on the existing levels within the downtown Toronto area. It would be expected that measured levels of this contaminant would be lower in the region due to lower traffic volumes within the Study Area.

Refer to **Section 5.2.4** for details on the air quality impacts, mitigation and monitoring requirements.

Table 2-7: Identified Critical Receptors within the Study Area

Receptor ID	Type	Address	Description	UTM Coordinates	
				Easting	Northing
CR1	Critical	511 Queensville Side Road, Holland Landing, ON L9N 0G1	Retirement Home	621582.68	4887574.43
CR2	Critical	20317 Leslie Street, East Gwillimbury, ON L0G 1R0	School	624052.00	4887964.00
CR3	Critical	20728 Leslie Street, Queensville, ON L0G 1R0	School	623797.00	4889056.00
CR4	Critical	552 Holland Street West, Bradford, ON L3Z 4H3	Retirement Home	612171.00	4884614.00
CR5	Critical	3053 9th Line, Bradford, ON L3Z 2A5	School	611613.00	4887382.00
CR6	Critical	459 Holland Street West, Bradford, ON L3Z 0C1	Daycare Centre	612768.00	4885030.00
CR7	Critical	70 Professor Day Drive, Bradford, ON L3Z 3B9	School	613540.00	4885302.00
CR8	Critical	40 Toronto Street, Bradford, ON L3Z 1N6	Retirement Home	614288.00	4885501.00
CR9	Critical	20 Fletcher Street, Bradford, ON L3Z 1L9	School	614590.00	4886181.00
CR10	Critical	40 John Street West, Bradford, ON	Daycare Centre	614722.00	4885607.00
CR11	Critical	127 Bridge Street #12, Bradford, ON L3Z 3H2	Daycare Centre	615819.61	4885623.57
CR12	Critical	105 Colborne Street, Bradford, ON L3Z 1C4	School	615130.00	4886025.00
CR13	Critical	402 Britannia Avenue, Bradford, ON L3Z 1A7	Daycare Centre	615336.00	4886983.00
CR14	Critical	110 Northgate Drive, Bradford, ON L3Z 2Z7	School	614003.00	4886244.00
CR15	Critical	100 Professor Day Drive, Bradford, ON L3Z 3B9	School	613500.00	4885688.00
CR16	Critical	3131 8th Line, Bradford, ON L3Z 4H2	Retirement Home	611575.00	4885892.00
CR17	Critical	3417 9th Line, Bradford, ON L3Z 3S4	School	609867.00	4886723.00
CR18	Critical	237 Sand Road, East Gwillimbury, ON L9N 1K1	Daycare Centre	619578.00	4886764.00
CR19	Critical	43 Balmoral Heights, East Gwillimbury, ON L0G 1R0	Retirement Home	623720.00	4888650.00
CR20	Critical	20507 Leslie Street, East Gwillimbury, ON L0G 1R0	Daycare Centre	623940.00	4888483.00

Figure 2-9: Sensitive Receptors Within the Study Area

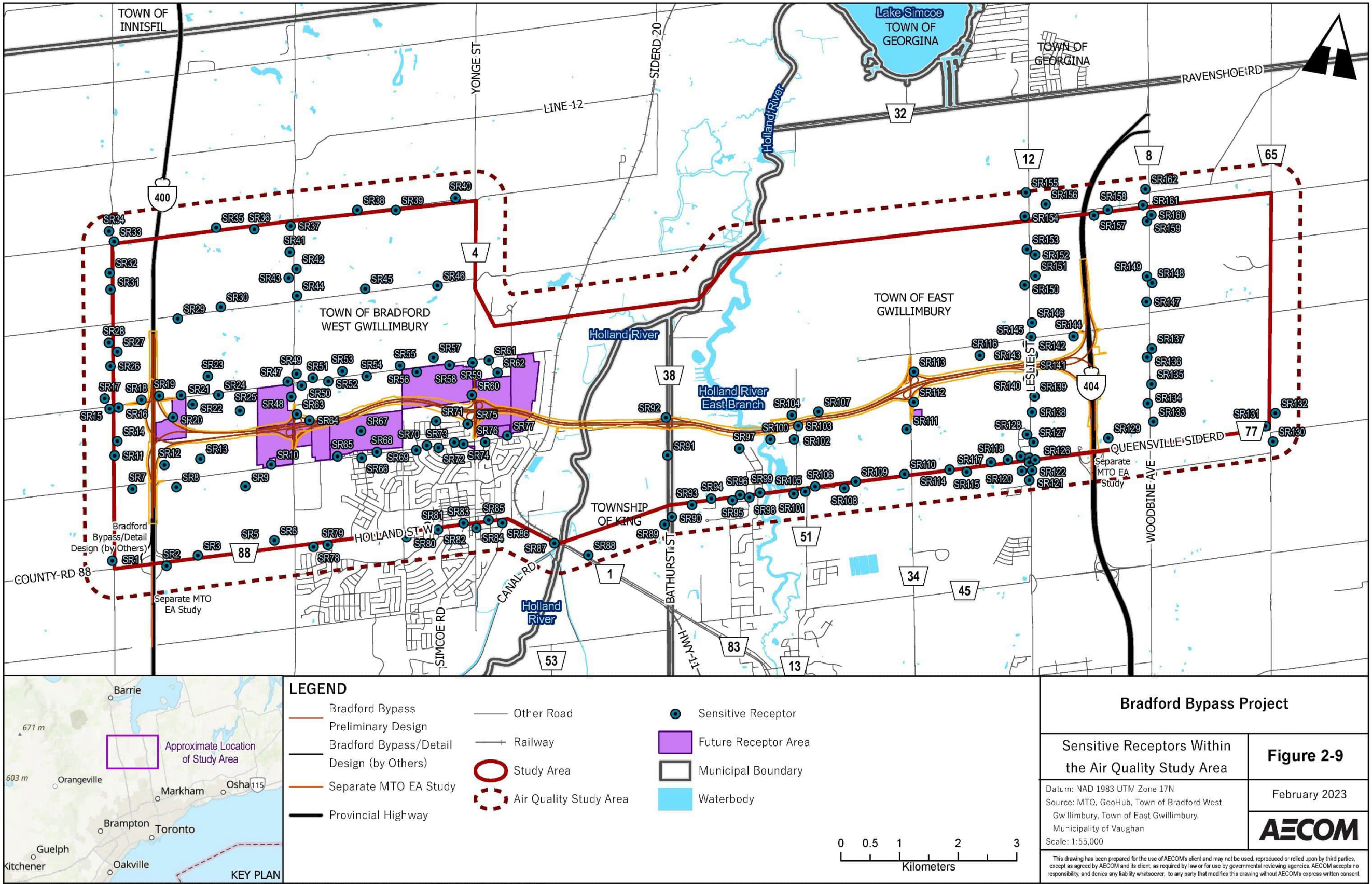


Figure 2-10: Critical Receptors Within the Study Area

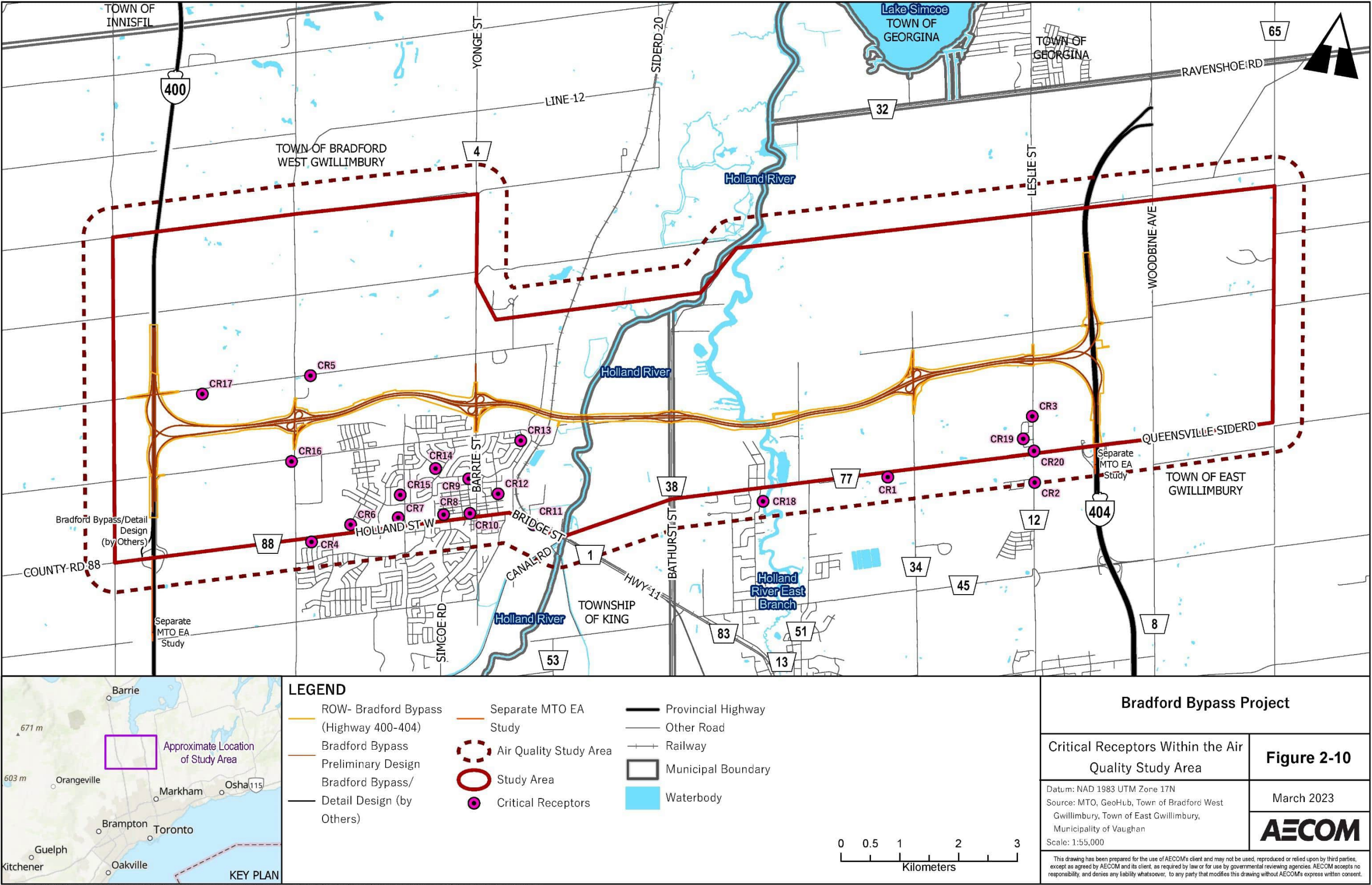


Table 2-8: Comparison of Background Ambient Air Quality Data to Relevant Ambient Air Quality Standards

CAC	Station ID	Averaging Period (hr)	Years	Average of Background Data (10 °C & 1 atm) (µg/m³)	Percentile	Standard Limit (µg/m³)	Standard Source	% of Standard Limit
NO ₂	65101	1	2016-2020	24.45	90th	400	AAQC	6%
		1	2016-2020	77.56	98th	113	CAAQS (2020)	69%
		1	2016-2020	77.56	98th	79	CAAQS (2025)	98%
		24	2016-2020	21.47	90th	200	AAQC	11%
		Annual	2016-2020	12.20	Mean	32	CAAQS (2020)	38%
		Annual	2016-2020	12.20	Mean	23	CAAQS (2025)	54%
CO	60440	1	2017-2020	343.46	90th	36200	AAQC	1%
		8	2017-2020	332.01	90th	15700	AAQC	2%
SO ₂	60440	1	2017-2020	14.68	99th	183	CAAQS (2020)	8%
		1	2017-2020	14.68	99th	170	CAAQS (2025)	9%
		1	2017-2020	1.05	90th	106	AAQC	1%
		10 min	2017-2020	1.73	90th	178	AAQC	1%
		Annual	2017-2020	0.49	Mean	11	AAQC	5%
		Annual	2017-2020	0.68	Mean	13	CAAQS (2020)	5%
		Annual	2017-2020	0.68	Mean	10	CAAQS (2025)	6%
PM ₁₀	65101	24	2016-2020	20.33	90th	50	AAQC	41%
PM _{2.5}	65101	24	2016-2020	17.91	98th	27	CAAQS	66%
		Annual	2016-2020	6.11	Mean	8.8	CAAQS	69%
Acetaldehyde	60439	30 min	2014-2017	5.00	90th	500	AAQC	1%
		24	2014-2017	1.69	90th	500	AAQC	0%
Acrolein	60439	1	2014-2017	0.17	90th	4.5	AAQC	4%
		24	2014-2017	0.07	90th	0.4	AAQC	17%
Benzene	65101	24	2016-2020	0.55	90th	2.3	AAQC	24%
		Annual	2016-2020	0.34	Mean	0.45	AAQC	75%
Benzo(a) pyrene	60427	24	2010-2014	1.3E-04	90th	5.0E-05	AAQC	252%
		Annual	2010-2014	7.7E-05	Mean	1.0E-05	AAQC	773%
1,3-Butadiene	65101	24	2016-2020	0.03	90th	10	AAQC	0%
		Annual	2016-2020	0.02	Mean	2	AAQC	1%
Formaldehyde	60439	24	2014-2017	3.16	90th	65	AAQC	5%
Ozone	65101	1	2016-2020	84.36	90th	-	-	-
		24	2016-2020	75.66	90th	-	-	-

- Notes:
- (1) Exceedances to Air Quality criteria are shown in red.
 - (2) Standard value from CAAQS for NO₂ is 42 ppb for the 1-hour averaging period and 12 ppb for the Annual averaging period. Standard converted to µg/m³ using a temperature of 10°C and pressure of 1 atm. The statistical form of the 1-hour background concentration is presented as a 3-year average of the 98th percentile of the daily maximum 1-hour average concentrations. The annual background concentration is presented as an average over a single calendar year of all 1-hour average concentrations.
 - (3) Standard value from CAAQS for SO₂ is 65 ppb for the 1-hour averaging period and 4.0 ppb for the Annual averaging period. Standard converted to µg/m³ using a temperature of 10°C and pressure of 1 atm. The Annual averaging period was higher than the AAQC Standard for the same averaging period and is therefore excluded from the table. The statistical form of the 1-hour background concentration is presented as a 3-year average of the 99th percentile of the daily maximum 1-hour average concentrations.
 - (4) The statistical form of the PM_{2.5} 24-hour background concentration is presented as a 3-year average of the 98th percentile of the daily 24-hour average concentrations. The annual background concentration is presented as a 3-year average of the daily 24-hour average concentrations.

2.2.5 Contamination, Waste and Excess Materials Management

The contamination, waste and excess materials management existing conditions assessment examines and summarizes the state of existing contamination, waste and excess materials management within the Study Area. This includes identifying existing high, medium and low potential contamination properties, and existing contamination potential ratings within the Study Area.

The following sections outline the background and describes the existing environmental conditions within the Study Area.

2.2.5.1 Background

The 2002 Approved Environmental Assessment included a high-level assessment of potential contamination within the Study Area through identification of landfill sites and made recommendations for mitigation should waste material or contaminated soils be identified during further design or construction.

As part of the preparatory work for the re-initiation of the Bradford Bypass, AECOM conducted a Contamination Overview Study to identify properties/areas within the Study Area with actual or potential site contamination that may impact future highway design; and, to identify appropriate future environmental work and mitigation measures to be implemented during the Preliminary Design and future Detail Design and construction phases of the project.

A summary of the environmental conditions within the Study Area is included in Section 2.2.5 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.2.5.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has completed a Waste and Excess Materials Management Plan (AECOM, April 2023), based on the results identified in the 2020 Contamination Overview Study. As the project has progressed since 2020 to Preliminary Design, the Ministry right-of-way has been further refined since the 2020 Contamination Overview Study was completed. 159 new properties have been added within the Study Area. These properties are to be assessed in subsequent Detail Design phases for potential environmental impacts. Refer to **Figure 2-11** for the properties assessed as part of the Waste and Excess Materials Management Plan (AECOM, April 2023).

Figure 2-11: Contamination Potential Ratings

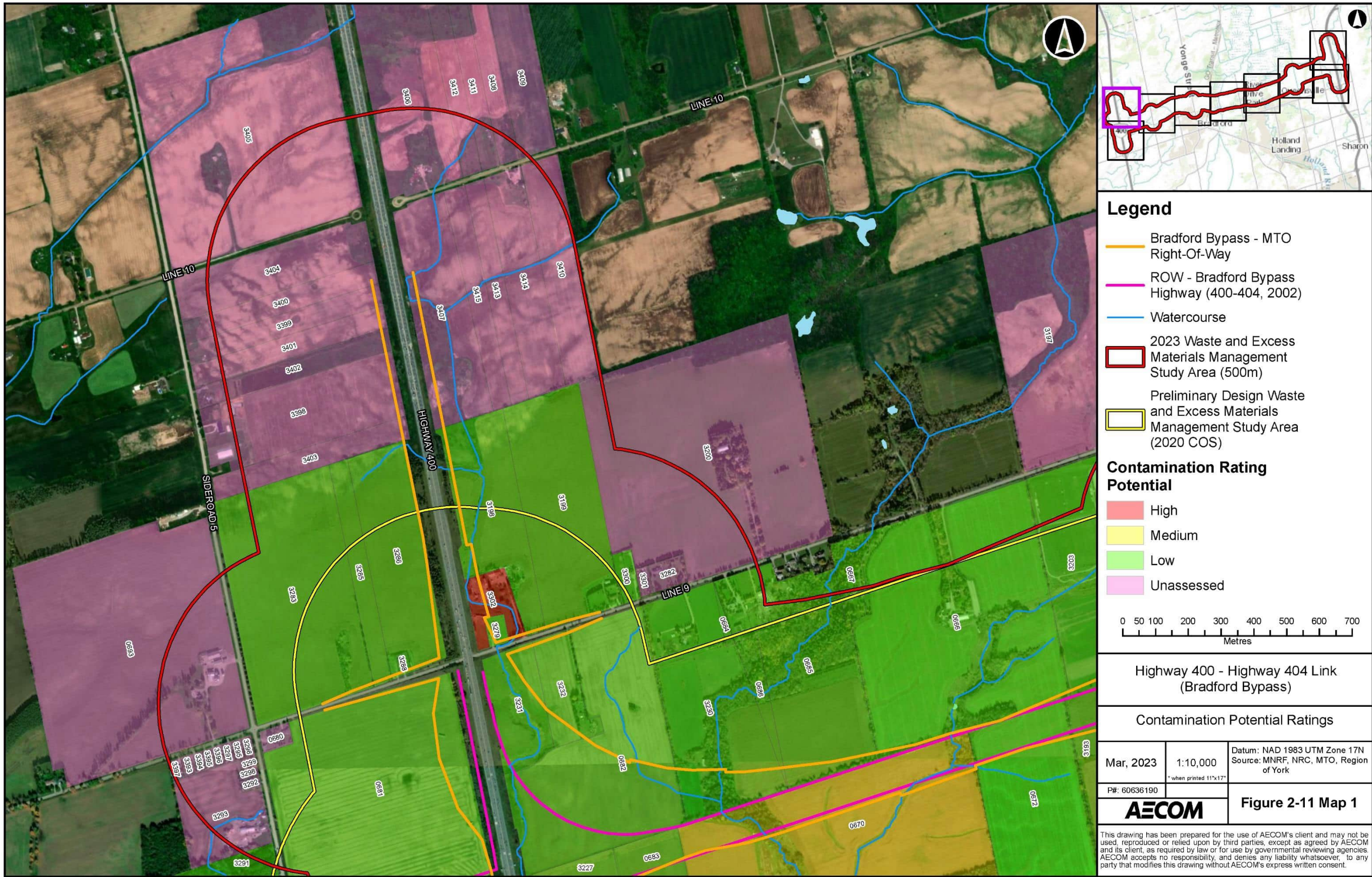


Figure 2-11: Contamination Potential Ratings

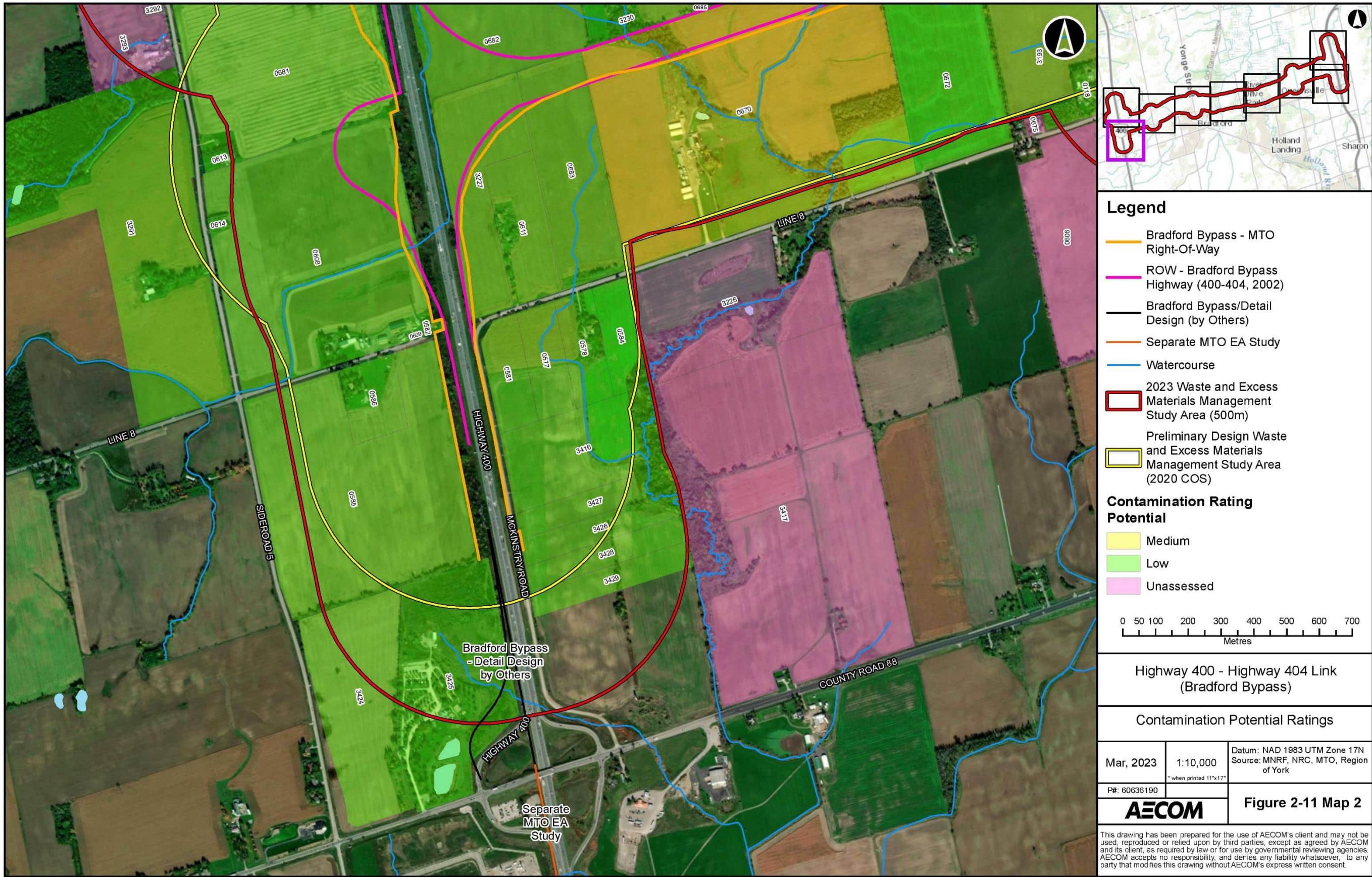


Figure 2-11: Contamination Potential Ratings

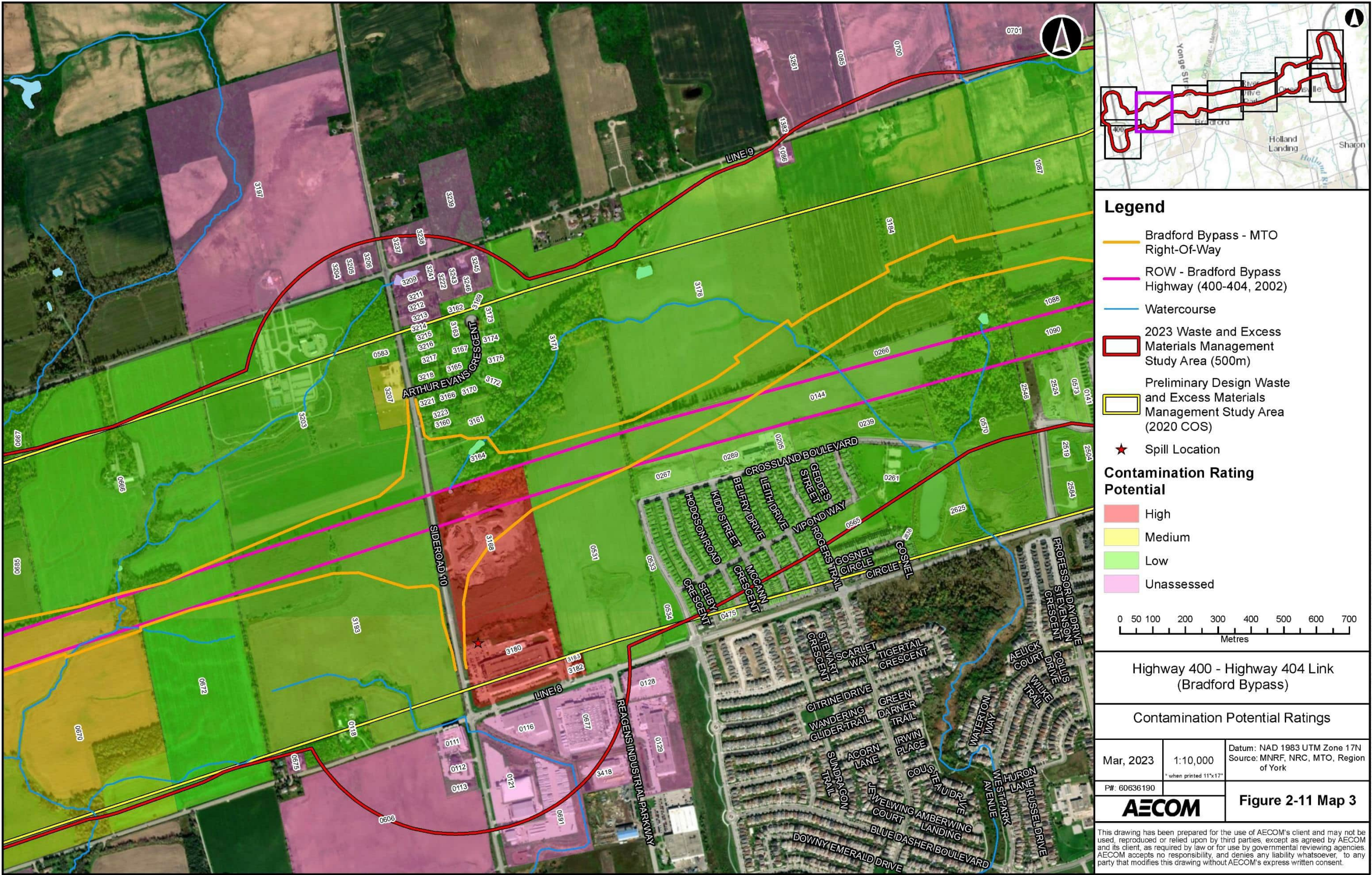


Figure 2-11: Contamination Potential Ratings



Figure 2-11: Contamination Potential Ratings

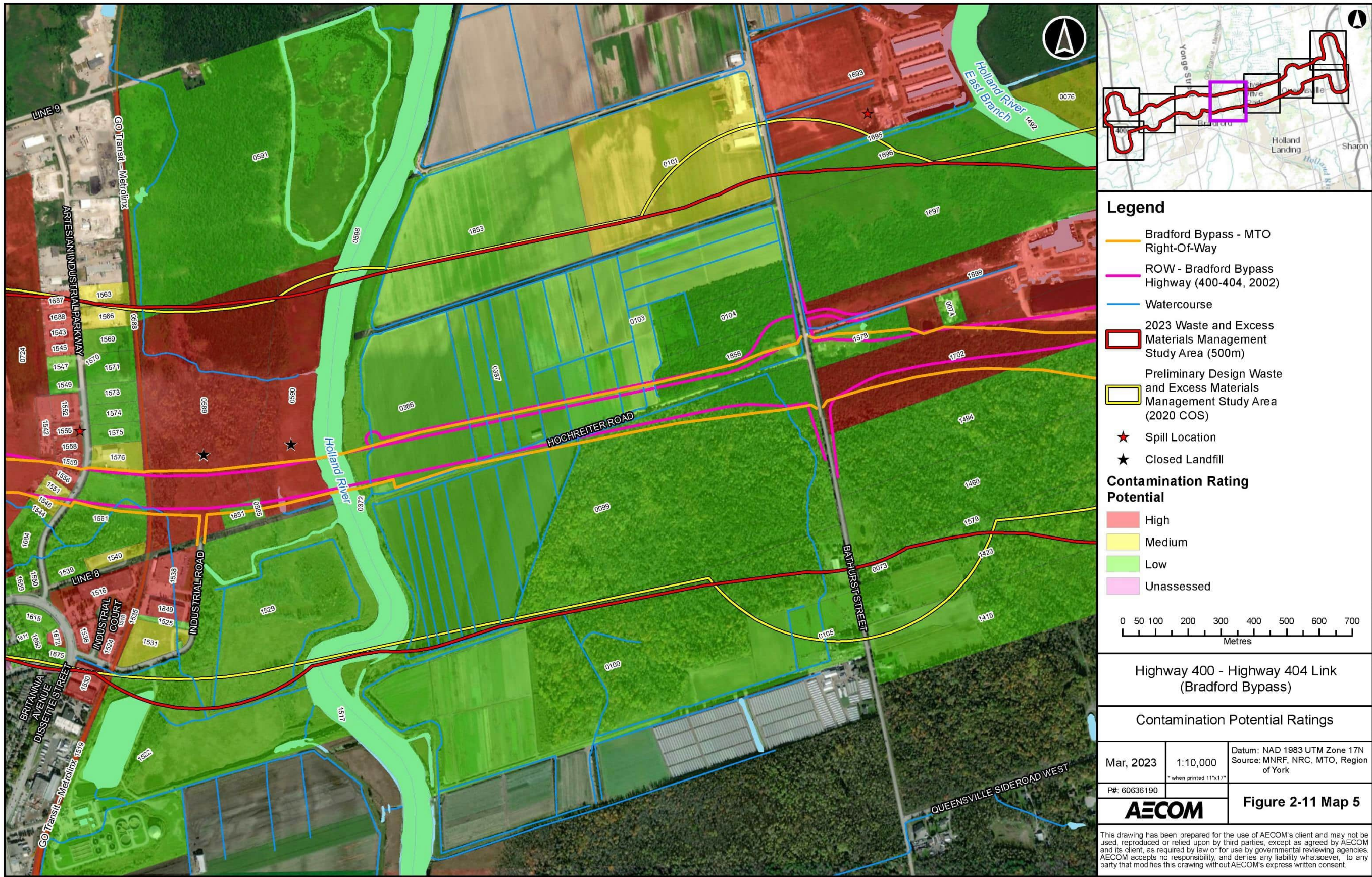


Figure 2-11: Contamination Potential Ratings

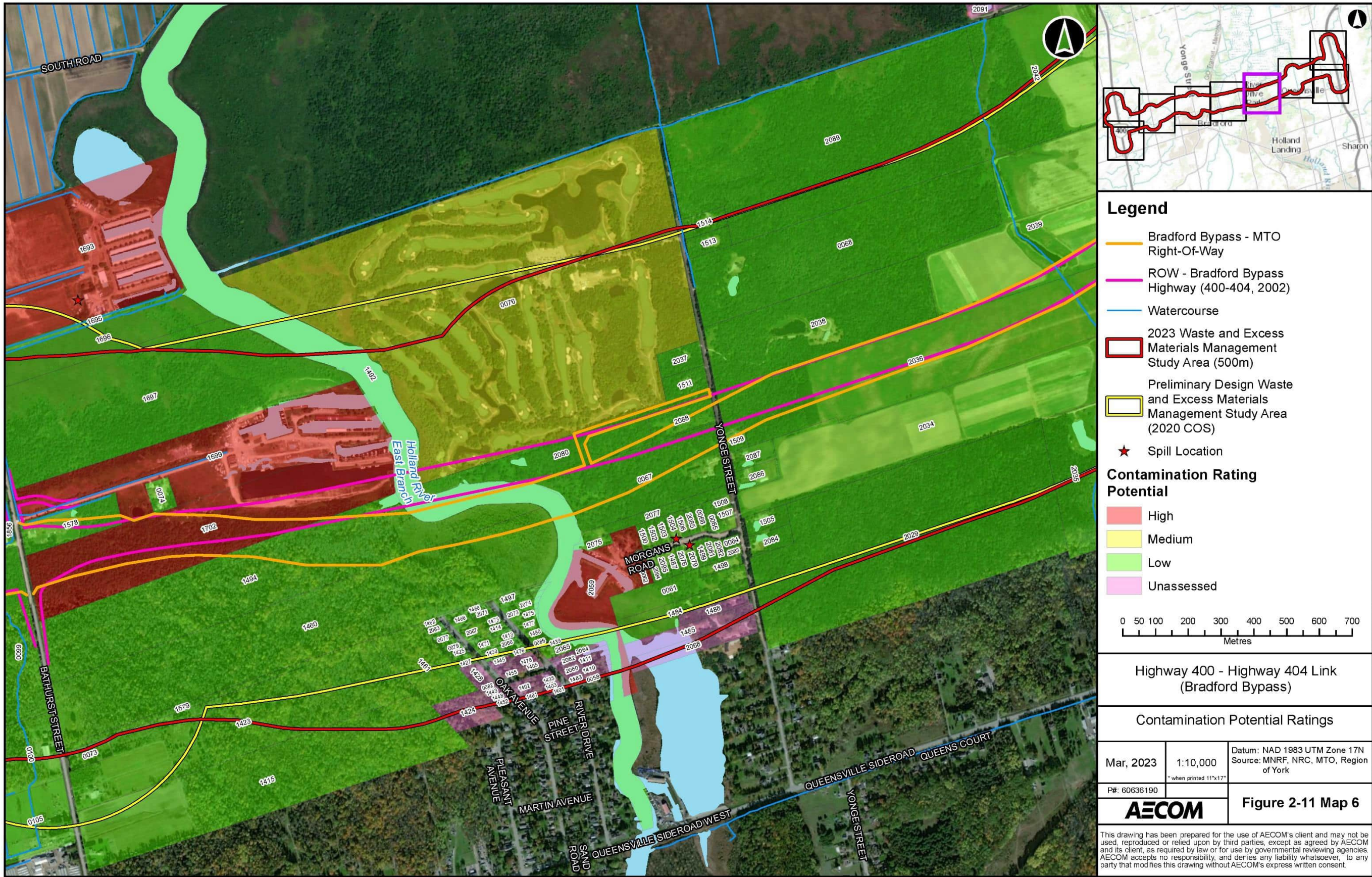


Figure 2-11: Contamination Potential Ratings

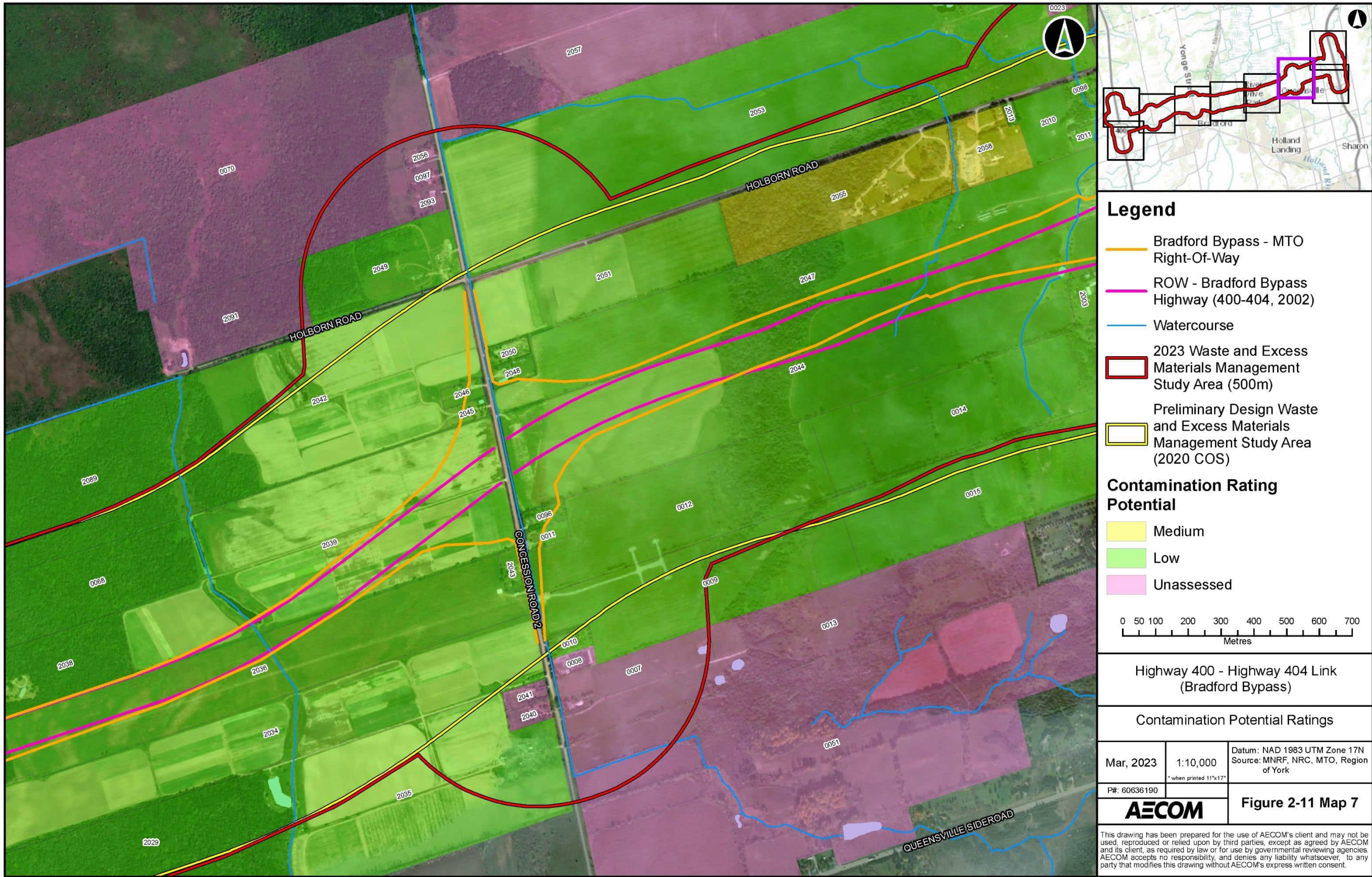


Figure 2-11: Contamination Potential Ratings

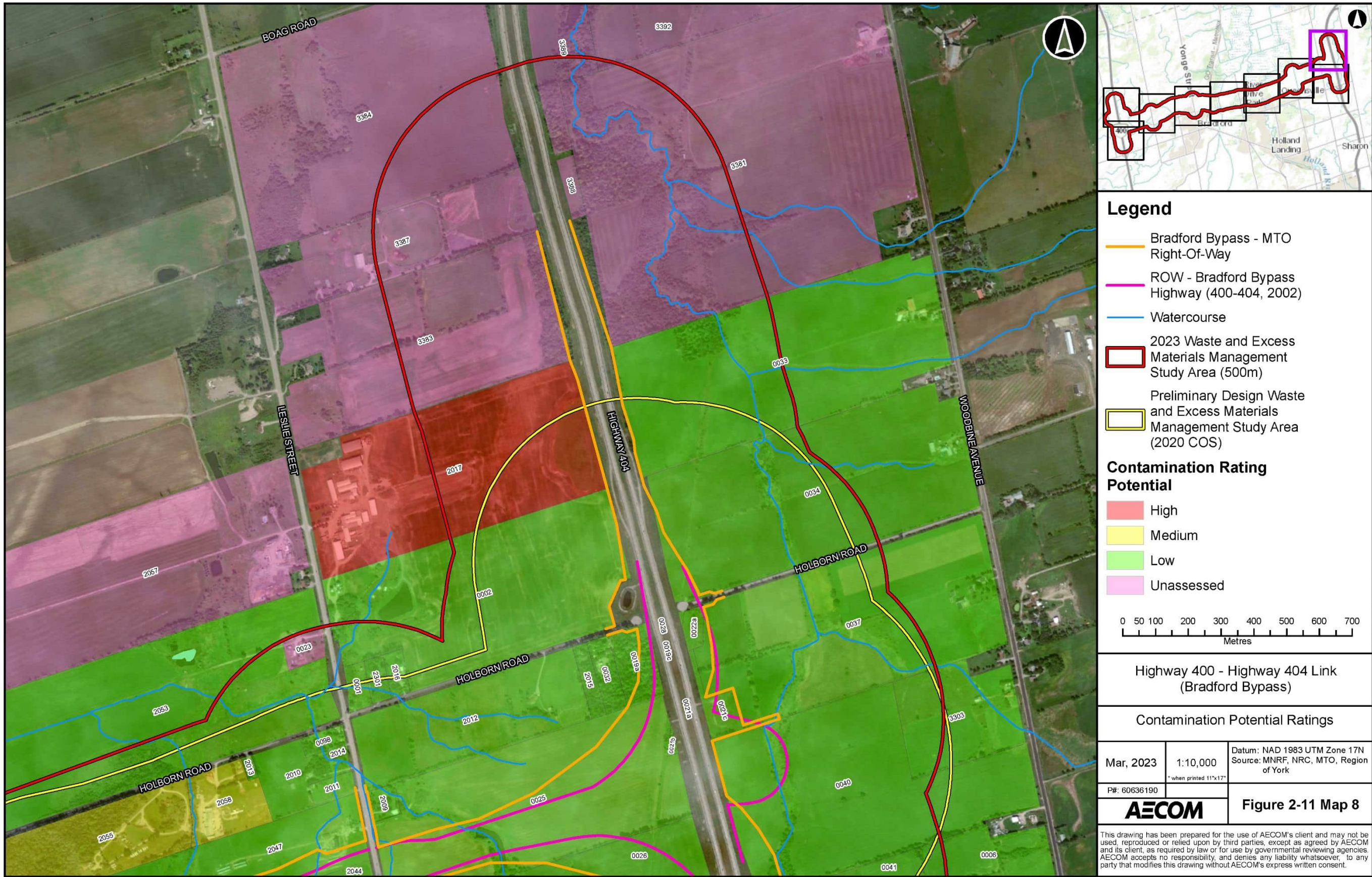
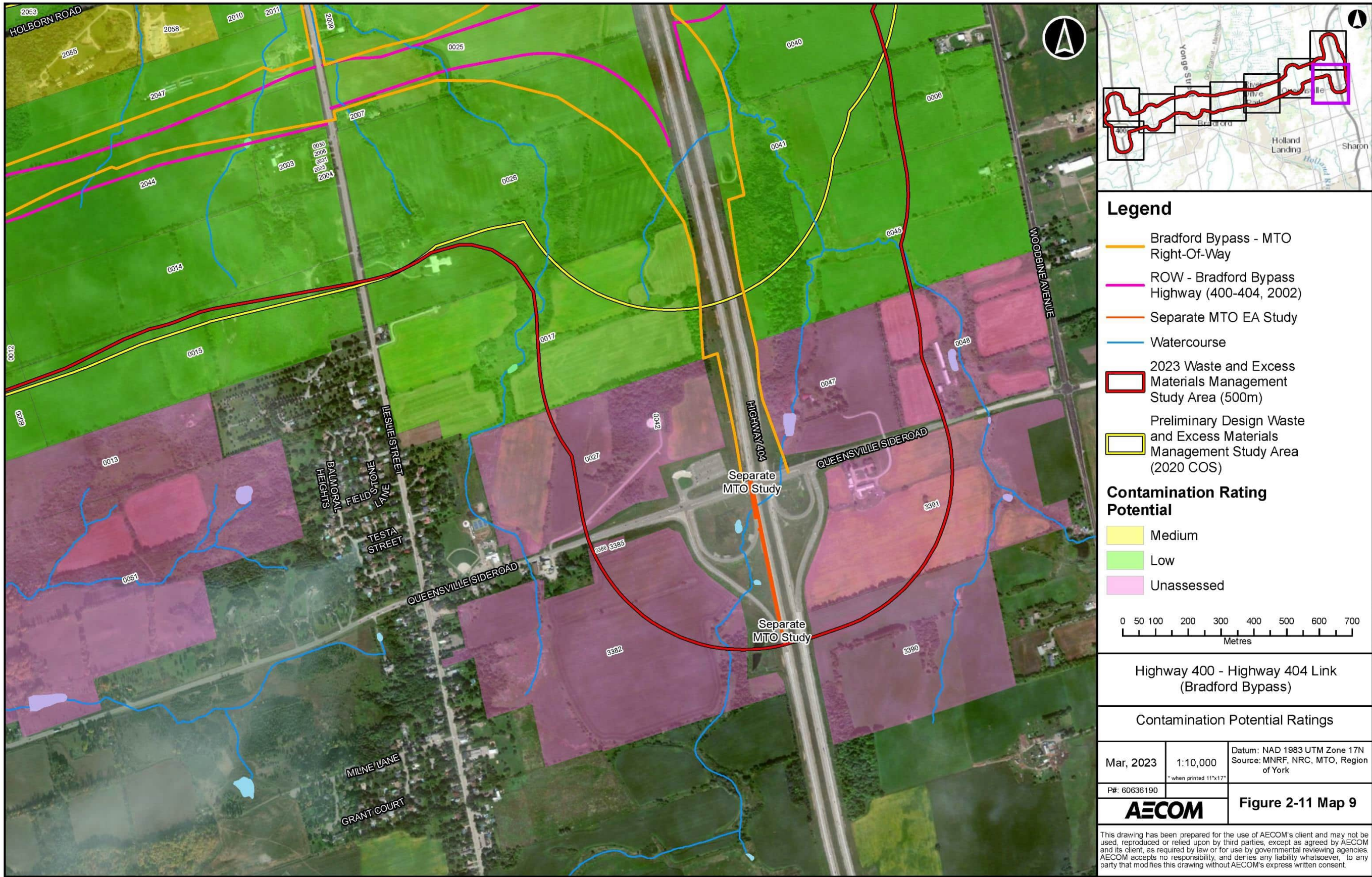


Figure 2-11: Contamination Potential Ratings



The waste environmental program was undertaken in conjunction with the preliminary foundation investigation and design works being undertaken by Golder Associates Ltd. (Golder) summarized in several Golder reports completed in 2022 noted below. At the time of issuing this Report a total of 47 boreholes were drilled by Golder for which the AECOM Waste Team was able to sample 33 boreholes. The soils sampling program was completed following Ontario Regulation 406/19 with the 33 sampling locations focusing on properties identified as high or medium risk of contamination based on the 2020 Contamination Overview Study (conducted by AECOM).

AECOM collected 42 soil samples from selected 33 boreholes which were selected due to their proximity to the PCA locations. The samples were taken within the depth range from 0.7 to 2.0 metres bgs and submitted for laboratory analyses.

Soil samples were screened for combustible organic vapours using a RKI GX-6000 photoionization detector, which was calibrated using isobutylene. Soil vapours readings ranged from 0 to less than 50 ppm in all soil samples across the site. In addition, field staff looked for potential visual indicators of soil contamination including staining or soil odours during the collection of samples; however, none were observed in the samples. Therefore, representative samples were submitted for laboratory analysis for PAHs, PHCs F1-F4, PCBs, VOCs, metals and inorganics, and mandatory testing of SPLP to support the requirements under Ontario Regulation 406/19.

Refer to **Section 5.2.5** for details on contamination and waste impacts, mitigation measures and recommendations.

2.2.6 Climate Change

A Qualitative Climate Change Assessment Report (AECOM, April 2023) has been prepared for this project to address the Ministry of the Environment, Conservation and Parks comments submitted in September 2020 to the Bradford Bypass Project Team. The Qualitative Climate Change Report was prepared to outline the qualitative impacts of climate change related to the Preliminary Design of the Bradford Bypass.

In 2017, the Ministry of Environment, Conservation and Parks released a new guide “Considering Climate Change in the Environmental Assessment Process” (Climate Change guide) released under the *Environmental Assessment Act*, R.S.O. 1990, chapter E.18. This guidance document demonstrates both quantitatively and qualitatively how proponents should address climate change impacts and mitigation considerations for new projects undergoing the environmental assessment process. In a letter dated September 28, 2020, the Ministry of Environment, Conservation and Parks requested this guidance be employed for the Highway 400 – Highway 404 Link (Bradford Bypass).

The directions implemented within the Ministry of Environment, Conservation and Parks Climate Change guide were developed to support the climate-focused policies of the Provincial Policy Statement (Section 3 of the Planning Act).

The Provincial Policy Statement was updated in 2020 to align with changes to the *Planning Act* through *More Homes, More Choice Act, 2019*, and *A Place to Grow: Growth Plan for the Greater Golden Horseshoe*.

As part of the climate change assessment under the Climate Change guide, the Ministry of Environment, Conservation and Parks expects proponents to evaluate and assess the following key items during the assessment of alternatives and alternative methods of implementing the project undergoing environmental assessment:

- the project's expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation), and
- the resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).

Refer to **Table 5-19** in **Section 5.2.4.1** for details on the project's greenhouse gas contribution.

The Qualitative Climate Change Assessment Report (AECOM, April 2023) focus is on both these key areas of assessment for the project and describes possible mitigation options available for reducing the project's effects on climate change (Climate Change Mitigation), and the effects of climate change on the project (Climate Change Adaption).

Refer to **Section 5.2.6** for the details on climate change potential impacts, mitigation measures and recommendations.

2.2.7 Human Health

The human health implications of the project such as air quality, noise, land use, traffic congestion and safety, economic, social cohesion, and neighborhood resources have been documented in the Human Health Implications Scoping Report (Intrinsik, May 2023).

The 2002 Approved Environmental did not include review or assessment specifically of human health implications of the project. As noted in Section 2.2.4 and the Final Environmental Conditions Report (AECOM, 2022), work for this project did include identification of sensitive and critical receptors and assessment of air quality impacts within the Study Area.

In keeping with the Ministry's Environmental Guide for Assessing Human Health Implications of Provincial Transportation Projects ("Ministry's Draft Human Health

Implications Guide”) (Ministry, 2022), the Ministry of Transportation Class Environmental Assessment process, the Regulation and the World Health Organization definition of health; the human health implications of the project have been identified holistically and so as to assess and understand the potential health impacts, both positive and negative.

In order to identify potential human health implications, the existing community health profile was identified for the Study Area using sources such as:

- Statistics Canada 2021 Census Profile
- York Region Public Health
- Simcoe-Muskoka District Health Unit
- Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
- Ontario First Nations Regional Health Survey Phase III
- Walkscore.com, and
- Other publicly available reputable open data sources.

In addition, a high-level review of the peer-reviewed scientific literature and reputable grey literatures (e.g., government documents and reports, policy literature, white papers, urban plans, etc.) and, where readily available and pertaining to human health, the Project Team utilized feedback provided through the consultation process from Indigenous communities, stakeholders, and the general public.

Refer to **Section 5.2.7** for the details on potential impacts, mitigation measures and recommendations.

2.2.8 Snowdrift

A Snowdrift Analysis Report (4DM, April 2023) was prepared by 4DM for the project to determine the severity of snowdrifting at locations along the Bradford Bypass route and designated interchanges, and to determine the recommended locations for applying mitigation treatments and type of measures to reduce snowdrifting.

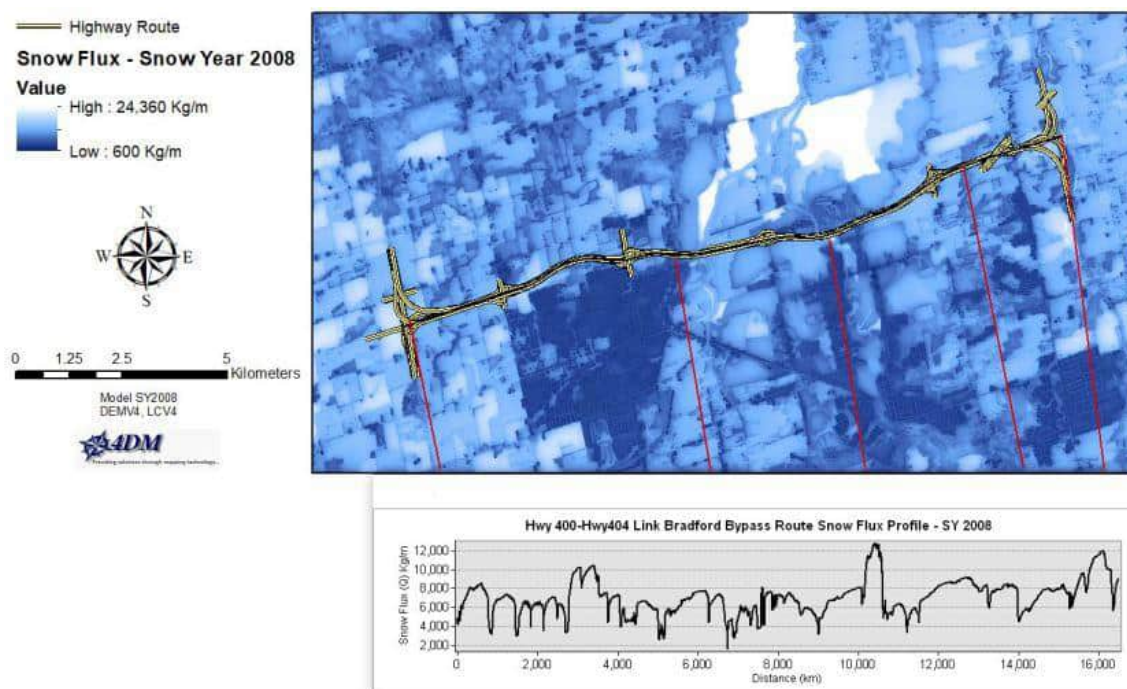
The snowdrifting assessment was completed to analyze the severity of blowing and drifting snow for the project and consisted of the following steps:

1. **Climatological Analysis:** A climatological analysis was conducted to quantify the meteorological and snow transport characteristics of the Study Area. Climatological analysis examines snow on the ground, wind conditions, and potential snow transport to estimate volumes and directionality of moving snow. The Snow Accumulation Season was determined using meteorological data. Climatological analysis included multiple Snow Accumulation Seasons to account for interannual variability snow conditions.

2. **Study Area Characterization:** By reviewing the available spatial data, the Study Area was characterized to account for factors relevant to snow transport (e.g., land cover, and topography). The information was then using in the snow transport modeling.
3. **Snow Transport Modeling:** Snow transport modeling is to quantify the movement of snow over the model area as a snow flux (kilograms/metre), considering site specific conditions. To determine snow transport, a SnowStream2D model developed by 4DM Inc. was used. SnowStream2D is a two-dimensional gridded numerical snow hydrology model designed to simulate snow transport processes by integrating regional meteorology with local topography and land use in the vicinity of the highway corridor.
4. **Snowdrift Assessment and Mitigation Analysis:** An analysis was conducted to determine the severity of snowdrifting and help decide if and which mitigation measures are warranted. SnowStream2D mitigation model determines the effectiveness of selective treatment such as fences, trees, and shrubs. Mitigation is risk-based approach using exceedance probability for non-precipitated events.

Figure 2-12 depicts the snow flux profiles for the 6.6 year return period (November 22, 2007 to April 3, 2008), where the magnitude ranges from 4,000 kilograms per metre to just under 12,000 kilograms per metre.

Figure 2-12: Snow Flux Profiles for 6.6 Year Return Period



Refer to **Section 5.2.8** for details on snowdrifting impacts, mitigation measures and recommendations.

2.2.9 Landscaping

A Preliminary Landscape Conceptual Design (AECOM, April 2023) was prepared for the project to identify opportunities to mitigate impacts and/or restore the landscape conditions, where possible, to pre-disturbed conditions for areas affected by the introduction of the proposed Bradford Bypass.

Refer to **Section 5.2.9** for the Preliminary Landscape Conceptual Plan (**Figure 5-4**), details on landscaping impacts, mitigation measures and recommendations.

2.3 Cultural Environment

Cultural environment studies have been completed to document and assess existing cultural environment features, outline the preliminary description of potential impacts of the project on the cultural environment, outline a description of potential measures to mitigate those impacts and identify applicable municipal, provincial, federal, or other regulatory approvals or permits associated with the cultural environment that may be required for the project.

The sections below summarize the study methodologies and describe the existing environmental conditions, for the following aspects of the cultural environment:

- Archaeology, and
- Built Heritage Resources and Cultural Heritage Landscapes.

2.3.1 Archaeology

Archaeological investigations within the Study Area are being completed in accordance with Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists. Indigenous community representatives continue to be involved in field investigations for archaeological work for the project. Avoidance and Protection of the archaeological resources is in keeping with Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and associated documentation, in addition to Ministry's policies regarding the engagement of community field liaisons and receives strong consideration as a way to show respect to Indigenous communities' heritage and point of view.

As part of this Preliminary Design study, AECOM conducted a Stage 1 Archaeological Assessment (P123-0436-2019) in 2019 for the proposed Bradford Bypass. The Stage 1 Archaeological Assessment was completed for the overall study corridor (approximately

23 square kilometres in size) in order to determine the presence/absence of archaeological potential. The Stage 1 Archaeological Assessment concluded that parts of the Study Area retained archaeological potential and required Stage 2 assessment. The Stage 1 Archaeological Assessment has been accepted by the Ministry of Citizenship and Multiculturalism.

The Stage 2 Archaeological Assessment of large sections of the Ministry's right-of-way was completed for the Bradford Bypass in 2020-2022 (P123-0454-2020). The assessment involved both pedestrian survey and test pitting in keeping with the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). The Stage 2 Archaeological Assessment for the Bradford Bypass resulted in the discovery of multiple archaeological sites, which are the subject of Stage 3 Archaeological Assessment Reports. The Stage 2 Archaeological Assessment Reports will be submitted to Indigenous communities as well as the Ministry of Citizenship and Multiculturalism in 2023. The Stage 2 Archaeological Assessment identified that Stage 3 work (field work and/or reporting) was required on the following sites.

- Wheatfield Site
- Fraser Creek Site
- Bradford Ridge Site
- Frazer Creek II Site
- Holland Forest East Site
- Holland Forest West Site
- Doan Site
- Holborn Site
- William Robinson Jr Site
- William Robinson Jr. II Site
- East Holland River Site
- Riverbend Site
- Bradford Hill Site
- Panville Site
- Goodwin Site
- Hollingshead 1, and
- Hollingshead 2.

Details of any findings are documented in Stage 3 Archaeological Assessment Reports and the reports will be submitted to Indigenous communities for review and comment and subsequently the Ministry of Citizenship and Multiculturalism and for acceptance.

The objective of the Stage 3 Archaeological Assessments was to further assess the cultural heritage value or interest of the site through the controlled collection of material. This information was used to support the determination of whether the site has been sufficiently documented or if further measures are required to protect or mitigate impacts to the site based on the evaluation of cultural heritage value or interest. The objectives of the Stage 3 site-specific assessments are:

- To determine the extent of the archaeological site and the characteristics of the artifacts
- To collect a representative sample of artifacts
- To assess the cultural heritage value or interest of the archaeological site, and
- To determine the need for mitigation of development impacts and recommend appropriate strategies for mitigation and future conservation.

The Stage 3 Archaeological Assessments have been conducted to meet the requirements of the Ministry of Citizenship and Multiculturalism's Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011) and in accordance with Section 21 of the Regulation. The Stage 3 Archaeological Assessments have identified sites requiring further archaeological work based on Section 3.4 of the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). These sites will be subject to a Stage 4 Archaeological Assessment following additional consultation with the Ministry of Citizenship and Multiculturalism and Indigenous communities.

Figure 2-13 below identifies the locations where Stage 2 Archaeological Assessment was required. As shown in **Figure 2-13**, Stage 2 archaeological investigations were not completed on two properties due to ongoing access issues. No construction activities will occur on these properties until the necessary archaeological investigations have been completed, in accordance with Ontario Regulation 697/21 and the Ontario Heritage Act.

Any required changes to the design of the Bradford Bypass following these archaeological investigations will be documented in an addendum, as per Section 29 of Ontario Regulation 697/21.

Refer to **Section 5.3.1** for the additional details on the results of the Stage 2 and 3 Archaeological Assessment including potential impacts, mitigation measures and recommendations regarding archaeological resources.

Figure 2-13: Archaeological Assessments

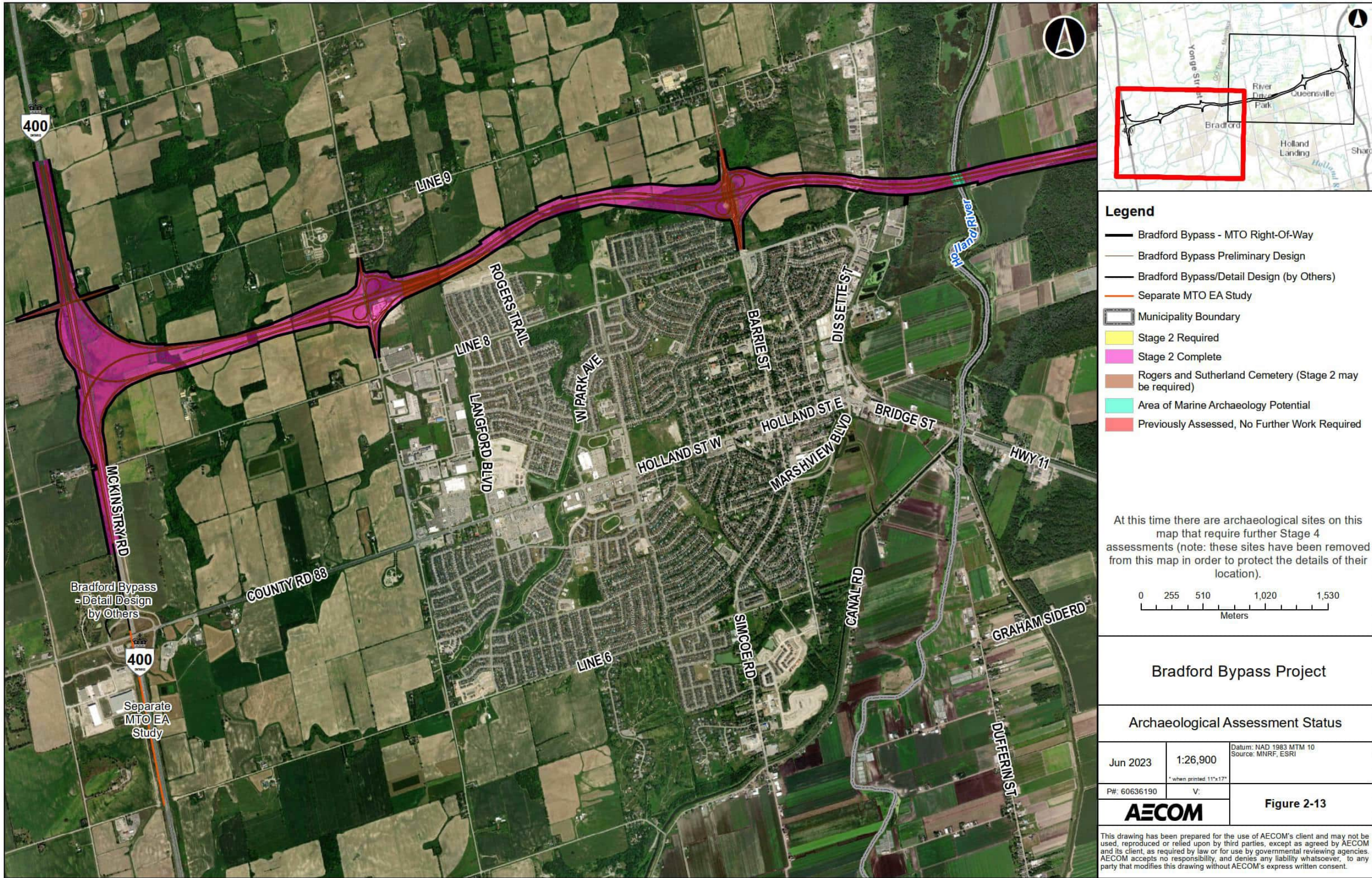
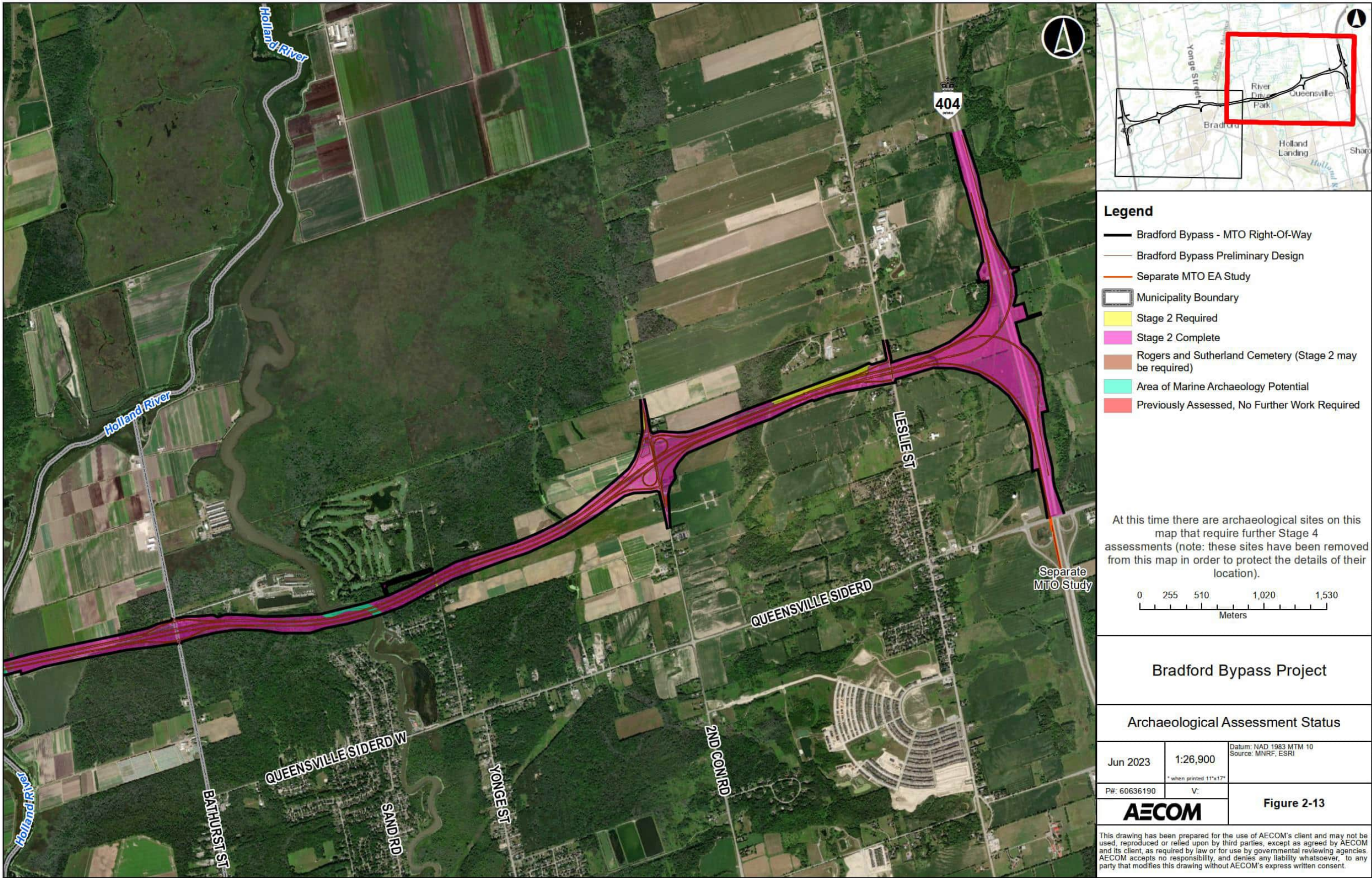


Figure 2-13: Archaeological Assessments



2.3.2 Built Heritage Resources and Cultural Heritage Landscapes

A Cultural Heritage Resource Assessment Report was prepared to identify all potential Built Heritage Resources and Cultural Heritage Landscapes located within the Study Area. It includes a preliminary assessment of the potential impacts from proposed project activities on identified Built Heritage Resources and Cultural Heritage Landscapes and provides recommendations on next steps and mitigations to conserve the identified cultural heritage resources.

As part of the preparatory work for the Preliminary Design, a Cultural Heritage Resource Assessment Report was prepared in 2020. As part of this Preliminary Design phase, the 2020 Cultural Heritage Resource Assessment Report was reviewed by the Ministry of Citizenship and Multiculturalism and the Project Team has undertaken an update to the Cultural Heritage Resource Assessment Report to reflect the existing conditions and potential impacts within the Study Area and inform project planning.

The updated report identifies and assesses potential impacts to the Built Heritage Resources and Cultural Heritage Landscapes from the proposed project design and recommends mitigation measures and next steps where there is potential for adverse impacts. Further heritage assessments are recommended for identified Built Heritage Resources and Cultural Heritage Landscapes anticipated to be potentially impacted as a result of the project. For these properties, Cultural Heritage Evaluation Reports will be prepared to determine if the property possess cultural heritage value or interest. For properties determined to possess cultural heritage value or interest, mitigation measures will be proposed to conserve or mitigate impacts to the cultural heritage resource.

The following sections outline the background and assessment of existing cultural heritage conditions within the Study Area.

2.3.2.1 Background

The 2002 Approved Environmental Assessment included a high-level assessment of built heritage resources and cultural heritage landscapes within the Study Area through identification of known or potential cultural heritage resources within, or immediately adjacent to, the Study Area. The assessment was used to support recommendations regarding further evaluation of properties for cultural heritage value or interest as well as assessment of potential impacts and development of mitigation strategies.

As part of the preparatory work for the re-initiation of the Bradford Bypass in 2020, AECOM completed a Cultural Heritage Resource Assessment Report (AECOM, 2020), which was updated in 2023.

Since the completion of the 2002 Approved Environmental Assessment and the 2020 Preliminary Design preparatory work, several changes have occurred associated with Built Heritage Resources and Cultural Heritage Landscapes. As such, an update to the description of the environmental conditions within the Study Area is included in Section 2.3.2 of the Final Environmental Conditions Report (AECOM, 2022) on the Project Website (<https://www.bradfordbypass.ca/study-process/>).

2.3.2.2 Key Summary of Environmental Conditions

Following completion of the Final Environment Conditions Report in October 2022, the Project Team has continued to work on heritage assessments. The updated Cultural Heritage Resource Assessment Report (AECOM, March 2023) has identified 18 properties with potential cultural heritage value or interest, including four Built Heritage Resources and fourteen Cultural Heritage Landscapes. Of these 18 properties, three Built Heritage Resources and five Cultural Heritage Landscapes are anticipated to be potentially impacted by the project. These eight cultural heritage resources are further being evaluated through Cultural Heritage Evaluation Reports to determine if they possess cultural heritage value or interest. For Built Heritage Resources and Cultural Heritage Landscapes determined through a Cultural Heritage Evaluation Report to possess cultural heritage value or interest, a Heritage Impact Assessment will be prepared for properties where impacts are still anticipated. The Heritage Impact Assessments are being prepared in accordance with the Ministry of Citizenship and Multiculturalism *Standards and Guidelines for Conservation of Provincial Heritage Properties*. Cultural heritage mitigations will be determined through the Heritage Impact Assessment which assesses the impacts of the project on those Built Heritage Resources and Cultural Heritage Landscapes and recommends design alternatives and mitigation measures. Refer to **Section 5.3.2** for the details on potential impacts, mitigation measures and recommendations regarding Built Heritage Resources and Cultural Heritage Landscapes.

2.4 Engineering Studies

In addition to the environmental studies described in **Section 2.1**, **Section 2.2** and **Section 2.3**, engineering studies were carried out to document and assess existing conditions and design features, outline the preliminary description of potential impacts of the project, outline a description of potential measures to mitigate those impacts and identify applicable municipal, provincial, federal or other regulatory approvals or permits associated with design and engineering that may be required for the project.

The sections below summarize the study methodologies and describe the existing conditions, for the following engineering disciplines:

- Traffic and Transportation
- Geotechnical, and
- Utilities.

2.4.1 Traffic and Transportation

A traffic and transportation model was developed to assess the existing traffic conditions for the traffic network within the Study Area. This section outlines the traffic model development and describes the existing traffic operations within the Study Area.

A traffic microsimulation model was developed in 2020 using the Aimsun Next 20 software package provided by the Ministry to review available information, including a review of historical Annual Average Daily Traffic on Highway 400 for the sections within the Study Area, raw traffic count data provided by the Ministry for Highway 404, and speed and travel time data for Highway 400 and Highway 404. Traffic volumes were balanced after applying growth projections to develop the base year existing conditions volumes. Pre-pandemic traffic volumes were used to represent typical peak hour volumes to avoid reflecting the impact of the COVID-19 pandemic on traffic within the Study Area.

An overview of the existing road intersections located within the Study Area is provided in **Table 2-9** below. All intersections are signalized except at the Queensville Sideroad and Highway 404 West Ramp Terminal, and Woodbine Avenue and Highway 404 North Ramp Terminal.

Table 2-9: Existing Intersections Within the Study Area

Intersection	Jurisdiction
Simcoe County Road 88 and 5 th Sideroad	Bradford West Gwillimbury
Simcoe County Road 88 and Highway 400 West Ramp Terminal	Ministry of Transportation
Simcoe County Road 88 and Highway 400 East Ramp Terminal	Ministry of Transportation
Highway 89 and 5 th Side Road	Ministry of Transportation
Highway 89 and Highway 400 West Ramp Terminal	Ministry of Transportation
Highway 89 and Highway 400 East Ramp Terminal/Reive Boulevard	Ministry of Transportation
Green Lane East and Leslie Street	York Region
Green Lane East and Highway 404 West Ramp Terminal	Ministry of Transportation
Green Lane East and Highway 404 East Ramp Terminal	Ministry of Transportation
Green Lane East/Herald Road and Woodbine Avenue	York Region
Queensville Sideroad and Leslie Street	York Region
Queensville Sideroad and Highway 404 West Ramp Terminal	Ministry of Transportation
Queensville Sideroad and Highway 404 East Ramp Terminal	Ministry of Transportation
Queensville Sideroad and Woodbine Avenue	York Region
Woodbine Avenue and Ravenshoe Road	York Region
Woodbine Avenue and Highway 404 North Ramp Terminal	Ministry of Transportation
Woodbine Avenue and Highway 404 South Ramp Terminal	Ministry of Transportation

The traffic microsimulation model analysis revealed eight critical (high volume) movements during the AM peak hour, as summarized below:

- Simcoe County Road 88 and Highway 400 West Ramp Terminal – Westbound left and southbound left
- Woodbine Avenue and Ravenshoe Road – Eastbound and northbound left
- Green Lane East and Leslie Street – Northbound and southbound
- Green Lane East and Harry Walker Parkway North – Westbound left, and
- Green Lane East and Woodbine Avenue – Left northbound.

The traffic simulation model analysis revealed 14 critical (high volume) movements during the PM peak hour, as summarized below:

- Highway 89 and Highway 400 East Ramp Terminal/Reive Boulevard – Southbound
- Simcoe County Road 88 and Highway 400 West Ramp Terminal – Northbound left and southbound left
- Woodbine Avenue and Ravenshoe Road – Eastbound, eastbound left, northbound left, and westbound
- Woodbine Avenue and Highway 404 South Ramp Terminal – Westbound right and southbound left
- Queensville Sideroad and Leslie Street – Eastbound left
- Green Lane East and Leslie Street – Northbound, northbound left and southbound, and
- Green Lane East and Highway 404 West Ramp Terminal – Southbound right.

The majority of movements were shown to operate at acceptable levels during both peak hours. Traffic operations at intersections throughout the Study Area are shown to operate at mostly acceptable levels. Given the close replication to existing operating conditions, the weekday AM, and PM peak period models are deemed to be acceptable for use in assessing future design alternatives and construction staging scenarios.

2.4.2 Geotechnical

Geotechnical studies were undertaken to evaluate the subsurface conditions and provide pavement engineering recommendations for the project.

Geotechnical field investigations for the project were carried out from 2021 to 2023, and included a pavement condition survey, borehole investigation, material sampling, and a

pavement coring program. The purpose of the geotechnical investigation was to advance drilling of boreholes. The boreholes were advanced in accordance with Ministry of Transportation's Provincial Pavement Engineering Investigations Guidelines (June 2013). Ninety-seven samples of granular and soil types were obtained from the boreholes and sent for laboratory testing in accordance with the Ministry of Transportation's Laboratory Testing Manual (May 2021).

Generally, the subgrade soils encountered within the Study Area have low susceptibility to frost heaving. Based on the profiles of the Updated Technically Preferred Route, the locations of moderate and high frost susceptible soils are within deep cut/fill sections. The regional geological and hydrogeological conditions within the Study Area are discussed in **Section 2.1.4**.

2.4.3 Utilities

Within the Study Area, Preliminary Design considerations for existing utilities that occur within, or may cross the Updated Technically Preferred Route have been identified. Engineering design and consultation has been carried out to determine potential conflicts and requirements for utility protection and relocation. All potentially affected utility companies will be contacted to develop a utility relocation plan prior to construction during the Detail Design phase. Utility relocations may occur prior to construction; however, if it is necessary to complete utility relocations during construction, the Contractor will be required to coordinate the timing of each operation to separate work areas. Issues related to utility relocations and protection of utilities will be addressed in the Detail Design phase. Utilities include both private and public utilities, as outlined below.

2.4.3.1 Private Utilities

Table 2-10 lists the privately-owned utility providers with infrastructure within the Study Area.

Table 2-10: Private Utilities Within the Study Area

Utility Provider	Utility Category
Alectra Utilities	Power
Bell Canada	Communications
Enbridge Inc.	Natural Gas
Hydro One Networks Inc. (Distribution and Transmission)	Power
Rogers Communications	Communications
ViaNet	Communications
Zayo	Communications

2.4.3.2 Public Utilities

Table 2-11 lists the public utility providers with infrastructure within the Study Area.

Table 2-11: Public Utilities Within the Study Area

Utility Provider	Utility Category
Simcoe County	Water, Stormwater, Traffic Signals, Illumination
York Region	Water, Stormwater, Traffic Signals, Illumination, Communications
Town of Bradford West Gwillimbury	Water, Stormwater, Traffic Signals, Illumination
Town of East Gwillimbury	Water, Stormwater, Traffic Signals, Illumination
Township of King	Water, Stormwater

3. Evaluation of Alternatives

In accordance with Section 20(2)3 and 20(2)6 of the Regulation, this section presents the evaluation of alignment alternatives to the Technically Preferred Route as set out in the conceptual design identified in Exhibit 5-1 in Section 5 of the 2002 Approved Environmental Assessment, and the evaluation of design alternatives for each of the components of the Updated Technically Preferred Route. This includes engineering updates identified through the Preliminary Design Preparatory Work (2019 – 2020) in advance of the Preliminary Design, which recommended freeway-to-freeway interchange designs at Highway 400 and Highway 404 that meet current design standards. The evaluation of alternatives takes into account existing environmental conditions and engineering design as described in **Section 2**.

For each of the alternatives, the Project Team used a reasoned argument (trade-off) method of evaluation to identify the advantages and disadvantages to select the design refinements and alternatives for the project. The evaluation factors and criteria summarized in **Table 3-1** below were used to evaluate the refinements and alternatives.

Table 3-1: Summary of Refinement Evaluation Factors and Criteria

Evaluation Factor	Criteria
Transportation and Engineering	<ul style="list-style-type: none"> ■ Traffic Operations and Safety ■ Highway Geometrics and Design Standards ■ Structural Engineering ■ Foundation and Geotechnical Conditions ■ Active Transportation ■ Utilities ■ Stormwater Management ■ Constructability and Staging ■ Navigability, and ■ Cost.
Natural Environment	<ul style="list-style-type: none"> ■ Fish and Fish Habitat ■ Terrestrial Ecosystems ■ Wildlife Crossings ■ Species at Risk ■ Environmentally Significant Features ■ Groundwater ■ Surface Water (Drainage and Hydrology) ■ Drinking Water ■ Fluvial Geomorphology, and ■ Greenways and Open Space Linkages.

Evaluation Factor	Criteria
Socio-Economic Environment	<ul style="list-style-type: none"> ■ Aesthetics and Landscaping ■ Noise, Vibration and Air Quality ■ Contamination and Property Waste ■ Residential Property ■ Agricultural Lands ■ Land Use (Policy Areas, Designated Areas), and ■ Approved Plans and Policies.
Cultural Environment	<ul style="list-style-type: none"> ■ Archaeological Resources ■ Built Heritage and Cultural Landscapes, and ■ Indigenous Communities interests

The following sections present the evaluation of each alternative and identifies the recommended alternative to be carried forward through Detail Design. This information was presented in Public Information Centre #2. The recommended design alternatives and Technically Preferred Route will become the Updated Technically Preferred Route, also known as the Recommended Plan (**Section 4**).

An alternative to slightly shift the alignment west of County Road 4 was first presented at Public Information Centre #1 for consideration. This alternative was not carried forward as a viable option to the Updated Technically Preferred Route when considering alternatives to avoid an archaeological site discovered during archaeological investigations during Preliminary Design.

Section 3.3 of this Report presents the outcome of the evaluation of alignment and design alternatives for the selection of the Updated Technically Preferred Route.

Note, in the sections that follow, evaluation tables correspond with the below legend:

● Preferred ● Moderately Preferred ○ Least Preferred

3.1 Alignment Alternatives

In accordance with Section 20(2)3 of the Regulation, this section presents the alignment alternatives that were developed to account for changes in environmental conditions between 10th Sideroad and County Road 4, and for the new crossing of the Holland River East Branch. These two alternatives were presented for public review in the Draft Environmental Conditions Report (AECOM, 2022).

The 2002 Approved Environmental Assessment design (Technically Preferred Route) required modification as a result of changes to the environmental conditions. The two changes to the highway alignment are described in Section 5 of the Final Environmental Conditions Report (AECOM, 2022). A key element of both changes is the discovery of

significant archaeological resources within the alignment of the Technically Preferred Route. The changes include:

- An alignment shift between 10th Sideroad and County Road 4 (**Section 3.1.1**), and
- An alignment shift from Bathurst Street to east of Yonge Street, including the crossing over the Holland River East Branch (**Section 3.1.2**).

An overview of these alignment alternatives and a summary of the evaluation was presented at Public Information Centre #2 on November 24, 2022. The preferred alternative at each location has been incorporated into the overall design, representing the Updated Technically Preferred Route presented in **Section 4** of this Report and is to be carried forward through Detail Design.

3.1.1 Alignment Shift Between 10th Sideroad and County Road 4

As noted in Section 2.3.1 of the Final Environmental Conditions Report (AECOM, 2022), a Stage 2 Archaeological Assessment was carried out and resulted in the discovery of archaeological resources. Following the completion of Stage 2 archaeology work, a Stage 3 Archaeological Assessment has been advanced to determine the limits and protective buffers of the archaeological site identified as the Bradford Hill site (BaGv-112). The Technically Preferred Route alignment crossed through this area and resulted in a direct impact to the site. As a result, the Project Team developed and assessed design alternatives to propose avoidance options as part of the Updated Technically Preferred Route.

The following alternatives were considered to address the anticipated potential impacts to the archaeological site, associated with the Technically Preferred Route between 10th Sideroad and County Road 4:

- **Base Case:** no change to the Technically Preferred Route
- **Refinement Alternative 1:** 1,700 metre radii
- **Refinement Alternative 2:** 1,700 and 1,300 metre radii, and
- **Refinement Alternative 3:** 1,300 metre radii.

These alternatives are further discussed in the sections below.

3.1.1.1 2002 Approved Environmental Assessment (Base Case)

The Technically Preferred Route is shown as the Base Case alignment (**Figure 3-1**), against which all alternatives are compared. At this location, the Base Case was not recommended as it does not meet the purpose to avoid a significant environmental impact.

When considering design alternatives to avoid the archaeological site within this section of the proposed highway, each of the developed alternatives would provide more benefit

in the avoidance of the archaeological site. As such, this initial design refinement was eliminated from consideration in the evaluation of alignment alternatives in this section of the highway.

During Public Information Centre #1, a design refinement was proposed to slightly shift a section of the mainline alignment west of County Road 4 to the north. The intent of this refinement was to avoid encroachment into properties at the edge of the right-of-way due to grading and drainage requirements, by creating greater separation between the property line and the southern edge of the active highway lanes. This refinement was not considered to be a significant change from the base case (Technically Preferred Route) alignment in this section.

3.1.1.2 Alternative 1

Alternative 1 (**Figure 3-2**) provides an alignment shift to the north to avoid the archaeological site (BaGv-112) and utilizes 1700 metre radii curves, passing through the underpass structure at County Road 4 at a skewed angle. Adjustments to the alignment east of County Road 4 are required to transition back into the Technically Preferred Route alignment at the Holland River crossing. This alternative design has the greatest overall length and is the only alternative with changes to the Technically Preferred Route east of County Road 4. As a result, it requires design modifications to the County Road 4 interchange ramps as well as the bridge and abutments of the underpass structure at County Road 4. Given the topography west of County Road 4, design considerations included retaining walls requirements.

3.1.1.3 Alternative 2 – Preferred

Alternative 2 (**Figure 3-3**) provides an alignment shift to the north to avoid the archaeological site (BaGv-112). It includes a 1700 metre radius curve that transitions into a 1300 metre radius curve to allow the alignment to tie back into the Technically Preferred Route at County Road 4. While minor refinements to the County Road 4 interchange ramps on the west side are required to facilitate this alternative, there are no alignment modifications east of County Road 4. Minor design changes to the County Road 4 Early Works structure are also required including adjustments to retaining walls and lowering of pier footings along with highway design features.

3.1.1.4 Alternative 3

Alternative 3 (**Figure 3-4**) provides an alignment shift to the north to avoid the archaeological site (BaGv-112). It features 1300 metre radii curves, allowing the alignment to tie back into the Technically Preferred Route at County Road 4. Similar to Alternative 2, this alternative requires minor refinements to the County Road 4 interchange ramps on the west side, and no modifications are required east of County Road 4. Minor design changes to the County Road 4 Early Works structure design including adjustments to retaining walls and lowering of pier footings along with highway design features.

Figure 3-1: Base Case Alignment between 10th Sideroad and County Road 4



Figure 3-2: Alignment Shift with 1700 metre Radii Curves (Alternative 1)

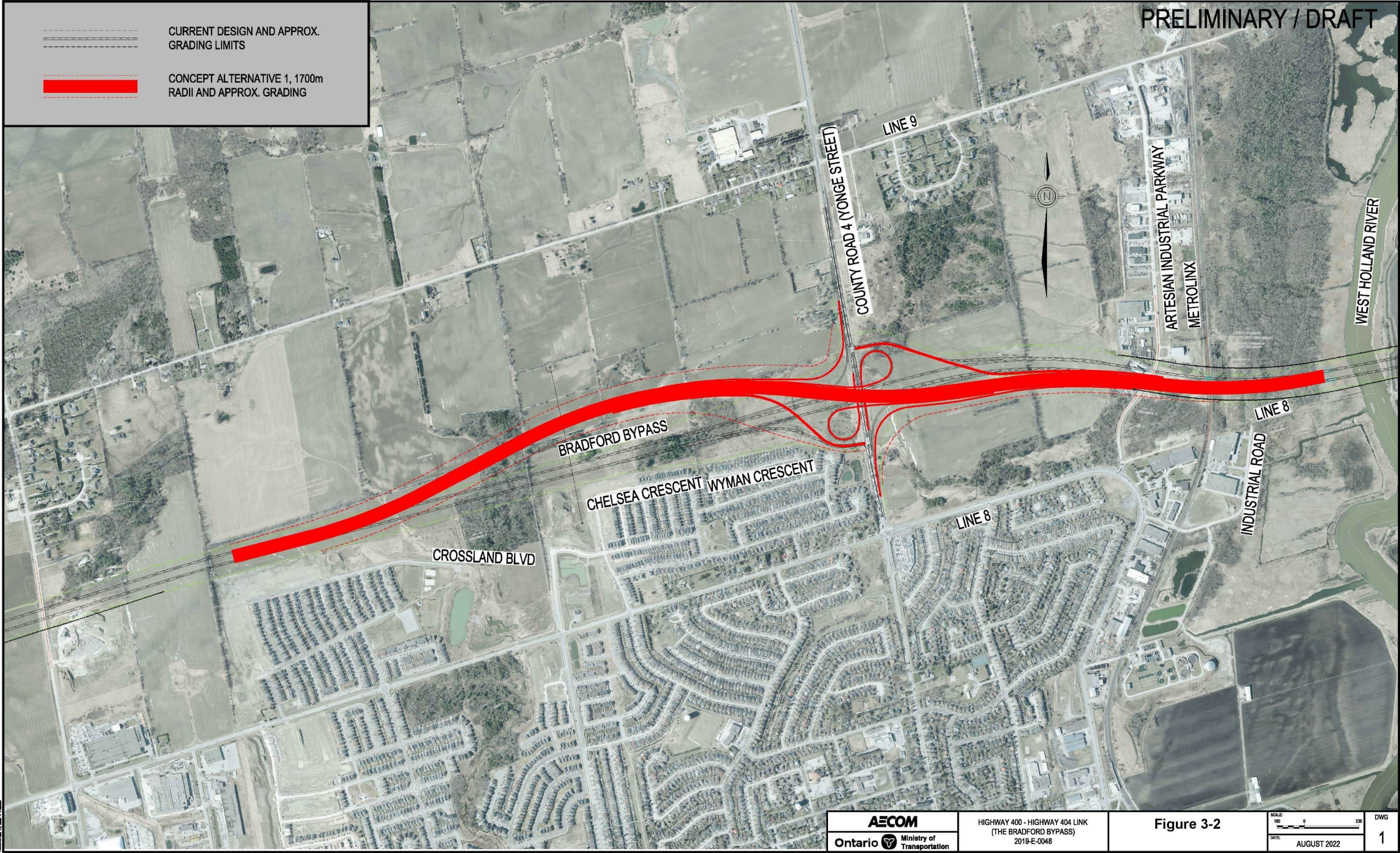


Figure 3-3: Alignment Shift with 1700 metre and 1300 metre Radii Curves (Alternative 2)

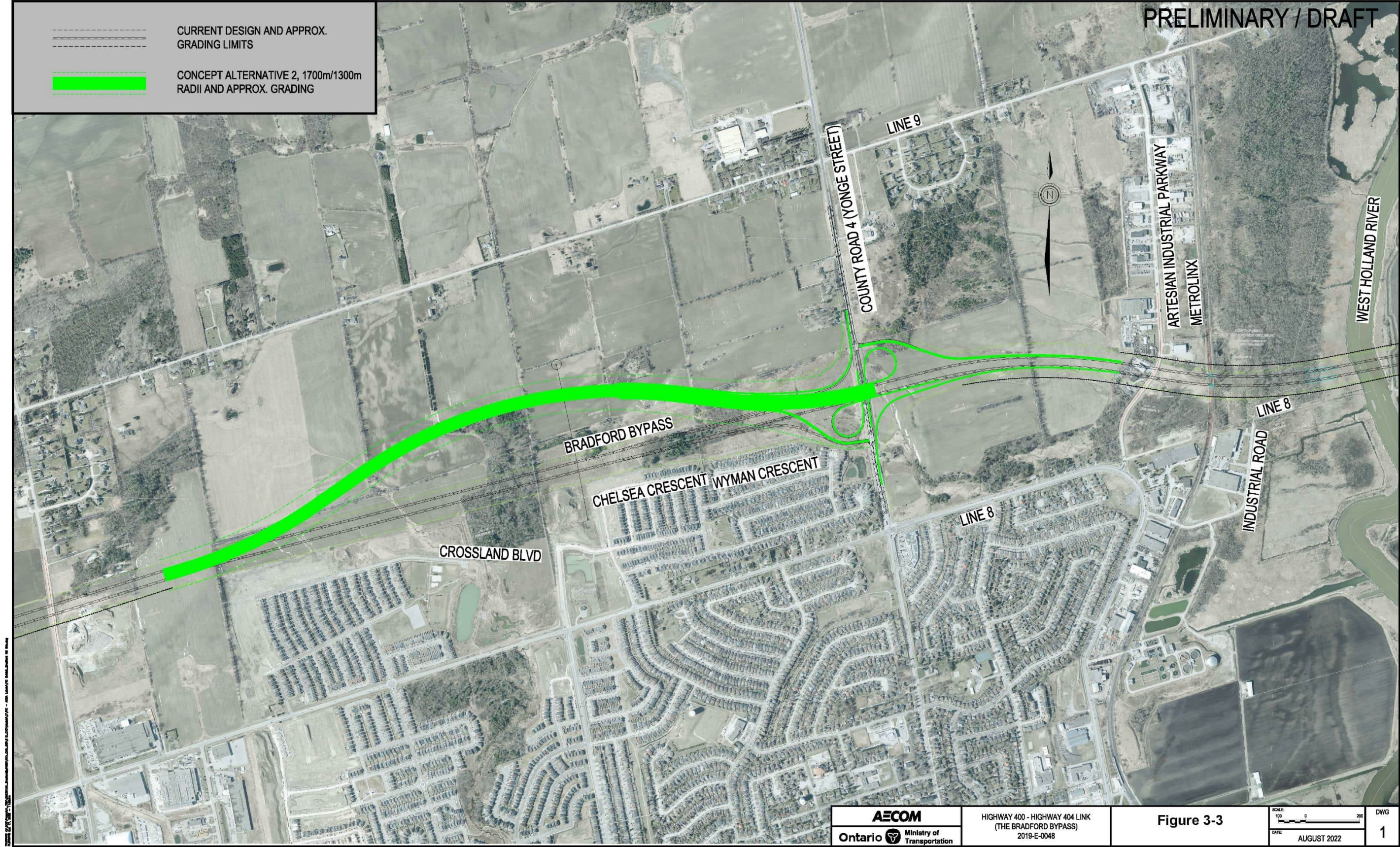
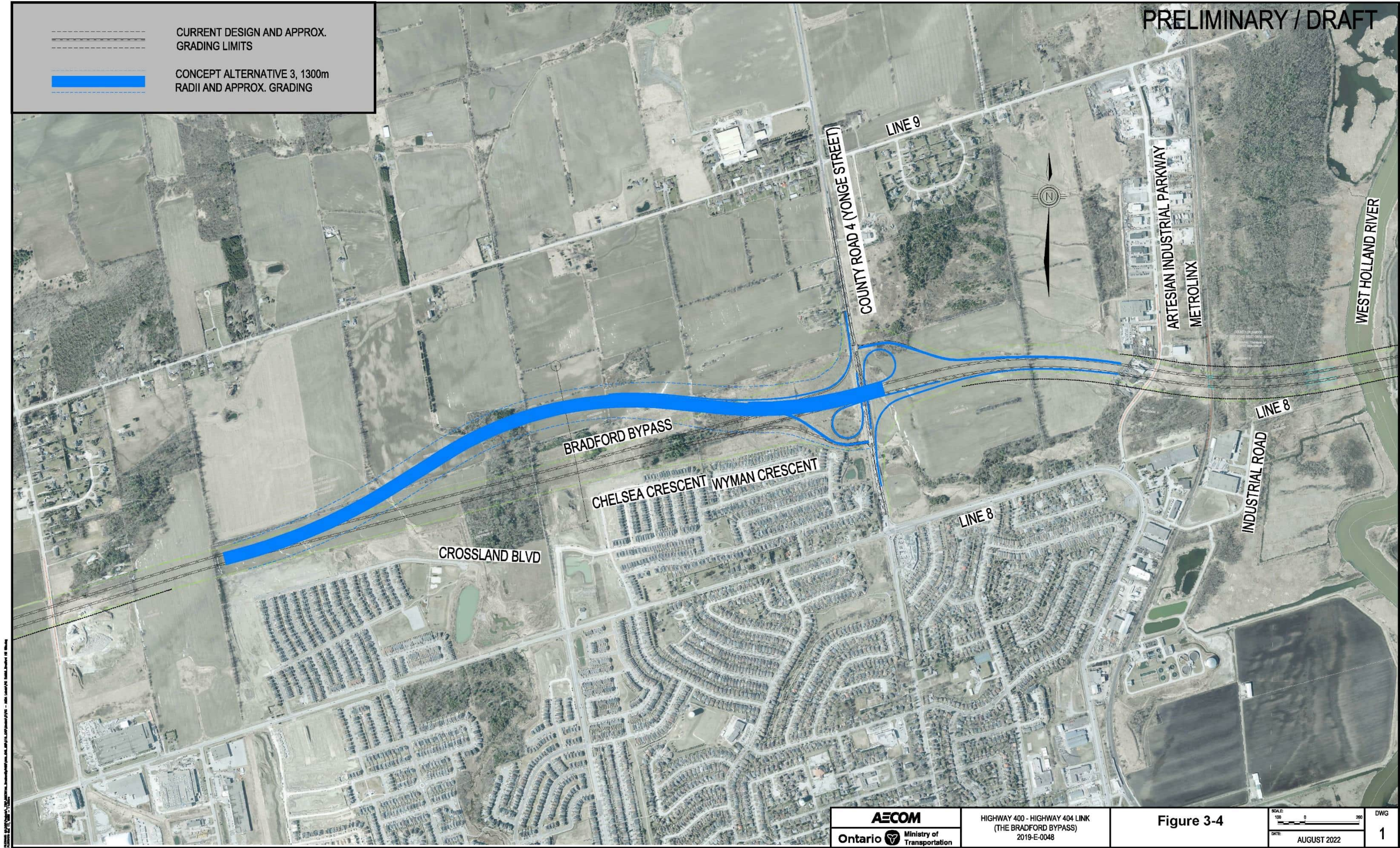


Figure 3-4: Alignment Shift with 1300 metre Radii Curves (Alternative 3)



3.1.1.5 Evaluation of the Alignment Shift Between 10th Sideroad and County Road 4

Based on the evaluation of these alternatives, Alternative 2 was recommended to be carried forward as the preferred alignment design at this location. Alternative 1 was least preferred and Alternative 3 was moderately preferred. The Base Case with the minor alignment refinement, while best aligned with the Technically Preferred Route, did not meet the priority requirement to avoid a direct impact to a sensitive archaeological site with importance to Indigenous communities.

Table 3-2 provides the ranking of each alternative by the evaluation criteria. Refer to Table 5-3 of the Final Environmental Conditions Report (AECOM, 2022) for a detailed summary of the evaluation of alignment alternatives for the alignment shift between 10th Sideroad and County Road 4.

Table 3-2: Evaluation of Alternatives Summary (Alignment Shift)

Criteria	Base Case	Alternative 1	Alternative 2	Alternative 3
Highway Engineering	○	◐	●	◐
Traffic Operations	●	●	●	●
Structural Engineering	●	○	◐	◐
Environment	◐	○	●	◐
Natural	◐	○	●	◐
Socio-Economic	◐	○	◐	●
Cultural	○	●	●	◐
Overall Summary	◐	○	●	◐

Alternative 2 provides greater separation from the residential areas to the south, which is anticipated to provide improvements from a noise perspective. The design in this area will not preclude a future municipal road crossing over the Bradford Bypass at Professors Day Drive. Compared to the Technically Preferred Route for this alternative, the environmental impacts, aside from those associated with archaeological factors, were considered to have a trade-off such that impacted woodland areas will remain more continuous and noise impacts are reduced, in lieu of changing the property impacts for future development and encroachment onto the back area of select heritage properties and existing agricultural lands to the north of the freeway corridor.

3.1.2 Holland River East Branch

The Technically Preferred Route identified an alignment at the Holland River East Branch that has the potential to impact fish habitat as a result of pier placement along the meander bends and a backwater refuge area, as well as impacts to a known archaeological site, known as the Riverbend site (BaGv-114). Additionally, socio-economic impacts to recreational facilities were identified.

Design refinements for the highway alignment and river crossing for the Holland River East Branch involved consideration for the commitments and recommendations from the 2002 Approved Environmental Assessment. This included environmental conditions related to scour and erosion, in-water impacts to fisheries, considerations for navigation, economic and community considerations, and cultural environment impacts for archaeological resources, and considerations to minimize impacts to both Albert's Marina and Silver Lakes Golf Club.

The following alternatives have been considered to address the potential impacts associated with the Technically Preferred Route at the Holland River East Branch:

- Base Case – No change to the Technically Preferred Route
- Refinement Alternative 1 – Curved Transition East of River Crossing, and
- Refinement Alternative 2 – Tangent Transition East of River Crossing.

These alternatives are further discussed in the sections below.

3.1.2.1 Alternative 1 - 2002 Approved Environmental Assessment Alignment (Base Case)

The first alternative represents the Base Case (**Figure 3-5**), which is the Technically Preferred Route alignment identified in the 2002 Approved Environmental Assessment.

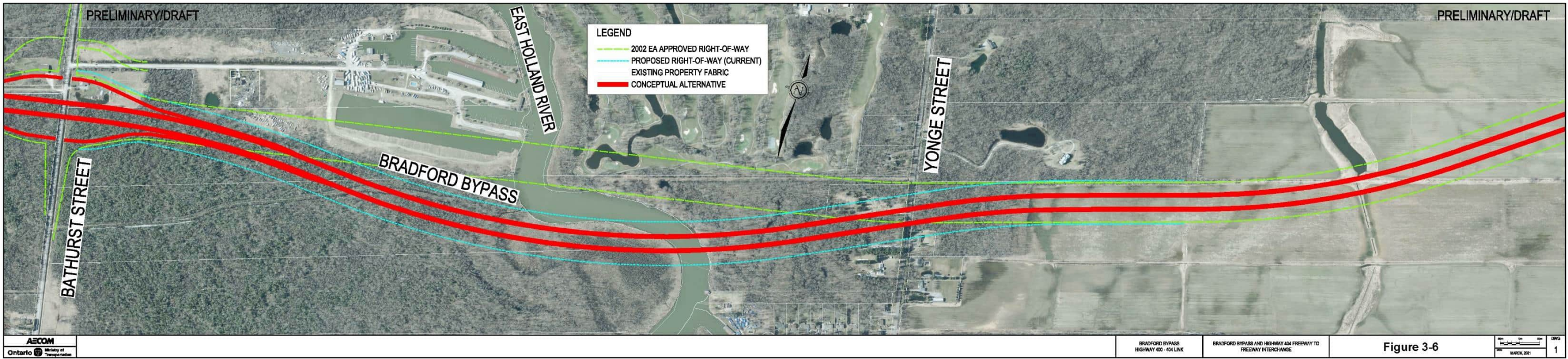
3.1.2.2 Alternative 2 – Preferred

Alternative 2 (**Figure 3-6**) shifts the alignment approximately 150 metres south, starting just east of the interchange at Bathurst Street, crossing the Holland River East Branch before reconnecting with the original alignment just east of Yonge Street. This alternative features back-to-back 2200 metre radius curves which allow the alignment to avoid the archaeological site, considers fisheries in-water impacts, navigational clearances, scour and erosion, and impacts to recreational facilities on both sides of the Holland River East Branch. The length of this alignment shift and property impact changes are mitigated compared to Alternative 3.

Figure 3-5: Base Case Alignment for the Holland River East Branch (Alternative 1)



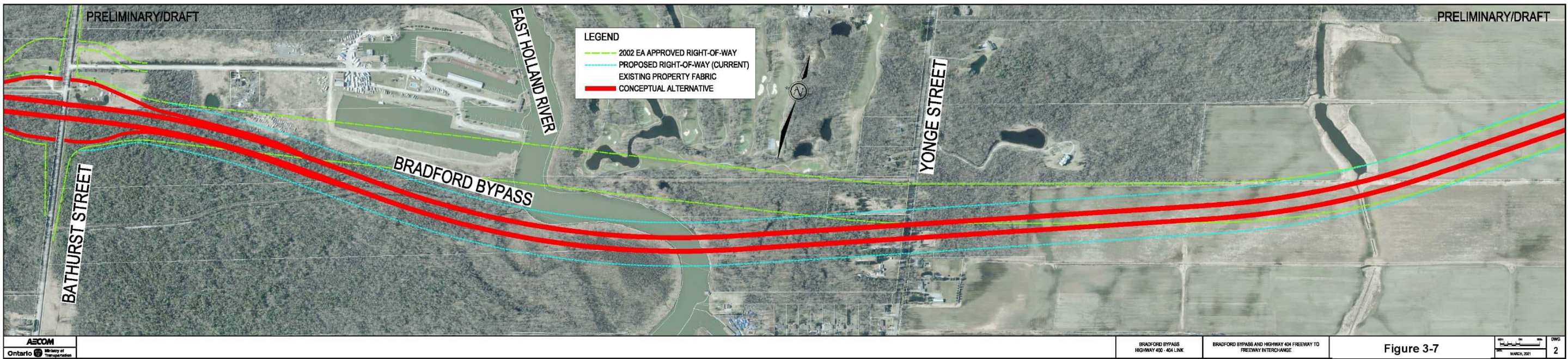
Figure 3-6: Curved Transition Alignment for the Holland River East Branch (Alternative 2)



3.1.2.3 Alternative 3

Alternative 3 (**Figure 3-7**) has an alignment shift similar to Alternative 2, between Bathurst Street and the crossing of the Holland River East Branch. It features a 2200 metre radius curve that transitions into a one-kilometre tangent section (straight line) east of the river, which reconnects with the original alignment beyond Yonge Street. As a result, the length of the alignment shift, and associated property impact changes is greater than Alternative 2, while still achieving the same avoidance and mitigation of impacts to archaeological resources, fisheries and recreational facilities as Alternative 2.

Figure 3-7: Tangent Transition Alignment for the Holland River East Branch (Alternative 3)



3.1.2.4 Evaluation of the Alignment Shift at the Holland River East Branch

Based on the evaluation, it was recommended that Alternative 2 be carried forward as the preferred alignment design at this location. Alternative 1 was least preferred, with Alternative 3 moderately preferred. Each design meets the current geometric design standards.

Table 3-3 provides the ranking of each alternative by the evaluation criteria. Refer to Table 5-4 of the Final Environmental Conditions Report (AECOM, 2022) for a detailed summary of the evaluation of alignment alternatives for the alignment shift at the Holland River East Branch.

Table 3-3: Evaluation of Alternatives (Holland River East Branch)

Criteria	Alternative 1	Alternative 2	Alternative 3
Highway Engineering	○	●	◐
Traffic Operations	●	●	●
Structural Engineering	●	◐	○
Environment	○	●	◐
Natural	●	◐	○
Socio-Economic	◐	●	●
Cultural	◐	●	●
Overall Summary	○	●	◐

Alternative 2 will realign the highway by approximately 150 metres to the south of the Technically Preferred Alignment, which avoids the identified Riverbend archaeological site (BaGv-42). The anticipated impact to the meandering river is less than other alternatives for both temporary and permanent impacts from the construction and placement of bridge piers. There is a slight offset to these benefits as there are increases in encroachment into natural areas compared to the Base Case, which will be considered through mitigation strategies in collaboration with Regulatory Agencies as the design is refined. Alternative 2 has substantially less permanent in-water footprint impacts relative to the 2002 Approved Environmental Assessment Design (Base Case). Furthermore, commitments from the 2002 Approved Environmental Assessment to mitigate impacts to adjacent properties are met.

Alternative 2 results in a constant horizontal bridge curvature, which is simpler in design, fabrication, and construction than Alternative 3. The structural design details for these twin bridges are presented in **Section 4.3.1**.

Overall, Alternative 2 best mitigates impacts to river sinuosity, in-water footprint of the structure, recreational activities, archaeological sites, and associated design complexities.

3.2 Design Alternatives

In accordance with Section 20(2)6 of the Regulation, this section presents the various design alternatives developed to modify to the design of the Technically Preferred Route presented in the 2002 Approved Environmental Assessment, present the evaluation of each design alternative, and identify the preferred design alternative at each location. These design alternatives represent those that were initially proposed and developed based on engineering design principals.

Design alternatives evaluated as part of this project include the following:

- Freeway-to-freeway interchanges at Highway 400 (**Section 3.2.1**) and Highway 404 (**Section 3.2.2**)
- Minor alignment refinements west of Leslie Street to address Hydro One utility impacts including access requirements (**Section 3.2.3**)
- Interchange location (**Section 3.2.4**)
- Interchange configurations at 10th Sideroad (**Section 3.2.5**), Bathurst Street (**Section 3.2.6**), 2nd Concession Road (**Section 3.2.7**) and Leslie Street (**Section 3.2.8**)
- County Road Early Works (**Section 3.2.9**), and
- Highway profile refinements affecting overpasses and underpasses where the highway will cross municipal roads and railways (**Section 3.2.10**).

An overview of these design alternatives and a summary of the evaluation was presented at Public Information Centre #2 on November 24, 2022. The preferred alternative at each location has been incorporated into the overall design, representing the Updated Technically Preferred Route presented in **Section 4** and is to be carried forward through Detail Design.

3.2.1 Highway 400 Freeway-to-Freeway Interchange

As part of the preparatory work in advance of the Preliminary Design between 2019 and 2020, it was determined that the proposed inner loop ramp configuration of the Highway 400 freeway-to-freeway interchange did not meet current design standards. As such, four alternatives were developed to provide connectivity between Highway 400 and the Bradford Bypass, allowing for free-flowing movement between the two freeways.

The following design alternatives were considered for the Highway 400 freeway-to-freeway interchange:

- Alternative 1 – 750 metre radius ramps with basketweave to County Road 88 interchange

- Alternative 2 – 440 metre radius Highway 400 southbound to Bradford Bypass Eastbound and Highway 400 northbound to Bradford Bypass eastbound ramps with basketweave to County Road 88 interchange
- Alternative 3 – 525 metre radius Bradford Bypass to Highway 400 southbound ramp with connectivity to County Road 88 interchange, and
- Alternative 4 – Dual curve Bradford Bypass to Highway 400 southbound with connectivity to County Road 88 interchange.

These alternatives are further discussed in the sections below.

3.2.1.1 Alternative 1

Alternative 1 (**Figure 3-8**) features four 750 metre radius directional ramps. A basketweave structure maintains the existing access to County Road 88 from Highway 400; however, there is no direct access to County Road 88 from the Bradford Bypass.

3.2.1.2 Alternative 2

Alternative 2 (**Figure 3-9**) features four directional ramps, two have a 750 metre radius (Bradford Bypass Westbound – Highway 400 Southbound and Bradford Bypass Westbound to Highway 400 Northbound) and two have a 440 metre radius (Highway 400 Northbound – Bradford Bypass Eastbound and Highway 400 Southbound to Bradford Bypass Eastbound). The access to County Road 88 from both Highway 400 and Bradford Bypass is the same as Alternative 1. Existing access from Highway 400 is maintained, however no access is provided from the Bradford Bypass.

3.2.1.3 Alternative 3 – Preferred

Alternative 3 (**Figure 3-10**) has four directional ramps, one ramp has a 750 metre radius (Bradford Bypass Westbound to Highway 400 Northbound), two ramps have a 440 metre radius (Highway 400 Southbound to Bradford Bypass Eastbound and Highway 400 Northbound to Bradford Bypass Eastbound), and one ramp has a 525 metre radius (Bradford Bypass Westbound to Highway 400 Southbound). Unlike Alternatives 1 and 2, access to the County Road 88 from both Highway 400 (existing) and the Bradford Bypass (new) is possible with this interchange and ramp configuration. Furthermore, this alternative has a smaller footprint, resulting in fewer overall impacts compared to Alternatives 1 and 2.

3.2.1.4 Alternative 4

Alternative 4 (**Figure 3-11**) is similar to Alternative 3. The exception is the curvature of the ramp from Bradford Bypass Westbound to Highway 400 Southbound, varies from a 650 metre radius to a 440 metre radius.

Figure 3-8: Ramps 750 metre Radius Ramps with Basketweave to County Road 88 (Alternative 1)

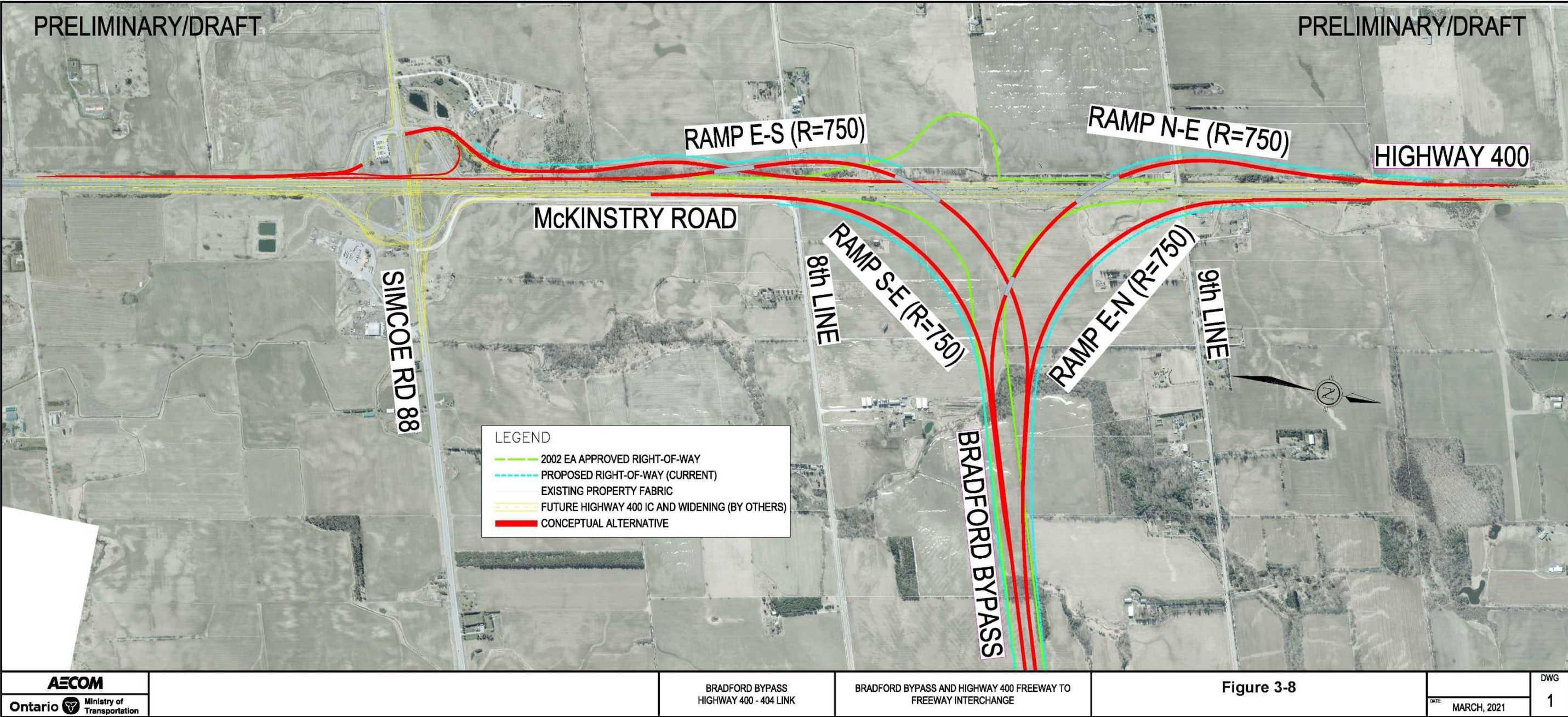


Figure 3-9: Two 750 metre Radius Ramps and Two 440 metre Radius Ramps, with Basketweave to County Road 88 (Alternative 2)

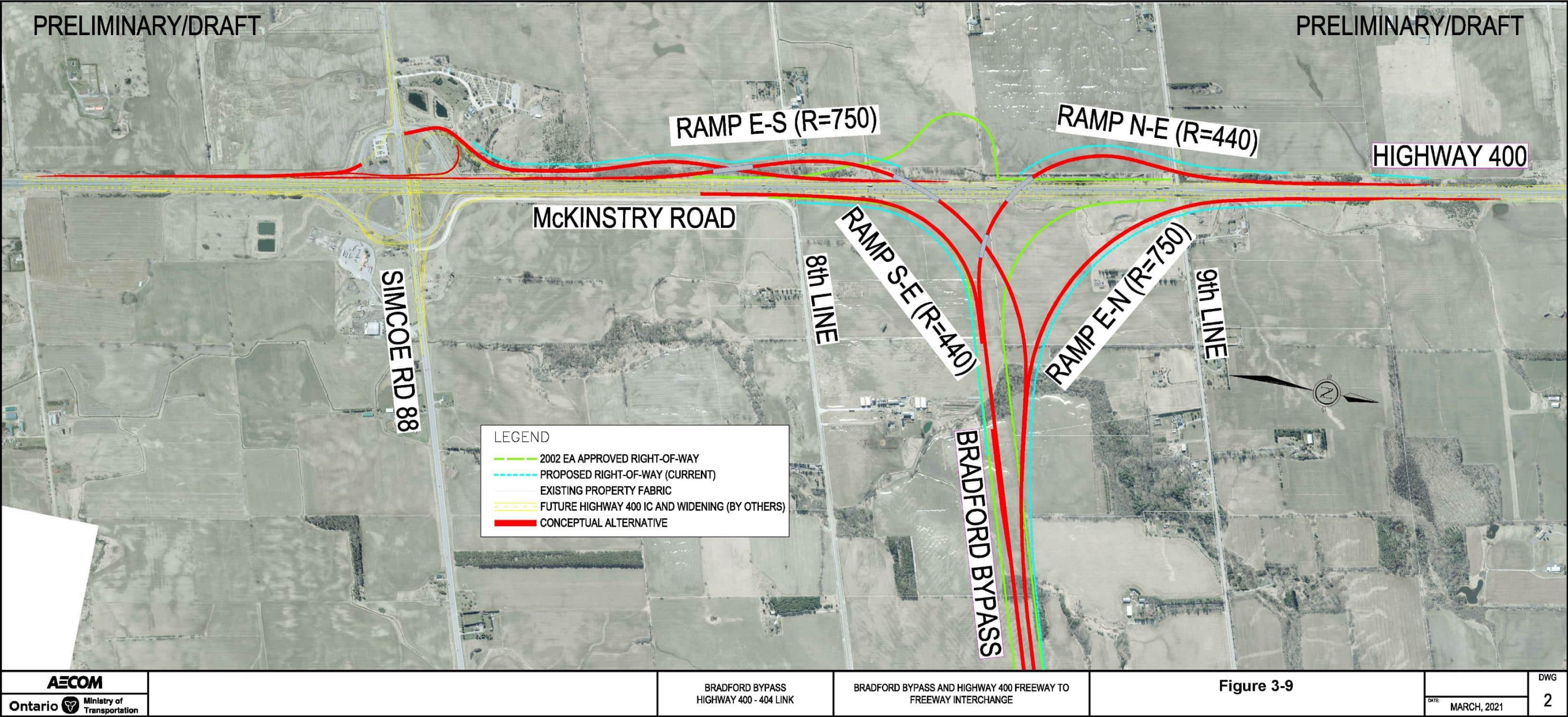


Figure 3-10: 525 metre Radius (Bradford Bypass to Highway 400 Southbound Ramp) with Lanes to County Road 88 (Alternative 3)

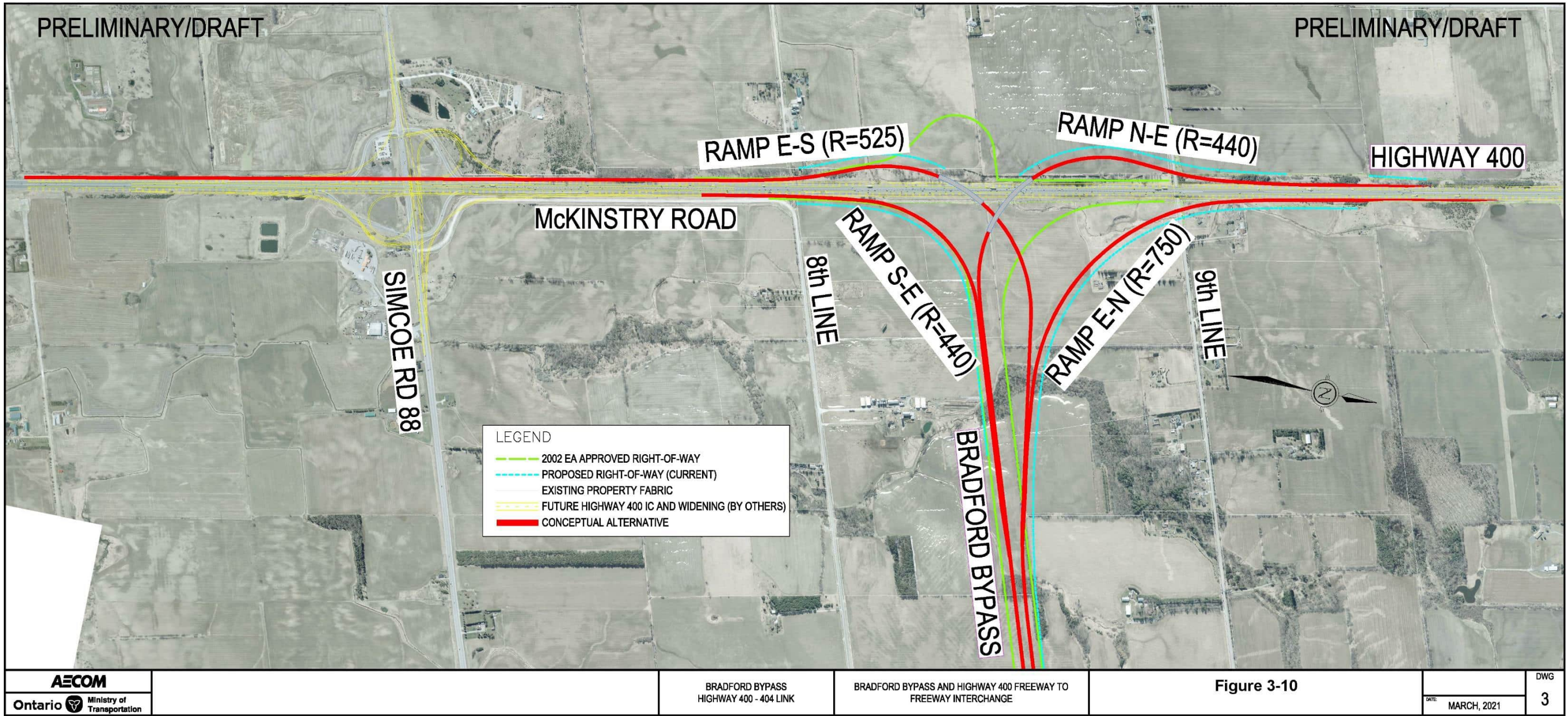
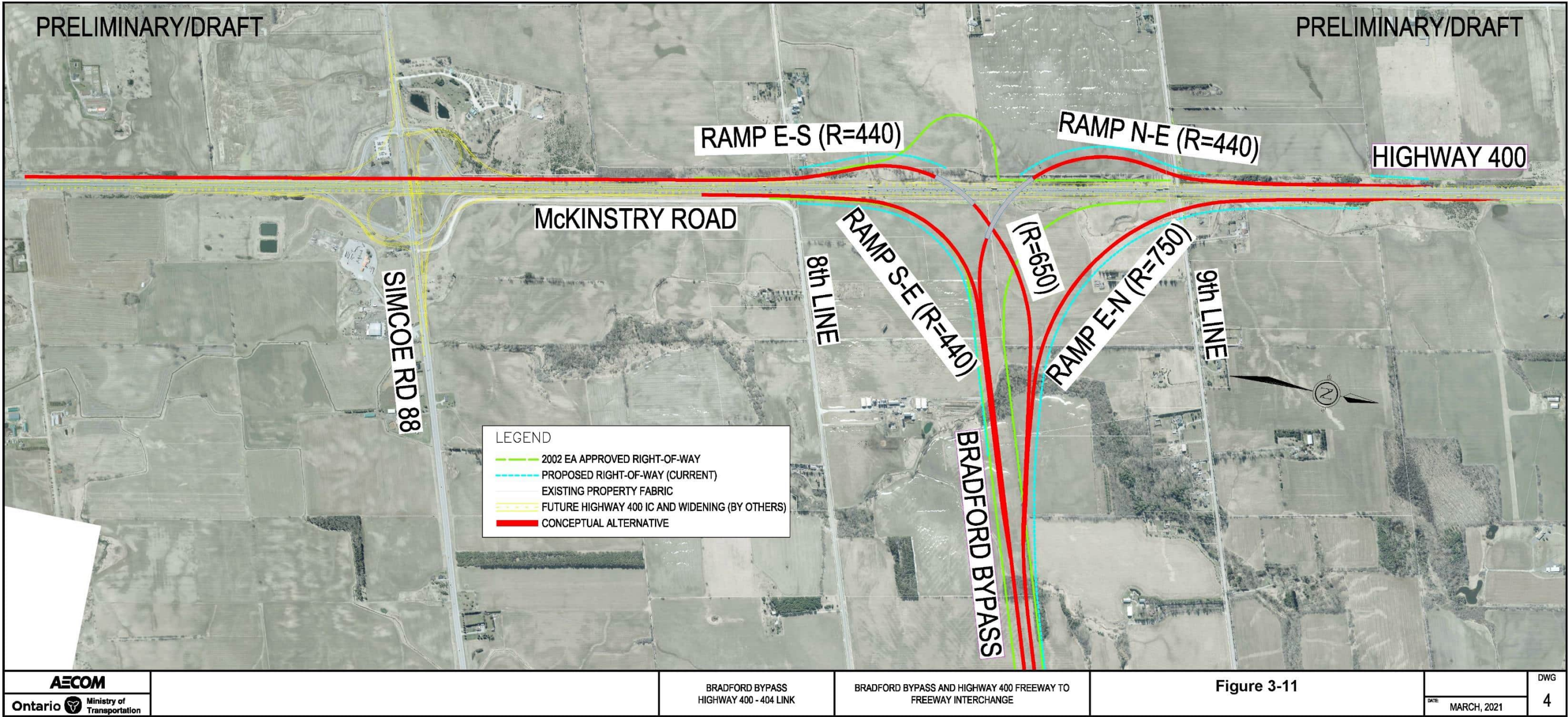


Figure 3-11: Dual Curve (Bradford Bypass to Highway 400 Southbound) with Lanes to County Road 88 (Alternative 4)



3.2.1.5 Evaluation of Highway 400 Alternatives

Based on the evaluation, it was recommended that Alternative 3 be carried forward as the preferred Highway 400 freeway-to-freeway interchange design. Alternatives 1 and 2 were least preferred, with Alternative 4 being moderately preferred.

Table 3-4 provides the ranking of each alternative by the evaluation criteria.

Table 3-4: Evaluation of Alternatives Summary (Highway 400 Interchange)

Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Highway Engineering	○	◐	●	◐
Traffic Operations	◐	◐	●	●
Structural Engineering	○	◐	●	●
Environment	○	◐	●	◐
Natural	○	◐	●	●
Socio-Economic	○	◐	●	●
Cultural	●	●	●	◐
Overall Summary	○	○	●	◐

Alternative 3 provides consistent ramp curvature (radii) which is preferred from a technical (geometric) and driver comfort perspective. Existing access between Highway 400 and County Road 88 is maintained, and additional connectivity to County Road 88 is provided from the Bradford Bypass, which is deemed beneficial to the future land use plans adjacent to the Highway 400 corridor. Furthermore, the proposed ramp configurations for this alternative eliminates the need for a basketweave and corresponding bridge, reducing the overall property impact when compared to Alternatives 1 and 2. This alternative is environmentally preferred from a socio-economic perspective as it has a smaller footprint which results in less encroachment onto properties, agricultural lands and natural areas. Additionally, the design will also avoid a cemetery west of Highway 400.

Overall, Alternative 3 provides the best access between the Bradford Bypass, Highway 400 and County Road 88, while maintaining existing access along Highway 400, and minimizing the footprint of the infrastructure of the interchange. The configuration of the interchange meets the current highway design standards for a 400-series freeway-to-freeway interchange.

3.2.2 Highway 404 Freeway-to-Freeway Interchange

As part of the preparatory work in advance of Preliminary Design, it was determined that the proposed inner loop ramp configuration of Highway 404 freeway-to-freeway interchange did not meet the current design standards. As such, four alternatives were developed to provide connectivity between Highway 404 and the Bradford Bypass, allowing for free-flowing movement between the two highways.

The following design alternatives are being considered for the Highway 404 freeway-to-freeway interchange:

- Alternative 1 – Extend two-lane ramp from Bradford Bypass eastbound ramp to Queensville Sideroad
- Alternative 2 – Extend two-lane ramp from Bradford Bypass eastbound ramp and close existing Queensville Sideroad off-ramp
- Alternative 3 – Extend one lane from Bradford Bypass eastbound ramp to Queensville Sideroad ramp, and
- Alternative 4 – Basketweave ramp connection from Highway 404 to Queensville Sideroad.

These alternatives are further discussed in the sections below.

3.2.2.1 Alternative 1 – Preferred

Alternative 1 (**Figure 3-12**) includes four directional ramps:

- A two-lane Bradford Bypass Eastbound to Highway 404 southbound ramp with a 750 metre radius
- Bradford Bypass Eastbound to Highway 404 Northbound ramp with a radius transitioning from 600 metre to 525 metre, and
- Both the Highway 404 Northbound and Southbound to Bradford Bypass westbound with 440 metre radii.

Alternative 1 maintains the existing access to Queensville Sideroad from Highway 404 and also provides access from Bradford Bypass. The tie in between Bradford Bypass and Highway 404 extends south of Queensville Sideroad.

3.2.2.2 Alternative 2

Alternative 2 (**Figure 3-13**) provides the same ramp configuration and radii as Alternative 1. This alternative differs from the first alternative by not providing access to Queensville Sideroad and closing the existing southbound off-ramp from Highway 404. Access to Queensville Sideroad will be maintained for northbound travel on Highway 404 only. Motorists seeking to access this interchange from the Bradford Bypass will need to exit at the Leslie Street interchange and utilize local roads.

Figure 3-12: Extend Two Lane Ramp from Bradford Bypass Eastbound Ramp to Queensville Sideroad Ramp (Alternative 1)

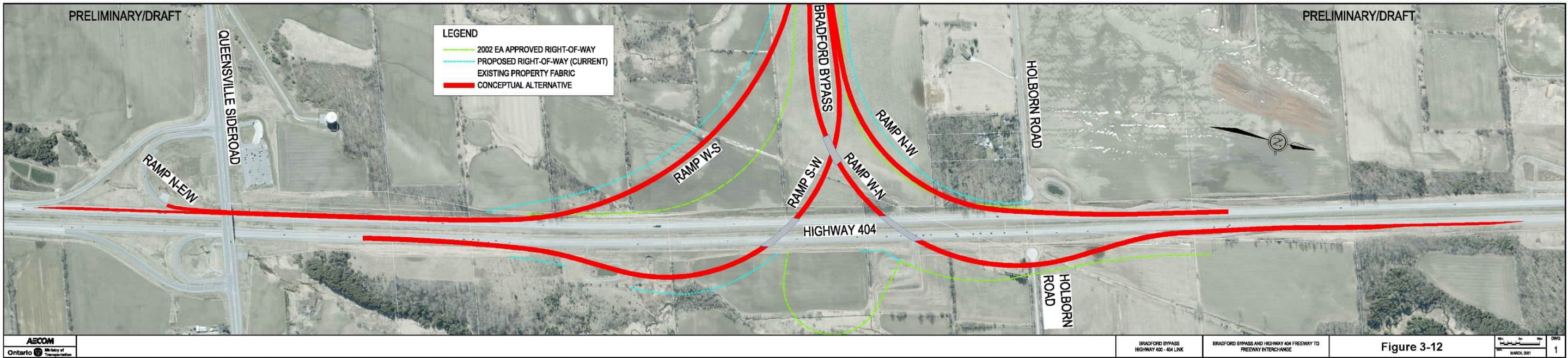
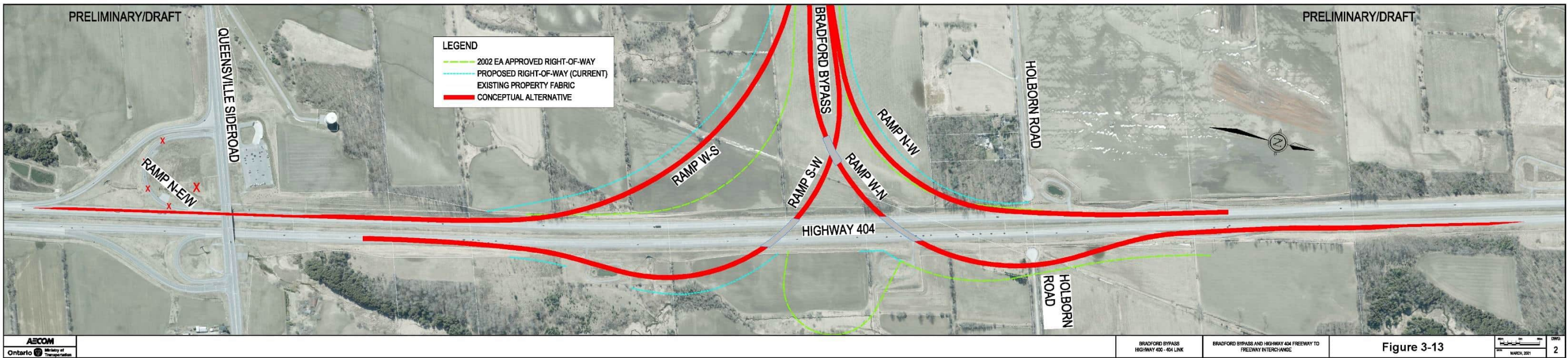


Figure 3-13: Extend Two Lane Ramp from Bradford Bypass Eastbound Ramp and Close Queensville Sideroad Off-Ramp (Alternative 2)



3.2.2.3 Alternative 3

Alternative 3 (**Figure 3-14**) provides a one-lane ramp as opposed to a two-lane ramp with the same radii as Alternatives 1 and 2. Access to Queensville Sideroad from both Highway 404 and Bradford Bypass is similar to Alternative 1. For this alternative, the tie-in between Bradford Bypass and Highway 404 occurs north of Queensville Sideroad.

3.2.2.4 Alternative 4

Alternative 4 (**Figure 3-15**) provides a one-lane ramp for the Bradford Bypass eastbound to Highway 404 southbound ramp, similar to Alternative 3, with the same radii as all alternatives. Access to Queensville Sideroad from both Highway 404 is maintained through a basketweave alignment with a structure allowing the Bradford Bypass eastbound to Highway 404 southbound ramp to overpass the new Highway 404 southbound to Queensville Sideroad interchange ramp. Access from Bradford Bypass to Queensville Sideroad is not provided and the existing Highway 404 southbound ramp to Queensville Sideroad is removed. Motorists seeking to access this interchange from the Bradford Bypass will need to exit at the Leslie Street interchange and utilize local roads. For Alternative 4, the tie-in between Bradford Bypass and Highway 404 occurs north of Queensville Sideroad.

Figure 3-14: Extend One Lane from Bradford Bypass Eastbound Ramp to Queensville Sideroad Interchange Ramp (Alternative 3)

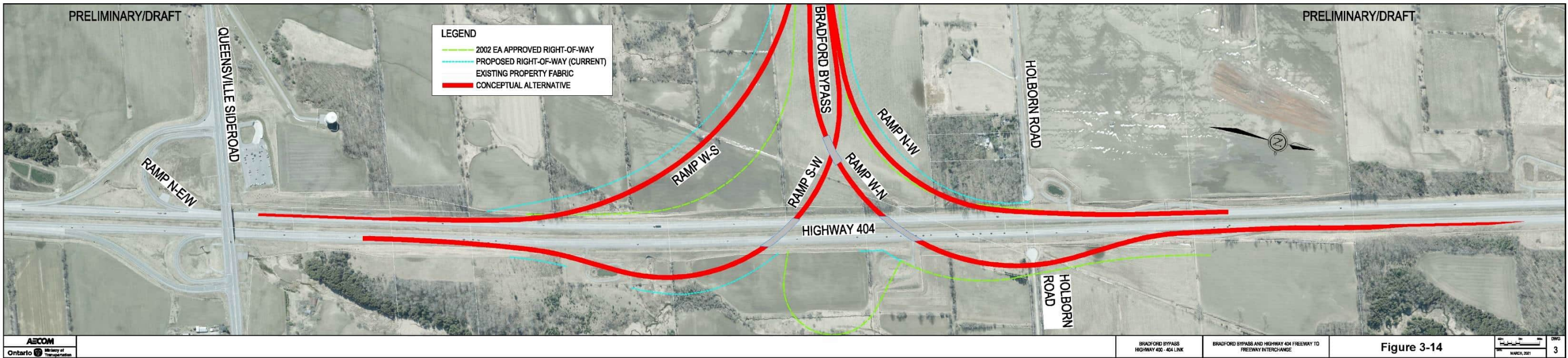
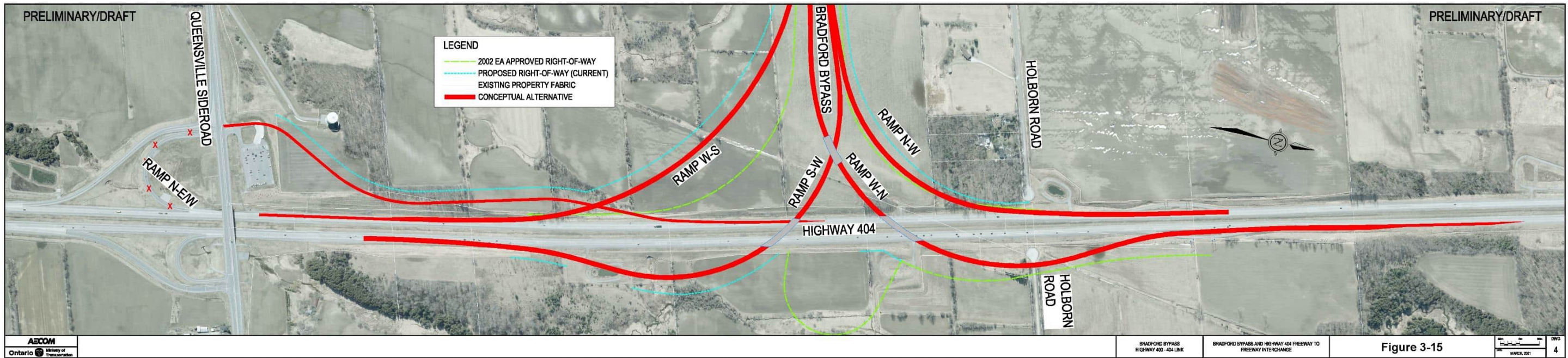


Figure 3-15: Basketweave Ramp Connection to Queensville Sideroad (Alternative 4)



3.2.2.5 Evaluation of Highway 404 Alternatives

Based on the evaluation, it was recommended that Alternative 1 be carried forward as the preferred interchange design for the Highway 404 freeway-to-freeway interchange. Alternatives 2 and 4 were least preferred and Alternative 3 was moderately preferred.

Table 3-5 provides the ranking of each alternative by the evaluation criteria.

Table 3-5: Evaluation of Alternatives Summary (Highway 404)

Criteria	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Highway Engineering	●	○	◐	◐
Traffic Operations	●	◐	○	●
Structural Engineering	●	●	●	○
Environment	●	◐	●	○
Natural	●	●	●	○
Socio-Economic	●	◐	●	○
Cultural	●	●	●	○
Overall Summary	●	○	◐	○

Each alternative meets the current geometric design standards for a freeway-to-freeway interchange. Both Alternative 1 and 3 provide full connectivity between the Bradford Bypass, Highway 404 and the existing Queensville Sideroad. While the difference between Alternatives 1 and 3 are considered minimal, Alternative 1 performs better with respect to traffic operations than Alternative 3. Alternative 2 is not preferred as it eliminates the southbound ramp to Queensville Sideroad and results in reduced connectivity in this area. Alternative 4 has the largest footprint, resulting in greater impacts and environmental risks, along with changes to Queensville Sideroad access making it the least preferred alternative.

Overall, Alternative 1 and 3 provide the best connectivity to Queensville Sideroad from Bradford Bypass and maintains the existing access from Highway 404, however Alternative 1 provides better traffic operations between the two alternatives. Property impacts are similar or less than other alternatives. This alternative, along with Alternative 3, were preferred in an environmental context as they have the least impact on environmental conditions due to the smallest footprint and least disruption on connectivity to the region. Alternative 1 requires design elements to extend south of

Queensville Sideroad and beyond the Study Area. As required by the Regulation Section 16(3), these elements will be assessed in accordance with the Ministry Class Environmental Assessment process. The project-specific assessment of environmental impacts for the ramp tie-ins are covered in this Report, considering that the interchange at Highway 404 and Queensville Sideroad was constructed after the 2002 Approved Environmental Assessment, and not represented in Exhibit 3-16 of the 2002 Approved Environmental Assessment.

3.2.3 Hydro Towers

The Technically Preferred Route passes through and under high power transmission lines, just west of Leslie Street, and is anticipated to conflict with several towers, including access to these towers. These transmission lines are operated and maintained by Hydro One. Two alignment designs were generated to provide alternatives to the Base Case scenario with the focus on avoiding impacts to the hydro towers.

The design and selection of the preferred alternative to avoid impacts to the hydro towers influences designs for the Leslie Street interchange. Alternatives for the interchange were proposed and are detailed in **Section 3.2.7.4**. Leslie Street interchange alternatives were evaluated independent of each hydro tower avoidance alternative as the designs are not interdependent.

The following design alternatives are being considered for the hydro towers:

- Alternative 1 – Relocation of Hydro Towers (2002 Approved Environmental Assessment Base Case)
- Alternative 2 – Realignment of Bradford Bypass eastbound and westbound to the north, and
- Alternative 3 – Realignment of Bradford Bypass eastbound to the south and westbound to the north.

These alternatives are further discussed in the sections below.

3.2.3.1 Alternative 1

Alternative 1 represents the Base Case (**Figure 3-16**), where the highway alignment follows the Technically Preferred Route. In order to achieve this alignment, the hydro towers that conflict with the proposed freeway corridor would have to be relocated outside the right-of-way.

3.2.3.2 Alternative 2 – Preferred

Alternative 2 (**Figure 3-17**) shifts the entire highway alignment to the north so that the eastbound and westbound lanes pass through an existing gap between the towers. This allows for the construction and operation of the freeway without needing to relocate the hydro towers. Similar to Alternative 3, as a result of the hydro towers remaining within or abutting the proposed right-of-way, undesirable access conditions are created which can be mitigated through the implementation of access roads adjacent to the proposed Bradford Bypass.

3.2.3.3 Alternative 3

Alternative 3 (**Figure 3-18**) splits the freeway alignment such that the eastbound lanes shift to the south of the existing hydro towers, while the westbound lanes shift to the north of the existing hydro towers. This facilitates the construction and operation of the freeway without needing to relocate the hydro towers. This design creates undesirable access conditions as the hydro towers are within the right-of-way and median, which require unconventional access roads along the highway median that are unfavourable for both Hydro One and the Ministry from an access and safety perspective.

Figure 3-16: Base Case Alignment – Relocation of Hydro Towers (Alternative 1)

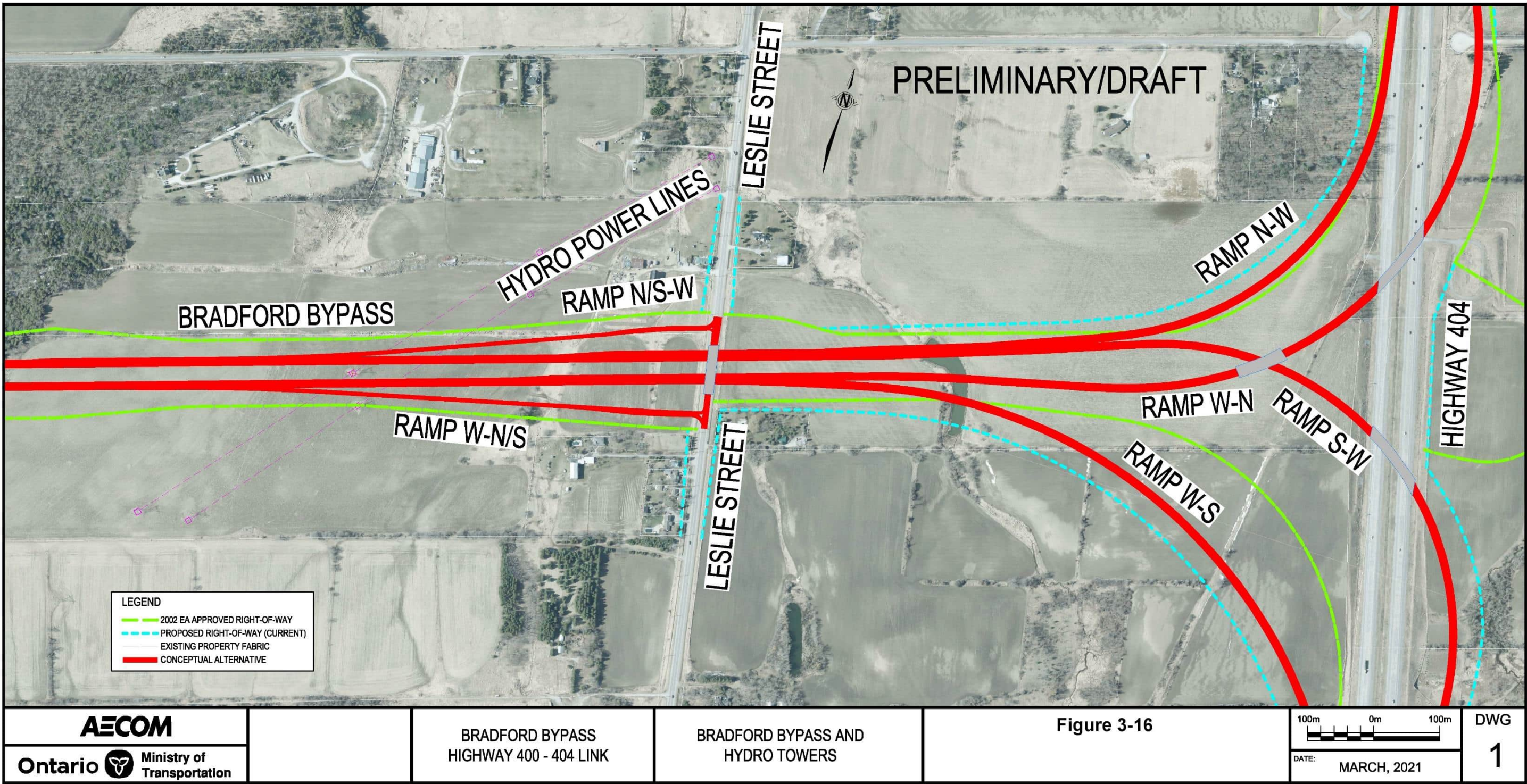


Figure 3-17: Northern Realignment of Both Eastbound and Westbound Lanes West of Leslie Street (Alternative 2)

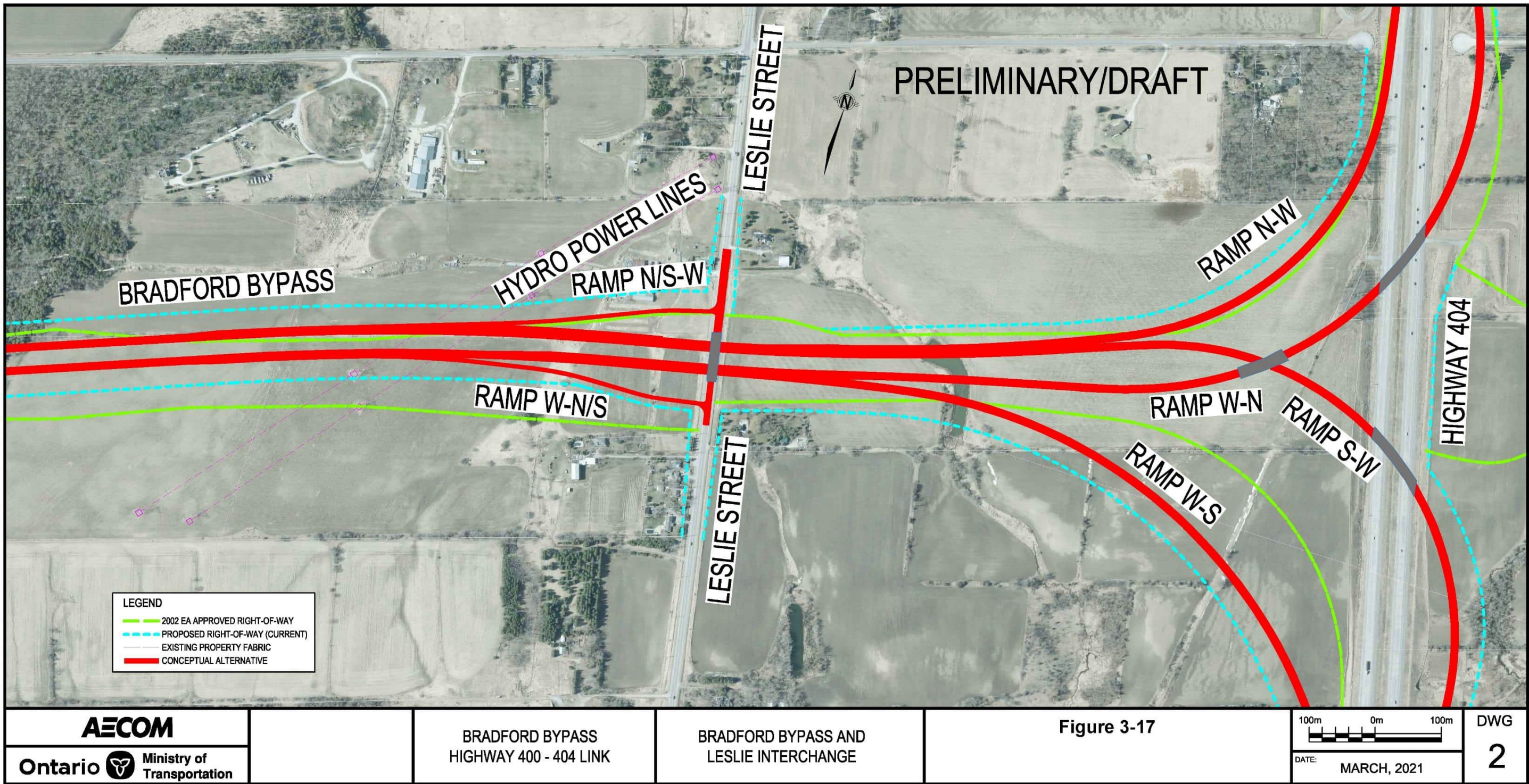
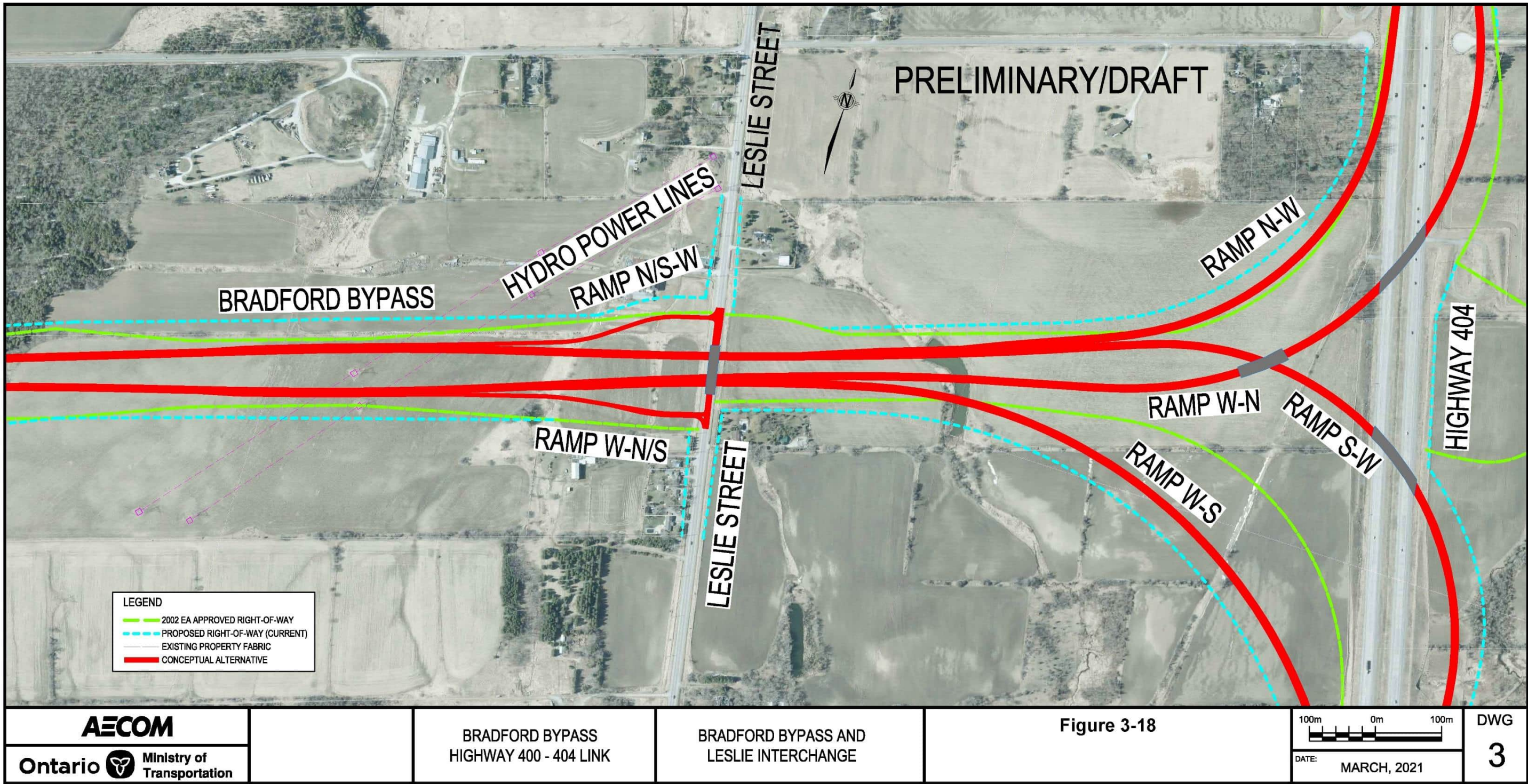


Figure 3-18: Split Realignment of Bradford Bypass Lanes West of Leslie Street (Eastbound to the South; Westbound to the North) (Alternative 3)



3.2.3.4 Evaluation of Hydro Tower Avoidance Alternatives

Based on the evaluation, it was recommended that Alternative 2 be carried forward as the preferred alignment design for the hydro towers. Alternative 3 was least preferred, with Alternative 1 as moderately preferred.

Table 3-6 provides the ranking of each alternative by the evaluation criteria.

Table 3-6: Evaluation of Hydro Tower Avoidance Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3
Highway Engineering	○	●	◐
Traffic Operations	●	●	○
Structural Engineering	○	●	○
Environment	●	◐	○
Natural	●	◐	○
Socio-Economic	●	◐	○
Cultural	●	○	◐
Overall Summary	◐	●	○

Alternative 2 avoids costly and complex relocation requirements for hydro towers within the right-of-way. It further avoids the need to provide utility maintenance access roads in the highway median and meets the clearance requirements identified by Hydro One. The impact to properties is consistent with other alternatives. Even with the close proximity to the Leslie Street underpass, Alternative 2 allows the development and implementation of the structure without a skew, which is preferred from a structural engineering perspective. There is a slight offset to these benefits as there are some increases in encroachment into natural areas, cultural property and agricultural lands compared to other alternatives.

Overall, Alternative 2 provides the best design alignment to avoid the conflict with the existing hydro towers while minimizing impacts to existing conditions and adjacent highway design elements, compared to the Technically Preferred Route at this location, and other alternatives developed. Alternative 2 provides the best opportunity for access to hydro towers without special accommodation or logistics within the right-of-way.

3.2.4 Interchange Locations

The 2002 Approved Environmental Assessment determined that three of seven municipal road crossings warranted interchanges (refer to Table 4-1 in the 2002 Approved Environmental Assessment Report). As such, the Technically Preferred Route includes interchanges at County Road 4, Bathurst Street and Leslie Street, plus freeway-to-freeway interchanges at Highway 400 and Highway 404.

Through Preliminary Design, the Project Team met with local municipalities, who requested that the Ministry consider including interchanges at 10th Sideroad and 2nd Concession Road, as described in **Section 3.2.4** and **Section 3.2.7**. The Project Team undertook a preliminary geometric feasibility assessment, traffic modelling (including weaving analysis) in consideration of interchange utilization, overall network delay and out of way travel, and review of preliminary environmental impacts at the interchanges to determine the best combination of crossing road interchanges through the Bradford Bypass corridor.

Table 3-7 illustrates the nine interchange location scenarios considered for this analysis. In all scenarios, the interchange at County Road 4 was included as it was deemed a key location that provides access to and from the Bradford Bypass and is anticipated to be among the highest utilized interchanges in the corridor, resulting from the dense residential and commercial development surrounding it. The analysis did not consider any changes to the freeway-to-freeway interchanges at Highway 400 and Highway 404 as they are a critical requirement to achieve the primary function and need of the Bradford Bypass.

Table 3-7: Summary of Interchange Location Scenario Ranking

Scenario	10 th Sideroad Interchange	County Road 4 Interchange	Bathurst Street Interchange	2 nd Concession Road Interchange	Leslie Street Interchange	Rank
Base Case	No	Yes	Yes	No	Yes	8 (tie)
2	No	Yes	No	Yes	Yes	8 (tie)
3	Yes	Yes	No	Yes	No	3
4	No	Yes	Yes	Yes	No	5
5	Yes	Yes	Yes	No	Yes	6
6	Yes	Yes	No	Yes	Yes	4
7	No	Yes	Yes	Yes	Yes	7
8	Yes	Yes	Yes	Yes	Yes	2
9	Yes	Yes	Yes	Yes	No*	1

*The outcome of the location analysis determined that Scenario 9 (with four out of five interchanges, not precluding the Leslie Street interchange) is the preferred number and location of interchanges considering geometric, traffic operations, and environment.

This is also fortified as Scenario 8, that includes interchanges at all five locations, was close in the overall evaluation relative to Scenario 9. From a purely geometric and traffic perspective, Scenario 8 (with an interchange at all five locations) was preferred as it best met the study objective to improve connectivity of the Study Area between Highway 400 and Highway 404, facilitating the improvement of traffic operations and movement of goods. The Base Case, consistent with the 2002 Approved Environmental Assessment, was among the least preferred.

Based on this assessment, the Ministry determined that interchanges at 10th Sideroad and 2nd Concession Road would be included in the Preliminary Design for the project. Interchange design configurations at each location were developed and evaluated. Information on this is presented in **Section 3.2.4**, **Section 3.2.7**, and **Section 7.6.2**. The recommendation is to carry forward the design for interchanges at all locations and determine the timing (phase) in Detail Design for when each interchange will be constructed. This provides the best benefit while not precluding a future interchange at Leslie Street.

3.2.5 10th Sideroad Interchange

As part of the consultation process, the Town of Bradford West Gwillimbury requested an interchange be incorporated at 10th Sideroad after Public Information Centre #1, as per the Town's Official Plan, to facilitate increased connectivity to and from the Bradford Bypass for the community. The Ministry acknowledges the council resolution adopted by Bradford West Gwillimbury on April 20, 2021, which reiterates support for the Bradford Bypass, the request to expand the scope of the study to include an interchange at 10th Sideroad as identified in the Town's Official Plan, advisement to provide access from the Bradford Bypass to Simcoe County Road 88, and encouragement to engage with agencies and stakeholders over the course of the study. Three 10th Sideroad interchange design alternatives were developed and evaluated through this Preliminary Design. The introduction of an interchange at 10th Sideroad was considered alongside the other potential interchange locations in the project and presented at the Preliminary Design Interchange Considerations public consultation event, with a public review period between April 21, 2022 and May 5, 2022 (Refer to **Section 7.6.2** for further details on this event).

The following design alternatives were considered for the 10th Sideroad Interchange:

- Alternative 1 – Parclo A4 interchange
- Alternative 2 – Parclo AB interchange, and
- Alternative 3 – Partial Parclo A Diamond interchange.

These alternatives are further discussed in the sections below.

3.2.5.1 Alternative 1 – Preferred

Alternative 1 (**Figure 3-19**) provides access and traffic flow in all directions (to and from the east and west on Bradford Bypass) and is the most common and one of the safest interchange configuration type in Ontario. This interchange design includes four directional ramps, with two on-ramps from 10th Sideroad northbound to Bradford Bypass eastbound and 10th Sideroad southbound to Bradford Bypass westbound, and two off ramps from Bradford Bypass eastbound and westbound to 10th Sideroad. The interchange also encompasses two loop ramps to provide access from 10th Sideroad northbound and southbound to the Bradford Bypass westbound and eastbound respectively.

3.2.5.2 Alternative 2

Alternative 2 (**Figure 3-20**) provides similar access between 10th Sideroad and Bradford Bypass as Alternative 1, with traffic flow in all directions (to and from the east and west on Bradford Bypass). It features two directional ramps; one on-ramp from 10th Sideroad northbound to Bradford Bypass eastbound and one off-ramp from Bradford Bypass westbound to 10th Sideroad, and also includes two normalized (intersects at a ramp terminal) loop ramps; one on-ramp from 10th Sideroad southbound to Bradford Bypass westbound and one off-ramp from Bradford Bypass eastbound to 10th Sideroad. This interchange configuration is less common in Ontario, has more conflict points, and operationally does not perform as well as Alternative 1.

3.2.5.3 Alternative 3

Alternative 3 (**Figure 3-21**) differs from both Alternative 1 and 2 as it only provides traffic access from 10th Sideroad northbound and southbound to Bradford Bypass eastbound and Bradford Bypass westbound to 10th Sideroad. Connectivity from 10th Sideroad to travel westbound on Bradford Bypass toward Highway 400 and from eastbound travel on Bradford Bypass originating from Highway 400 to exit at 10th Sideroad is not provided.

Figure 3-19: Parclo A4 Interchange at 10th Sideroad (Alternative 1)

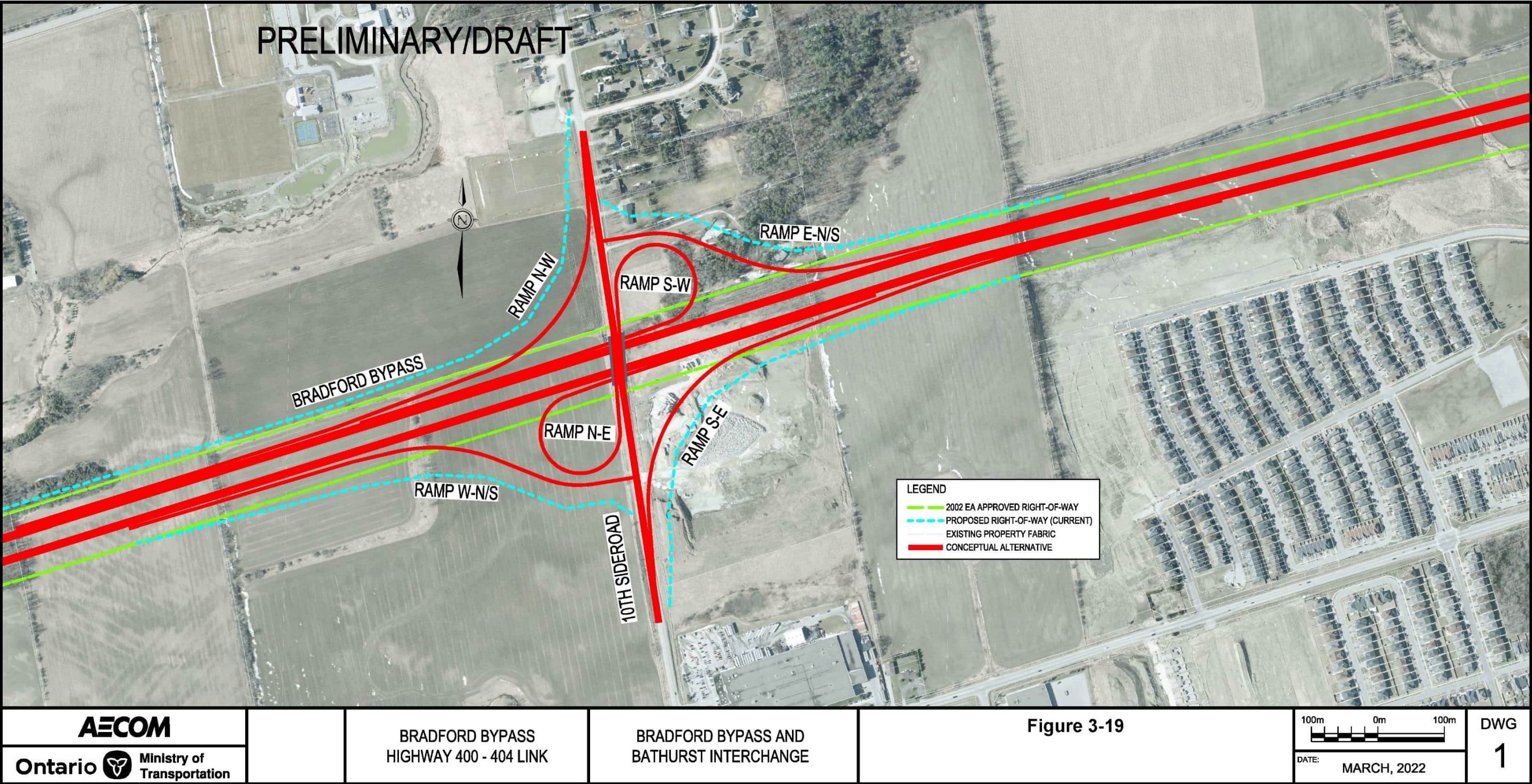


Figure 3-20: Parclo AB Interchange at 10th Sideroad (Alternative 2)

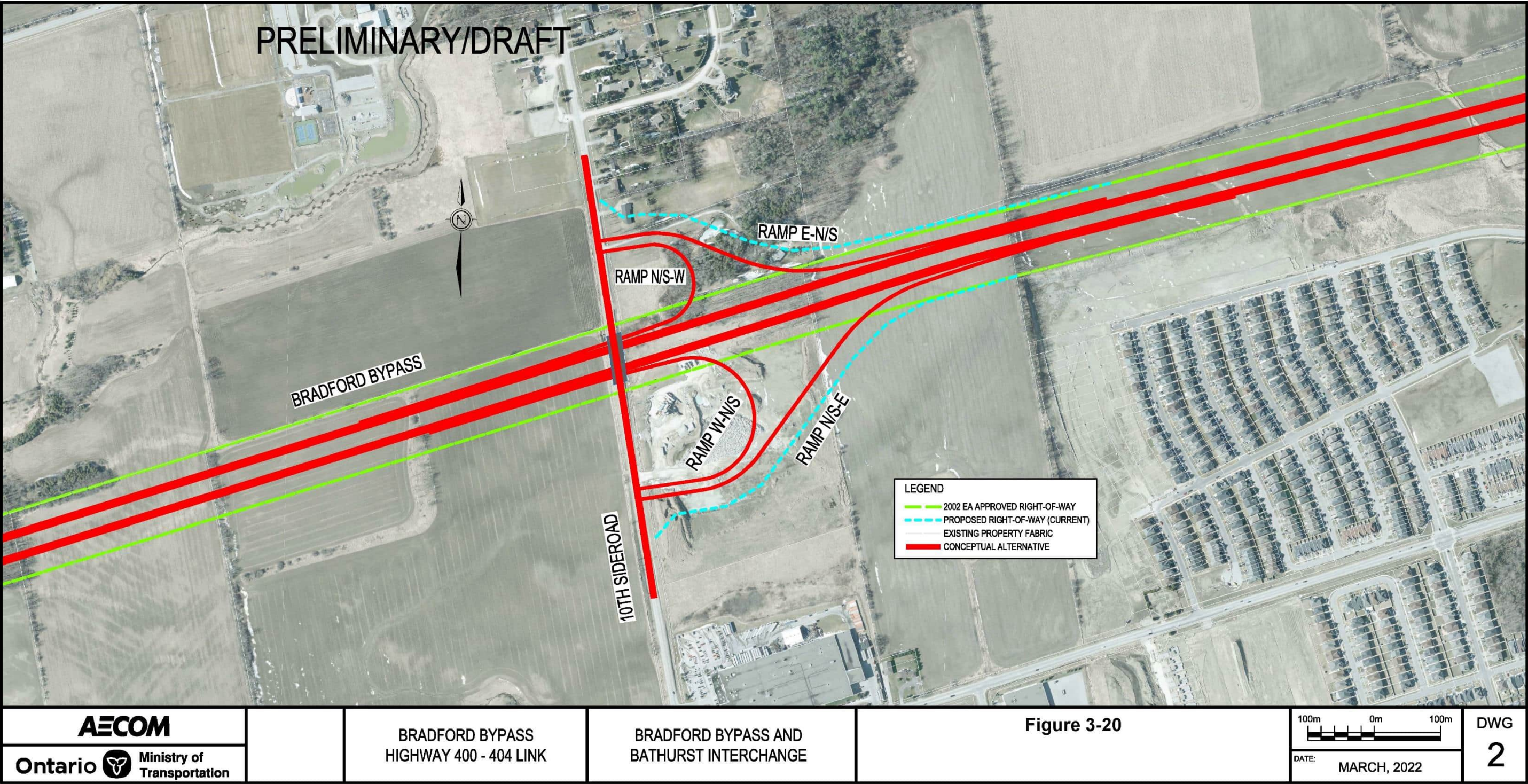
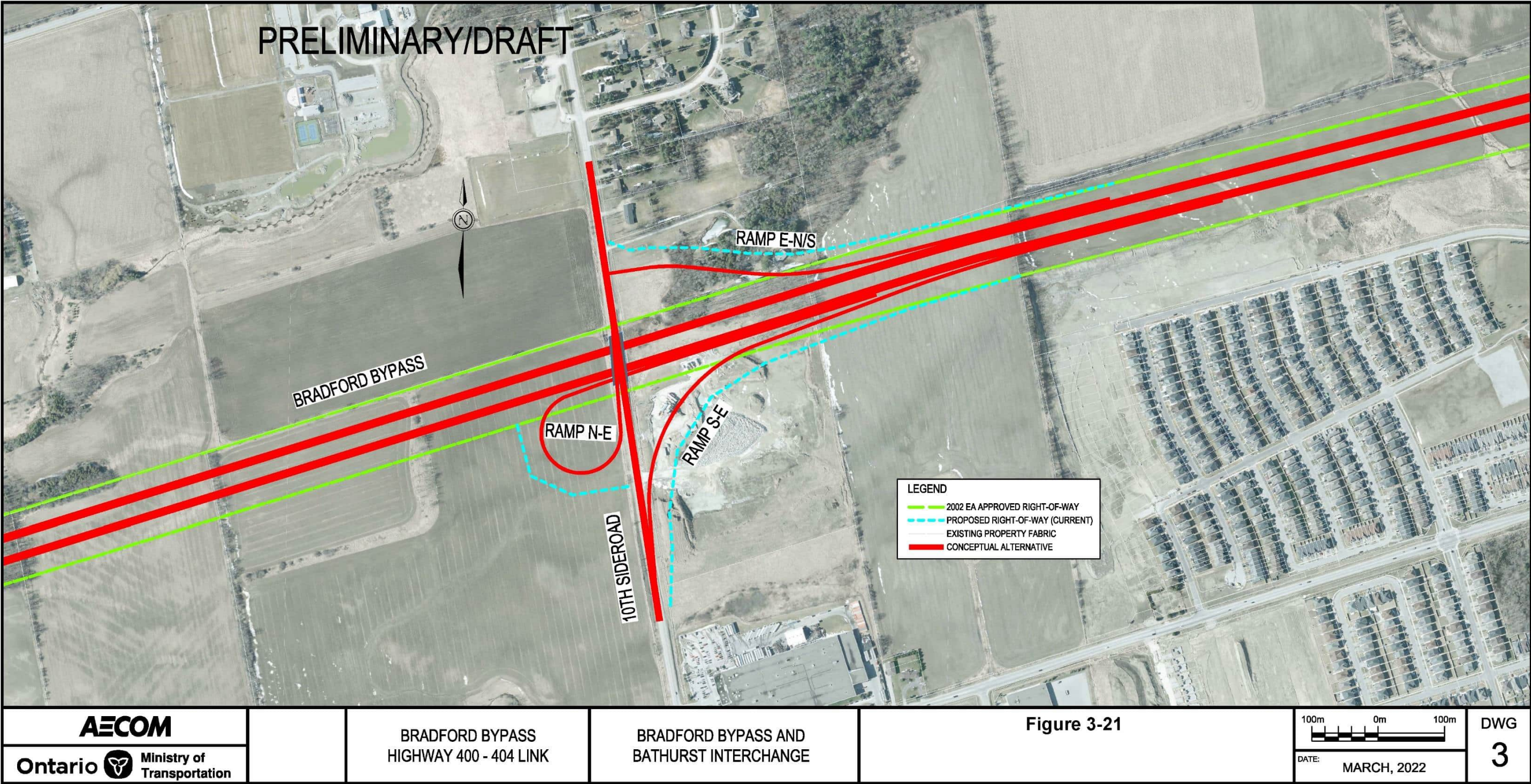


Figure 3-21: Partial Parclo A Diamond Interchange at 10th Sideroad (Alternative 3)



3.2.5.4 Evaluation of 10th Sideroad Interchange Alternatives

Based on the evaluation, it was recommended that Alternative 1 be carried forward as the preferred interchange design for the 10th Sideroad Interchange. Alternative 3 was least preferred, and Alternative 2 was moderately preferred.

Table 3-8 provides the ranking of each alternative by the evaluation criteria.

Table 3-8: Evaluation of 10th Sideroad Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3
Highway Engineering	●	◐	○
Traffic Operations	●	◐	○
Structural Engineering	●	●	●
Environment	○	◐	●
Natural	○	◐	●
Socio-Economic	○	●	●
Cultural	○	◐	●
Overall Summary	●	◐	○

All design alternatives meet the current geometric standards and require similar configurations for the bridge structure at 10th Sideroad; however, Alternative 1 provides the best traffic operations with travel in all directions to and from the Bradford Bypass and 10th Sideroad.

From an environmental perspective, Alternative 3 was most preferred as it results in the smallest overall footprint, with Alternate 2 being moderately preferred as it provided improvements in access with a smaller footprint compared to Alternative 1.

Overall, Alternative 1 provides the most common interchange configuration accommodating access, connectivity, and travel in all directions between 10th Sideroad and Bradford Bypass, it introduces the lowest vehicle conflicts at the ramps, accommodates controlled points for pedestrian and active transportation crossings, provides minimally complex opportunities for a carpool lot at this location, and provides the highest capacity for traffic. Opportunities to minimize environmental impacts should continue to be explored through Detail Design.

3.2.6 Bathurst Street Interchange

Two interchange alternatives were generated in addition to the design configuration proposed as part of the Technically Preferred Route (Base Case). Each alternative is based on a diamond interchange configuration, which allows for traffic flow and access

in all directions from a lower volume arterial road, while having a smaller footprint than a typical Parclo A4 interchange. Variations in the alternatives considered intersection controls, potential Hochreiter access realignments and maintaining access to Albert's Marina. The realignment of the Hochreiter access and access to Albert's Marina would be subject to discussions with the municipalities and property owners.

The following design alternatives have been considered for the Bathurst Street Interchange:

- Alternative 1 – Diamond interchange (2002 Approved Environmental Assessment Base Case)
- Alternative 2 – Diamond interchange with realignments to accesses 400 metres to the north, and
- Alternative 3 – Diamond interchange with roundabout ramp terminals.

These alternatives are further discussed in the sections below.

3.2.6.1 Alternative 1 – Preferred

This first alternative represents the Base Case, originating from the 2002 Approved Environmental Assessment recommended interchange design (**Figure 3-22**). This design proposes a diamond interchange configuration, featuring four directional ramps, two on-ramps from Bathurst Street northbound and southbound to Bradford Bypass westbound and eastbound, and two off-ramps from Bradford Bypass eastbound and westbound to Bathurst Street. In addition, Alternative 1 encompasses a potential realignment of the Hochreiter access to run parallel to the right-of-way for the Bradford Bypass on the west side of Bathurst Street, and a slight realignment of the entrance to Albert's Marina on the east side of Bathurst Street.

3.2.6.2 Alternative 2

Alternative 2 (**Figure 3-23**) also proposes a diamond interchange configuration. Similar to Alternative 1, Alternative 2 includes a potential realignment of the Hochreiter access to run parallel to the right-of-way for the Bradford Bypass on the west side of Bathurst Street, and a potential realignment of the entrance to Albert's Marina on the east side of Bathurst Street, however this alternative shifts the Marina entrance from Bathurst Street 400 metres to the north to improve weaving at the ramp terminals.

3.2.6.3 Alternative 3

Alternative 3 (**Figure 3-24**) proposes the same diamond interchange as Alternative 1 and 2 and potential realignment of the Hochreiter Access and realignment of and the Albert's Marina access, however this alternative introduces roundabouts at the interchange ramp terminals. While Albert's Marina entrance ties into the roundabout (introducing an undesirable fifth leg) at the north ramp terminal, a potential realignment of the Hochreiter access entrance would be situated further north.

Figure 3-22: Diamond Interchange – Base Case at Bathurst Street (Alternative 1)

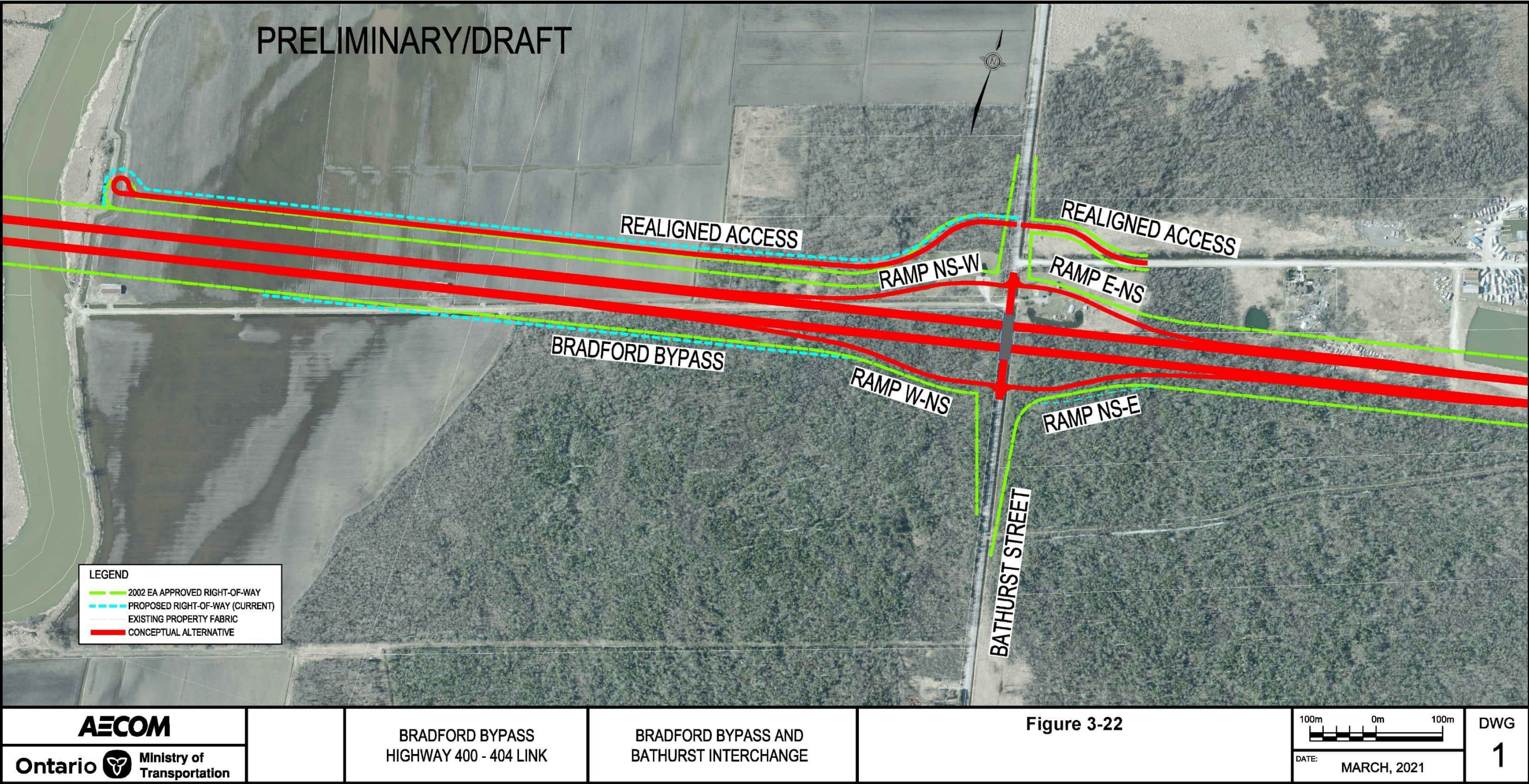


Figure 3-23: Diamond Interchange at Bathurst Street with Realignment of Access Road 400 metres to the North (Alternative 2)

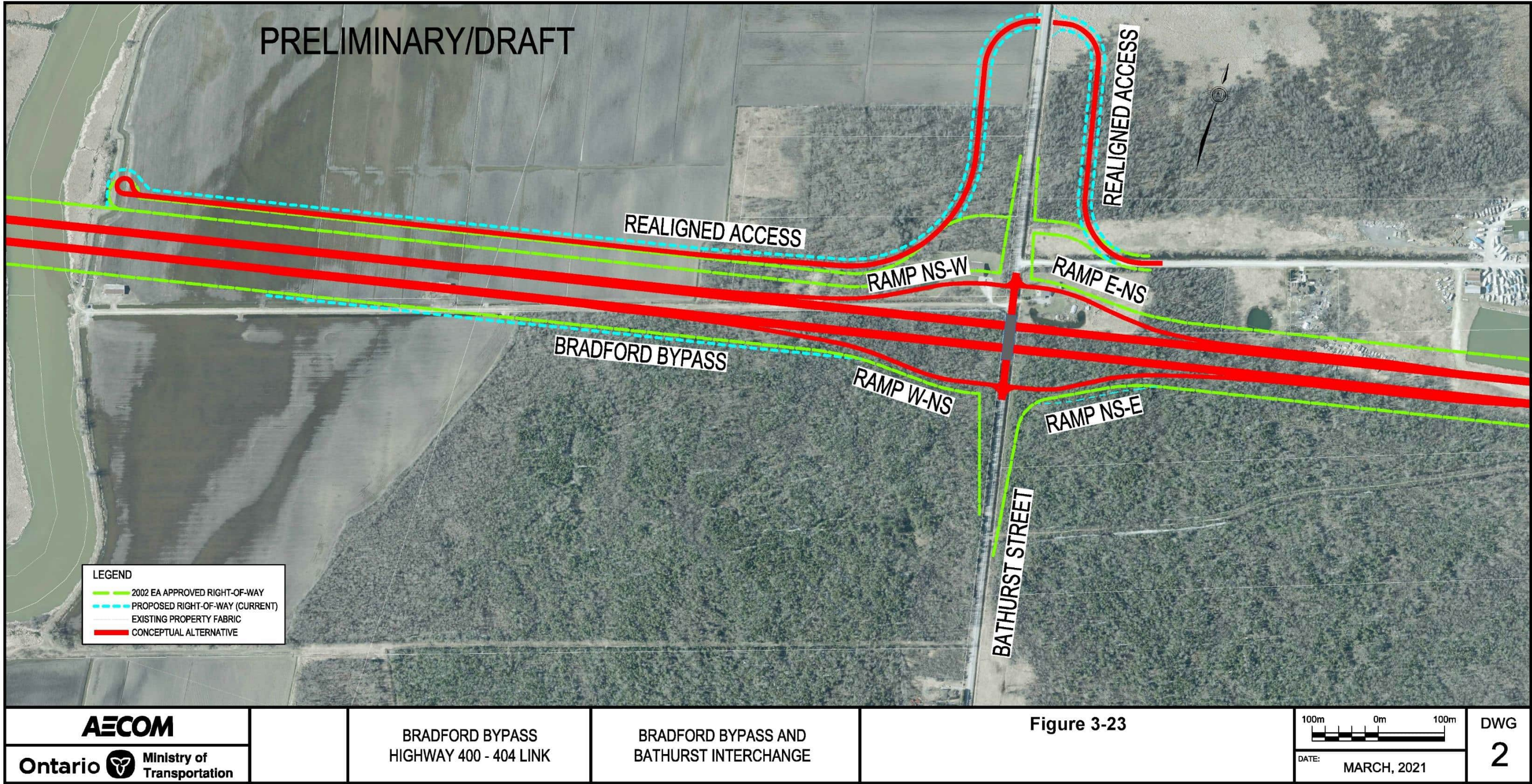
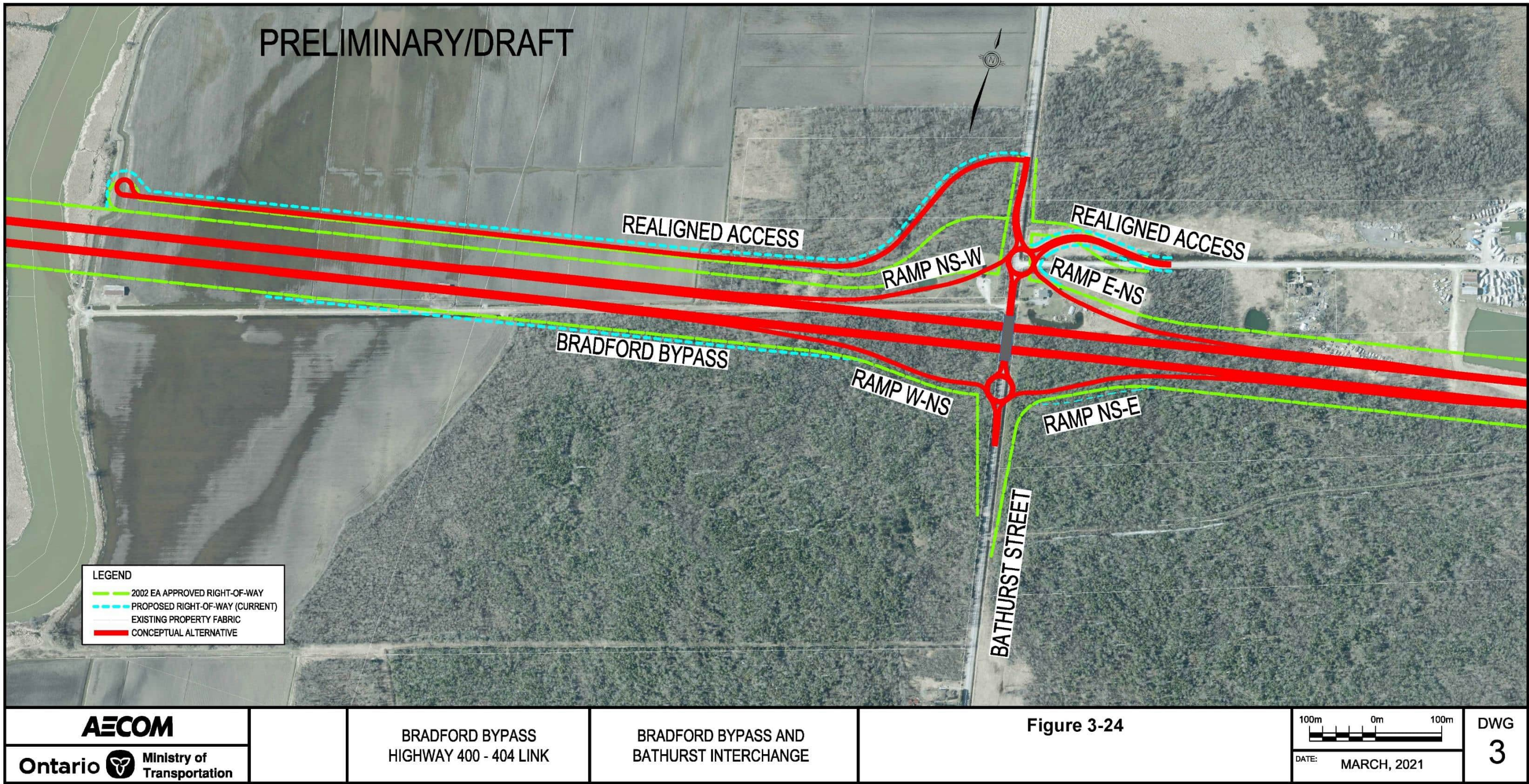


Figure 3-24: Diamond Interchange at Bathurst Street with Roundabouts at the Ramp Terminals (Alternative 3)



3.2.6.4 Evaluation of Bathurst Street Interchange Alternatives

Based on the evaluation, it was recommended that Alternative 1 be carried forward as the preferred interchange design for the Bathurst Street interchange. Alternative 3 was least preferred, with Alternative 2 moderately preferred.

Table 3-9 provides the ranking of each alternative by the evaluation criteria.

Table 3-9: Evaluation of Bathurst Street Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3
Highway Engineering	●	◐	○
Traffic Operations	◐	●	○
Structural Engineering	●	●	●
Environment	●	○	●
Natural	●	○	◐
Socio-Economic	●	○	◐
Cultural	●	○	◐
Overall Summary	●	◐	○

All design alternatives meet the current geometric standards and require similar configurations for the bridge structure over Bathurst Street. The design accommodates access roads such that they do not interfere with the traffic operation of the interchange ramp terminals. Alternative 1 results in the smallest footprint of impacts and minimizes the overall realignment of the intersection entrances. It also avoids additional property impacts and encroachment into provincially significant wetland areas, while still accommodating the necessary property access. Although roundabouts can be beneficial from a traffic operation perspective, they are less desirable based on the projected road users (i.e. trailers, agricultural vehicles, etc.) within this interchange, the unconventional configuration of the north roundabout, and feedback received from the agricultural community.

Overall, Alternative 1 provides the best balance between accessibility, traffic operations, design and minimizing the footprint and environmental impacts compared to other alternatives. See **Section 3.2.10** for details on the overpass/underpasses, and **Section 4.2.3** for municipal road cross sections.

3.2.7 2nd Concession Road Interchange

As part of the consultation process, after Public Information Centre #1, the Town of East Gwillimbury requested an interchange be incorporated at 2nd Concession Road to

facilitate the town's future planning objectives. Three interchange design alternatives were developed and evaluated through Preliminary Design. The introduction of an interchange at 2nd Concession Road was considered alongside the other potential interchange locations in the project and presented at the Preliminary Design Interchange Considerations public consultation event, with a public review period between April 21, 2022 and May 5, 2022 (Refer to **Section 7.6.2** for further details on this event).

The following design alternatives were considered for the 2nd Concession Road Interchange:

- Alternative 1 – Parclo A4 Interchange
- Alternative 2 – Parclo A2 Interchange, and
- Alternative 3 – Diamond Interchange.

These alternatives are further discussed in the sections below.

3.2.7.1 Alternative 1 – Preferred

Alternative 1 (**Figure 3-25**) provides access and traffic flow in all directions (to and from the east and west on Bradford Bypass) and is the most common and one of the safest interchange configuration interchange type in Ontario. This interchange design includes four directional ramps, which includes two on-ramps from 2nd Concession Road northbound to the Bradford Bypass eastbound and 2nd Concession Road southbound to the Bradford Bypass westbound, and two off-ramps from Bradford Bypass eastbound and westbound to 2nd Concession Road. The interchange also encompasses two loop ramps to provide access from 2nd Concession Road northbound and southbound to the Bradford Bypass westbound and eastbound respectively.

3.2.7.2 Alternative 2

Alternative 2 (**Figure 3-26**) provides similar access between 2nd Concession Road and Bradford Bypass as Alternative 1, however, does not provide exclusive directional on-ramp, opting instead for normalized (intersecting with the crossing road) loop ramps. Although the configuration of ramps results in fewer property impacts than a Parclo A4, it introduces more conflict points compared to Alternative 1 as it requires left turns for access onto the highway for southbound to westbound travel and for northbound to eastbound travel.

3.2.7.3 Alternative 3

Alternative 3 (**Figure 3-27**) proposes a diamond interchange, featuring four directional ramps, two on-ramps from 2nd Concession Road Northbound and Southbound to Bradford Bypass westbound and eastbound and two off-ramps from Bradford Bypass eastbound and westbound to 2nd Concession Road. The configuration of the interchange is more compact than a Parclo A4, resulting a smaller footprint; however, it reduces the capacity of the interchange with limited opportunities for future expansion.

Figure 3-25: Parclo A4 Interchange at 2nd Concession Road (Alternative 1)

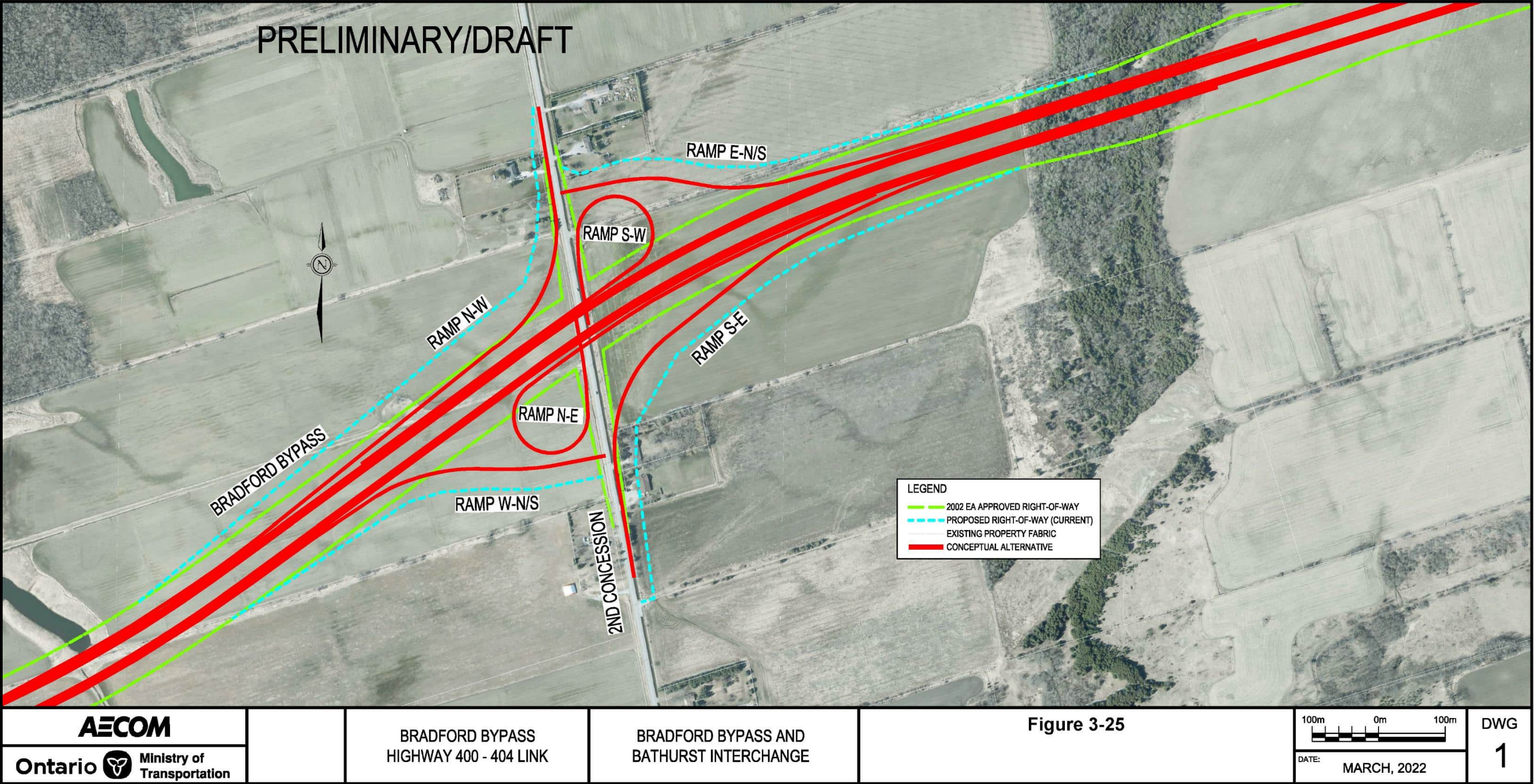


Figure 3-26: Parclo A2 Interchange at 2nd Concession Road (Alternative 2)

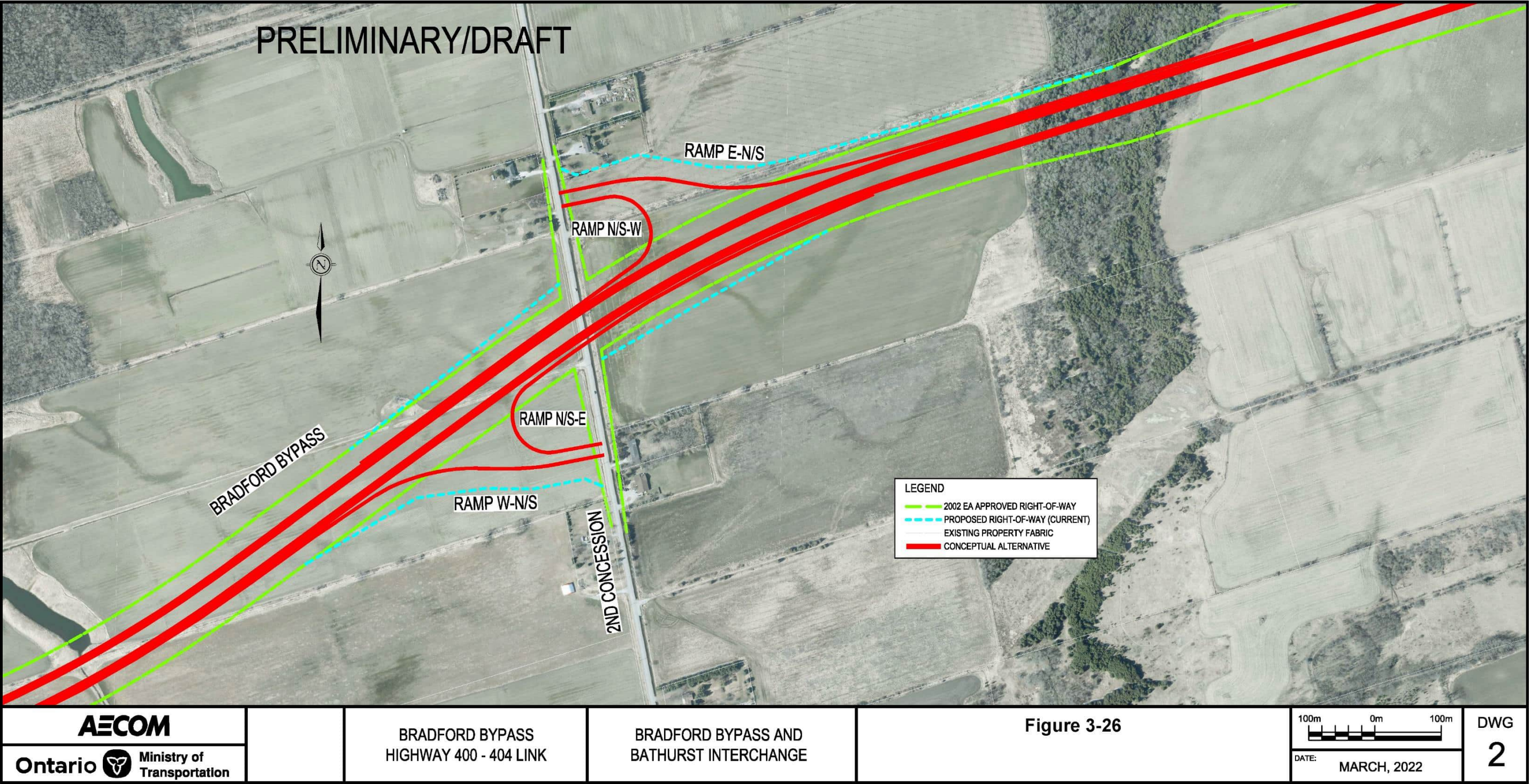
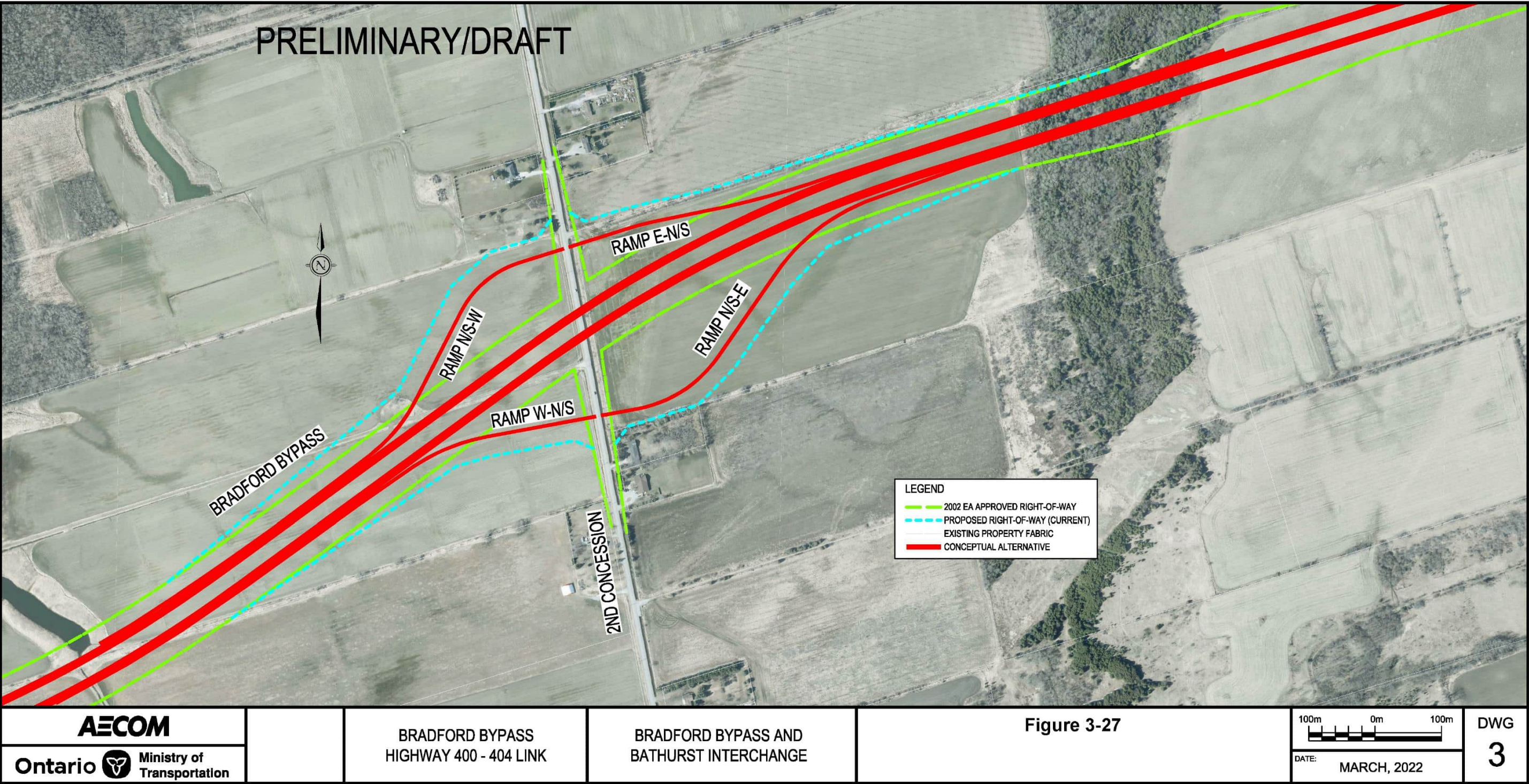


Figure 3-27: Diamond Interchange at 2nd Concession Road (Alternative 3)



3.2.7.4 Evaluation of 2nd Concession Road Interchange Alternatives

Based on the evaluation, it was recommended that Alternative 1 be carried forward as the preferred interchange design for the 2nd Concession Road interchange. Alternative 3 was least preferred, with Alternative 2 moderately preferred.

Table 3-10 provides the ranking of each alternative by the evaluation criteria.

Table 3-10: Evaluation of 2nd Concession Road Interchange Alternatives

Criteria	Alternative 1	Alternative 2	Alternative 3
Highway Engineering	●	◐	○
Traffic Operations	●	◐	○
Structural Engineering	●	●	●
Environment	○	◐	●
Natural	○	◐	●
Socio-Economic	○	◐	●
Cultural	○	●	●
Overall Summary	●	◐	○

All design alternatives meet the current geometric standards and require similar configurations for the bridge structure at 2nd Concession Road; however, Alternative 1 provides the highest overall interchange capacity with the lowest conflicting vehicle movements at ramps.

From an environmental perspective, Alternative 3 was generally most preferred as it results in the smallest overall footprint, with Alternative 2 being moderately preferred as it provided improvements in access with a smaller footprint compared to Alternative 1.

Overall, Alternative 1 provides the most common interchange configuration accommodating access, connectivity, and travel in all directions between 2nd Concession Road and Bradford Bypass, it provides the highest capacity for traffic, introduces the lowest vehicle conflicts at the ramps, accommodates controlled points pedestrian and active transportation for crossings, and provides opportunities for a carpool lot with few design complexities at this location. Opportunities to minimize environmental impacts, should continue to be explored through Detail Design.

3.2.8 Leslie Street Interchange

The proposed interchange at this location includes the Technically Preferred Route design from the 2002 Approved Environmental Assessment for a partial interchange, and one alternative configuration.

The design and selection of the preferred alternative for the Leslie Street interchange is negligibly influenced by the preferred alignment at the Hydro Towers **Section 3.2.3**. Leslie Street interchange alternatives were evaluated independent of each hydro tower avoidance alternative as the designs are not interdependent and the variance between combined alternatives was considered negligible.

The following design alternatives were considered for the Leslie Street Interchange:

- Alternative 1 – Partial Diamond Interchange (2002 Approved Environmental Assessment Base Case), and
- Alternative 2 – Partial Parclo A2 Diamond Interchange.

These alternatives are further discussed in the sections below.

3.2.8.1 Alternative 1 – Preferred

Alternative 1 (**Figure 3-28**) is a partial diamond configuration with two directional ramps that permit access to westbound Bradford Bypass from Leslie Street and from eastbound Bradford Bypass to Leslie Street. Access is not provided from Leslie Street to the Eastbound Bradford Bypass-Highway 404 interchange, nor is there access from the Highway 404-Westbound Bradford Bypass interchange to Leslie Street due to the close proximity of the interchanges. The interchange footprint is entirely on the west side of Leslie Street.

3.2.8.2 Alternative 2

Alternative 2 (**Figure 3-29**) is a Partial Parclo A2 diamond, that provides access to the Westbound Bradford Bypass from Leslie Street via a normalized (intersecting with crossing road) loop ramp and provides access from the Eastbound Bradford Bypass to Leslie Street. Consistent with Alternative 1, there is no access between the Highway 404-Bradford Bypass interchange and Leslie Street.

Figure 3-28: Partial Diamond Interchange at Leslie Street (Alternative 1)

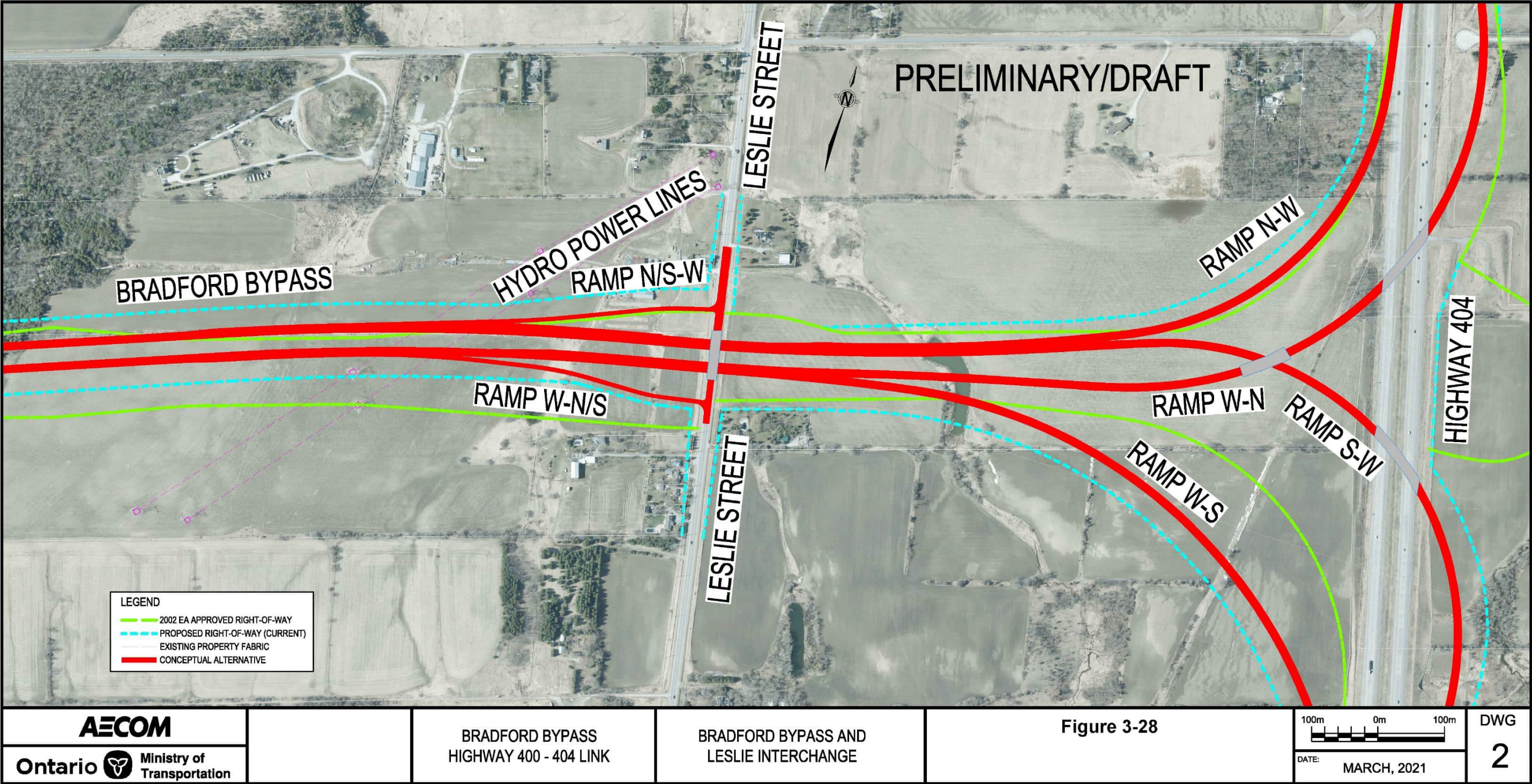
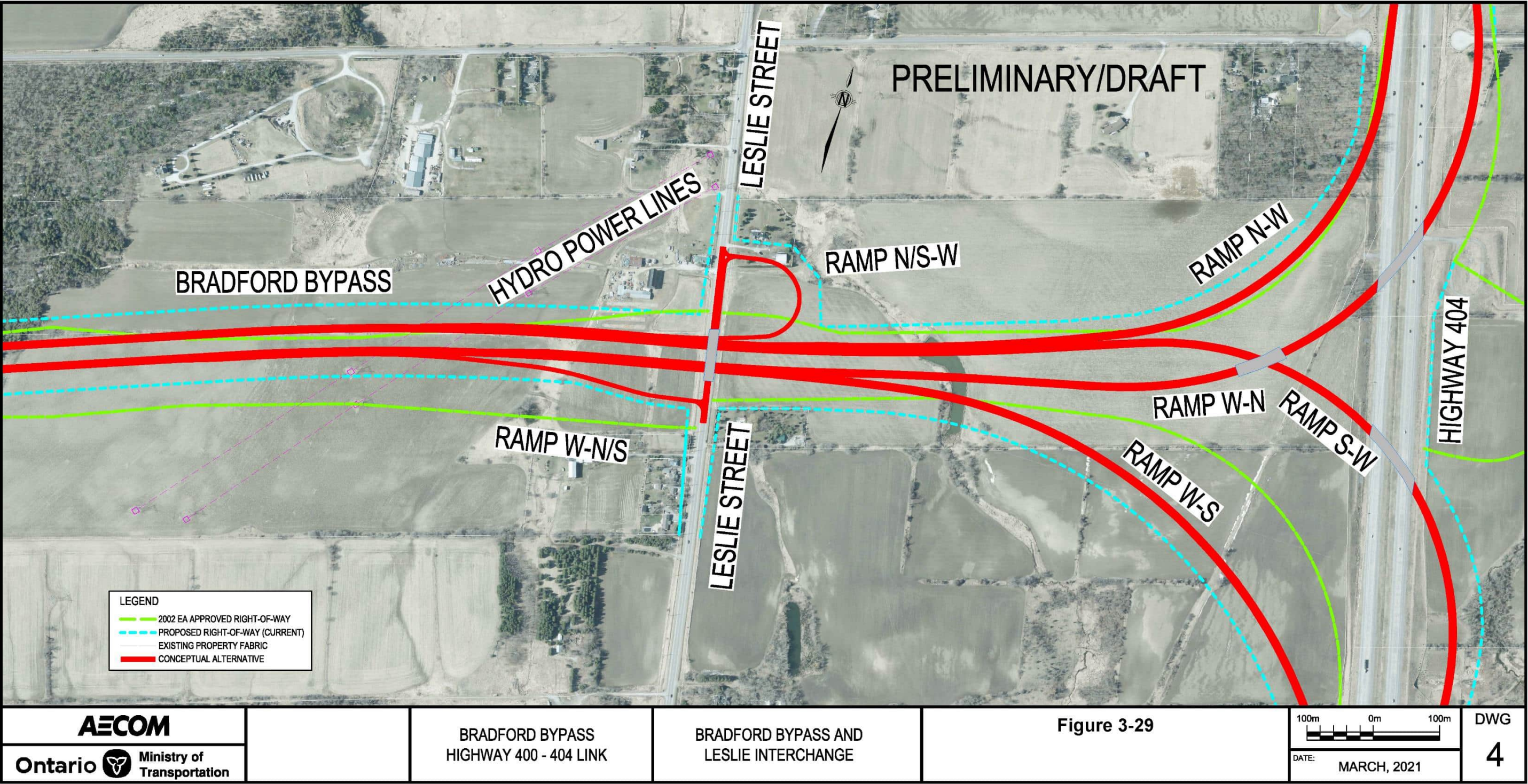


Figure 3-29: Partial Parclo A2 Diamond Interchange at Leslie Street (Alternative 2)



3.2.8.3 Evaluation of Leslie Street Interchange Alternatives

Based on the evaluation, it was recommended that Alternative 1 be carried forward as the preferred interchange design for the Leslie Street interchange. Alternative 2 was least preferred.

Table 3-11 provides the ranking of each alternative by the evaluation criteria.

Table 3-11: Evaluation of Leslie Street Alternatives

Criteria	Alternative 1	Alternative 2
Highway Engineering	●	○
Traffic Operations	●	◐
Structural Engineering	●	○
Environment	●	○
Natural	●	○
Socio-Economic	●	○
Cultural	●	○
Overall Summary	●	○

Overall, Alternative 1 results in the fewest property impacts and avoids potential impacts to a significant cultural heritage resources and ecological features. The configuration of the interchange mitigates weaving concerns with adjacent interchanges and allows for a narrower structure at Leslie Street to be constructed.

3.2.9 County Road 4 Interchange

A Parclo A4 configuration at County Road 4 was selected, as this is a key location that provides access to and from the Bradford Bypass, and is anticipated to be among the highest utilized interchanges in the corridor, resulting from the dense residential and commercial development surrounding it. The Parclo A4 interchange is the most common interchange configuration in Ontario, providing the largest vehicular capacity and maximizing safety to its users. As a result, the 2002 Approved Environmental Assessment recommendation for a Parclo A4 at this location was confirmed and carried forward.

The Ministry retained AECOM to undertake the design and assessment of the County Road 4 Early Works in accordance with the Regulation. The County of Simcoe completed an Environmental Study Report (2012) under the Municipal Class Environment

Assessment for the widening of County Road 4 from north of 8th Line to north of County Road 88 (approved in 2012). The County of Simcoe has since started site preparation works for the widening of County Road 4 from the southern limit 8th Line to 11th Line.

The Early Works focuses on the grade separated crossing for the Bradford Bypass at County Road 4 (Yonge Street). The Early Works has been awarded to Brennan Paving & Construction Ltd. As the successful bidder for the design and construction (2022).

For further information on the County Road 4 Early Works, refer to **Section 1.2.3.1** of this Report, the Final County Road 4I Early Works Report (AECOM, 2022) and Final County Road 4 Early Works Report Addendum (Morrison Hershfield, 2022) available on the Project Website (<https://www.bradfordbypass.ca/early-works/>).

3.2.10 Overpasses and Underpasses

The Bradford Bypass is an east-west freeway that will cross perpendicular to several municipal roads along the proposed route. To allow for an east-west controlled access freeway while maintaining north-south traffic on municipal roads, grade separated crossings at each of the existing roadways and railways will be required. **Table 3-12** identifies the location of each structure and the proposed crossing type as an overpass or an underpass. Where a change in the crossing type from the 2002 Approved Environmental Assessment is recommended based on the Preliminary Design and project-specific assessment of environmental impacts, the crossing is bolded. Rationale for these changes is summarized for each, following **Table 3-12**.

Table 3-12: Summary of Overpass and Underpass Recommendations

Structure Location	Proposed Crossing Type (2002 Approved Environmental Assessment)	Preliminary Design Recommendation
9 th Line at Highway 400	Overpass	Overpass
10 th Sideroad	Overpass	Underpass
Professor Day Drive	-	*Underpass (not precluded)
County Road 4	Underpass	Underpass
Artesian Industrial Parkway	Overpass	Overpass
Metrolinx Rail	Overpass	Overpass
Holland River	Overpass	Overpass
Bathurst Street	Overpass	Overpass
Holland River East Branch	Overpass	Overpass
Yonge Street	Overpass	Overpass
2 nd Concession Road	Underpass	Overpass
Leslie Street	Overpass	Overpass

Note: * Town of Bradford West Gwillimbury initiative for a potential extension of Professor Day Drive. The Bradford Bypass will not preclude a future grade separated crossing at this location.

An overpass occurs when the highway will go over a municipal road or railway. For instance, Highway 400 is an overpass at 9th Line.

An underpass occurs when the highway will go under the municipal road or railway. For instance, Bradford Bypass is an underpass at County Road 4.

Through Preliminary Design, and as an outcome of the independent Value Engineering Study, it was recommended that crossing configurations at two locations are changed.

Based on the profile optimization recommendations of the Value Engineering Study, to utilize cut and fill requirements more efficiently by reducing earth fill required to construct embankments, it is recommended that Bradford Bypass be traverse under 10th Sideroad as an underpass, rather than over 10th Sideroad as an overpass.

Based on the profile optimizations developed as part of the Preliminary Design, to provide smoother transitions and continuity in the highway profile through to the Highway 404 freeway to freeway interchange, it is recommended that the Bradford Bypass traverse over 2nd Concession Road as an overpass, rather than under 2nd Concession Road as an underpass.

The other change pertains to the future crossing of Professor Day Drive. At the time of this Preliminary Design and Draft Environmental Impact Assessment Report, Professor Day Drive terminates south of the Bradford Bypass right-of-way. The design of Bradford Bypass will not preclude a Town of Bradford West Gwillimbury initiative for a potential future extension of Professor Day Drive, such that a future grade separate crossing (overpass) can be constructed at this location.

3.3 Summary of Preferred Alternatives

Table 3-13 provides a summary of the recommended options for each alternative, which become part of the Updated Technically Preferred Route presented in **Section 4** and are to be carried forward to Detail Design.

Table 3-13: Summary of the Preferred Alternatives and Rationale for the Selection

Location	Preferred Alternative	Rationale for Selection of the Preferred Alternative
Alignment Shift 10 th Sideroad to County Road 4	Alternative 2 Realignment to the north featuring 1,700 metre curve that transition to 1300 metre to tie back into the 2002 Approved Environmental Assessment alignment at County Road 4.	<ul style="list-style-type: none"> Minimizes impacts to a sensitive archaeological site Mitigates design impacts to the County Road 4 Early Works Meets the Ministry’s geometric standards, and Mitigates potential impacts to current and future land uses.
Alignment Shift Holland River East Branch	Alternative 2 Realignment 150 metres to the south, featuring back-to-back 2200 metre radius curves that tie back into the 2002 Approved Environmental Assessment alignment at Yonge Street.	<ul style="list-style-type: none"> Provides the best approach to avoid impacts to river sinuosity and in-water footprints for bridge piers Avoids a sensitive archaeological site Avoids socio-economic impacts on both sides of the river The anticipated impact to the meandering river is less than other alternatives for both temporary and permanent impacts from the construction and placement of bridge piers. There is a slight offset to these benefits as there are increases in encroachment into natural areas compared to the Base Case, which will be considered through mitigation strategies in collaboration with Regulatory Agencies as the design is refined Alternative 2 has substantially less permanent in-water footprint impacts relative to the 2002 Approved Environmental Assessment Design (Base Case) Commitments from the 2002 Approved Environmental Assessment to mitigate impacts to adjacent properties are met, and Alternative 2 results in a constant horizontal bridge curvature, which is simpler in design, fabrication, and construction than Alternative 3.
Highway 400 Freeway-to-Freeway Interchange	Alternative 3 525 metres Radius (Bradford Bypass to Highway 400 Southbound Ramp) with Lanes to County Road 88	<ul style="list-style-type: none"> Provides connectivity to County Road 88 from both Highway 400 and Bradford Bypass Consistent ramp radii Property Requirements less than Alternatives 1 and 2 (similar to Alternative 4), and Minimizes environmental impacts.
Highway 404 Freeway-to-Freeway Interchange	Alternative 1 Extend Two Lane Ramp from Bradford Bypass Eastbound Ramp to Queensville Sideroad Ramp	<ul style="list-style-type: none"> Provides the best connectivity to Queensville Sideroad from Bradford Bypass and maintains existing access from Highway 404 Provides preferred connectivity within the region, and Smallest footprint, minimizing environmental impacts.
Alignment Shift Hydro One Towers West of Leslie Street	Alternative 2 Northern Realignment of Both Eastbound and Westbound Lanes West of Leslie Street	<ul style="list-style-type: none"> Avoids conflict with and costly relocation of existing hydro towers Provides the best opportunities for maintaining access to hydro towers Avoid undesirable utility maintenance access roads in the highway median Minimizes potential impacts to environmental and cultural resources, and Minimizes property impacts.
10 th Sideroad Interchange	Alternative 1 Parclo A4 Interchange	<ul style="list-style-type: none"> Provides a highly recognizable interchange with access in all directions Highest traffic capacity with lowest vehicle conflicts, and Opportunities for future carpool lot.
Bathurst Street Interchange	Alternative 1 Diamond Interchange (Base Case)	<ul style="list-style-type: none"> Smallest footprint and lowest environmental area of disturbance Access to Albert’s Marina and potential for connectivity to the Hochreiter Access is subject to discussions with Ministry and property owners, and Accommodates traffic operation considerations for farm vehicles/operations.
2 nd Concession Road Interchange	Alternative 1 Parclo A4 Interchange	<ul style="list-style-type: none"> Provides a highly recognizable interchange with access in all directions, and Highest traffic capacity with lowest vehicle conflicts, and Opportunities for future carpool lot.
Leslie Street Interchange	Alternative 1 Partial Diamond	<ul style="list-style-type: none"> Lowest environmental and property impacts Provides access westerly to/from Leslie Street with well performing interchange operations, and Avoids a significant heritage resource.

Location	Preferred Alternative	Rationale for Selection of the Preferred Alternative
Overpasses and Underpasses	Overpasses: <ul style="list-style-type: none">■ 9th Line (Highway 400)■ Artesian Industrial Parkway■ Metrolinx Rail■ Yonge Street■ 2nd Concession Road, and■ Leslie Street. Underpasses: <ul style="list-style-type: none">■ 10th Sideroad■ Professor Day Drive (Not precluding future municipal initiatives)■ County Road 4 (Ministry Early Works)	<ul style="list-style-type: none">■ Profile optimizations (cut and fill balance)■ Flexibility for future road extensions, and■ Avoids impacts to existing railway line.
Interchange Locations	<ul style="list-style-type: none">10th Sideroad■ County Road 4■ Bathurst Street (not precluded)■ 2nd Concession, and■ Leslie Street (not precluded).	<ul style="list-style-type: none">■ Accommodates municipal requests and considerations■ Allows for phasing of interchange locations as required■ Early integration and consideration of environmental impacts to the design, and■ Best satisfies the study objective to improve connectivity of the study area between Highway 400 and 404, facilitating improved traffic operations and movement of goods.

4. Updated Technically Preferred Route (Recommended Plan)

In accordance with Section 20(2) of the Regulation, this section includes a description, drawings and map of the Updated Technically Preferred Route, as presented at the Public Information Centre #2 on November 24, 2022.

4.1 Overview of the Updated Technically Preferred Route

The Updated Technically Preferred Route builds on the design identified in the 2002 Approved Environmental Assessment and the Preliminary Design Preparatory Work (2019 – 2020) completed in advance of the Preliminary Design. It encompasses the recommended alternatives to the Technically Preferred Route as set out in the Final Environmental Conditions Report (AECOM, 2022), any proposed changes presented to the public at each of the public consultation opportunities described in **Section 7.6**, and as evaluated in **Section 3** of this Report. Along with the recommended alternatives, preliminary designs for the highway including structural elements, highway profiles, carpool lots, active transportation, trails, Intelligent Transportation Systems, and illumination are presented in the sections below. Refer to **Section 5.2.10** for details on navigation requirements for the project.

Appendix B of this Report provides the overall Roll Plan for the Updated Technically Preferred Route.

4.2 Highway Engineering

4.2.1 Bradford Bypass Cross Section – Interim and Ultimate

The Updated Technically Preferred Route for the Bradford Bypass is comprised of the initiatives discussed in **Section 3**. The interim Bradford Bypass will be comprised of a four-lane cross section featuring two general purpose lanes in each direction, as shown in **Figure 4-1** below. The ultimate cross section will be widened towards the highway median within the already established right-of-way footprint for the corridor and will be comprised of three general purpose lanes and one High Occupancy Vehicle lane in each direction, as shown in **Figure 4-2**. Additional property beyond the proposed right-of-way is not required to facilitate this future widening.

Figure 4-1: Interim Cross Section

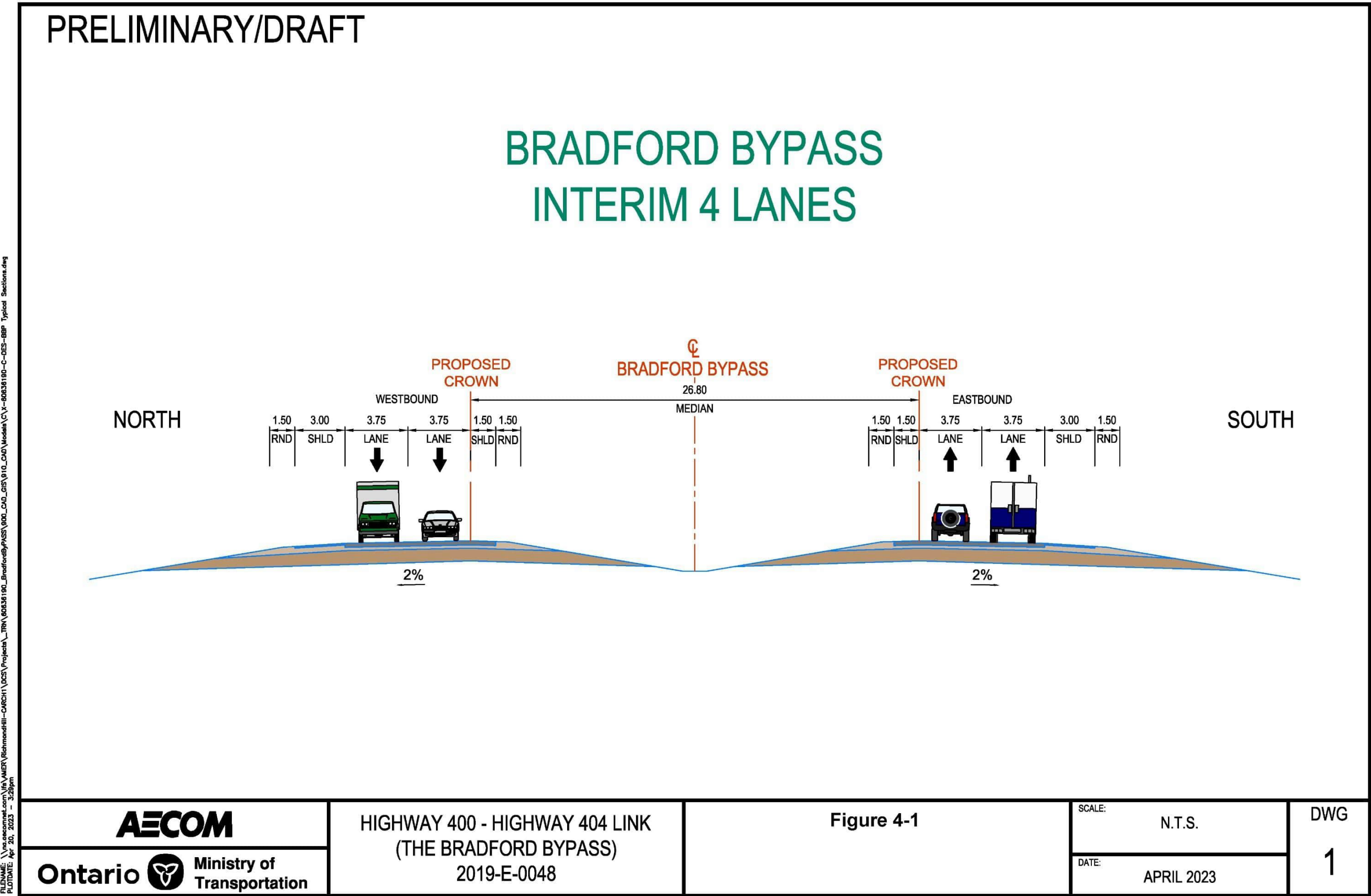
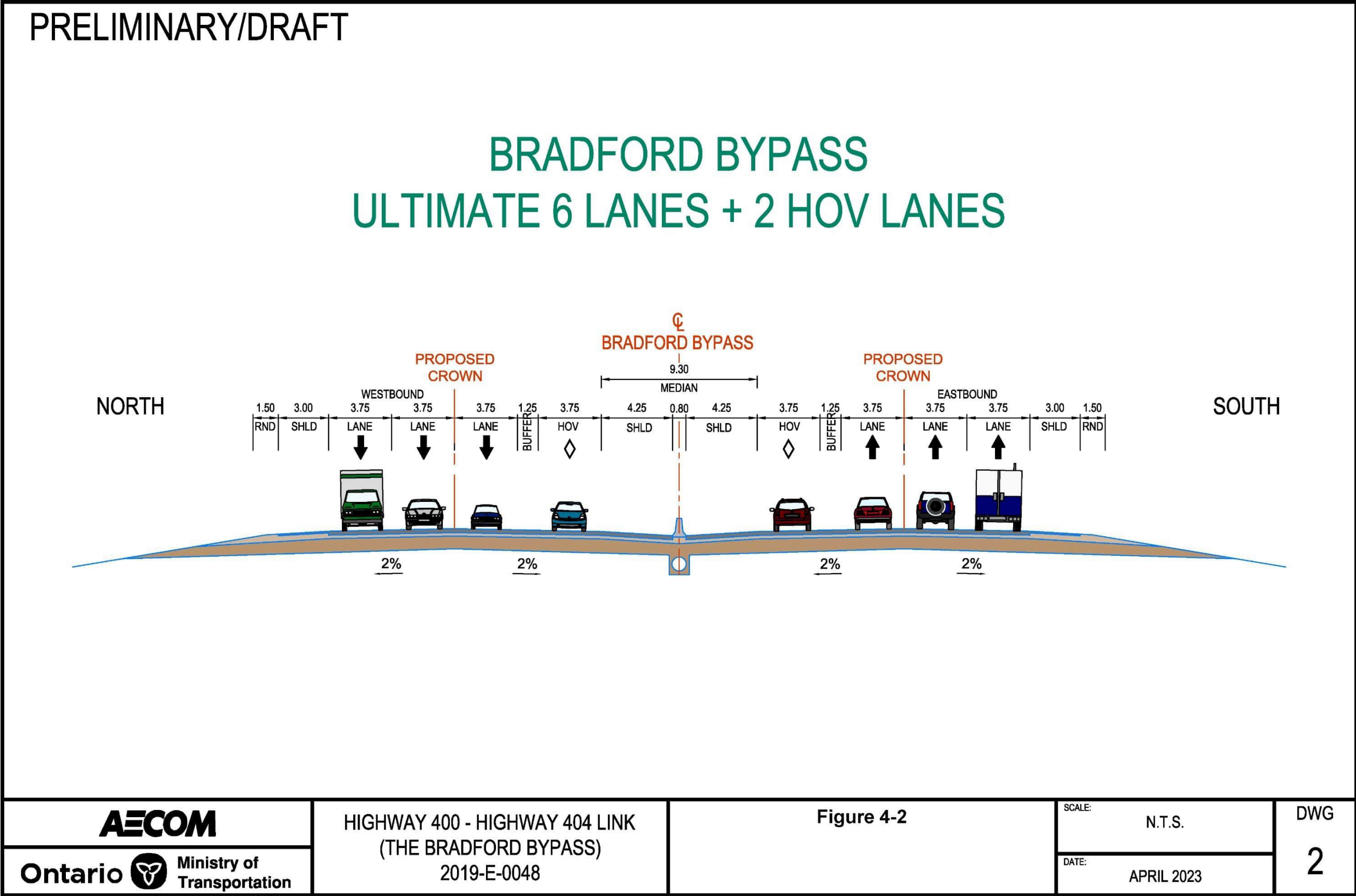


Figure 4-2: Ultimate Cross Section



4.2.2 Freeway-to-Freeway Interchanges

4.2.2.1 Highway 400 Freeway-to-Freeway Interchange (West Terminus of the Bradford Bypass)

The Highway 400 freeway-to-freeway interchange will be a stacked interchange facilitating all movements to and from the Bradford Bypass and Highway 400. This interchange will feature four directional ramps. Two ramps will provide access to the Bradford Bypass from the northbound and southbound Highway 400 (Ramp S-E and Ramp N-E) both with 440 metre radii. Two ramps will provide access to the northbound and southbound Highway 400 from the Bradford Bypass (Ramp E-S and Ramp E-N), with radii of 525 metres and 750 metres respectively. It is anticipated that the major move at this interchange will be from the Bradford Bypass to the northbound Highway 400, as a result this ramp features a larger radius to facilitate an increased design speed.

In this configuration, access to the adjacent County Road 88 interchange is maintained from both the southbound Highway 400 and the eastbound Bradford Bypass merging with the southbound traffic.

Impacts to the known cemetery at 8th Line adjacent to the N-E Ramp are also mitigated through grading optimizations.

Per the Regulation, work beyond the defined Study Area limits are subject to a separate Class Environmental Assessment process. The Ministry is undertaking a separate Environmental Assessment reflective of the auxiliary lane for the E-S ramp which extends south of the County Road 88 interchange structure. The Ministry is also undertaking the Detail Design for the replacement of the Highway 400 and 9th Line overpass structure and reconfiguration of the County Road 88 interchange, including the widening of the Highway 400 Southbound to County Road 88 Eastbound and Westbound ramp, separately, however design and environmental considerations for the proposed replacement structure are being coordinated with the proposed Bradford Bypass works.

Figure 4-3 shows the Updated Technically Preferred Route for Highway 400 Freeway to Freeway interchange.

4.2.2.2 Highway 404 Freeway-to-Freeway Interchange (East Terminus of the Bradford Bypass)

The Highway 404 freeway-to-freeway interchange will be a stacked interchange facilitating all movements to and from the Bradford Bypass and Highway 404. This interchange will feature four directional ramps. Two ramps will provide access to the

Bradford Bypass from the northbound and southbound Highway 404 (Ramp S-W and Ramp N-W) both with 440 metre radii. Two ramps will provide access to the northbound and southbound Highway 400 from the Bradford Bypass (Ramp W-S and Ramp W-N), with radii of 750 metres and 600 metres to 525 metres respectively. It is anticipated that the major move at this interchange will be from the eastbound Bradford Bypass to the southbound Highway 404, as a result this ramp features a larger radius to facilitate an increased design speed.

In this configuration, access to the adjacent Queensville Sideroad interchange is maintained from both the southbound Highway 404 and the eastbound Bradford Bypass merging with the southbound traffic.

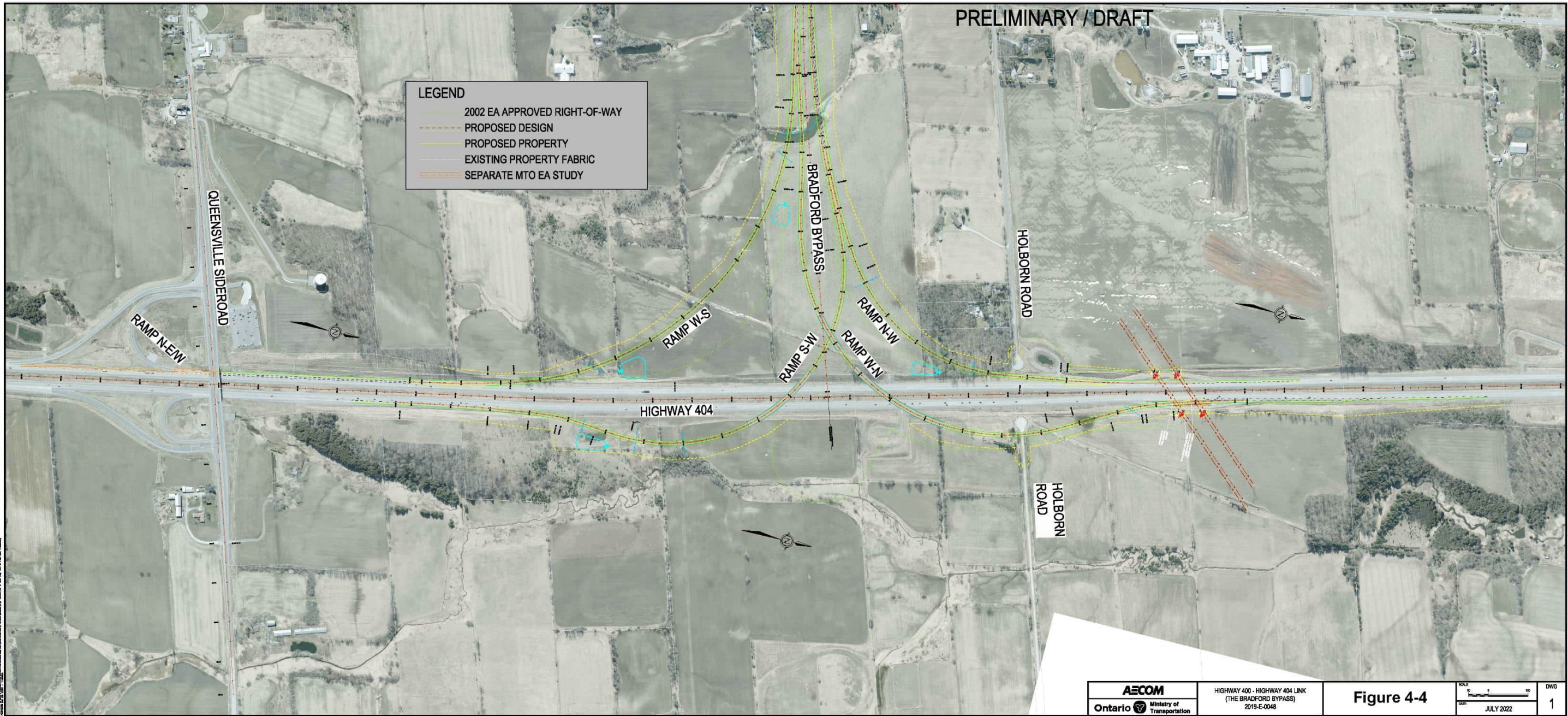
Per the Regulation, work beyond the defined Study Area limits are subject to a separate Class Environmental Assessment process. The Ministry is undertaking a separate Environmental Assessment reflective of the auxiliary lane for the W-S ramp which extends south of the Queensville Sideroad interchange.

Figure 4-4 shows the Updated Technically Preferred Route for the Highway 404 Freeway-to-Freeway interchange.

Figure 4-3: Recommended Plan for the Highway 400 Freeway to Freeway Interchange



Figure 4-4: Recommended Plan for the Highway 404 Freeway-to-Freeway Interchange



4.2.3 Crossing Road Interchanges

4.2.3.1 10th Sideroad Interchange

The Updated Technically Preferred Route (Recommended Plan) for the 10th Sideroad interchange is a full moves Parclo A4 interchange comprised of four directional ramps and two loop ramps. The Bradford Bypass will traverse under 10th Sideroad. 10th Sideroad will feature one through lane and one speed change lane in each direction at the structure, with one lane in each direction between the structure and the ramp terminals which is reflective of the existing lane configuration. The proposed design does not preclude a future widening of 10th Sideroad to four lanes, if Simcoe County undertakes this initiative in the future.

Provisions for Active Transportation are also provided on both sides of 10th Sideroad between ramp terminals based on consultation with the Town of Bradford West Gwillimbury and initiatives beyond the ramp terminals of these Active Transportation facilities are not precluded. Beyond the ramp terminal limits, the design ties into the existing roadway.

A carpool lot is also recommended in the southeast quadrant of the interchange.

Figure 4-5 shows the Updated Technically Preferred Route for the 10th Sideroad Interchange.

4.2.3.2 County Road 4/Yonge Street Interchange

The Updated Technically Preferred Route for County Road 4/Yonge Street is a full moves Parclo A4 Interchange, consistent with the 2002 Approved Environmental Assessment, comprised of four directional ramps and two loop ramps. The Bradford Bypass will traverse under County Road 4. County Road 4 itself will consist of two through lanes and a speed change lane in each direction separated by a raised median. The design ties into the existing roadway. Provisions for a future multi-use pathway facility are also provided adjacent to the east side of the roadway and on the structure in consideration of Simcoe County's Municipal Class Environmental Assessment for County Road 4 and based on consultation with Simcoe County. These facilities transition to a sidewalk at the 8th Line intersection to tie back into existing conditions.

A carpool lot is also recommended in the southeast quadrant of the interchange.

Figure 4-6 shows the Updated Technically Preferred Route for the County Road 4 interchange.

4.2.3.3 Bathurst Street Interchange

The Updated Technically Preferred Route for Bathurst Street is a full moves Diamond Interchange, consistent with the 2002 Approved Environmental Assessment and is comprised of four directional ramps to and from the Bradford Bypass. The Bradford Bypass will traverse over Bathurst Street. The crossing road will feature one lane in each direction, with provisions for future Active Transportation facilities on both sides of the roadway, based on consultation with the Town of East Gwillimbury and Township of King. Realignment of the Albert's Marina access is subject to discussions with the municipalities and property owner.

The option for the realignment for the Hochreiter access was removed from the Updated Technically Preferred Route based on further considerations and consultations, including correspondence with King Township in August 2022.

The structure proposed at this location will not preclude a future widening of Bathurst Street to two lanes and a speed change lane in each direction, separated by a raised median. Furthermore, the design will also not preclude future Active Transportation facilities if and when the road is widened by the Town of East Gwillimbury and King Township. Beyond the ramp terminals, the design ties into the existing roadway.

Figure 4-7 shows the Updated Technically Preferred Route for the Bathurst Street interchange.

4.2.3.4 2nd Concession Road Interchange

The Updated Technically Preferred Route for 2nd Concession Road is a full moves Parclo A4 interchange, comprised of four directional ramps and two loop ramps. The Bradford Bypass will traverse over 2nd Concession Road. The crossing road will consist of two through lanes, one lane in each direction, with speed change lanes at the structure. Provisions for future Active Transportation facilities are included on both sides of the roadway based on consultation with the Town of East Gwillimbury, between the north and south ramp terminals. The design ties into the existing roadway. A carpool lot is also recommended in the northwest quadrant of the interchange.

The Recommend Plan will not preclude a future widening of 2nd Concession Road to four lanes if the Town of East Gwillimbury undertakes this initiative in the future.

In consultation with the Town of East Gwillimbury, 2nd Concession Road is recommended to be reduced from a posted speed of 70 kilometres per hour to 60 kilometres per hour from south of Holborn Road to north of Queensville Sideroad, subject to review in subsequent design phases. The decision to reduce the speed is

reflective of geometric constraints and considerations for motorist safety, while mitigating the degree of impact, where feasible, to adjacent lands

Figure 4-8 shows the Updated Technically Preferred Route for the 2nd Concession Road interchange.

4.2.3.5 Leslie Street Interchange

The Updated Technically Preferred Route for Leslie Street is a partial Diamond Interchange, comprised of two directional ramps providing access to and from west of Leslie Street. The Bradford Bypass will traverse over Leslie Street at this location. The crossing road will consist of one lane in each direction, with a median left turn lane for the on-ramp to the Bradford Bypass. Provisions for future Active Transportation facilities are provided on both sides of the roadway based on consultation with the Town of East Gwillimbury's between the north and south ramp terminals.

The Updated Technically Preferred Route will not preclude a future widening of Leslie Street to four lanes, and corresponding Active Transportation improvements, if and when the Town chooses to pursue this initiative.

Figure 4-9 shows the Updated Technically Preferred Route for the Leslie Street interchange.

Figure 4-5: Recommended Plan for 10th Sideroad Interchange

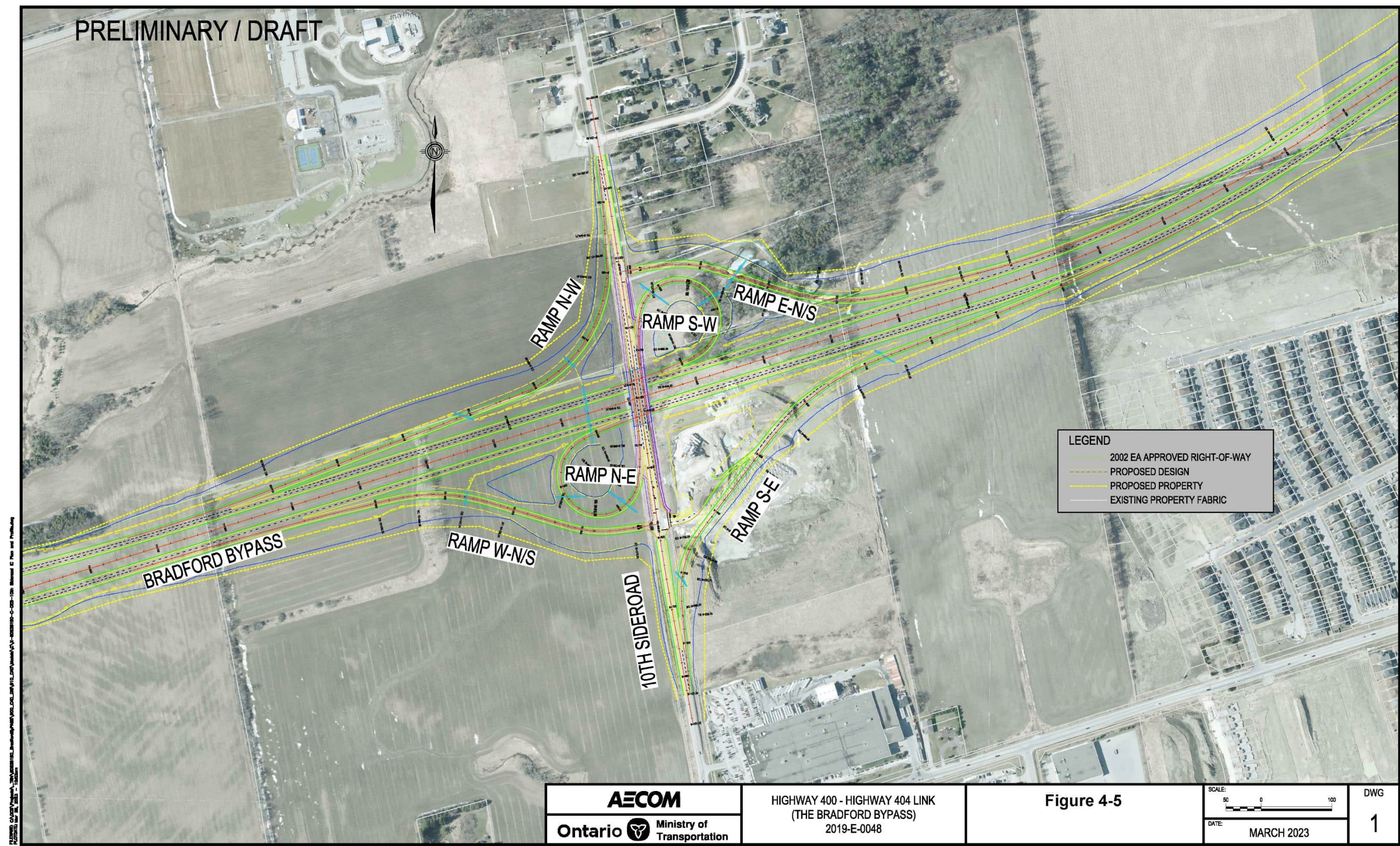


Figure 4-6: Recommended Plan for the County Road 4/Yonge Street Interchange



Figure 4-7: Recommended Plan for the Bathurst Street Interchange

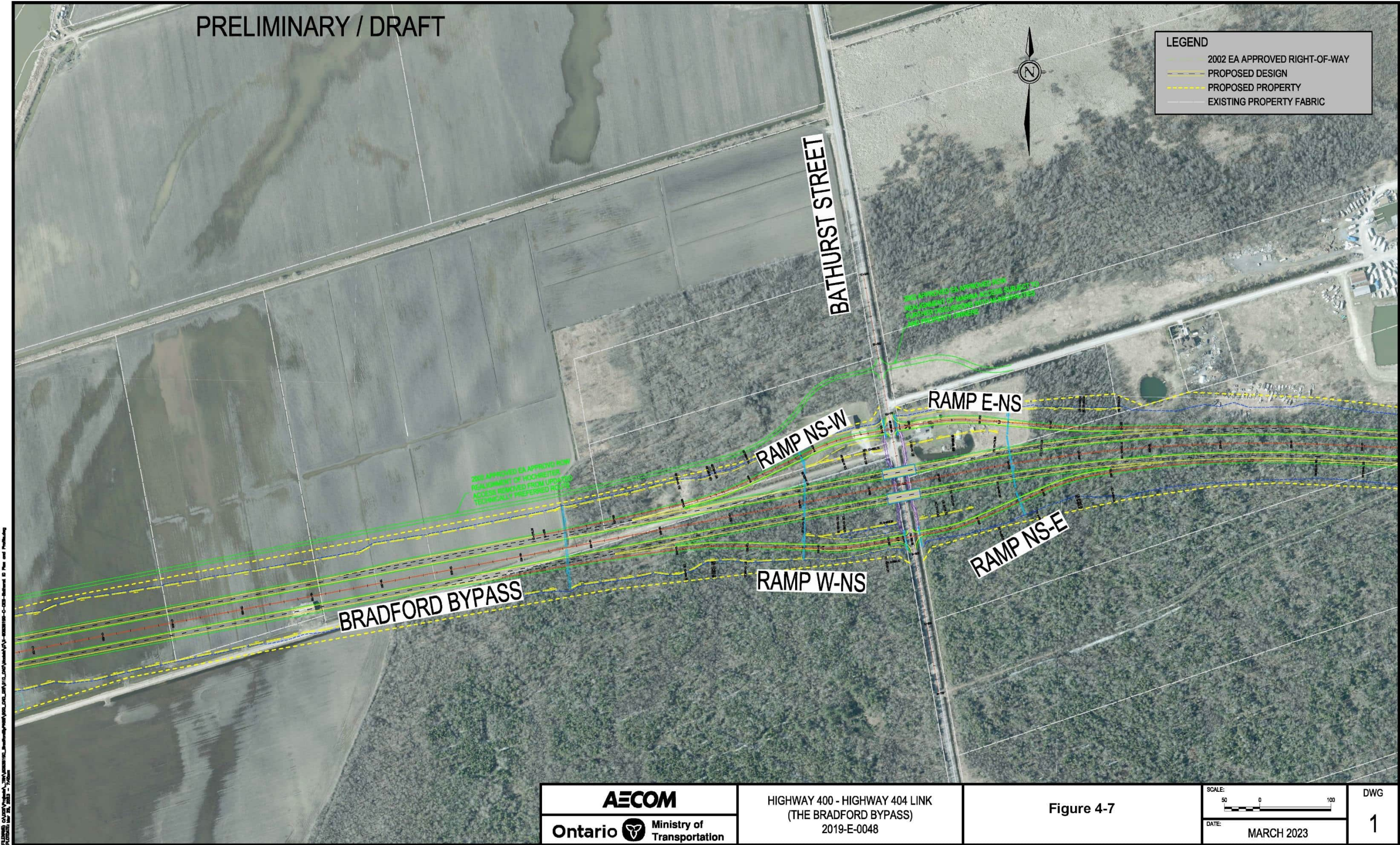


Figure 4-8: Recommended Plan for the 2nd Concession Road Interchange

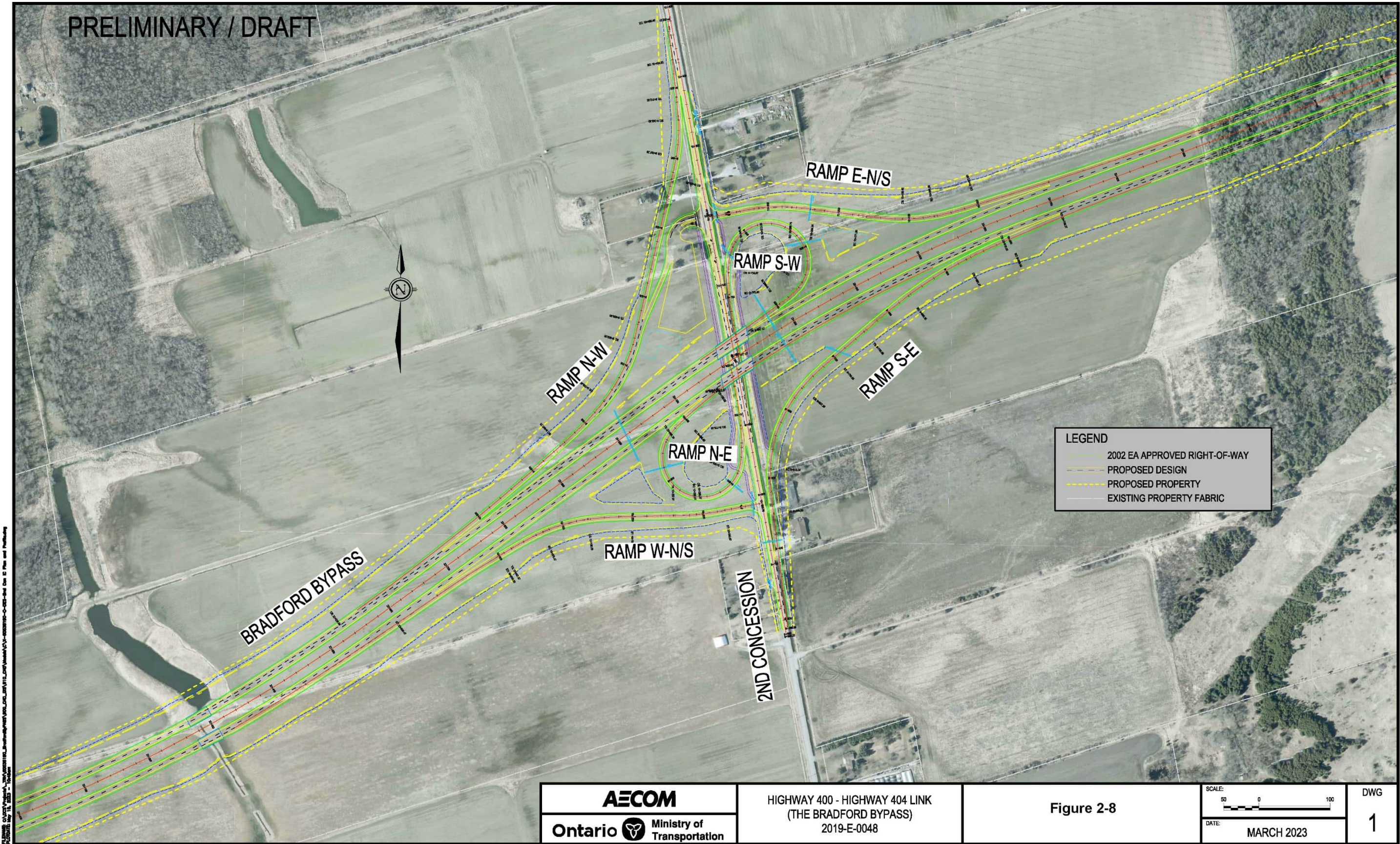
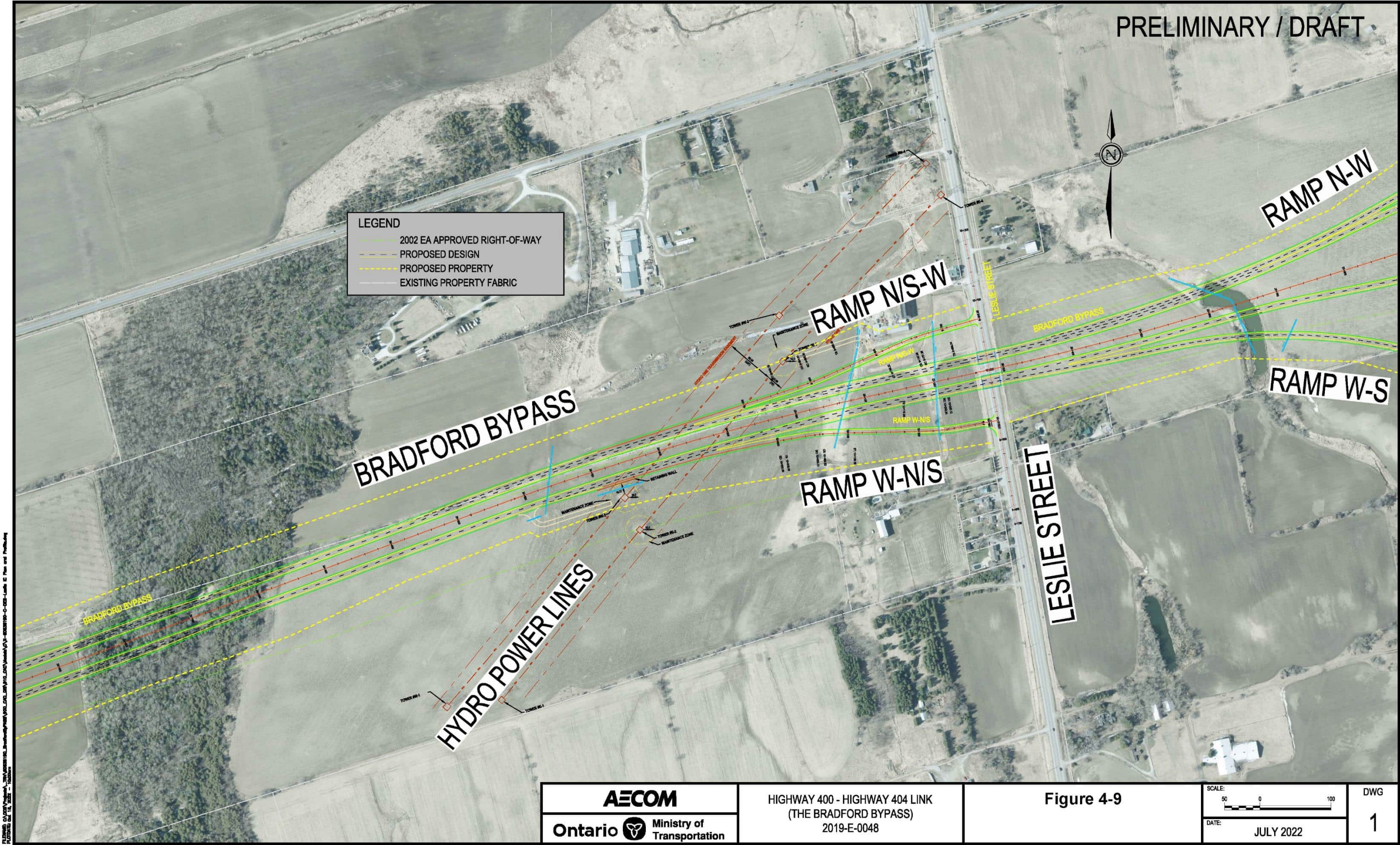


Figure 4-9: Recommended Plan for the Leslie Street Interchange



4.2.4 Alignment Shifts

4.2.4.1 Bradford Bypass between 10th Sideroad and County Road 4

Between 10th Sideroad and County Road 4, the Updated Technically Preferred Route realigns the Bradford Bypass to the north, with a combination of 1700 metre and 1300 metre curves to facilitate the avoidance of the known Bradford Hill archaeological site BaGv-112. This realignment increases the distance of the Bradford Bypass from existing residential development to the south of the proposed corridor, and also mitigates extensive impacts to the County Road 4 Early Works design and structure. Minor design changes to the County Road 4 Early Works structure are also required including adjustments to retaining walls and lowering of pier footings along with highway design features.

The Updated Technically Preferred Route and alignments proposed at 10th Sideroad, detailed in **Section 4.2.3.1**, and County Road 4, detailed in **Section 4.2.3.2**, are not impacted by this realignment.

In consultation with the Town of Bradford West Gwillimbury, the Updated Technically Preferred Route at this location also does not preclude a future extension of Professors Day Drive and a grade separated crossing over the Bradford Bypass if the Town of Bradford West Gwillimbury pursues this initiative.

Figure 4-10 shows the Updated Technically Preferred Route between 10th Sideroad and County Road 4.

4.2.4.2 Bradford Bypass Between County Road 4 and the Holland River

The Updated Technically Preferred Route at this location encompasses refinements two horizontal curve radii to meet current design standards. Curve radii was enhanced to 1700 metres. This results in minor adjustments to the alignment through this section of the Bradford Bypass.

Figure 4-11 shows the Updated Technically Preferred Route between County Road 4 and the Holland River.

4.2.4.3 Holland River East Branch

The Updated Technically Preferred Route at the Holland River East Branch comprises of a realignment of the Bradford Bypass to the south approximately 150 metres with two back-to-back 2200 metre radius curves, facilitating the avoidance of a known Riverbend archaeological site BaGv-42 directly impacted by the 2002 Approved Environmental Assessment Technically Preferred Route. This realignment best implements drainage

and fluvial elements that consider the movement of water over time and how it results in scour and erosion potential at the bridge pier and abutments. Furthermore, it mitigates design challenges associated with constructing a bridge over the river meander, while also facilitating the required navigation clearances and mitigating a permanent in water footprint. It also mitigates impacts to two known archaeological sites along the river. The southern realignment avoids ponds and a naturally occurring backwater refuge which hosts aquatic and amphibious wildlife. In additions, it maintains a larger forested section east of Yonge Street as alignment is closer to the southern boundary. Furthermore, it meets the 2002 Approved Environmental Assessment commitments to mitigate impacts to adjacent commercial properties.

Figure 4-12 shows the Updated Technically Preferred Route at the Holland River East Branch.

4.2.4.4 Bradford Bypass at the Hydro Tower Crossing

The Updated Technically Preferred Route at this location realigns the Bradford Bypass to the north, avoiding impacts to the existing hydro towers. The profile of the Bradford Bypass at this location is also lowered through this corridor to meet the vertical clearance requirements at the hydro towers based on consultation with Hydro One. Access to the hydro towers is provided via access roads at or adjacent to the Leslie Street interchange ramps, detailed in **Section 4.2.3.5**.

Figure 4-13 shows the Updated Technically Preferred Route at the hydro tower crossing.

Figure 4-10: Recommended Plan between 10th Sideroad and County Road 4

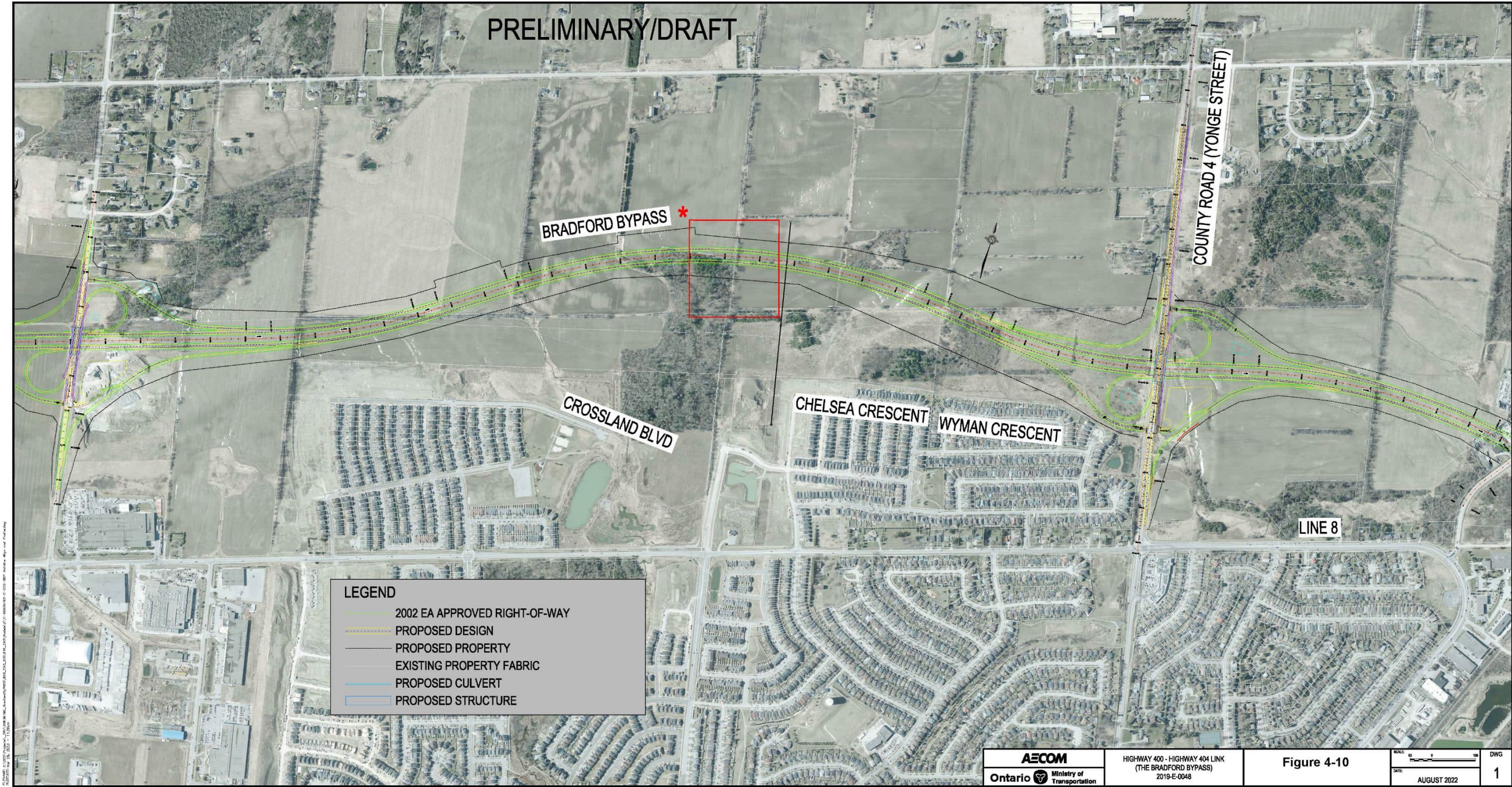


Figure 4-11: Recommended Plan between County Road 4 and the Holland River

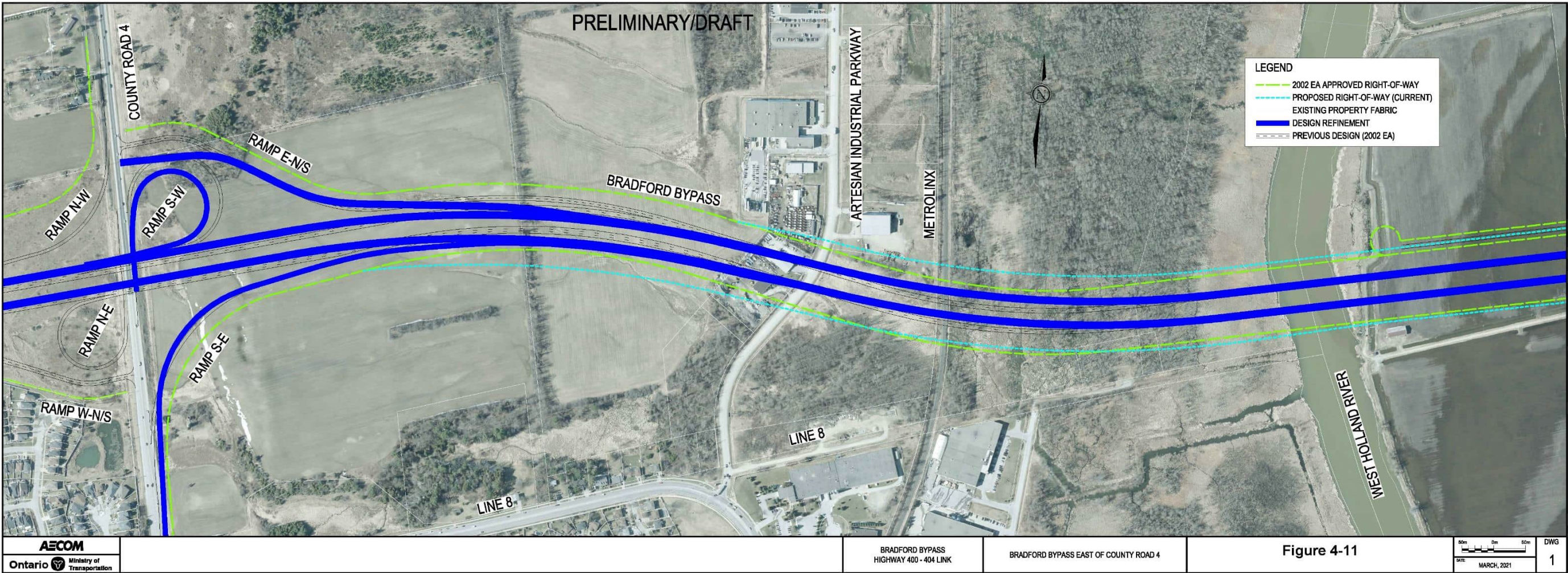
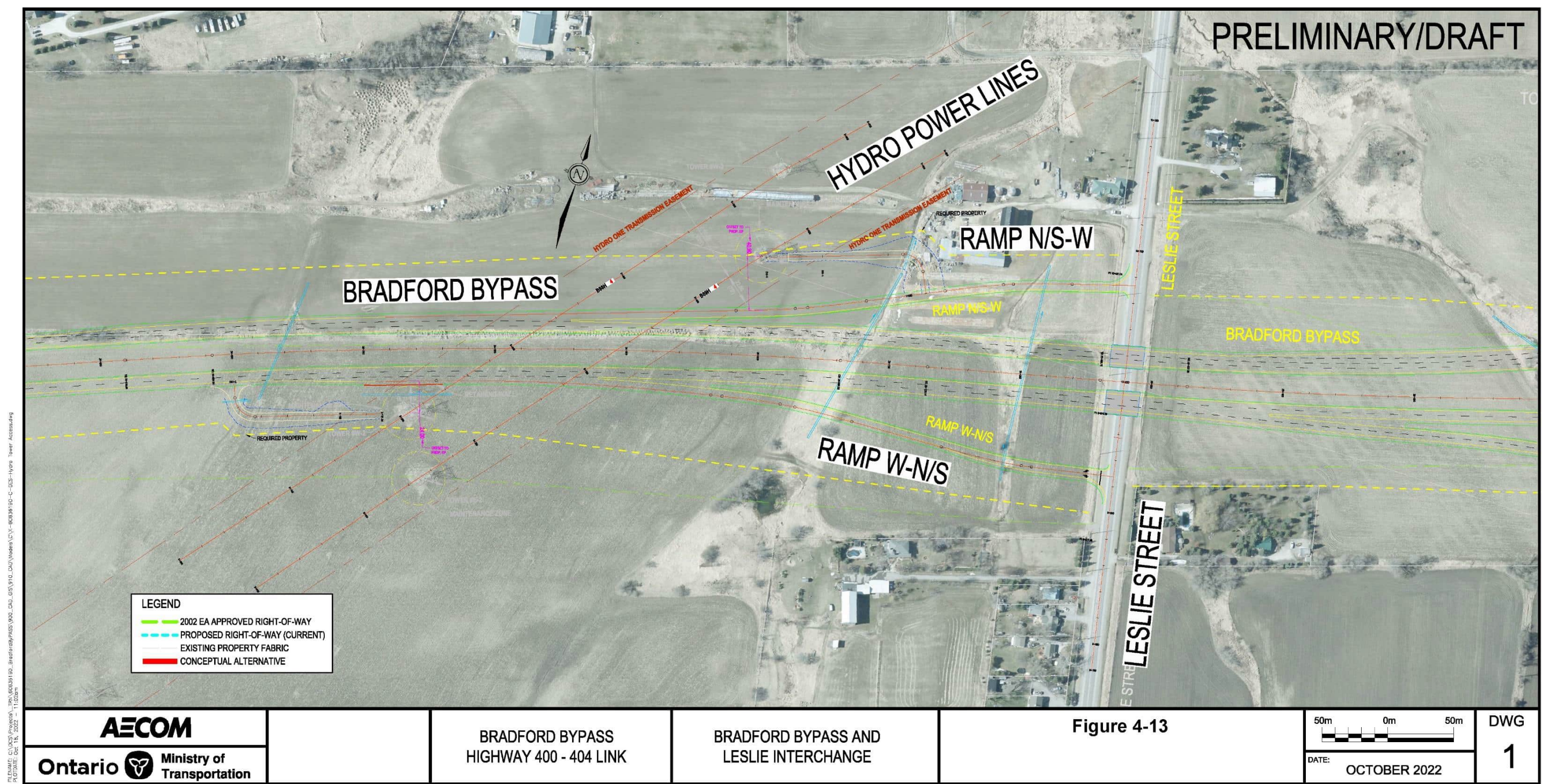


Figure 4-12: Recommended Plan at the Holland River East Branch



Figure 4-13: Recommended Plan at the Hydro Tower Crossings



4.2.5 Crossing Roads

4.2.5.1 9th Line

9th Line is required to be reconstructed and lowered to facilitate the proposed replacement of the 9th Line structure in accordance with current governing design standards. Highway 400 and the adjacent Bradford Bypass ramps will traverse over 9th Line. The crossing road will consist of two lanes, one in each direction, and accommodate shared bike lanes based on consultation with the Town of Bradford West Gwillimbury. In consultation with the Town of Bradford West Gwillimbury, 9th Line is recommended to be reduced from a posted speed of 80 kilometres per hour to 60 kilometres per hour, subject to review in subsequent design phases. The decision to reduce the speed is reflective of geometric constraints and considerations for motorist safety, while mitigating the degree of impact, where feasible, to adjacent lands. Updated Technically Preferred Route for 9th Line will not preclude a future widening to four lanes and future active transportation facilities if the Town of Bradford West Gwillimbury pursues this initiative.

Figure 4-14 shows the Updated Technically Preferred Route for the 9th Line crossing road.

4.2.5.2 Artesian Industrial Parkway and Yonge Street

Municipal roads not designated to be interchanges will be reconstructed to match existing conditions if impacted by the construction of the Bradford Bypass. Both Artesian Industrial Parkway and Yonge Street will be maintained in their existing two-lane configuration, which includes one lane in each direction. The Bradford Bypass will traverse over both of these roads. The Updated Technically Preferred Route (Recommended Plan) for the Bradford Bypass does not preclude future Active Transportation facilities on both sides of a two-lane rural cross section. Furthermore, the Bradford Bypass structures will not preclude future widening to four lanes of Artesian Industrial Parkway and Yonge Street, if and when the Town of Bradford West Gwillimbury and the Town of East Gwillimbury respectively, choose to pursue this initiative.

Figure 4-15 and **Figure 4-16** shows the Updated Technically Preferred Route for Artesian Industrial Parkway and Yonge Street respectively.

Figure 4-14: Recommended Plan for 9th Line Crossing Road

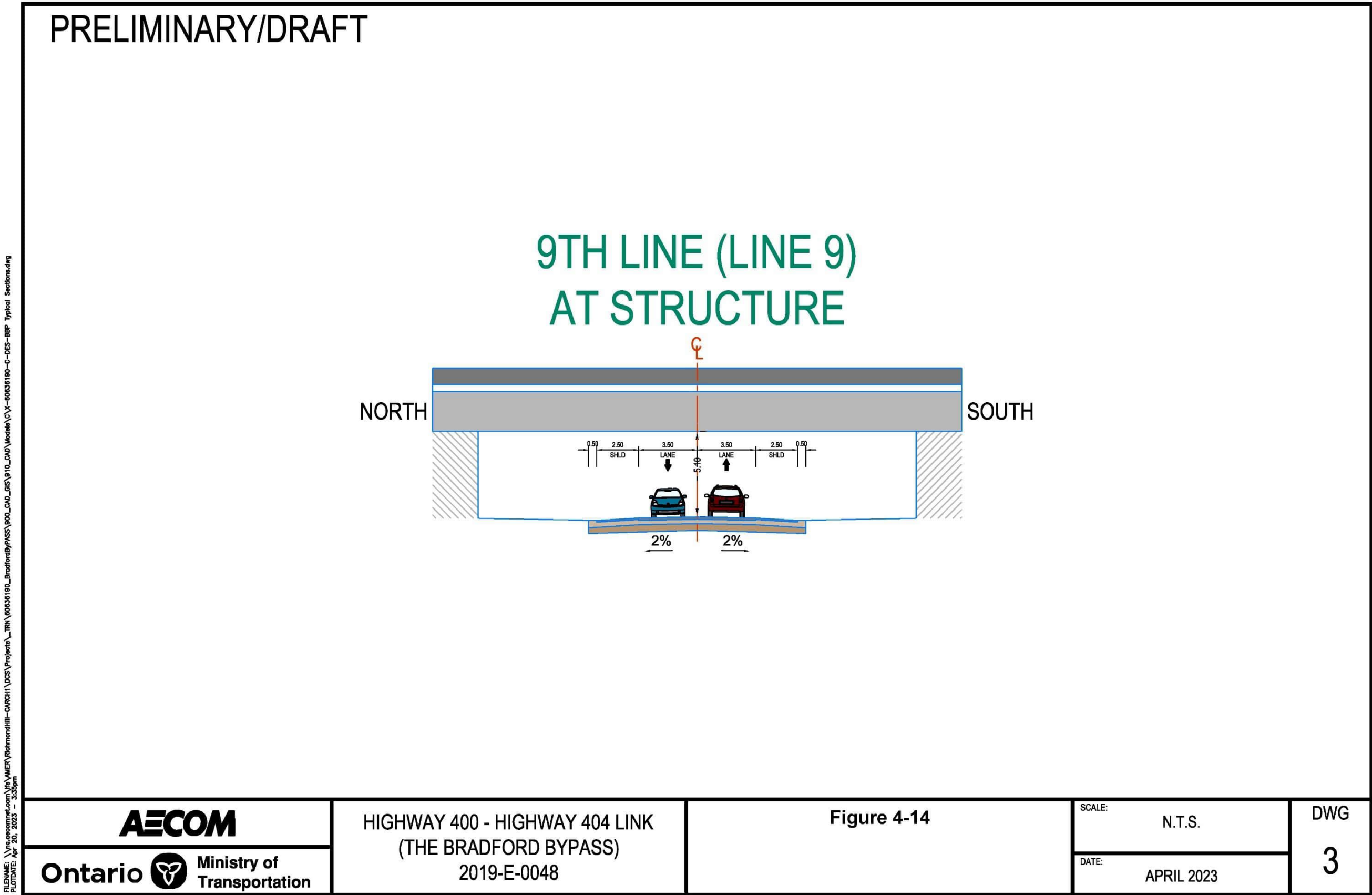


Figure 4-15: Recommended Plan for Artesian Industrial Parkway

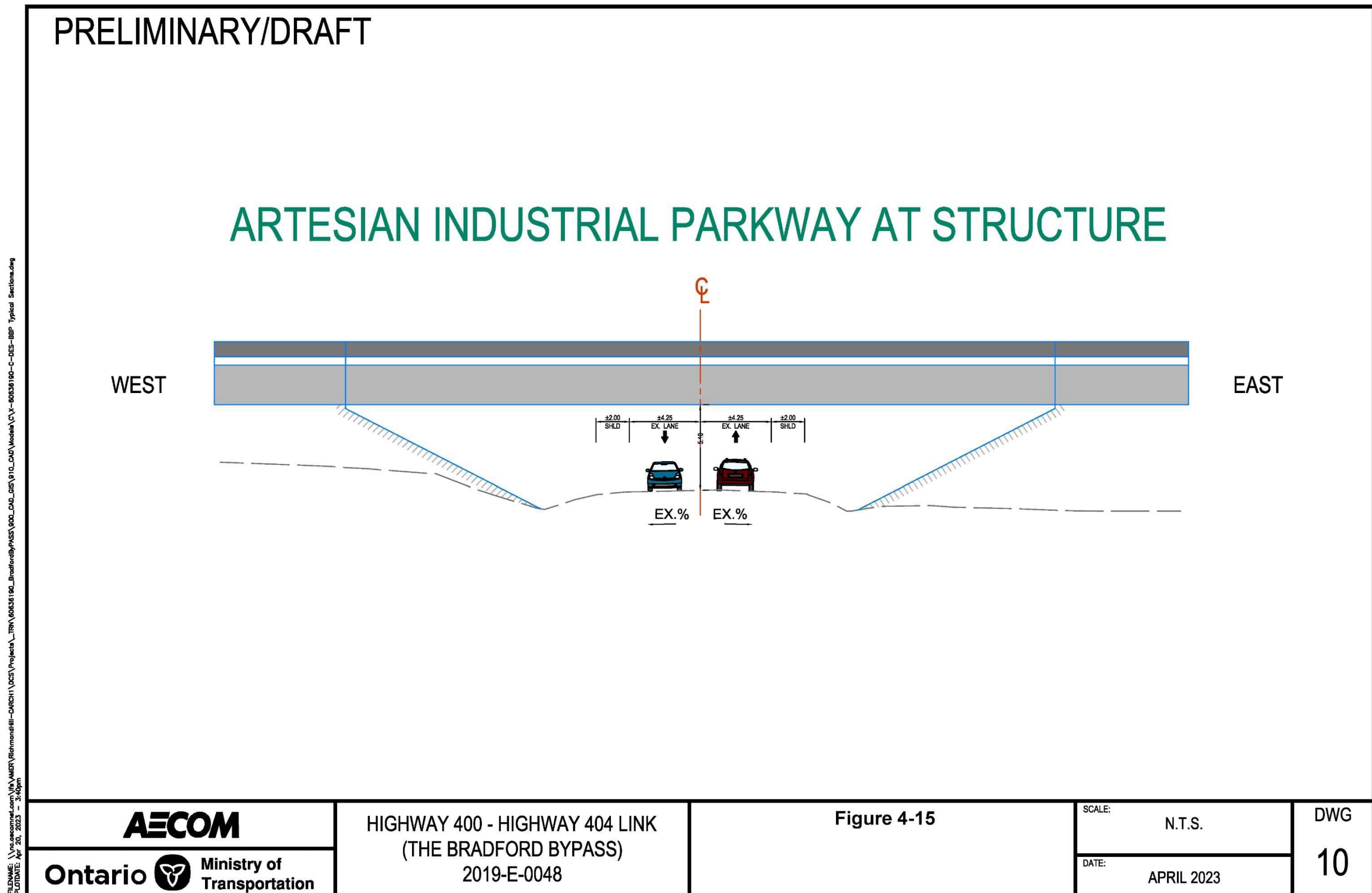
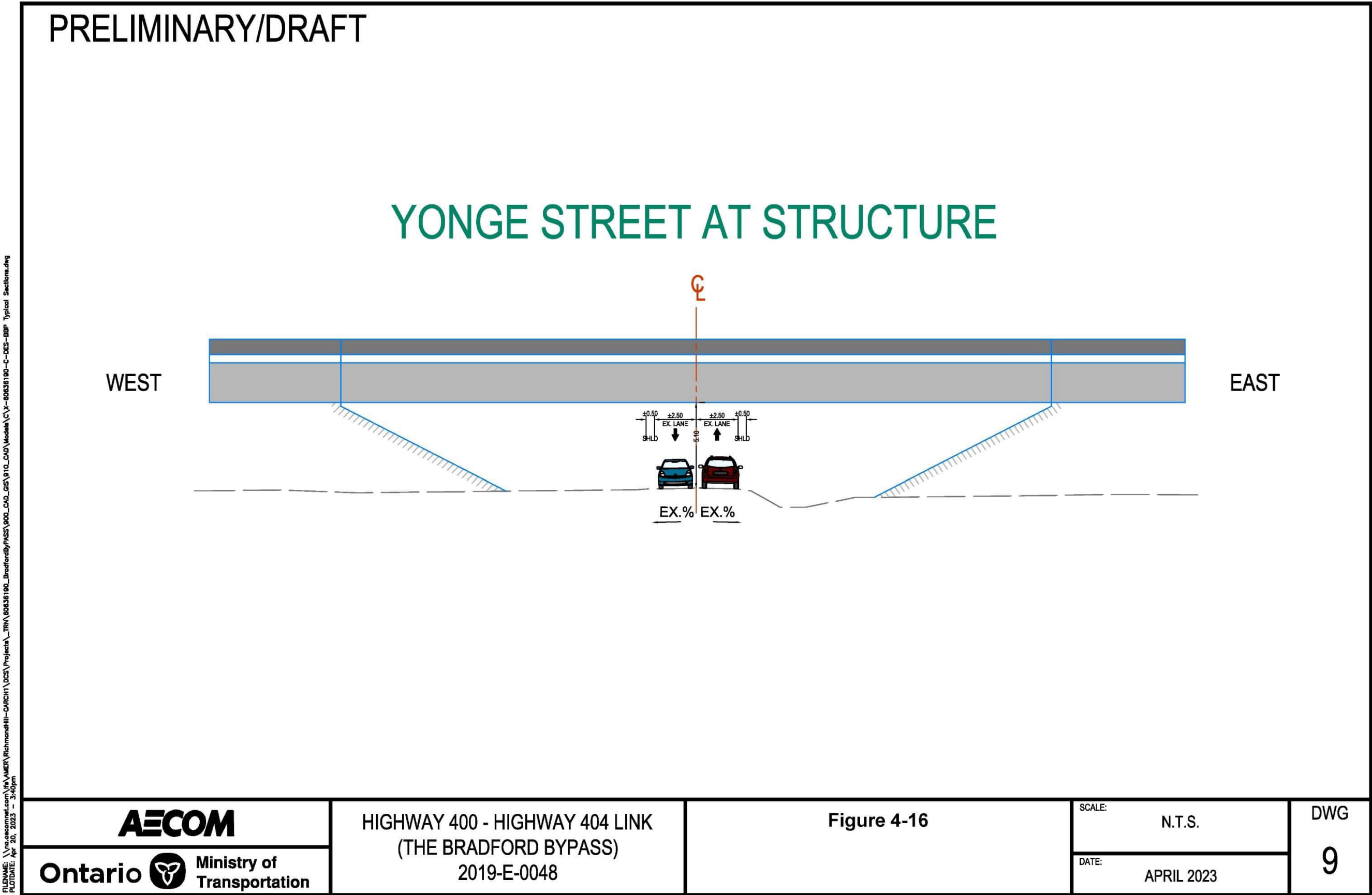


Figure 4-16: Recommended Plan for Yonge Street



4.2.6 Carpool Lots

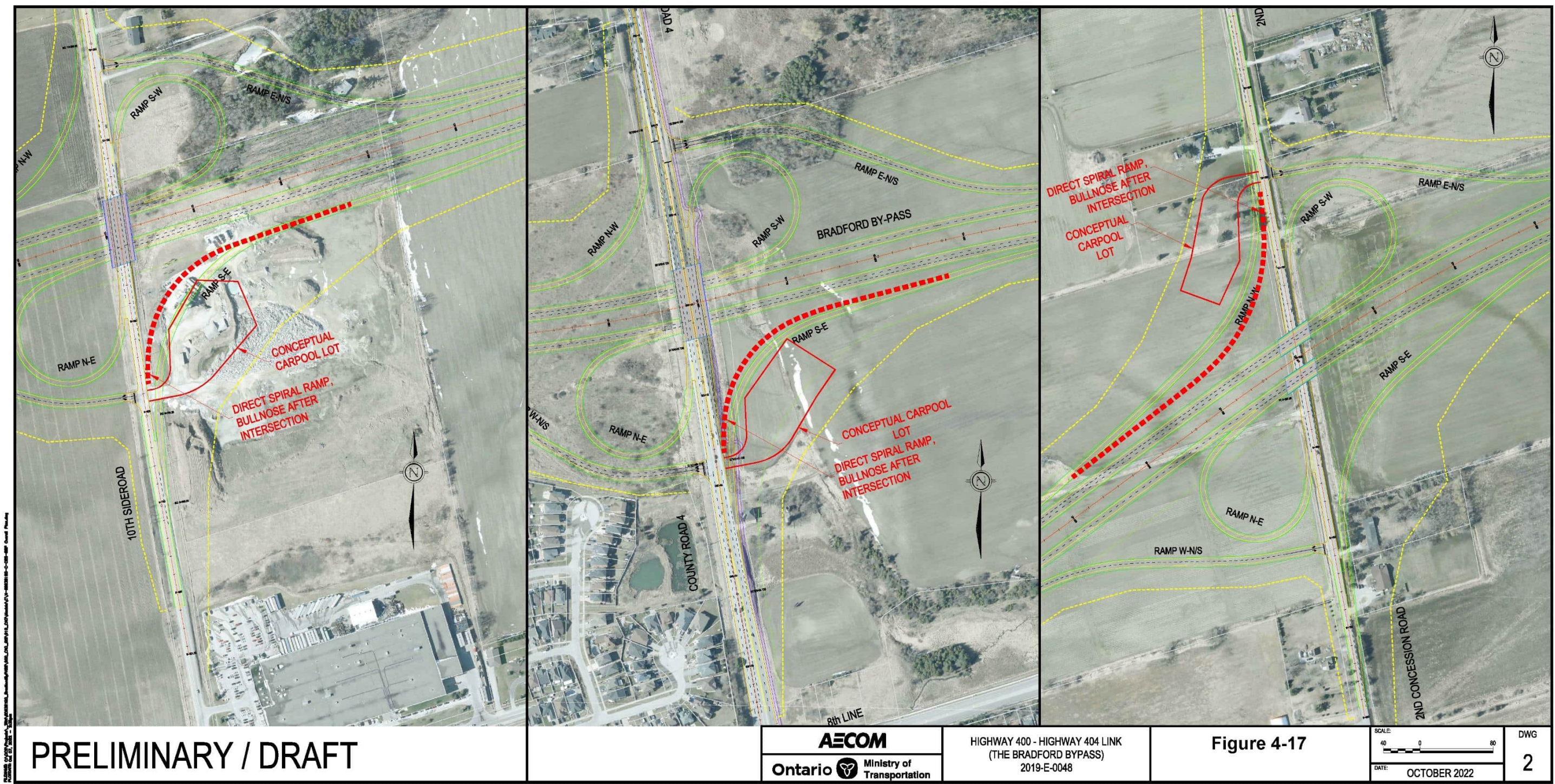
Recognising the continued growth in traffic and congestion and to support the sustainable transportation goals of the provincial Growth Plan, a preliminary site screening assessment for the implementation of carpool lots along the Bradford Bypass corridor was completed in accordance with Ministry Standards and Directives.

The potential carpool lots for the Bradford Bypass were assessed based on the Ministry's Site Selection Criteria under directive PLNG-B-008. Locations were assessed in consideration of various factors including but not limited to proximity to other carpool lot facilities, adjacency to and accessibility from major roads and highways, accessibility to local transit and commuter transit, and compatibility with existing and future land use based on municipal planning.

Sites at Bathurst Street and Leslie Street were screened out for carpool lots due to limited available lands and/or environmental constraints, and limited accessibility to the lots respectively. Considerations for 10th Sideroad, County Road 4, and 2nd Concession Road were screened and recommended to be carried forward for further assessment during subsequent design phases of the project with the number of carpool lots implemented to be determined at that time.

Carpool lots were considered both inside and outside of the interchange at these locations. **Figure 4-17** shows the outside location alternatives.

Figure 4-17: Outside Carpool Lot Configurations

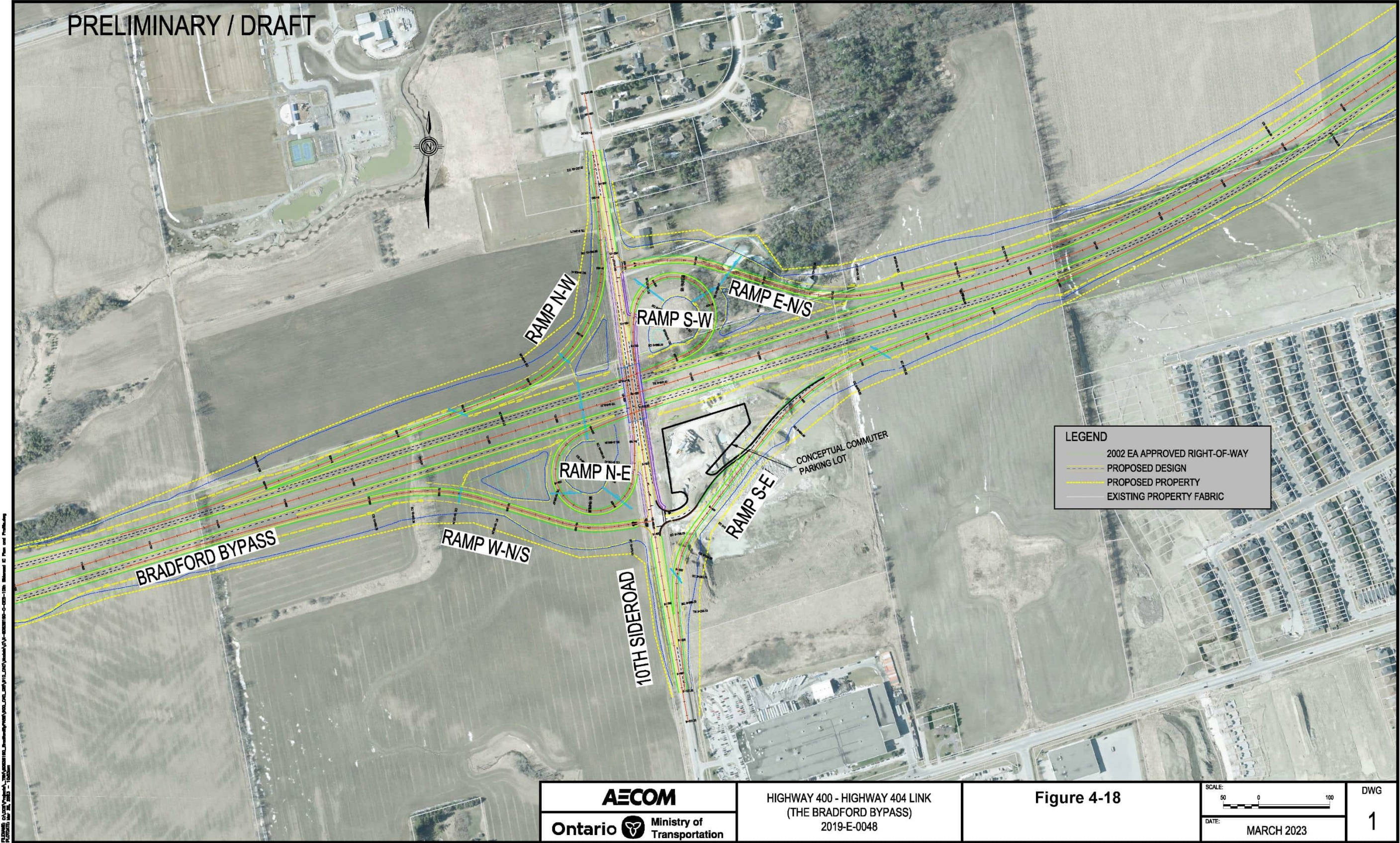


4.2.6.1 10th Sideroad

. Based on the assessment, a carpool lot at 10th Sideroad is proposed to be located inside of the interchange in the southeast quadrant. This location provides the most direct access to motorists from Highway 400, allowing them to easily continue eastbound on the Bradford Bypass from the carpool lot. In addition, the Town of Bradford West Gwillimbury's Transportation Master Plan for 2031 indicates an existing transit route that crosses east-west on 8th Line through the Yonge Street and Barrie Street intersection. Opportunity may exist to modify this route to add a stop at the proposed 10th Sideroad carpool lot upon further discussion with the municipality.

Figure 4-18 shows the recommended location of the carpool lot at the 10th Sideroad interchange.

Figure 4-18: Carpool Lot at 10th Sideroad Interchange



4.2.6.2 County Road 4

. Based on the assessment, a carpool lot at County Road 4 is proposed to be located inside the interchange, in the southeast quadrant. This location provides the most direct access to motorists, allowing them to easily continue eastbound on the Bradford Bypass from the carpool lot.

It is noted that Metrolinx has a north-south GO bus route along Yonge Street/County Road 4. This route stops along the Yonge Street/Barrie Street and 8th Line intersection, and at the Bradford GO station. The Town of Bradford West Gwillimbury's Transportation Master Plan for 2031 also indicates an existing transit route that crosses east-west on 8th Line through the Yonge Street and Barrie Street intersection.

If a carpool lot is implemented at County Road 4, opportunity may exist to modify the routes to add a stop at the proposed lot upon further discussion with the municipality.

Figure 4-19 shows the recommended location of the carpool lot at the County Road 4 interchange.

Figure 4-19: Carpool Lot at County Road 4 Interchange

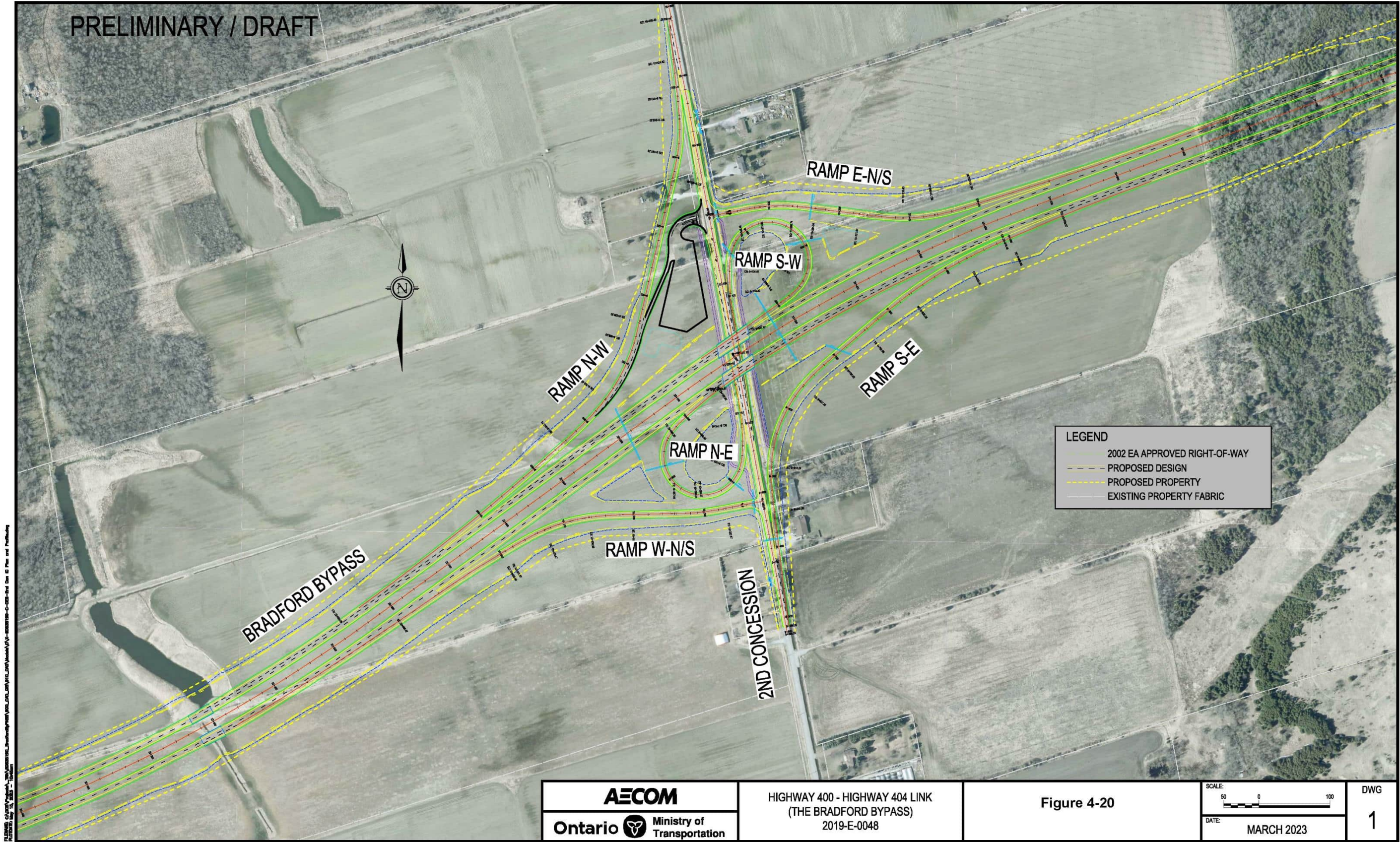


4.2.6.3 2nd Concession Road

Based on the assessment, a carpool lot at 2nd Concession Road is proposed inside of the interchange in the northwest quadrant. Based on traffic analysis, similar to the other proposed locations, the lot provides access to motorists, with connectivity from 2nd Concession Road to continue eastbound on the Bradford Bypass from the carpool lot. While York Region's Transportation Master Plan for 2051 Rapid Transit Network does not include plans for an additional transit corridor on 2nd Concession Road near the Bradford Bypass, the current design does not preclude future bus service.

Figure 4-20 shows the recommended location of the carpool lot at the 2nd Concession Road interchange.

Figure 4-20: Carpool Lot at 2nd Concession Road Interchange



4.2.7 Roundabouts

The Bradford Bypass has proposed intersections at the north and south ramp terminals of the five proposed interchange locations: 10th Sideroad (County Road 54), County Road 4 (Yonge Street), Bathurst Street, 2nd Concession Road, and Leslie Street. A roundabout screening analysis was conducted and reviewed if the implementation of roundabouts is an appropriate solution where intersections are proposed for the Bradford Bypass based on the criteria identified in the Ministry Roundabout Supplementary Manual, National Cooperative Highway Research Program Roundabout Manual, and other Ministry standards. This analysis considered the existing municipal and regional roundabout guidelines and criteria in the study area including the County of Simcoe, York Region, Town of Bradford West Gwillimbury, Township of King, and Town of East Gwillimbury. The benefits and drawbacks of implementing a roundabout based on Geometric, Environmental, and Traffic criteria were evaluated.

A pre-screening assessment was completed for traffic signal warrants and other intersection requirements in parallel with the roundabout screening analysis for intersections along the Bradford Bypass corridor. The Bradford Bypass ramp terminal intersections were assessed for the need to install traffic signals per the Ontario Traffic Manual Book 12 traffic signal warrant analysis. Through the traffic analysis, it was determined that, based on traffic volumes, traffic signals are warranted for ramp terminals at 10th Sideroad (north and south), County Road 4 (north and south), and Leslie Street (south only).

For County Road 4, the recommended four-lane design for the road was carried forward from the County of Simcoe's 2012 Approved County Road 4 Municipal Class Environmental Assessment and the Bradford Bypass interchange at County Road 4 was carried forward from the 2002 Approved Environmental Assessment design. While a multi-lane (more than one-lane) roundabout may be considered at the north and south ramp terminals of the County Road 4 interchange, the impacts to the interchange design, and Early Works contract (construction commenced in 2022) would be significant and extensive requiring interchange redesign, modifications/retrofits, additional property requirements, additional utility relocations, throwaway costs, schedule delays, and other considerations (e.g., multi-lane roundabout challenges for individuals with visual impairment). Due to these impacts, roundabouts are not recommended to be reviewed further at County Road 4 interchange.

For the north and south Bathurst Street, north and south 2nd Concession Road, and north Leslie Street ramp terminal intersections, the traffic analysis did not warrant the installation of traffic signals in either the 2031 interim or 2041 ultimate horizon years. At these intersections where traffic signals were not warranted, roundabouts were also considered but are not recommended to be reviewed further as stop-controlled intersections would provide acceptable traffic operations with reduced property impacts.

Another consideration in pre-screening was the requirement for all Bradford Bypass interchanges to accommodate Long Combination Vehicles (LCVs) as per the Ministry LCV Best Practices for Design Manual. As all Bradford Bypass arterial interchange crossings, except for County Road 4, are proposed to be implemented as two-lane roads, the inclusion of single-lane roundabouts precludes LCV operations per the Ministry's guideline.

Overall, roundabouts are not recommended at the aforementioned locations. While a roundabout provides similar traffic operations as a signalized intersection, a roundabout may not accommodate all anticipated vehicles (e.g., priority for emergency services and transit, trucks, farm vehicles, and LCVs) and users (priority for pedestrians/cyclists and corresponding crossings, visually impaired pedestrians), and does not provide consistency in the upstream and downstream road network. Furthermore, roundabouts may result in greater utility and property impacts, and may introduce safety concerns with vehicle skidding and yield line visibility due to steep approaches.

4.2.8 Active Transportation

Provisions for future Active Transportation facilities at municipal north-south crossing roads within the Bradford Bypass corridor are recommended. These proposed routes were identified in both the municipal Active Transportation plans and Transportation Master Plans, and by the municipalities in meetings with the Project Team. Details are noted in the preceding sections, **Section 4.2.3** and **Section 4.2.5**.

4.3 Structural Engineering

The proposed Bradford Bypass alignment crosses seven existing municipal roads, one existing rail line, two river crossings at the Holland River and Holland River East Branch and an additional flood relief crossing west of 2nd Concession Road, for a total of 11 mainline bridge crossings. Additionally, the freeway-to-freeway interchanges at Highway 400 and Highway 404 require seven ramp bridges, including two new ramp bridge over 9th Line, and the replacement of the existing Highway 400 over 9th Line bridge as well.

Various bridge alternatives are weighed at each site to determine the preferred bridge structure that balances construction cost, ease of construction, impacts to traffic, future maintenance needs and aesthetic features.

Other structural elements include thirteen new structural culverts to facilitate the drainage design for the corridor. In addition, Overhead Sign Structures will be implemented throughout the corridor to provide decision point signage which will be determined in subsequent design phases.

4.3.1 Bridges

Table 4-1 below summarizes the new bridge structures required as part of the Updated Technically Preferred Route for the Bradford Bypass.

Table 4-1: Summary of Proposed Structures

Structure Identifier	Description/ Location	Structure Summary
BR01 BR02 BR03	9 th Line at Highway 400	Replacement of Existing Overpass ■ Twin, Single-Span Rigid Frame Overpass Bridges ■ 27.5 metres long, 17.8 metres wide, and ■ Concrete Deck on Precast Box Girders. New Ramp Bridges (N-E & E-N) ■ Single-Span Rigid Frame Ramp Bridges ■ 29.0 metres long (N-E)/27.5 metres long (E-N), 12.05 metres wide, and ■ Concrete Deck on Precast Box Girders.
BR07	10 th Sideroad	■ Two-Span Underpass Bridge ■ 82 metres long, 26.3 metres wide, and ■ Concrete Deck on Steel Box Girders.
BR10	Artesian Industrial Parkway	■ Twin, Single-Span Overpass Bridges ■ 38 metres long, 14.05 metres wide, and ■ Concrete Deck on Precast NU Girders.
BR11	Metrolinx Rail Line	■ Twin, Single-Span Overhead Bridges ■ 26 metres long, 14.05 metres wide, and ■ Concrete Deck on Precast NU Girders.
BR12	Holland River	■ Twin, Multi-Span Bridges ■ 580 metres long, 14.05 metres wide ■ Seven piers ■ 115 metres long main span over river ■ 8.0 metres tall navigation clearance over river, and ■ Concrete Deck on Steel Plate Girders.
BR13	Bathurst Street	■ Twin, Single-Span Overpass Bridges ■ 41 metres long, 14.05 metres wide, and ■ Concrete Deck on Precast NU Girders.
BR14	Holland River East Branch	■ Twin, Multi-Span Bridges ■ 765 metres long, 14.05 metres wide ■ Ten piers North Bridge, 11 piers South Bridge ■ 120 metres long main span over river North Bridge, 100 metres long main span over river South Bridge ■ 8.0 metres tall navigation clearance over river, and ■ Concrete Deck on Steel Plate Girders.
BR15	Yonge Street	■ Twin, Single-Span Overpass Bridges ■ 38 metres long, 14.05 metres wide, and ■ Concrete Deck on Precast NU Girders.
PR-CL-BBP-11	Flood Relief Bridges (1.0 kilometre West of 2 nd Concession Road)	■ Twin, Single-Span Bridges ■ 32 metres long, average 15.0 metres wide, and ■ Concrete Deck on Precast NU Girders.
BR16	2 nd Concession Road	■ Twin, Single-Span Overpass Bridges ■ 50 metres long, average 18.25 metres wide, and ■ Concrete Deck on Steel Box Girders.
BR17	Leslie Street	■ Twin, Single-Span Overpass Bridges ■ 46.3 metres long, average 18 metres wide, and ■ Concrete Deck on Precast NU Girders.
BR04 BR06	Highway 400 Interchange Ramps	Structures facilitate three level stacked freeway-to-freeway directional interchange ramps New Ramp Bridge (N-E) ■ Multi-Span Ramp Bridge ■ 243 metres long, 14.05 metres wide ■ Four piers ■ Two 54 metres long main spans over Highway 400, and ■ Concrete Deck on Steel Box Girders. New Ramp Bridge (E-S) ■ Multi-Span Ramp Bridge ■ 217 metres long, 14.05 metres wide ■ Three piers ■ 70 metres and 57 metres long main spans over Highway 400, and ■ Concrete Deck on Steel Box Girders.
BR18 BR19 BR20	Highway 404 Interchange Ramps	Structures facilitate three level stacked freeway-to-freeway directional interchange ramps New Ramp Bridge (W-N) ■ Multi-Span Ramp Bridge ■ 211 metres long, 14.05 metres wide ■ Three piers ■ 58 metres and 62 metres long main spans over Highway 404, and ■ Concrete Deck on Steel Box Girders. New Ramp Bridge (W-N over S-W) ■ Single-Span Ramp Bridge ■ 19.4 metres long, 19.6 metres wide ■ Cast-in-Place Concrete Rigid Frame New Ramp Bridge (S-W) ■ Multi-Span Ramp Bridge ■ 178 metres long, 14.05 metres wide ■ Three piers ■ 48 metres and 56 metres long main spans over Highway 404, and ■ Concrete Deck on Steel Box Girders.
BR09/30X-0886/B0	County Road 4	Undertaken as part of Early Works Refer to the Early Works Report (January 2022) and the Addendum to the Early Works Report (September 2022) ■ Two-Span Underpass Bridge ■ 80 metres long, average 32.6 metres wide, and ■ Concrete Deck on Steel Box Girders.

4.3.2 Culverts

The Study Area for the Updated Technically Preferred Route encompasses 74 proposed culverts, 31 bridges, and 13 new structural culverts. Hydrology and hydraulic modelling and assessments in consultation with the Ministry and external Regulatory Agencies were conducted and the following are being prepared as part of the Preliminary Design:

- Preliminary layout and design of the roadside ditches, other minor flow channels, and any other ancillary flow elements to convey the highway runoff to locations with sufficient outlet
- Accommodation of major overland flow requirements on the road surface and other major flow paths
- Preliminary layout and design of proposed culvert opening, erosion protection and associated structures that are part of the surface drainage system, and
- Identify the location of the outlet and Preliminary Design of outfall, connections to outlets and outfall protection.

Culvert invert elevations were obtained from the proposed preliminary grading, culvert lengths and sizing were obtained from design drawings and in consideration of highway and environmental design constraints. Tailwater elevations were obtained from typical sections of the watercourses located downstream of the culverts where this information was applicable and available. Otherwise, the cross section and slope of the proposed side ditches where outflows from the culverts will discharge to were used.

For culverts not associated with fish habitat or fluvial processes, the size that was suitable to the site conditions where the culvert will be installed was confirmed iteratively until the Ministry design standards are satisfied.

The Drainage and Stormwater Management Report (AECOM, 2022) provides the proposed Drainage Mosaics that show the drainage areas for the proposed culverts, and it includes information related to the specific function of the culverts and their characteristics. The hydrologic assessment of these culverts was completed using the Ministry 2097 IDF Curves corresponding to the 75 years service life of the Bradford Bypass proposed drainage structure included the new culverts.

The hydraulic assessment of all the proposed culverts indicates that all culverts satisfy the Design Criteria (Depth Criterion ($HW/D \leq 1.5$), 50-year Freeboard Criterion ($FB \geq 1$ metre), and the Overtopping Criterion (no road overtopping during the 100-year storm)).

Additional analysis for the structural culverts and structures spanning watercourses was completed. Result of the analysis are provided in the Drainage and Hydrology Report (AECOM, 2022).

Table 4-2 below summarizes the structural culverts associated with the Updated Technically Preferred Route.

Table 4-2: Structural Culverts within the Study Area

Structure Identifier	Description/Location	Structure Summary
PR-CL-400-2	Highway 400 Mainline North of 8 th Line	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 112 metres long, and ■ 5.5 metres wide.
PR-R-BBP-4	East side of Highway 400 under E-N Ramp	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 52 metres long, and ■ 4.92 metres wide.
PR-R-BBP-6A	Bradford Bypass Mainline between Highway 400 & 10 th Sideroad	<ul style="list-style-type: none"> ■ Open-Footing Arch Culvert ■ 60 metres long, and ■ 12 metres wide.
PR-R-BBP-6B	Bradford Bypass Mainline between Highway 400 & 10 th Sideroad	<ul style="list-style-type: none"> ■ Open-Footing Arch Culvert ■ 73 metres long, and ■ 12 metres wide.
PR-R-BBP-8A&B	Bradford Bypass Mainline between Highway 400 & 10 th Sideroad	<ul style="list-style-type: none"> ■ Open-Footing Arch Culvert ■ 100 metres long, and ■ 12 metres wide.
PR-R-BBP-10	East side of Highway 400 under S-E Ramp	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 35 metres long, and ■ 5.5 metres wide.
PR-R-BBP-11	West side of Highway 400 under E-S Ramp	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 46 metres long, and ■ 5.5 metres wide.
PR-CL-BBP-9	Bradford Bypass Mainline between Yonge Street & 2 nd Concession Road	<ul style="list-style-type: none"> ■ Open-Footing Arch Culvert ■ 95 metres long, and ■ 20 metres wide.
PR-CL-BBP-10	Bradford Bypass Mainline between Yonge Street & 2 nd Concession Road	<ul style="list-style-type: none"> ■ Open-Footing Arch Culvert ■ 90 metres long, and ■ 20 metres wide.
PR-CL-2	East side of Highway 400 under 9 th Line	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 30 metres long, and ■ 4.92 metres wide.
PR-R-404-2	Bradford Bypass Mainline East of Leslie Street	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 32 metres long, and ■ 5.36 metres wide.
PR-R-404-10	East side of Highway 404 under S-W Ramp	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 67 metres long, and ■ 4.88 metres wide.
PR-R-404-11	West side of Highway 404 under W-S Ramp	<ul style="list-style-type: none"> ■ Rigid Frame Open-Footing Box Culvert ■ 63 metres long, and ■ 4.88 metres wide.

4.3.3 Retaining Walls

A retaining wall is proposed along the existing McKinstry Road to handle the grade separation for new ramp construction, and is currently estimated at two hundred metres in length, subject to further design development during detail design. Any other retaining walls required will be evaluated on a site-by-site basis and will be designed accounting for site specific requirements.

4.4 Traffic Engineering

4.4.1 Traffic Model Development

The 2031 and 2041 Future Conditions Aimsun microsimulation models were used to assess traffic operations along the Bradford Bypass corridor, as per the recommended design and interchange locations from the 2002 Approved Environmental Assessment Study, as well as an updated preferred interchange locations scenario as discussed below. The Future Conditions models were developed by modifying the previously calibrated Existing Conditions models to include the new Bradford Bypass and respective interchange locations under each scenario. The 2002 Approved Environmental Assessment recommended interchange locations at County Road 4, Bathurst Street, and Leslie Street. The updated preferred interchange locations include 10th Sideroad, County Road 4, and 2nd Concession Road in 2031, with additional interchanges at Bathurst Street and Leslie Street (partial interchange) added in 2041. Other road network improvements anticipated for 2031 and 2041 were also implemented into the respective models to reflect Future Conditions.

The updated interchange locations scenario was developed through a comparison of nine different interchange location combination options as detailed in **Section 3.2.4**, including the interchanges recommended by the 2002 Approved Environmental Assessment study. From the traffic operations standpoint, criteria for selecting the best interchange locations were based on the interchange utilization, overall network travel time savings, and out of way travel savings.

Future weekday AM and PM peak hour forecasts were developed from the Emme subarea model extracted from the Province's Greater Golden Horseshoe Model (GGHMv4). The subarea model reflects all road network and transit improvements planned for the 2031 and 2041 horizon years. The options comparison identified a scenario with all five interchanges at major crossing roads along the corridor as the preferred option.

4.4.2 Traffic Model Analysis

A comparison of travel patterns in the Emme subarea model between Build and No-Build scenarios indicates network wide improvements to connectivity and traffic flow with the inclusion of the Bradford Bypass. While a minor increase in additional auto-based trips in the region would occur, the overall network benefits from vehicle-hours of travel time savings and vehicle-kilometres of travel distance savings are observed during the 2041 AM peak hour and during the 2041 PM peak hour in the updated interchange locations. Local roads forecasted to exceed capacity by 2031 and 2041 under the No-Build scenarios see significant relief from traffic as a result of the diversion to the Bradford Bypass in the Build scenarios.

Mainline traffic operations were assessed using the Ministry Geometric Design Standards for Ontario Highways methodology for calculating Freeway Level of Service based on vehicle density extracted from the Aimsun model, as well as through a comparison of service flow rates for given Level of Service against the actual demand, and are shown in **Table 4-3** and

Table 4-4. The 2031 mainline operations indicate an acceptable Level of Service D or better for all sections of the Bradford Bypass in both directions in both the 2002 Approved Environmental Assessment and updated preferred interchange locations scenarios. With the addition of one general purpose lane and one HOV lane in each direction in 2041, mainline operations are shown to improve.

A weaving analysis was also performed to evaluate weaving segments on Highway 400 and Highway 404 between the Bradford Bypass freeway-to-freeway interchanges and the adjacent interchanges to the south. The evaluation of weaving operations against Highway Capacity Manual weaving Level of Service criteria indicates the weaving segments would operate between Level of Service B and Level of Service C depending on the peak hour and direction. Under the updated interchange locations scenario, the northbound weaving segment on Highway 404 would operate at Level of Service D during the PM peak hour, within acceptable capacity.

Table 4-3: Interim 2031 Mainline Operations – Updated Preferred Interchange Locations

Section of Bradford Bypass		Direction	Lanes (GPL)	2031 AM				2031 PM			
From	To			Volume AM	Density (pc/ km/lane)	Density LOS	Service Flow LOS	Volume PM	Density (pc/ km/lane)	Density LOS	Service Flow LOS
Highway 400	10th Sideroad	EB	2	2761	11.8	B	C	3206	14.1	C	C
		WB	2	3330	11.5	B	C	2631	10.1	B	C
10th Sideroad	County Road 4	EB	2	2938	14.6	C	C	2719	13.8	C	C
		WB	2	3156	15.2	C	C	2602	13.8	C	C
County Road 4	2nd Concession Road	EB	2	4056	21.8	D	D	2847	14.5	C	C
		WB	2	3147	15.2	C	C	3653	20.4	D	D
2nd Concession Road	Highway 404	EB	2	3737	22.0	D	D	2487	14.1	C	C
		WB	2	2597	12.9	C	C	3326	19.6	D	D

Table 4-4: Ultimate 2041 Mainline Operations – Updated Preferred Interchange Locations

Section of Bradford Bypass		Direction	Lanes (GPL)	2041 AM				2041 PM			
From	To			Volume AM	Density (pc/km/ lane)	Density LOS	Service Flow LOS	Volume PM	Density (pc/km/ lane)	Density LOS	Service Flow LOS
Highway 400	10th Sideroad	EB	4	3836	9.1	B	B	3507	8.3	B	B
		WB	4	3475	8.4	B	B	2999	7.9	B	A
10th Sideroad	County Road 4	EB	3	3643	11.7	B	C	2947	9.3	B	B
		WB	3	3262	10.4	B	B	2983	9.3	B	B
County Road 4	Bathurst Street	EB	3	5311	19.3	D	D	3265	10.9	B	B
		WB	3	3642	13.6	C	C	4480	23.7	D	C
Bathurst Street	2nd Concession Road	EB	3	4870	16.3	C	D	2963	9.3	B	B
		WB	3	3472	11.3	B	C	4265	14.0	C	C
2nd Concession Road	Leslie Street	EB	3	4444	13.3	C	C	2880	8.2	B	B
		WB	3	3292	9.7	B	B	4117	11.9	B	C
Leslie Street	Highway 404	EB	4	4332	16.2	C	B	2558	6.4	A	A
		WB	4	2973	7.8	B	A	4110	10.7	B	B

4.4.3 Travel Time Savings

Compared to the No Build scenario, the presence of the Bradford Bypass corridor would save a total of approximately 2,500 vehicle-hours of travel time during the AM peak hour and approximately 1,400 vehicle-hours of travel time during the PM peak hour by 2041. Vehicle hours are defined as the product of the number of vehicles and their time travelled. Travel times savings are calculated across the subarea model limits which include the entirety of York Region south of the community of Keswick as well as Simcoe County south of Innisfil Beach Road.

In terms of travel distance, the No Build scenario would result in approximately 110,800 additional vehicle-kilometres traveled during the AM peak hour and approximately 61,300 additional vehicle-kilometres traveled during the PM peak hour compared to the Build scenario.

Travel time savings for routes between specific origins and destinations to be served by the Bradford Bypass were also calculated using the updated Emme subarea link travel time outputs. The following origin and destination locations were reviewed to determine the average travel time savings during the AM and PM peak hours:

- Highway 400 at Simcoe County Road 88
- Highway 404 at Queensville Sideroad
- Highway 400 at Bradford Bypass
- Highway 404 at Bradford Bypass
- Bradford Centre, and
- East Gwillimbury Centre.

On average, between the various origin-destination pairs using the Bradford Bypass, drivers in the peak direction during the peak period, would save up to 73% or 33 minutes of travel time when connecting between Highway 400 and Highway 404 compared to existing routes in the No Build scenario.

4.4.4 Traffic Signal Warrants

Based on the forecast volumes, traffic signal warrant analyses were carried out to determine the traffic control (i.e., stop control, signalization, etc.) which would be implemented at each ramp terminal intersection. The findings indicate that signalization would be warranted at both 10th Sideroad and County Road 4 ramp terminal intersections by 2031. In 2041, the Leslie Street south ramp terminal would also be warranted. The intersections at Bathurst Street, 2nd Concession Road, and the Leslie Street north ramp terminal would not warrant signals by the ultimate 2041 horizon year.

Future Conditions intersection traffic operations for the 2031 and 2041 weekday AM and PM peak hours indicate that the ramp terminal intersections along the Bradford Bypass would operate well with all movements also operating at acceptable Levels of Service.

4.4.5 Recommendation

Overall, based on the traffic analysis detailed above, it is recommended to proceed with an interim four lane configuration of the Bradford Bypass followed by an ultimate eight lane configuration, with widening occurring towards the median of the Bradford Bypass, within the established Ministry right-of-way footprint. The traffic operations analysis of the Bradford Bypass using the Aimsun microsimulation model indicates a well performing corridor with acceptable operations in both the interim 2031 and ultimate 2041 Future Conditions along the mainline and at the ramp terminals under the recommended cross-sections and lane configurations.

4.5 Electrical Engineering

4.5.1 Illumination

There are seven proposed interchanges within the Bradford Bypass corridor. **Table 4-5** shows the preferred alternative plan and illumination warrants recommended for each interchange. In the table that follows, partial illumination refers to lighting implemented at key decision areas, potential conflict points, and approach to the interchange and interchange intersections. Full illumination refers to implementing lighting such that it covers the entire travelled portion of the interchange area, such as along ramps.

Table 4-5: Illumination Recommendations

Interchange	Interchange Configuration	Illumination Warranted
Highway 400 (freeway to freeway)	Three Level Stacked	Full
10 th Sideroad	Parclo A4	Partial
County Road 4	Parclo A4	Partial
Bathurst Street	Diamond	Partial
2 nd Concession Road	Parclo A4	Partial
Leslie Street	Partial Diamond	Partial
Highway 404 (freeway to freeway)	Three Level Stacked	Full

4.5.2 Illumination at Carpool Lots

The recommended Ministry Carpool Lots at 10th Sideroad, County Road 4, and 2nd Concession Road will be designed to Ministry standards and illuminated using conventional LED luminaires from the Ministry Designated Sources of Materials list. The

light poles in the carpool lots will be on raised footings. The number and locations of vehicle charging stations will be determined during subsequent Detail Design phases of the project. Refer to **Section 4.2.6** for further details on the proposed carpool lots for the project.

4.5.3 Traffic Signal Systems

Table 4-6 lists the locations of the five required new Ministry traffic signal systems.

Table 4-6: Recommended Traffic Signal Systems

Interchange	Intersection
10 th Sideroad	North Ramp Terminal
10 th Sideroad	South Ramp Terminal
County Road 4	North Ramp Terminal
County Road 4	South Ramp Terminal
Leslie Street	South Ramp Terminal

The systems at 10th Sideroad and County Road 4 will be maintained by the Ministry and as a result the Ministry's design standards and equipment specifications shall be utilized including the traffic controller. Leslie Street will be maintained by York Region, and similarly York Region traffic signal design standards and equipment shall be used at each intersection including the traffic controller. Where pedestrian crossings are required, the pedestrian signals shall meet Ministry's *Accessibility for Ontarians with Disabilities Act* requirements.

4.6 Advanced Traffic Management Systems

4.6.1 Communication Subsystem

To enable a robust and reliable communication between the field equipment and the COMPASS TMC, transmission of full motion video streams from the large number of cameras, communication of VMS and CAV data, an extension of the existing fibre optic network is recommended within the study limits.

Together with Highway 401, the new network coverage will create an opportunity to establish a new path for a redundant 10G communications backbone when the fibre network is deployed fully. This path redundant backbone will increase reliability on the existing Highway 400 and Highway 404 subnets. The installation of the fibre optic network is recommended on one side of the highway, consistent with CCTV placement,

south side for East-West highway and east side for North-South highway. The backbone design shown will utilize the existing head-end switches at the TMC and the DTOC, will integrate the 10G node that will be installed on Highway 400 at Rutherford in the upcoming contract, and introduce four (4) new 10G network nodes to establish this new backbone.

All field devices included within the study limits will be connected to the 10G network following the existing Ministry architecture of local 1G VLANs connected in a ring topology. The deployment of the new backbone, and the connecting subnets, is expected to evolve as opportunities to build the proposed coverage present themselves, until the fibre network gap is fully closed.

4.6.2 Traffic Detection

Currently the Ministry is reconsidering the deployment of in-pavement inductive loops or off-pavement sensors for traditional traffic data collection of volume, speed and occupancy on standard freeways.

The modern AI solutions may offer potential for detection of traffic and safety hazards or predict traffic events based on traffic patterns in addition to automatically measuring traffic volume and vehicle speeds. They may be able to allow to determine vehicle classification, queue length and detect incidents such as crashes, slow/stopped traffic and stalled vehicles, as well as unsafe or risky vehicle behaviours, including vehicles travelling the wrong way.

The most prevalent AI technology on the market today focuses on Intelligent Video Analytics which is available from an increasing number of vendors. This is an add-on software that analyzes video from traffic surveillance cameras. The Intelligent Video Analytics software available on the market processes the video feeds either at the camera or at TMC as an add-on to the TMC Video Management System. The technology is rapidly evolving and is becoming more robust and accurate.

The Ministry has evaluated the Intelligent Video Analytics technologies in recent years and concluded that TMC central Intelligent Video Analytics software applications are more efficient to deploy, configure and maintain. The pilot project testing Intelligent Video Analytics solutions has been successfully operating utilizing Intelligent Video Analytics cloud processing. At the time of system implementation within the study area there may be additional options available or in use by the Ministry. Those should be investigated in detail for potential deployment.

Connected and Automated Vehicle (CAV) technology is also gradually being adopted by road agencies looking to leverage technology to improve traffic operations and safety. Connected Vehicle technology uses Vehicle-to-Infrastructure (V2I) communication

between vehicle Onboard Units and Roadside Units (RSUs). The data collected from CVs may include vehicle position, direction, speed, acceleration, behaviour (deceleration/braking/acceleration), and timestamp, and is used to help drivers make informed decisions in real time.

Radio-based Cellular V2X (C-V2X) is the primary communications medium for Connected Vehicle technology and provides the low latency that is needed to make safety-critical applications effective. C-V2X technology operates within a specific radio band and has federal licensing requirements that must be met. Connected Vehicle applications that have been deployed on freeways in the US include Queue Warning, Reduced Speed/Work Zone Warning, and Curve Speed Warning. As an example, for the Curve Speed Warning Connected Vehicle application, OBUs and RSUs work together to detect when a vehicle is travelling at an unsafe speed when approaching a curve in the road and sends a visual and/or auditory alert to the driver to adjust their speed via an in-vehicle device connected to the Onboard Units, such as a tablet.

In addition to the infrastructure needed to accommodate Connected Vehicle technology in the field, Connected Vehicle technology also requires data warehousing for the significant amount of data generated. Dedicated staff are also needed to manage the data. Due to the associated data needs and the potential to enhance ATMS operations, Connected Vehicle technology has significant potential for integration with ATMS.

Currently, a limited number of vehicles contain the built-in OBUs to communicate with RSUs, and car manufacturers are not yet legislated in Canada to include OBUs in vehicles. However, both Connected Vehicle technology and the associated legislation is evolving. To date, road agencies have deployed Connected Vehicle technology through pilot projects using a limited number of vehicles, such as road agency fleet vehicles. Road agencies use these pilot projects to understand the potential of these applications at a small scale, and to gain institutional knowledge.

It is assumed that RSUs will be installed at all CCTV sites as an add-on in the future. The technology should be investigated in detail design to confirm its readiness for field deployment.

4.6.3 CCTV Cameras

A full COMPASS camera coverage is recommended to cover the Advanced Traffic Management System study area and include the Bradford Bypass as well as the stretch of Highway 400 and Highway 404 starting at the existing COMPASS limits.

The future widening of the freeway in this study includes High Occupancy Vehicles lanes, and the potential for utilizing the video for Intelligent Video Analytics. CCTV sites will be designed with a typical average spacing of one kilometre and as dictated by the

geographical features of the area such as the terrain, presence of vegetation, rivers, and creeks, as well as the roadway features including vertical/horizontal curves and structures, long bridges, etc.

Cameras are proposed to be placed more frequently at major interchanges to facilitate coverage of all ramps. All cameras will be located on the east side of Highway 400 and Highway 404 and on the south side of the Bradford Bypass.

The Ministry currently makes traffic CCTV video available to multiple media outlets. This is assumed to continue and perhaps expand to include safety messages to 24-hour news channels such as CP24.

4.6.4 Traveller Information

Currently, Variable Message Signs are a prevailing means of relaying traffic information to the road users. Eight new Variable Message Signs are proposed to be deployed within the Advanced Traffic Management System study area to facilitate notifications to motorists regarding traffic and road conditions. These signs will also display travel time to strategic destinations; therefore, their deployment should be coordinated with the Travel Time Service adjustment.

The Variable Message Signs will be strategically located in advance of the major interchanges in anticipation of the vehicles being diverted to these roadways in the event of traffic issues such as congestion, closures, or weather advisories downstream of the Variable Message Signs.

5. Environmental Impacts and Mitigation Measures of the Updated Technically Preferred Route

In accordance with Section 20(2)8, Section 20(2)9, and Section 20(2)10 of the Regulation, this section identifies the key environmental issues, potential impacts, and outlines the recommended mitigation measures to be implemented during subsequent Detail Design and construction phases of the project. Where appropriate, monitoring commitments have been identified and will form commitments during construction to verify the effectiveness of mitigation measures developed and implemented for the project. The results of the monitoring and verification will be made available on the Project Website.

The 2002 Approved Environmental Assessment identified a number of Conditions of Approval set by the Ministry of the Environment, Conservation and Parks, summarized in **Section 5.4**. Additionally, the 2002 Approved Environmental Assessment identified a number of commitments to be carried forward, which have been summarized in **Section 5.5**. Commitments identified through this Preliminary Design and project-specific assessment of environmental impacts phase of the project are summarized in **Section 5.6**.

The environmental studies described in this section have been prepared based on the Updated Technically Preferred Route described in **Section 4**. Following Preliminary Design, the project will be completed according to the design standards, the impact assessment will be updated, and mitigation and monitoring measures prescribed in this Report and environmental reports prepared for this project will be carried forward to subsequent Detail Design phases of the project. Consultation with Regulatory Agencies to obtain permits, approvals or authorizations as required, will be continued in subsequent Detail Design phases of the project.

5.1 Natural Environment

5.1.1 Terrestrial Ecosystems

For the purposes of the Preliminary Design and the terrestrial ecosystems impact assessment, it is assumed that the project will impact all natural features delineated within the proposed right-of-way limits. It is likely that in the Detail Design phase of the project, impacts will be refined to a specific construction footprint and further reduced

through avoidance and mitigation measures. The potential impacts associated with the project include:

- Loss or degradation of vegetation cover, wildlife habitat, Significant Wildlife Habitat and Species At Risk habitat
- Disturbance to wildlife, including Species At Risk and Species of Conservation Concern through noise or possible mortality, and
- Possible injury and mortality of wildlife, including Species of Conservation Concern and Species At Risk, during construction.

A general discussion of the potential impacts and the mitigation measures recommended to avoid or minimize these potential impacts is provided in the following sections.

5.1.1.1 Potential Impacts

The construction disturbance area, which encompasses the outermost limit of the proposed right-of-way, represents the anticipated wildlife disturbance and habitat removal areas. Potential effects on vegetation communities, wildlife and wildlife habitat, including Significant Wildlife Habitat, and Species at Risk and their habitats as a result of vegetation removal and other construction activities, were analyzed based on Preliminary Design and are discussed in the following sections. For Preliminary Design purposes, all areas within the proposed right-of-way have been assumed to be impacted by the proposed works yet refinements during the Detail Design stage are likely to reduce the amount of habitat and vegetation community removal. The following discussion and assessment of potential impacts is primarily focused on the construction phase wherein most of the project-related impacts may occur if proper mitigation measures are not implemented.

5.1.1.1.1 Designated Natural Areas, Vegetation Communities and Plants

The area of vegetation communities affected by vegetation clearing is summarized in **Table 5-1** below. A total of 147 hectares of identified vegetation have the potential to be impacted by the proposed works. However, it is not anticipated that all 147 hectares will be impacted. As mentioned in **Section 5.1**, project refinements during Detail Design, in addition to implementation of proper mitigation measures, are anticipated to reduce the amount of habitat and vegetation removal.

Table 5-1: Summary of Vegetation Community Impacts

ELC Community	ELC Vegetation Code	Total Area (hectares) in Study Area	Total Impacted Area (hectares)
Cultural Meadow (CUM)	CUM1 – Mineral Cultural Meadow Ecosite	3.04	0
	CUM1-1 - Dry – Fresh Old Field Cultural Meadow	104.91	64.16
CUM Subtotal	-	107.96	64.16
Cultural Plantation (CUP)	CUP3 - Coniferous Plantation	0.89	0
	CUP3-1 - Red Pine Coniferous Plantation	1.22	0.94
	CUP3-2 - White Pine Coniferous Plantation	1.78	0.05
	CUP3-3 - Scotch Pine Coniferous Plantation	0.40	0.40
	CUP3-9	0.90	0
CUP Subtotal	-	5.19	1.39
Cultural Thicket (CUT)	CUT1 - Mineral Cultural Thicket	9.66	7.46
	CUT1-4 - Grey Dogwood Cultural Thicket	2.08	0.75
	CUT1-5 - Raspberry Cultural Thicket	5.08	0.82
CUT Subtotal	-	16.81	9.03
Cultural Woodland (CUW)	CUW1 - Mineral Cultural Woodland	14.91	6.57
Coniferous Forest (FOC)	FOC	1.47	0
	FOC4 - Fresh - Moist White Cedar Coniferous Forest Ecosite	4.80	2.01
	FOC4-1 - Fresh - Moist White Cedar Coniferous Forest	0.48	0.13
FOC Subtotal	-	6.75	2.14
Deciduous Forest (FOD)	FOD – Deciduous Forest	6.05	0.55
	FOD2-3 - Dry - Fresh Hickory Deciduous Forest	0.41	0
	FOD4 - Dry – Fresh Upland Deciduous Forest Ecosite	16.47	5.61
	FOD5-1 - Dry - Fresh Sugar Maple Deciduous Forest	7.03	2.34
	FOD5-2 - Dry - Fresh Sugar Maple - Beech Deciduous Forest	3.98	1.32
	FOD5-6 - Dry - Fresh Sugar Maple - Basswood Deciduous Forest	3.09	1.95
	FOD6-5 - Fresh - Moist Sugar Maple Deciduous Forest	3.33	0.51
	FOD7 - Fresh - Moist Lowland Deciduous Forest	17.28	4.59
	FOD7-1 - Fresh - Moist White Elm Lowland Deciduous Forest	1.15	0.99
	FOD7-2 - Fresh - Moist Ash Lowland Deciduous Forest	2.15	0.71
	FOD7-3 - Fresh - Moist Willow Lowland Deciduous Forest	2.88	2.52
	FOD8-1 - Fresh - Moist Poplar Deciduous Forest	3.34	1.31
FOD Subtotal	-	67.15	22.41
Mixed Forest (FOM)	FOM – Mixed Forest	0.49	0
	FOM5-2 - Dry - Fresh Poplar Mixed Forest	0.56	0
	FOM6-1 - Fresh - Moist Sugar Maple - Hemlock Mixed Forest	1.25	0.03
	FOM7 - Fresh - Moist White Cedar - Hardwood Mixed Forest	10.79	3.27
	FOM7-2 - Fresh - Moist White Cedar - Hardwood Mixed Forest	5.64	1.78
	FOM8-1 - Fresh - Moist Poplar Mixed Forest	0.06	0
FOM Subtotal	-	18.78	5.08
Meadow Marsh (MAM)	MAM – Meadow Marsh	4.45	0.07
	MAM2 - Mineral Meadow Marsh Ecosite	0.88	0.24
	MAM2-2 - Reed-canary Grass Mineral Meadow Marsh	5.09	1.09
MAM Subtotal	-	10.42	1.40
Shallow Marsh (MAS)	MAS2-1 - Cattail Mineral Shallow Marsh	11.82	4.85
	MAS3-1 - Cattail Organic Shallow Marsh	0.19	0
MAS Subtotal	-	12.02	4.85
Open Aquatic (OAO)	OAO - Open Aquatic	12.82	4.26
Floating Aquatic (SAF)	SAF1-3 - Duckweed Floating-leaved Shallow Aquatic	0.15	0
Deciduous Swamp (SWD)	SWD – Deciduous Swamp	3.21	0
	SWD2-2 - Green Ash Mineral Deciduous Swamp	39.30	17.24
	SWD3-1 - Maple Mineral Deciduous Swamp Ecosite	0.99	0.57
	SWD3-2 - Silver Maple Mineral Deciduous Swamp	1.94	1.71
	SWD3-3 - Swamp Maple Mineral Deciduous Swamp	0.93	0.58
	SWD4 - Mineral Deciduous Swamp Ecosite	0.39	0
	SWD4-3 - White Birch – Poplar Mineral Deciduous Swamp	1.03	0.52
	SWD6-3 - Swamp Maple Organic Deciduous Swamp	0.38	0
SWD Subtotal	-	48.18	20.62
Mixed Swamp (SWM)	SWM – Mixed Swamp	0.22	0
	SWM3-1 - Birch - Conifer Mineral Mixed Swamp	1.79	0.70
SWM Subtotal	-	2.01	0.70
Swamp Thicket (SWT)	SWT – Swamp Thicket	1.23	0
	SWT2-2 - Willow Mineral Deciduous Thicket Swamp	0.82	0.80
	SWT2-9 - Gray Dogwood Mineral Deciduous Thicket Swamp	0.42	0
	SWT3-1 - Organic Thicket Swamp Ecosite	6.47	3.33
SWT Subtotal	-	8.94	4.12
Grand Total	-	332.08	146.72

The potential impacts to vegetation communities are described as follows:

- **Loss of and/or damage to vegetation, Ecological Land Classification communities and designated natural areas:** Vegetation removal required to support the proposed works will be limited to the extent of the proposed right-of-way. A total of 37 vegetation community types and 94 individual vegetation communities have the potential to be impacted by the proposed works, including a mixture of forest, wetland, and meadow habitats. The sizes in hectares of the affected vegetation communities are provided in **Table 5-1**. Of the 147 hectares of total potential impacts to vegetation communities, cultural communities (cultural meadow, plantation, thicket and woodland communities) account for 55% of the total area, forested communities account for 20% of the total area, marsh communities account for 4% of the total area, aquatic communities account for 3% of the total area and swamp communities account for 17% of the total area.
- **Loss of and/or damage to designated natural areas:** A total of 4.79 hectares (0.4%) of the Provincially Significant Holland Marsh (BW5) Wetland (1261.67 hectares), 7.94 hectares (0.4%) of the Holland Marsh Wetland Complex Provincially Significant Wetland (1986.90 hectares), 0.86 hectares (0.2%) of the Maskinonge River Wetland Complex Provincially Significant Wetland (398.77 hectares) and 23.41 hectares of unevaluated wetlands are anticipated to be impacted by the proposed work. The right-of-way also overlaps with the Greenbelt Plan (128.04 hectares) and 12.19 hectares of the Lake Simcoe Region Conservation Authority Holland Marsh Environmentally Significant Area. ANSIs are not anticipated to be impacted by the proposed works.
 - According to the Provincial Policy Statement and the Greenbelt Plan, while “development” is not permitted in Provincially Significant Wetlands, the definition of “development” does not pertain to the creation or maintenance of infrastructure such as transit and transportation corridors and facilities authorized under an Environmental Assessment process. Section 1.6.8.6. of the Provincial Policy Statement states that consideration shall be given to significant resources (e.g., Provincially Significant Wetlands) when planning for corridors and right-of-ways of significant transportation. Mitigation measures provided in **Section 5.1.1.2** provide consideration for minimizing effects on Provincially Significant Wetlands.
 - For the purposes of this Report, all vegetation communities located within the proposed right-of-way are assumed to be impacted by the proposed works, however, Provincially Significant Wetland

communities, as identified in the 2002 Approved Environmental Assessment, will be t spanned by the proposed highway in accordance with commitments made in the 2002 Approved Environmental Assessment. As such, refinements to the design and limits of work in the Detail Design phase of the project will reduce the extent of impacts to the Provincially Significant Wetlands intersected by the proposed Bradford Bypass. Spanning of wetland communities may lead to indirect impacts including changes to species assemblage within communities that the highway crosses due to the potential shading effect of the proposed structure.

Adjacent Ecological Land Classification communities and designated natural areas may also be inadvertently damaged or indirectly affected, as described below, if not appropriately mitigated:

- **Indirect Loss and/or Damage to Vegetation Communities:** Incidental intrusion into the adjacent vegetation communities surrounding the right-of-way 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 (including groundwater):** Oil, gasoline, grease and other materials from construction equipment, materials, storage and handling may enter vegetation communities and adjacent watercourses, if not appropriately managed, and
- **Introduction or spread of invasive species:** A total of 85 of the 327 plants (26%) recorded within the Study Area during field investigations are non-native including some highly invasive species such as phragmites, garlic mustard (*Alliaria petiolata*) and common buckthorn. These species can outcompete and displace native species, forming monocultural stands that impact the form and function of the community. Vegetation clearing, grubbing, grading, and movement of construction equipment may perpetuate invasive species in new areas and advance the spread of the species in already established areas if control measures are not implemented.

The potential effects on vegetation, Ecological Land Classification communities and designated natural areas described above are not anticipated to be significant provided that mitigation measures are implemented.

5.1.1.1.2 Wildlife and Wildlife Habitat

Vegetation communities provide a variety of habitats for various wildlife, including Species of Conservation Concern and/or birds protected under the Migratory Birds Convention Act. Species of Conservation Concern and their habitats potentially affected by proposed works include Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield population), Barn Swallow, Common Nighthawk, Eastern Wood-pewee, Wood Thrush, Monarch, Northern Map Turtle (*Graptemys geographica*), Snapping Turtle and Western Chorus Frog (*Great Lakes/St. Lawrence - Canadian Shield population*). Furthermore, migratory birds may use humanmade structures, isolated trees and shrubs, and suitable ground cover for nesting. The potential impacts on wildlife and wildlife habitats as a result of the project are described as follows:

■ **Disturbance or displacement of migratory birds and destruction of their nests:**

- Of the 63 species of birds observed within the Study Area, 28 species were recorded displaying probable or confirmed breeding activity during breeding bird surveys or incidentally. 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, and
- Additionally, nests of species listed under Schedule 1 of the Migratory Birds Convention Act may be present within the proposed limits of work and could require removal. Bird species listed under Schedule 1 are known to re-use nests annually and as such, their nests are provided additional protections under the Migratory Birds Convention Act. Two species listed under Schedule 1, Green Heron and Pileated Woodpecker, were observed within the Study Area along with suitable nesting habitat. Authorization under the Migratory Birds Convention Act may be required if removal of nests of Schedule 1 species cannot be avoided through Detail Design and construction.

■ **Loss of and/or damage to wildlife habitat:**

- Vegetation removal may result in the direct or indirect loss of wildlife habitat, including confirmed and candidate Significant Wildlife Habitat such as habitat for Species of Conservation Concern (Western Chorus Frog, Common Nighthawk, Eastern Wood-pewee, Wood Thrush, Monarch, Northern Map Turtle and Snapping Turtle), Terrestrial

Crayfish, bat maternity colonies, deer yarding and winter congregation areas, raptor wintering areas, reptile hibernaculum, seeps and springs, turtle wintering areas, waterfowl stopover and staging areas and woodland raptor nesting habitat, Turtle Nesting Areas, Marsh Breeding Bird Habitat and Amphibian Breeding Habitat (Wetlands). As the Bradford Bypass is a new highway intersecting some previously undeveloped lands, most impacts will be permanent. For the purposes of the Preliminary Design, 147 hectares of wildlife habitat is anticipated to be damaged or removed. Effects to vegetation communities situated within the proposed right-of-way but outside of the permanent footprint of the highway infrastructure will either be avoided or temporarily disturbed until vegetation is re-established or rehabilitated following the completion of construction activities.

■ **Disturbance to wildlife from lighting, noise and vibration:**

- Although wildlife within the majority of the Study Area is likely already adapted to existing anthropogenic sources of lighting and noise (i.e., homesteads, farms and adjacent roads), they may be temporarily disturbed or displaced by increased lighting and noise emissions from construction activities and future use of the proposed infrastructure. Wildlife within the larger tracts of natural habitat associated with the Holland River and Holland River East Branch may not be as adapted and tolerant to the same existing anthropogenic noise sources other wildlife are exposed to in sections of the Study Area that are more fragmented and under anthropogenic influences. As such, the additional light and noise generated by construction activities and vehicular traffic in these areas may cause the permanent displacement of some species to locations outside the limits of the Study Area.

■ **Incidental wildlife injury or mortality from construction activities:**

- There are several Significant Wildlife Habitats and other wildlife habitats present within the Study Area. Wildlife may enter the construction work area and become susceptible to accidental injury or mortality associated with construction machinery and equipment if not mitigated.

■ **Wildlife mortality through vehicle collisions:**

- A review of Land Information Ontario (Ministry of Natural Resources and Forestry, 2019) identified Deer Wintering Areas (Stratum 2) between the Holland River and Holland River East Branch, between the Holland River East Branch and Yonge Street and between 2nd Concession Road and Leslie Street within the Study Area. Approximately 44.34 hectares of the

Deer Wintering Area (Stratum 2) is anticipated to be impacted by the proposed works. Vegetation removal and the construction of a new highway within the Deer Wintering Area (Stratum 2) may lead to increased wildlife vehicle collisions in the immediate area due to increased exposure to humanmade infrastructure.

Adverse impacts to wildlife and wildlife habitat can be minimized provided avoidance and mitigation measures are implemented.

5.1.1.1.3 Species At Risk

Several Species at Risk may be negatively affected by the removal/disturbance of vegetation communities within the proposed right-of-way and by sources of disturbance during construction and operations. Potential impacts to Species at Risk and their habitats include:

■ **Disturbance or displacement of Chimney Swift and destruction of their nests:**

- Although no Chimney Swift nests were identified within buildings likely affected by construction activities, there is potential for them to occur within the Study Area as targeted surveys were not completed at this stage and will be undertaken in Detail Design. Removal of buildings within the Study Area may therefore result in the disturbance or displacement of chimney swift and destruction of their nests if conducted during the bird nesting period of April 1 to August 31. If confirmed habitat is identified in the Study Area and impacts to Chimney Swift habitat cannot be avoided, authorization under the Endangered Species Act may be required, and
- Mitigation measures to limit or avoid impacts to Chimney Swift and their habitat are presented in **Section 5.1.1.2**.

■ **Removal of candidate bat Species at Risk habitat and possible disturbance, mortality or injury:**

- The right-of-way overlaps approximately 58.91 hectares of suitable maternity roosting habitat, represented by forest communities, cultural woodlands, and swamps. These communities are often associated with larger, contiguous wooded communities located inside and beyond the limits of the Study Area (i.e., candidate bat habitat in the vicinity of the Holland River and Holland River East Branch). As such, the removal of a portion of vegetation within the forested and woodland communities is not anticipated to prevent the continued use of the remaining treed habitat as roosting habitat by bat Species at Risk. To prevent impacts to

bat Species at Risk, vegetation clearing shall occur between October 1 and March 31, outside of the bat roosting season. Authorization under the Endangered Species Act may be required if the presence of bat Species at Risk is confirmed during Detail Design phase and impacts cannot be avoided, and

- Mitigation measures to limit or avoid impacts to bat Species at Risk and their habitat are presented in **Section 5.1.1.2**.

■ **Removal of candidate Eastern Whip-poor-will habitat and possible disturbance, mortality or injury:**

- The right-of-way overlaps approximately 20.96 hectares of candidate habitat for Eastern Whip-poor-will. As discussed above, candidate nesting habitat for Eastern Whip-poor-will was identified in the deciduous forest, cultural woodland, cultural thicket and cultural meadow communities west of County Road 4, in the cultural woodland community west of Yonge Street and in the coniferous forest east of 2nd Concession Road. To prevent impacts to nesting Eastern Whip-poor-will, vegetation clearing shall occur between September 1 and March 31. If impacts on Eastern Whip-poor-will habitat cannot be avoided, consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required, and
- Mitigation measures to limit or avoid impacts to Eastern Whip-poor-will and their habitat are presented in **Section 5.1.1.2**.

■ **Removal of confirmed grassland bird Species at Risk habitat and possible disturbance, mortality or injury:**

- Both Bobolink and Eastern Meadowlark require large areas of grassland habitat to carry out their life process and are often found nesting in agricultural settings such as pastures and hayfields (McCracken et al., 2013). As such, the presence of candidate habitat for Bobolink and Eastern Meadowlark largely depends on the type of crop (i.e. wheat) planted within the agricultural fields that intersect the Study Area. Currently, the right-of-way overlaps approximately 8.05 hectares of confirmed Bobolink and Eastern Meadowlark Habitat. Most of the confirmed habitat present within the Study Area is located directly east of Highway 400 in the cultural meadow community south of 9th Line. The majority of the cultural meadow community is located within the proposed right-of-way and is expected to be temporarily and permanently impacted to accommodate the construction of the new highway. The majority of the confirmed habitat east of 2nd Concession Road is located outside of the proposed right-of-way, with only a small

portion of the overall habitat expected to be impacted by the project. However, as noted in above, the field was mowed at some point between the first and second round of breeding bird surveys and was no longer providing suitable nesting habitat. Bobolink and Eastern Meadowlarks are ground nesters and build their nests on soil that is concealed by dense vegetation. To prevent impacts to nesting Bobolink and Eastern Meadowlark, vegetation clearing shall occur between September 1 and March 31. If impacts to Bobolink and Eastern Meadowlark habitat cannot be avoided, consultation with Ministry of the Environment, Conservation and Parks, and/or authorization under the Endangered Species Act will be required, and

- Mitigation measures to limit or avoid impacts to grassland bird Species at Risk and their habitat are presented in **Section 5.1.1.2**.

■ **Possible injury or mortality of Black Ash:**

- Black ash typically prefers wet environments such as swamps but can also persist in moist upland communities (Committee on the Status of Endangered Wildlife in Canada, 2018). In the Study Area, black ash was identified in swamp and forested communities present within the Holland River floodplain. As targeted surveys for Black Ash were not completed as part of Preliminary Design, any moist forest, swamp or swamp thicket community where Black Ash was not observed was flagged as candidate habitat. Black Ash individuals and their habitat will eventually be afforded protection under the Endangered Species Act, however, the protection of the species has been temporarily suspended until January, 2024 to allow the Ministry of the Environment, Conservation and Parks to determine a strategy to protect and recover Black Ash in the Province of Ontario. During this time, activities that impact Black Ash and its habitat may proceed without authorization under the Endangered Species Act. A detailed plant inventory of the right-of-way during Detail Design is recommended to identify the total number of Black Ash. Authorization under the Endangered Species Act may be required if removal of Black Ash cannot be avoided through Detail Design, and
- Mitigation measures to limit or avoid impacts to Black Ash and their habitat are presented in **Section 5.1.1.2**.

■ **Possible injury or mortality of Butternut:**

- A total of 32 Butternut trees were observed in the forest and thicket communities west of County Road 4 and another eight Butternut were observed in the southeastern limits of the Study Area where the

proposed highway is planned to connect to the Highway 404 southbound lanes. A detailed plant inventory of the right-of-way during Detail Design phase is recommended to identify the total number of Butternuts within the proposed right-of-way. Any ground disturbance work (e.g., grading, excavation) within 25 metres of a Butternut or removal of butternuts will require a butternut health assessment to be completed by a qualified Butternut Health Assessor and an authorization under the Endangered Species Act for the harm or removal of any identified Butternuts may be required, and

- Mitigation measures to limit or avoid impacts to Butternut and their habitat are presented in **Section 5.1.1.2**.

■ **Removal of candidate Blanding's Turtle and Least Bittern habitat and possible disturbance, injury or mortality:**

- Candidate Blanding's Turtle and Least Bittern habitat is associated with the Holland River and Holland River East Branch open water and wetland communities present within the Study Area. While areas of candidate Blanding's Turtle and Least Bittern habitat will be spanned to accommodate the 2002 Approved Environmental Assessment commitments and floodplain design requirements, impacts to candidate habitat for both species is anticipated as a result of construction activities and the permanent shading that will be created by the proposed structure. Approximately 9.65 hectares of candidate Blanding's Turtle habitat and 2.81 hectares of Least Bittern habitat is anticipated to be impacted by the proposed works
- Blanding's Turtle may be impacted while moving in between habitats if these species enter the construction work area. Stockpiled substrates in the construction work area may attract nesting turtles between late May to early July
- Targeted surveys will be required during the Detail Design phase to assess potential need for authorization under the Endangered Species Act for both species, and
- Mitigation measures to limit or avoid impacts to Blanding's Turtle and Least Bittern and their habitat are presented in **Section 5.1.1.2**.

Additional targeted species surveys will be undertaken during Detail Design as these species may find new habitats from year to year. Recommendations for additional targeted surveys are provided in **Section 5.1.1**. The removal of Species at Risk habitat can be minimized, and possible injury or mortality of Species at Risk can be avoided provided that mitigation measures as outlined in **Section 5.1.1.2** are implemented.

5.1.1.2 Commitments and Recommended Mitigation Measures

Proposed mitigation and avoidance measure 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 Provisions should be utilized at a minimum:

- Ontario Provincial Standard Specification (OPSS)-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-801: Construction Specification for the Protection of Trees
 - All planned vegetation removals are anticipated to occur within the proposed Ministry right-of-way. However, should anything change, and removals be required outside of Ministry right-of-way, a tree inventory, an arborist report and a Tree Protection Plan may be required to obtain permits to injure or remove trees beyond the Ministry right-of-way in accordance with applicable municipal by-laws.
- OPSS-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 and native flowering plants should be used to rehabilitate or restore areas of herbaceous vegetation temporarily disturbed during proposed works.
- OPSS-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, and
 - 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 (Ministry of the Environment, Conservation and Parks, 2020) around stockpiles or area of

disturbance prior to April 1. Fencing should be installed immediately after stockpiles are created if after April 1.

- OPSS-182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks
- OPSS-804 and OPSS-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, and
 - Erosion and Sediment Control measures should be installed along the construction footprint within 30 metres of any Provincially Significant Wetland. In areas where the construction of the highway is expected to intersect a Provincially Significant Wetland, Erosion and Sediment Control measures should be installed along the limits of work.
- OPSS-517: Construction Specification for Dewatering
- Special Provision 199S56 Control of Emissions During Structural Work
- SP 100S14 Unexpected Species at Risk Occurrence
 - Should Species at Risk be encountered within the work area, construction activities will cease and the Ministry and Ministry of the Environment, Conservation and Parks will be contacted for next steps.
- Non-Standard Special Provision Invasive Species Prevention
- 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' (e.g., 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 the Endangered Species Act, and
 - Structures likely to be affected by construction may provide suitable nesting habitat for Migratory Birds Convention Act protected birds (i.e. Barn Swallow or Cliff Swallow) in the future. As such, it is recommended that they be examined to confirm the presence or absence of migratory bird nests prior to the commencement of construction activities. If birds are observed nesting in, under or on the structure prior to or during rehabilitation or 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. Such measures may include the installation of bird exclusion netting.

To address potential wildlife vehicle collisions within the Study Area, the following mitigation measures are recommended:

- **Wildlife Exclusion Fencing** - Permanent Wildlife Exclusion Fencing should be considered to be erected along the entire limits of the Bradford Bypass right-of-way where there is opportunity for herpetofauna or mammals to enter the right-of-way. Additionally, jump-outs are recommended at approximately 1.4 kilometre intervals to ensure that wildlife trapped within the right-of-way are able to exit (Ministry, 2015). Wildlife are likely to experience fence-end effects at the limits of the Study Area, wherein wildlife attempting to cross the right-of-way will walk along the fence and cross where the fence ends. This may result in an increase in wildlife crossing at the limits of the Study Area. To mitigate end-effects, it is recommended that fence ends angle away from the right-of-way for a distance up to 100 metres (Ministry, 2015)
- **Ecopassages** – Maintaining habitat connectivity across the landscape is important for preserving local wildlife and may reduce potential wildlife-vehicle collisions. While most of the proposed right-of-way is situated within areas of active agriculture or commercial land use, a portion of the right-of-way intersects forested and wetland habitats, specifically in the vicinity of the Holland River. In order to account for watercourse crossing, potential flooding scenarios, and the commitment made in the 2002 Approved Environmental Assessment to span existing Provincially Significant Wetlands, a significant portion of the highway in the vicinity of the Holland River and Holland River East Branch will be spanned. The extensive floodplain in the area will mean that the structure's abutments will extend beyond the river and the wetlands, providing ample wildlife crossing opportunities for both large and small wildlife to access the natural features present both north and south of the proposed right-of-way. Additionally, it is recommended that culverts be designed to provide openness ratios that would allow for the passage of small mammal and/or herpetofauna where possible. An openness ratio of 0.4 would permit usage by medium-sized mammals, while the minimum openness ratio to be considered should be 0.25, which would permit usage by reptiles such as turtles (Credit Valley Conservation, 2017). Although not observed during Preliminary Design surveys due to the absence of targeted surveys, where larger mammal movement in the proposed right-of-way (i.e., white-tailed deer) is observed, wildlife passage should be considered. Additional winter tracking surveys during Detail Design phase may be necessary to determine the need of additional wildlife crossing locations within the proposed right-of-way for larger mammals. A potential location where a larger passage

could be considered is where the proposed highway intersects the Deer Wintering Area between 2nd Concession Road and Leslie Street. An openness of ratio of 0.6 or greater should be considered for ungulates (Credit Valley Conservation, 2017). Other ecopassage characteristics to consider during Detail Design phase include the following:

- Around the culvert structure, avoid the use of rip-rap or sharp rock protection and ensure areas on both sides of the watercourse provide substrate materials conducive to animal movement, where possible
 - If rip-rap must be used, fill the interstitial space with small materials which would provide appropriate footing for wildlife,
 - Include natural substrates within the structure
 - Provide suitable cover elements adjacent to the structure (e.g., retained or planted vegetation) that can facilitate wildlife use of the structures (i.e., cover/shelter on route to structure) while not blocking the structure entrance
 - Wherever possible, ensure that entrance and exits to the structures are reasonably level (e.g., no major grade changes) to provide an unimpeded view through the structure and habitat beyond
 - Ensure that the elevation and slope of the structure does not result in flooding
 - Remove or reduce potential predator perches (i.e., ledges) to the extent possible
 - Avoid artificial light sources near the entrances/exit of the wildlife passage
 - Any landscaping and erosion control materials required shall not include materials known to accidentally entrap snakes or fish, and
 - Restore adjacent vegetation areas disturbed for construction access using native species.
- The Detail Design phase of the project should determine areas that can be restored based upon the final highway design. Where possible, edge management plantings shall be considered along newly exposed forest edges. Plantings should consist of native tree and shrub species, similar to the native species already present in the area. Additionally, sections of the Holland River Marsh Provincially Significant Wetland that will be spanned by the project and have been temporarily disturbed due to construction activities should be restored back to wetland habitat where possible in order to retain the function of the wetland. Planted species should consist of native species that are present within the adjacent wetland vegetation communities to ensure the composition of adjacent communities is retained. When deciding which species should be included in restoration plans, the Detail Design phase of the project should account for the shading effect the new structure will have on the restored habitat. Species planted directly underneath the new structures should include species

that prefer or tolerate shaded environments. Plantings should be limited to low-growing species to allow the most amount of light to reach underneath the structure given the east-west orientation of the highway. Shade tolerant species observed in the Holland River Marsh Provincially Significant Wetland that could be considered include spotted jewelweed (*Impatiens capensis*), sensitive fern (*Onoclea sensibilis*), ostrich fern (*Matteuccia struthiopteris*), marsh marigold (*Caltha palustris*), American black currant (*Ribes americanum*), fringed loosestrife (*Lysimachia ciliata*) and fowl mannagrass (*Glyceria striata*). Where wetland habitat cannot be restored or is permanently impacted by the proposed highway the Ministry should consider wetland compensation efforts including enhancement to the adjacent wetland communities or creation of new wetland habitat to maintain wetland function throughout the Study Area

- 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
- Avoid work within areas of candidate turtle overwintering habitat during the turtle overwintering period (October 31 to April 1), whenever possible
- Avoid removal of Monarch habitat (areas of milkweed), whenever possible. Where milkweed must be removed, milkweed should be seeded within rehabilitated/landscaped areas of the Bradford Bypass right-of-way
- If work is required within the candidate reptile hibernacula habitat (i.e., rockpiles), work should be completed outside of the reptile overwintering period (October 31 to April 1), whenever possible
- Avoid driving within construction zones in proximity to amphibian breeding habitat at night between April 1 and June 30, and any rainy nights from spring to early autumn, whenever possible
- For areas adjacent to natural heritage features (i.e., woodlands and wetlands) conduct construction activities during daylight hours for increased visibility (i.e., avoid wildlife strikes) and to avoid light pollution effects during the night, whenever possible
- The final highway design should take into consideration potential light impacts on wildlife species and their habitats (i.e. bats, amphibian, amphibian breeding habitats etc.). Mitigation measures to be considered included the following:
 - Limit the number of lights immediately adjacent to woodlands to the extent possible
 - If feasible, turn off lighting or reduce the number of active lights immediately adjacent to woodlands during sensitive timing windows (i.e., April 1 – September 30), and

- Avoid the use of high-pressure sodium and LED lights immediately adjacent to woodlands as these types of lighting have been noted to negatively affect bat activity (Row et al. al., 2015 & ILP, 2018).
- Wherever possible, avoid changes to hydrology in areas of candidate and confirmed terrestrial crayfish habitat
- If during construction any wildlife are observed within the construction work area:
 - 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, do not handle the individual unless it is in immediate danger. A qualified Biologist shall contact the Contracting Authority and Ministry of the Environment, Conservation and Parks immediately. In accordance with the Endangered Species Act, no Threatened or Endangered species can be handled or relocated without the proper approvals/permitting and authorization from Ministry of Natural Resources and Forestry
 - If the species is not identified as Species at Risk, direct the species away from the construction zone into the nearest natural area (i.e., woodland, wetland, etc.); if unsure of where to move the species, a Qualified Biologist shall be contacted for guidance, and
 - For Species of Conservation Concern (e.g., a snapping turtle) or other non-Species at Risk wildlife, it may appropriate to request that a Qualified Biologist of environmental move the species for the safety of both the onsite personnel and the species.
- Should an injured or orphaned animal be encountered, a Qualified Biologist will transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the Ministry of Natural Resources and Forestry or a member of the College of Veterinarians of Ontario.
 - Any injured wildlife will be immediately transported to a suitable wildlife rehabilitation centre, and
 - Any amphibians or reptiles unearthed during their hibernation will also be immediately transported to a suitable wildlife rehabilitation centre.

All vegetation removal within suitable maternity roost habitat for bat Species at Risk shall occur outside of the bat roosting season between April 1 and September 30 and

can only proceed upon confirmation from Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act.

During the bat roosting season between April 1 and September 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.

Avoid or minimize vegetation removal within areas of confirmed Bobolink and Eastern Meadowlark Habitat. If impacts to Bobolink and Eastern Meadowlark habitat cannot be avoided, consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required.

The need for additional plans (i.e., 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.

Additional mitigation specific to Species at Risk will be confirmed through Ministry of the Environment, Conservation and Parks consultation, and permitting processes as outlined in Section 6.

5.1.2 Fish and Fish Habitat

Fish and Fish Habitat was assessed in accordance with the Protocol. Step 4 of the Protocol is a Fisheries Assessment Process that applies to project activities that may impact fish habitat and that do not qualify as Ministry Routine Works (Step 1) nor meet the conditions of the Ministry Best Management Practice Manual for Fisheries (Step 3).

5.1.2.1 Description of the Proposed Works

The following provides a summary of the proposed activities in or near water identified during this Preliminary Design stage. **Sections 5.1.2.6 to 5.1.2.10** discuss the potential impacts on the watercourses characterized as Not Fish Habitat.

A summary of proposed works at each watercourse crossing is provided in **Table 5-2** below. It is anticipated that construction activities (riparian vegetation removal, grading, highway surfacing, etc.) associated with the new highway construction will be completed at or within 30 metres of every watercourse crossing, even if a culvert or structure is not proposed to span a watercourse.

Table 5-2: Summary of Proposed Works

Watercourse ID	Crossing ID	Culvert Data	Existing Structure	Proposed Works
WC-1	C10-A-A	N/A	No proposed culvert at this location	N/A
	C10-A-B	N/A	No proposed culvert at this location	N/A
	C10-A-C	N/A	No proposed culvert at this location	N/A
	C10-A-1	Concrete box (2400 x 1200)	Culvert replacement (like-for-like)	Proposing a channel adjustment, the existing (PR-CL-2) and proposed
	C10-A-2	N/A	No proposed culvert at this location	N/A
	C10-A-3	N/A	No proposed culvert at this location	N/A
	C10-A-4	Concrete box (3600 x 1500)	Culvert replacement (like-for-like)	Channel realignment proposed
WC-1b	C10-A-5	N/A	No proposed culvert at this location. However, it needs to be confirmed if a culvert is required	N/A
WC-1c	C10-A-6	N/A	No proposed Culvert at this location	N/A
WC-2	C10-B-1	N/A	Channel realignment proposed to redirect flows to the proposed culvert	N/A
	C10-B-2	N/A	No proposed culvert at this location	N/A
	C10-C-1	Concrete Box (3600 x 1500)	New Culvert	Channel adjustment at the new ramp crossing
	C10-C-2	Concrete Box (3600 x 1500)	New Culvert	Channel adjustment at the new ramp crossing
WC-3	C11-A-1	Concrete Box (2400 x 1500)	New Culvert	Channel adjustment at the new ramp crossing
WC-4	C11-A-2	Concrete Box (2400 x 1500)	New Culvert	Channel adjustment at the new ramp crossings
WC-5	C12-A-1	Corrugated Steel Pipe (CSP) (900)	New culverts	Channel realignment through the 10th Sideroad interchange
	C13-A-1	Concrete Box (1500 x 1200)	New Culvert (PR-CL-BBP-2)	Channel adjustment is required at the crossing location
WC-6	C14-A-1	CSP	New culvert	Channel adjustment required at the crossing
Pond 1	NA	N/A	N/A	N/A
WC-7	NA	N/A	N/A	No proposed culvert at this location
WC-8	C16-A-2	Concrete Box (1800 x 1500)	New culvert	Channel realignment/adjustment across the project
	C16-A-3	N/A	N/A	Channel realignment to redirect flows to the new culvert
WC-9	C16-A-4	Concrete Box (1200 x 1200)	New culvert	Watercourse realignment west of County Road 4 to accommodate the new interchange
WC-9	CR-4	Concrete Box (1200 x 800)	New culvert	N/A
	C16-A-1	Concrete Pipe (750)	Culvert Replacement	EX-CL-14. Proposed work to be coordinated with Metrolinx
WC-10	C17-A-1	N/A	New bridge structure	N/A
WC-11	C17-B-1	N/A	N/A	N/A
WC-12	C17-C-1	N/A	N/A	N/A
WC-13	C17-D-1	N/A	N/A	N/A
WC-14	C17-E-1	N/A	N/A	N/A
WC-15	C17-F-1	N/A	N/A	N/A
WC-16	C18-A-1	N/A	N/A	N/A
WC-17	C18-B-1	N/A	N/A	N/A
WC-19	C18-C-1	N/A	N/A	N/A
WC-20	C18-D-1	New culvert	N/A	N/A
WC-22	C18-E-1	New culvert	N/A	N/A
WC-23	C18-F-1	CSP (900)	New culvert	New grading and relocation of ditches will be required to accommodate the new Inlet control at Bathurst Street
	C18-G-1	CSP (900)	New culvert	New grading and relocation of ditches will be required to accommodate the new Interchange at Bathurst Street
WC-24	C18-H-1	CSP (750)	New culvert to be relocated	New culvert to be relocated to Bathurst Street interchange ramp East -North /South
WC-25	C20-A-1	N/A	New bridge structure	N/A
	C20-B-1	N/A	No proposed culvert at this location	N/A
WC-26	C22-A-1	Concrete Box (1500 x 1200)	New culvert	Minimum watercourse adjustment at the crossing location. Existing pond north of the new crossing. This pond will be impacted by the project and will need to be modified to accommodate the new highway.
WC-27	C23-A-1	Concrete Box (1200 x 1200)	New culverts	Two new culverts are proposed at the new Interchange. New ditches are required to accommodate the new interchange (2 nd Concession Road.)
WC-28	C24-A-1	Concrete Box (1500 x 1200)	New culvert	New watercourse adjustment at the Bradford Bypass crossing
WC-29	C25-A-1	CSP (900)	New culvert	Watercourse adjustment at the Bradford Bypass crossing

Watercourse ID	Crossing ID	Culvert Data	Existing Structure	Proposed Works
WC-30	C25-B-1	CSP (900)	New culvert	Watercourse adjustment at the Bradford Bypass crossing
WC-31	C25-C-1	Concrete Box (1800 x 1500)	New culvert	The culvert crossing will impact the existing Leslie Street/404 Pond. The pond will need to be relocated along the watercourse.
WC-32	C25-A-2	Concrete/Span Bridge (4880 x 3050)	New bridge structure	Adjustment to the existing watercourse to accommodate the new bridge structure
	C26-A-1	Concrete/Span Bridge (4880 x 3050)	Existing bridge to remain	N/A
WC-33	C27-A-1	Concrete/Span Bridge (4880 x 3050)	New bridge structure	Adjustment to the existing watercourse to accommodate the new bridge structure
WC-34	C28-A-1	N/A	No proposed culvert at this location	N/A

General construction activities that occur within 30 metres of a watercourse or drainage feature could have the potential to cause a Harmful Alteration, Disruption or Destruction. Some of the more common general construction activities that will take place within 30 metres of identified drainage features and watercourses are identified below:

- Use of industrial equipment
- Vegetation clearing/grubbing
- Excavation
- Grading
- Riparian planting, and
- Organic debris management.

5.1.2.2 Proposed In-water Works

The details of the proposed in-water works for each watercourse providing direct or indirect fish habitat are provided in **Table 5-3**.

Table 5-3: Proposed In-Water Works

Waterbody ID//Crossing ID/Culvert ID	Existing Structure				New Structure				
	Type	Length (m)	Width (mm)	Height (mm)	Type	Length (m)	Width (mm)	Height (mm)	Proposed In-water Work
Innisfil Creek Subwatershed									
WC-1/C10-A-1/PR-CL-2	Concrete Box	18.0	2400	1200	Open-foot (concrete)	30.0	4920	2400	Like-for-like replacement
WC-1/C10-A-1/PR-CL-400-2	Concrete Box	107.0	3600	1500	Open-foot (concrete)	114.3	5500	2400	Like-for-like replacement. Channel realignment will be required. Existing Culvert ID: EX-CL-400-5.
WC-1/C10-A-3/Berm	N/A	N/A	N/A	N/A	Earthen Berm				An earthen berm will be constructed to direct runoff from Bradford Bypass ramps to a stormwater management pond. After surface water has been treated by the stormwater management pond it will outlet back to WC-1 and flow west under Highway 400. Possible channel adjustment associated with the tie-in to the watercourse will be confirmed in Detail Design.
Holland River Subwatershed									
WC-3/C11-A-1/PR-R-BBP-4	N/A	N/A	N/A	N/A	Open-foot (Concrete)	52.0	4920	2400	New Culvert. Channel adjustment at the new ramp crossing. Ditching will be required.
WC-5/C10- C-1/PR-R-BBP-6A	N/A	N/A	N/A	N/A	Open-foot (concrete)	60.0	12000	2400	New Culvert. Channel realignment through 10 th Sideroad interchange.
WC-5/C12-A-1/PR-R-10IC-2	N/A	N/A	N/A	N/A	Concrete	42.9	900	900	New Culvert. Channel realignment through 10 th Sideroad interchange.
WC-5/C12-A-1/PR-R-10IC-3	N/A	N/A	N/A	N/A	Concrete	41.3	900	900	New Culvert. Channel realignment through 10 th Sideroad interchange.
WC-5/C10-C-2/PR-R-BBP-6B	N/A	N/A	N/A	N/A	Open-foot (concrete)	73.0	2400	12000	New Culvert. Channel realignment
WC-5/C13-A-1/PR-CL-BBP-2	N/A	N/A	N/A	N/A	Concrete Box	96.1	1800	1200	New Culvert. Minimal channel adjustments at the crossing.
WC-3/C11-A-1/PR-R- BBP- 8A	N/A	N/A	N/A	N/A	Open-foot (concrete)	45.0	12000	2400	New culvert. Channel realignment.
WC-3/C11-A-2/PR-R- BBP- 8B	N/A	N/A	N/A	N/A	Open-foot (concrete)	50.0	12000	2400	New culvert. Channel realignment.
WC-1/C-10-A-3/PR-R-BBP-9	N/A	N/A	N/A	N/A	Concrete	76.4	900	900	New culvert. Channel realignment.
WC-1/C-10-A-3/PR-R-BBP-10	N/A	N/A	N/A	N/A	Open-foot (concrete)	35.9	5500	2400	New culvert. Channel realignment.
WC-1/C-10-A-4/PR-R-BBP-11	N/A	N/A	N/A	N/A	Open-foot (concrete)	46.0	55000	2400	New culvert. Channel realignment
WC-9/CR-4/PR-R-C4IC-4	N/A	N/A	N/A	N/A	Concrete	43.2	900	900	New culvert. Watercourse realignment east of County Road 4 to accommodate the new interchange
WC-10/C17-A-1/Holland River Bridge	N/A	N/A	N/A	N/A	Bridge structure	Control span lengths: 120 metres	120000	8000	Bridge structure over Holland River. Piers are expected to span the Provincially Significant Wetland to the west of the river and remain out of the wetted portion of the river itself. Piers are anticipated to be constructed above the normal annual water level (active channel) but likely below the 2-year return level. Temporary in-water works will be required, but a permanent footprint is not anticipated within the active channel.
WC-20/C18-D-1/PR-CL-BBP-6A	N/A	N/A	N/A	N/A	TBD	20.1	TBD	TBD	Proposed work to adjust the drain should be discussed with the Drain Superintendent of the Town of Bradford West Gwillimbury.
WC-20/C18-D-1/PR-CI-BBP-6B	N/A	N/A	N/A	N/A	TBD	19.4	TBD	TBD	It is proposed to realign the south ditch and redirect flows westerly. Works to adjust the drain should be discussed with the Drain Superintendent of the Town of Bradford West Gwillimbury.
WC-23/C18-F-1/PR-CL-BBP-7	N/A	N/A	N/A	N/A	CSP	99.2	1200	1200	New Culvert. Grading and relocation of ditches will be required to accommodate the interchange at Bathurst St.
WC-23/C18-H-1/PR-CL-BBP-8	N/A	N/A	N/A	N/A	CSP	74.6	1200	1200	New Culvert. Grading and relocation of ditches will be required to accommodate the interchange at Bathurst St.
WC- 23/C18-G-1/PR-R-BST-2	N/A	N/A	N/A	N/A	Concrete	30.2	1200	1200	New culvert. Proposed realignment associated with the Bathurst St Interchange.
WC-23/C18-H-1/PR-R-BST-3	N/A	N/A	N/A	N/A	Concrete	34.6	1200	1200	New culvert. Proposed realignment associated with the Bathurst St Interchange.
WC-23/C18-H-1/PR-R-BST-4	N/A	N/A	N/A	N/A	Concrete	30.3	1200	1200	New culvert. Proposed realignment associated with the Bathurst St Interchange.

Waterbody ID//Crossing ID/Culvert ID	Existing Structure				New Structure				
	Type	Length (m)	Width (mm)	Height (mm)	Type	Length (m)	Width (mm)	Height (mm)	Proposed In-water Work
Holland River East Branch Subwatershed									
WC-25/C20-A-1/Holland River East Branch Bridge	N/A	N/A	N/A	N/A	Bridge	Control span lengths: 120 metres	120000	8000	Piers of the new bridge over Holland River East Branch are anticipated to be constructed above the normal annual water level, but likely below the 2-year return level. Temporary in-water works may be required, but a permanent footprint is not anticipated below the annual average water level.
WC-26/C22-A-1/PR-CL-BBP-11	N/A	N/A	N/A	N/A	Open foot (concrete)	97.0	30000	30000	Watercourse adjustment at the Bradford Bypass crossing. Existing online pond north of the new crossing. This pond will be impacted by the Bradford Bypass, and it will likely need to be modified to accommodate the new highway.
WC-29/C25-A-1/PR-CL-BBP-16	N/A	N/A	N/A	N/A	CSP	91.0	900	900	Watercourse adjustment at the crossing location.
WC-31/C25-C-1/PR-R-404-1	N/A	N/A	N/A	N/A	Concrete Box	82.5	5360	2400	This new culvert crossing will impact the existing Leslie Street/Highway 404 pond. The pond will need to be relocated along the watercourse.
WC-31/C25-C-1/PR-R-404-2	N/A	N/A	N/A	N/A	Concrete Box	32.0	5360	2400	The new Bradford Bypass culvert crossing will impact the existing Leslie Street/Highway 404 pond. The pond will need to be relocated along the watercourse.
WC-31/C25-C-1/PR-R-404-3	N/A	N/A	N/A	N/A	Concrete Box	34.8	5360	2400	This new culvert crossing will impact the existing Leslie Street/Highway 404 pond. The pond will need to be relocated along the watercourse.
Maskinonge River Subwatershed									
WC-32/C26-A-1/PR-R-404-9	N/A	N/A	N/A	N/A	Concrete	69.0	750	750	New culvert. Drainage under Highway 404.
WC-32/C25-A-2/PR-R-404-10	N/A	N/A	N/A	N/A	Open foot (concrete)	67.0	4880	3050	Adjustment to the existing watercourse to accommodate the new bridge structure.
WC-33/C27-A-1/PR-R-404-11	N/A	N/A	N/A	N/A	Open Foot (concrete)	63.0	4880	3050	Adjustment to the existing watercourse to accommodate the new bridge structure.

5.1.2.3 Step 2 - Ministry Routine Works

Project activities were assessed against the list of Ministry Routine Works in Table 2 of the Protocol (Ministry, 2020). Routine works are those within the Ministry right-of-way, which includes the shoulders and paved areas that do not occur within the waterbody and which can be mitigated to prevent sediment/debris from entering an aquatic feature. Proposed works associated with drainage (where no in-water work is proposed within fish habitat), electrical, signage, and pavement resurfacing are all covered by Ministry Routine Works. At this time, it is not anticipated that any of the proposed in-water works can be completed under Ministry Routine Works. Activities such as culvert replacements and extensions, culvert and ditch clean-outs, channel tie-ins, grading within 30 metres of a watercourse, and riparian vegetation removal have all been carried forward to Step 3.

5.1.2.4 Step 3 - Ministry Best Management Practices

Project activities for all the culvert replacements, extensions, clean-outs, and modifications (liner installation) in fish habitat were assessed against the Ministry Best Management Practices Manual for Fisheries (Ministry of Transportation, 2020c) to determine which activities can be addressed by Best Management Practices as per Step 3 in the Protocol. Application of the Fisheries Best Management Practices requires adherence to the Operational Constraints and Protection Measures identified in each Best Management Practice. Certain conditions and provisions are outlined in each Best Management Practice (e.g., work must be completed within the allowable in-water work timing window, etc.), which must be met to remain in compliance. Applicable notification procedures are required for the use of Best Management Practices. **Table 5-4** summarizes the activities carried forward from Step 2 and the applicable Best Management Practice.

There are no applicable Best Management Practices for the proposed culvert replacements that are not like-for-like (i.e., those that require extensions), installing a culvert liner, or channel/pond realignments; therefore, these proposed works will be carried forward for a full impact assessment as discussed in **Section 5.1.2.5**.

Table 5-4: Summary of Construction Activity and Associated Best Management Practice

Activity	Associated Best Management Practice
Vegetation removal within the road right-of-way to accommodate the road widening and culvert replacements	Maintenance of Riparian Vegetation in Existing Right-of-Way Best Management Practice (C10-A-4; C25-C-1; C25-A-2)
Culvert like-for-like replacement	Like-For-Like Culvert Replacement Best Management Practice (C10-A-1; C10-A-2)
Culvert removal and replacement with extension	None, carried to Step 4 (Section 5.4)
Culvert Clean-out	Culvert Maintenance Best Management Practice (C18-D-1)
Channel Realignment	None, carried to Step 4 (Section 5.4)
Ditch Maintenance	Ditch Maintenance Within 30 metres of a Watercourse (To Be Determined)
New culvert installation	None, carried to Step 4 (Section 5.4)
New Bridge construction	Clear Span Bridges Best Management Practice (C25-A-2)

5.1.2.5 Step 4 – Fisheries Assessment Protocol

5.1.2.5.1 Potential Impacts

The proposed activities associated with the work described in **Section 5.1.2.4** that did not meet the requirements listed under Ministry Routine Works or Fisheries Best Management Practices have been assessed to determine the potential impacts to the fish and fish habitat. Potential impacts to fish habitat have been identified using the Pathway of Effects diagrams provided in the Guide. The Pathway of Effects diagrams are used to display how activities may impact the aquatic environment and determine the mitigation and protection measures required to minimize or avoid these impacts. This is accomplished through the pathways, stressors, and residual effects flow charts, and has been developed for both in-water and land-based construction activities.

The following is a summary of the potential negative effects on fish and fish habitat, which may result from activities associated with the proposed work that is applicable to all works described in **Section 5.1.2.4** unless specifically noted.

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, and
- Grading may result in alterations to sediment concentrations and habitat structure and cover because of increased erosion potential and sediment deposition.

In-water Activities

- Placement of material or structures in water can result in changes in 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 fluid leaks from equipment
- 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 water extraction using 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, and
- Structure removals could result in changes to channel morphology or shoreline morphology and habitat structure or cover.

5.1.2.6 Commitments and Recommended Mitigation Measures

The following is a description of design and mitigation measures prescribed in the Mitigation Measures Master Table in Section 5: Impact Assessment and Mitigation of the Guide (Ministry, 2020) designed to mitigate or avoid the potential negative effects identified above. The mitigation measures provided are based on Preliminary Design. These measures shall be confirmed and finalized during Detail Design. Associated Ontario Provincial Standard Specifications and Ministry Central Region Special Provisions are also listed below.

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
- In-water work below the high-water mark and work on watercourse banks shall be carried out during the appropriate timing window:
 - Coolwater (WC-1): Permitted in-water timing window of July 16 – March 14 (i.e., no in-water work is permitted from March 15 – July 15), or
 - Warmwater (WC-2 to WC-34): Permitted in-water timing window of July 16 – February 28 (i.e., no in-water work is permitted from March 1 – 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 182)
- 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 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

- 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 805 and OPSS 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.
- Design and install culverts to prevent the creation of barriers to fish movement and maintain bankfull channel functions and habitat functions to the extent possible. Where permanent in-water structures are placed in fish habitat, naturalize these areas by placing riverstone below the 2-year high-water mark (as per OPSS 825 and 1005). Design and install in-stream cover to replace or reinstate fish cover removed, altered, or disturbed during construction
- Watercourses requiring realignment shall be designed using Natural Channel Design principles as discussed in the Fluvial Geomorphological Assessment Report: Highway 400 – Highway 404 Link (Bradford Bypass) (AECOM, 2022)
- As per OPSS 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. 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
- 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 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 (i.e., fibre roll barrier, sediment log, coir rolls etc.) shall be used in the drainage ditches to mitigate sediment transport
- Materials used or generated during construction (i.e., organics, soil, woody debris, temporary stockpiles, construction debris, etc.) shall be stored and managed in a way that prevents the release of these materials to a waterbody. This shall include storing materials a safe distance from a waterbody (i.e., greater than 30 metres from any watercourse) and/or isolation measures (as per OPSS 182)
- Dewatering operations shall be managed to prevent erosion or the release of sediment-laden water to a waterbody (as per OPSS 805)
- 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 182)
- 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 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, and
- The Contractor shall refer to and incorporate mitigations and obtain permits highlighted in the Wildlife Management Plan, Access Management Plan, Erosion and Sediment Control Plan, Invasive Species Management Plan, among others that shall be developed at a later stage of the project.

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 182 and OPSS 1005)
- Stabilize the banks of a waterbody that have been disturbed during construction to pre-construction conditions or better (as per OPSS 182 and OPSS 804). This shall include riparian vegetation or stone material, temporary measures, and the avoidance of hard engineering; an Erosion, and Sediment Control Plan shall be developed, and
- Stabilize and re-vegetate soils exposed or disturbed during construction, including new or cleaned-out ditches (as per OPSS 182).

Monitoring

- Should a permit under the Endangered Species Act and/or Authorization under the Fisheries Act be required, the construction and post-construction monitoring shall incorporate all requirements of these approvals
- 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 182), and
- Erosion and Sediment Control in accordance with the Ministry NSSP (OPSS 805 and SP805F01).

5.1.2.7 Environmental Provisions

The following OPSSs and SPs are recommended for evaluation and inclusion during Detail Design:

- Environmental Protection During Work in Watercourses and on Watercourse Banks in accordance with OPSS 182
- Temporary Erosion and Sediment Control Measures in accordance with OPSS 805 and Erosion and Sediment Control in accordance with the Ministry NSSP (OPSS 805 and SP805F01)
- Environmental Incident Management Under Legislation Protecting the Environment and Natural Resources in accordance with OPSS 100
- Management of Excess Materials in accordance with OPSS 180
- General Environmental Protection in accordance with the Ministry NSSP
- Maintenance of Existing Drainage in accordance with the Ministry NSSP
- Spill Prevention and Response Contingency Plan in accordance with Ministry NSSP
- Timing of in-water Work in accordance with SSP101F23
- Construction Specification for Dewatering in accordance with OPSS 517
- Placement of Aggregates in Waterbodies in accordance with OPSS.PROV 825, and
- Material Specification for Aggregates – Streambed Material with OPSS.PROV 1005.

Design considerations tables were prepared for the proposed works at each crossing and are presented in **Table 5-5** to **Table 5-10**.

Table 5-5: Design Considerations for Innisfil Creek Subwatershed (WC-01)

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Preliminary Design
In-water Works Timing Window	<ul style="list-style-type: none"> Reported to be a cool water thermal regime (Ministry of Natural Resources and Forestry, 2019), and No in-water works are permitted from March 15 – July 15 (Ministry of Natural Resources and Forestry, 2019). 	<ul style="list-style-type: none"> The construction schedule and in-water work will be planned to comply with the in-water work timing window.
Fish Passage	<ul style="list-style-type: none"> Maintain fish passage at culvert replacements and new culvert installations, and At the time that this Report was completed, it is anticipated that if the flow rates remain below the following, there will likely not be issues with fish passage: C10-A-1: 1.1 metres per second; C10-A-4: 0.62 metres per second 	<ul style="list-style-type: none"> Culverts shall be countersunk a minimum of 10% to maintain fish passage Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish Fish screens shall be used to avoid the entrainment of fish in pumps or hoses, and Recommend culvert design in future stages aim to meet the velocities listed in the previous column.
Significant Fish Habitat	<ul style="list-style-type: none"> The crossings C10-A-1 and C10-A-4 are significant fish habitat and provide direct habitat for migration, spawning, feeding, and/or rearing, and are generally non-limiting throughout, and No habitat classified as critical by the Species at Risk Act (Species at Risk Act) was identified. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	<ul style="list-style-type: none"> Channelized watercourse from C10-A-2 to the culvert inlet at C10-A-4. Recommend the channel be naturalized from C10-A-2 to the culvert inlet at C10-A-4 Recommend natural channel design tie-ins at the culvert inlet and outlet Recommend culverts should be sized to bankfull width and to meet hydraulic requirements, and Incorporation of design best management practices for culvert works (e.g., refuge pools, low-flow channels, etc.). 	<ul style="list-style-type: none"> Recommend natural channelization, natural channel tie-ins and culverts sized to bankfull be carried forward to Detail Design.
Other Considerations	<ul style="list-style-type: none"> Stream bed protection will consist of native material where possible, and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS-1005 and NSSP-008, and An earthen berm is proposed to prevent surface flows from the Bradford Bypass/Highway 400 interchange from directly flowing into WC-1. The berm will direct flows to a stormwater management pond which, after treatment, will outlet to WC-1 and continue to flow west under Highway 400. This should not disrupt flows downstream. 	<ul style="list-style-type: none"> Stream bed material shall consist of riverstone in accordance with OPSS-1005 and NSSP-008. See the Fluvial Geomorphological Assessment Report – Bradford Bypass Crossings (AECOM, 2023) under separate cover for more details Surface runoff from Bradford Bypass will be treated by the stormwater management pond prior to flowing downstream, and Recommend that the berm design plans be carried forward to Detail Design and that any proposed outlet from the stormwater management pond to WC-1 be designed to minimize impacts to WC-1.

Table 5-6: Design Considerations for Holland River Subwatershed (WC-01b to WC-09 & WC-11 to WC-24)

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Preliminary Design
In-water Works Timing Window	<ul style="list-style-type: none"> Reported to be a warmwater thermal regime warmwater (Ministry of Natural Resources and Forestry, 2019) No in-water works are permitted from March 1 – July 15 at WC-07 to WC-09, WC-16, and WC-21 (Ministry of Natural Resources and Forestry, 2019), and No in-water works are permitted from March 15 – July 15 at WC-01b to WC-06, WC-10 to WC-15, and WC-17 to WC-20 (Ministry of Natural Resources and Forestry, 2019). 	<ul style="list-style-type: none"> The construction schedule and in-water work will be planned to comply with the in-water work timing window.
Fish Passage	<ul style="list-style-type: none"> Maintain fish passage at culvert replacements and new culvert installations Fish passage obstructions (ex., debris) observed at C18-D-1 Fish passage could potentially be impeded in low flow conditions at C10-C-1 and C10-C-2, and At the time that this Report was completed, it is anticipated that if the flow rates remain below the following, there will likely not be issues with fish passage: C10-C-1: 0.75 metres per second; C10-C-2: 0.7 metres per second; C11-A-11: 0.81 metres per second; C12-A-1: 0.71 metres per second; C13-A-1: 0.37 metres per second; C16-A-4: 0.6 metres per second; C16-A-1: 0.88 metres per second; C18-F-1: 0.49 metres per second; C18-G-1: 0.49 metres per second; C18-H-1: 0.76 metres per second. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish Fish screens shall be used to avoid the entrainment of fish in pumps or hoses Culverts will be countersunk a minimum of 10% to maintain fish passage Culvert debris shall be removed following the Culvert Maintenance Best Management Practice, and Recommend culvert design in future stages aim to meet the velocities listed in the previous column.
Significant Fish Habitat	<ul style="list-style-type: none"> C16-A-1 (WC-09): Mapped Northern Pike spawning habitat The crossings C10-C-1, C10-C-2, C11-A-1, C13-A-1, C16-A-1, C18-F-1, C18-G-1, and C18-H-1 are significant fish habitat and provide habitat for migration, spawning, feeding, and/or rearing, and are generally non-limiting throughout, and No habitat classified as critical by the Species at Risk Act (Species at Risk Act) was identified. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	<ul style="list-style-type: none"> Obstructions to fish passage at C10-C-1 and C10-C-2. - Provide low-flow fish passage channels at C10-C-1 and C10-C-2. Lower culvert to eliminate perch and allow upstream fish passage at C18-A-1. Unstable banks at C10-C-1, C10-C-2, C11-A-1, C18-A-1 – Recommend the banks at C10-C-1, C10-C-2, C11-A-1, C18-A-1 be stabilized Limited riparian vegetation at C10-A-5 Culvert bottom failing at C10-A-6 Natural channel design tie-ins at culvert inlet and outlet, and Culverts sized to bankfull width and to meet hydraulic requirements. Incorporate best management practices for culvert works into the design (e.g., refuge pools, low-flow channels, etc.). 	<ul style="list-style-type: none"> Recommend natural channelization, natural channel tie-ins, bank stabilization, and culverts sized to bankfull be carried forward to Detail Design.
Other Considerations	<ul style="list-style-type: none"> Should stream bed protection be proposed in Detail Design, it should consist of native material where possible, and any rock protection below the highwater mark should be round riverstone in accordance with OPSS-1005 and NSSP-008. 	<ul style="list-style-type: none"> Stream bed material shall consist of riverstone in accordance with OPSS-1005 and NSSP-008. See Fluvial Geomorphological Assessment Report – Holland River Crossings (AECOM, 2023) under separate cover for more details.

Table 5-7: Design Considerations for the Holland River Bridge (WC-10/C17-A-1)

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Preliminary Design
In-water Works Timing Window	<ul style="list-style-type: none"> Reported to be a warmwater thermal regime (Ministry of Natural Resources and Forestry, 2019), and No in-water works are permitted from March 1 – July 15 (Ministry of Natural Resources and Forestry, 2019). 	<ul style="list-style-type: none"> The construction schedule and in-water work will be planned to comply with the in-water work timing window.
Fish Passage	<ul style="list-style-type: none"> Currently, no fish impediments are present within the assessed crossing, and Cofferdams and work isolation measures will be limited to the smallest necessary footprint to maintain fish passage during construction. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish Fish screens shall be used to avoid the entrainment of fish in pumps or hoses, and It is not feasible nor necessary to isolate the entire river for pier construction. A small section surrounding the pier will be isolated to facilitate the construction and provide Erosion Sediment Control measures which will be subject to conditions provided by the various permits that will be applied for.
Significant Fish Habitat	<ul style="list-style-type: none"> C17-A-1 (WC 10) Acts as a migratory corridor for fish to reach upstream spawning habitat and specialized habitats that fish use for spawning and nursery (e.g., slower-moving areas with instream cover). Confirmed spawning habitat for muskellunge species (Ministry of Natural Resources and Forestry, 2019) C17-A-1 is significant fish habitat and provides habitat for migration, spawning, feeding, and/or rearing, and is generally non-limiting throughout No habitat classified as critical by the Species at Risk Act (Species at Risk Act) was identified, and American Eel (END: Endangered Species Act; NAR*: Species at Risk Act) has the potential to be present in the Holland River (WC-25). 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish, and Works may be subject to approvals under the Endangered Species Act. This shall be confirmed during the Detail Design stage. Further discussions with Ministry of Natural Resources and Forestry and Ministry of the Environment, Conservation and Parks are recommended.
Constraints and Opportunities	<ul style="list-style-type: none"> Temporary in-water work for pier installation will be confirmed during Detail Design Invasive species management, including invasive species removal, should be considered, and Incorporate best management practices for bridge works into the design (e.g., implement Erosion and Sediment Control measures, restore riparian zone after construction, isolate work area, etc.). 	<ul style="list-style-type: none"> A site-specific Erosion and Sediment Control plan, which includes measures such as the installation, monitoring, maintenance, and removal of temporary Erosion and Sediment Control measures, will be completed according to OPSS.PROV- 182 and OPSS.PROV-805 shall be developed and implemented, and All other applicable Best Management Practices to the bridge construction shall be implemented.
Other Considerations	<ul style="list-style-type: none"> Riverbed protection will consist of native material where possible, and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS-1005 and NSSP-008. 	<ul style="list-style-type: none"> Stream bed material shall consist of riverstone in accordance with OPSS-1005 and NSSP 008. See Fluvial Geomorphological -Assessment Report – Holland River Crossings (AECOM, 2023) under separate cover for more details, and Species at Risk mitigation and registration with all applicable Regulatory Agencies will be completed if any aquatic Species at Risk are identified.

Note: * Under Consideration for Status Change

Table 5-8: Design Considerations for Holland River East Branch Subwatershed (WC-26 to WC-31)

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Preliminary Design
In-water Works Timing Window	<ul style="list-style-type: none"> Reported to be a warmwater thermal regime warmwater (Ministry of Natural Resources and Forestry, 2019) No in-water works are permitted from March 1 – July 15 at WC-26 and WC-31 (Ministry of Natural Resources and Forestry, 2019), and No in-water works are permitted from March 15 – July 15 at WC-27 to WC-30 (Ministry of Natural Resources and Forestry, 2019). 	<ul style="list-style-type: none"> The construction schedule and in-water work will be planned to comply with the in-water work timing window.
Fish Passage	<ul style="list-style-type: none"> Maintain fish passage at culvert replacements and new culvert installations The earthen berm at the northwest end of the online pond at C25-C-1 creates a fish passage barrier. A submerged culvert or pipe allowed for some water to continue to flow downstream at the time of inspection, and At the time that this Report was completed, it is anticipated that if the flow rates remain below the following, there will likely not be issues with fish passage: C22-A-1: 0.47 metres per second; C25-A-1: 0.72 metres per second; C25-C-1: 0.39 metres per second. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish Fish screens shall be used to avoid the entrainment of fish in pumps or hoses Culverts shall be countersunk a minimum of 10% to maintain fish passage, and Recommend culvert design in future stages aim to meet the velocities listed in the previous column.
Significant Fish Habitat	<ul style="list-style-type: none"> The crossings C22-A-1 and C25-C-1 are significant fish habitat and provide habitat for migration, spawning, feeding, and/or rearing, and are generally non-limiting throughout, and No habitat classified as critical by the Species at Risk Act was identified. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	<ul style="list-style-type: none"> Unstable banks at C25-C-1. Recommend the channel be stabilized and naturalized Earthen berm at the northwest end of the anthropogenic online pond at C25-C-1 inhibits fish passage, disrupts the flow, and may introduce species downstream during high-flow washouts. Recommend removal of pond and naturalization of the channel Recommend natural channel design tie-ins at the culvert inlet and outlet Recommend culverts should be sized to bankfull width and to meet hydraulic requirements, and Incorporation of design best management practices for culvert works (e.g., refuge pools, low-flow channels, etc.). 	<ul style="list-style-type: none"> Recommend natural channelization, natural channel tie-ins and culverts sized to bankfull be carried forward to Detail Design. See Fluvial Geomorphological Assessment Report – Holland River Crossings (AECOM, 2023) under separate cover for more details, and Recommend removal of the pond be carried forward to Detail Design.
Other Considerations	<ul style="list-style-type: none"> Should stream bed protection be proposed in Detail Design, it should consist of native material where possible, and any rock protection below the highwater mark should be round riverstone in accordance with OPSS-1005 and NSSP-008. 	<ul style="list-style-type: none"> The planting plan will revegetate exposed soils and areas cleared to facilitate the replacement culvert installation within the right-of-way, and Stream bed material shall consist of riverstone in accordance with OPSS-1005 and NSSP-008.

Table 5-9: Design Considerations for the Holland River East Branch Bridge (WC-25/C20-A-1)

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Preliminary Design
In-water Works Timing Window	<ul style="list-style-type: none"> Reported to be a warmwater thermal regime (Ministry of Natural Resources and Forestry, 2019), and No in-water works are permitted from March 1 – July 15 at WC-25 (Ministry of Natural Resources and Forestry, 2019). 	<ul style="list-style-type: none"> The construction schedule and in-water work will be planned to comply with the in-water work timing window.
Fish Passage	<ul style="list-style-type: none"> Currently, no fish impediments are present within the assessed crossing, and Cofferdams and work isolation measures will be limited to the smallest necessary footprint to maintain fish passage during construction. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish Fish screens shall be used to avoid the entrainment of fish in pumps or hoses, and It is not feasible nor necessary to isolate the entire river for pier construction. A small section surrounding the pier will be isolated to facilitate the construction and provide Erosion and Sediment Control measures which shall be subject to the conditions provided by the various permits that will be applied for.
Significant Fish Habitat	<ul style="list-style-type: none"> C20-A-1 (WC-25) acts as a migratory corridor for fish to reach upstream spawning habitat and specialized habitats that fish use for spawning and nursery (e.g., slower moving areas with instream cover). Confirmed spawning habitat for muskellunge species (Ministry of Natural Resources and Forestry, 2019) C20-A-1 is significant fish habitat and provides habitat for migration, spawning, feeding, and/or rearing, and is generally non-limiting throughout No habitat classified as critical by the Species at Risk Act was identified, and American Eel (END: Endangered Species Act; NAR*: Species at Risk Act) has the potential to be present in the East Holland River (WC-25). 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish, and Works may be subject to approvals under the Endangered Species Act. This shall be confirmed during the Detail Design stage. Further discussions with Ministry of Natural Resources and Forestry and Ministry of the Environment, Conservation and Parks are recommended.
Constraints and Opportunities	<ul style="list-style-type: none"> Temporary in-water work for pier installation will be confirmed during Detail Design Invasive species management, including invasive species removal, should be considered, and Incorporate best management practices for bridge works into the design (e.g., implement Erosion and Sediment Control measures, restore riparian zone after construction, isolate work area, etc.). 	<ul style="list-style-type: none"> A site-specific Erosion and Sediment Control plan, which includes measures such as the installation, monitoring, maintenance, and removal of temporary Erosion and Sediment Control measures, will be completed according to OPSS.PROV- 182 and OPSS.PROV -805 shall be developed and implemented, and All other applicable Best Management Practices to the bridge construction shall be implemented.
Other Considerations	<ul style="list-style-type: none"> Stream bed protection will consist of native material where possible, and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS-1005 and NSSP-008, and At this time, there are no known aquatic Species at Risk in the Study Area. If it is determined that there is an aquatic Species at Risk at any of the watercourse crossings, the impact assessment will need to include Species at Risk mitigation, and a Notice of Activity registration of the work with Ministry of the Environment, Conservation and Parks will need to be completed. 	<ul style="list-style-type: none"> Stream bed material shall consist of riverstone in accordance with OPSS-1005 and NSSP-008, and Species at Risk mitigation and registration with all applicable Regulatory Agencies will be completed if any aquatic Species at Risk are identified.

Table 5-10: Design Considerations for Maskinonge River Subwatershed (WC-32 to WC-34)

Factors to Consider	Design Considerations Provided by the Fisheries Assessment Specialist	Describe How Each Factor Was Addressed Through Preliminary Design
In-water Works Timing Window	<ul style="list-style-type: none"> Reported to be a warmwater thermal regime warmwater (Ministry of Natural Resources and Forestry, 2019), and No in-water works are permitted from March 15 – July 15 (Ministry of Natural Resources and Forestry, 2019). 	<ul style="list-style-type: none"> The construction schedule and in-water work will be planned to comply with the in-water work timing window.
Fish Passage	<ul style="list-style-type: none"> Currently, no fish impediments are present within the Unnamed Stream At the time that this Report was completed, it is anticipated that if the flow rates remain below the following, there will likely not be issues with fish passage: C25-A-2: 0.75 metres per second; C26-A-1: 0.6 metres per second; C27-A-1: 0.49 metres per second, and Incorporate best management practices for culvert works into the design (e.g., refuge pools, low-flow channels, etc.). 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish Fish screens shall be used to avoid the entrainment of fish in pumps or hoses, and Recommend culvert design in future stages aim to meet the velocities listed in the previous column.
Significant Fish Habitat	<ul style="list-style-type: none"> C27-A-1 is significant fish habitat and provides habitat for migration, spawning, feeding, and/or rearing, and is generally non-limiting throughout, and No habitat classified as critical by the Species at Risk Act was identified. 	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
Constraints and Opportunities	<ul style="list-style-type: none"> Recommend natural channel design tie-ins at the culvert inlet and outlet Recommend culverts should be sized to bankfull width and to meet hydraulic requirements, and Incorporation of design best management practices for culvert works (e.g., refuge pools, low-flow channels, etc.). 	<ul style="list-style-type: none"> Recommend natural channelization, natural channel tie-ins and culverts sized to bankfull be carried forward to Detail Design.
Other Considerations	<ul style="list-style-type: none"> Stream bed protection will consist of native material where possible, and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS-1005 and NSSP-008. 	<ul style="list-style-type: none"> The planting plan will revegetate exposed soils and areas cleared to facilitate the replacement culvert installation within the right-of-way, and Stream bed material shall consist of riverstone in accordance with OPSS-1005 and NSSP-008. See Fluvial Geomorphological Assessment Report – Bradford Bypass Crossings (AECOM, 2023) under separate cover for more details.

5.1.2.8 Determination of Harmful Alteration, Disruption or Destruction

Following the completion of the impact assessment (including the identification of environmental protection and mitigation measures), it was determined that many of the potential negative effects of the proposed works could be avoided or mitigated at many locations. However, due to the number and size of some of the required new crossings it is anticipated that not all negative effects can be avoided or mitigated entirely. **Table 5-11** provides a summary of the works that may result in a Harmful Alteration, Disruption or Destruction and future recommendations. Due to the anticipated permanent alterations of fish habitat described below, at this time, it is assumed that a Request for Review will need to be submitted to Fisheries and Oceans Canada during Detail Design/prior to construction.

At this time, insufficient data is available to determine if the proposed culverts will cause any disruptions to fish passage, these details are to be confirmed during Detail Design. The Swim Distance and Water Velocity Tool (Di Rocco & Gercais, 2021) was consulted, and the maximum velocities for each culvert that will still allow passage for the average White Sucker (*Catostomus commersonii*) and Northern Pike are available in **Section 5.1.2**. White Sucker and Northern Pike were chosen as indicator species for fish passage as they are poorer swimmers than some other species that have been recorded in this watercourse (e.g., Brook Trout, Brown Trout etc.). It is assumed that if White Sucker and Northern Pike can pass through the culverts at the proposed velocity, then these other species would also be able to swim through the culvert. It is recommended that the fish passage assessment should be deferred and assessed as part of Detail Design.

Due to design and construction challenges, the bridges over the Holland River and Holland River East Branch cannot completely span the River outside the high-water mark (2-year return event) on each side of the bank. Access to the Holland River and Holland River East Branch will be required for construction, with options for access developed and detailed in subsequent Detail Design and construction phases of the project. A pier is required below the high-water mark, but outside the active wetted portion of the channel. As a result, a small portion of the river will be isolated using cofferdams to facilitate the pier work and protect fish and fish habitat.

Measures to protect banks along portions of both the Holland River and Holland River East Branch watercourses to provide erosion protection around the piers will be further discussed in subsequent Detail Design phases of the project. At this stage of design, it is also proposed that footings for the Holland River East Branch bridge will be located under the riverbed. Final design of the pier placement, scour protection requirements, and additional design details for the Holland River watercourses will be more closely investigated during the Detail Design stage.

Table 5-11: Summary of Harmful Alteration, Disruption or Destruction

Activity	Location	Associated Best Management Practice	Step 4 Assessment	Will the Work Result in a Harmful Alteration, Disruption or Destruction?	Recommendations
Vegetation removal within both the existing and new road right-of-way to accommodate the road widening and culvert replacements	All watercourse crossings.	Maintenance of Riparian Vegetation in Existing Right-of-Way Best Management Practice	N/A	<ul style="list-style-type: none"> Provided the clearing of riparian vegetation follows the associated Best Management Practice, it is anticipated that the Harmful Alteration, Disruption or Destruction of fish habitat is unlikely. 	<ul style="list-style-type: none"> The required clearing of riparian vegetation should be re-assessed during the Detail Design phase.
Culvert like-for-like replacement	C10-A-1, C10-A-4	Like-For-Like Culvert Replacement Best Management Practice	N/A	<ul style="list-style-type: none"> Provided the like-for-like culvert replacement can follow the associated Best Management Practice, it is anticipated that a Harmful Alteration, Disruption or Destruction of fish habitat is unlikely. 	<ul style="list-style-type: none"> The like-for-like culvert replacement should be re-assessed during the Detail Design phase. If the Best Management Practice is no longer applicable, then the culvert work should be assessed under Step 4 of the Protocol.
Culvert removal and replacement with extension	C16-A-1	None	Carried to Step 4 (Section 5.4)	<ul style="list-style-type: none"> The culvert replacement with extension will result in a permanent alteration to fish habitat and a temporary disruption of fish habitat associated with the construction activities. 	<ul style="list-style-type: none"> Submit a Request for Review to Fisheries and Oceans Canada during the Detail Design phase for the culvert replacement with extensions.
Culvert clean-out	C18-D-1	Culvert Maintenance Best Management Practice	N/A	<ul style="list-style-type: none"> Provided the culvert clean-out can follow the associated Best Management Practice, it is anticipated that the Harmful Alteration, Disruption or Destruction of fish habitat is unlikely. 	<ul style="list-style-type: none"> The culvert cleanout works should be re-assessed during the Detail Design phase. If the Best Management Practice is no longer applicable, then the culvert cleanout should be assessed under Step 4 of the Protocol.
Channel realignment	C10-C-1, C10-C-2, C11-A-1, C12-A-1, C13-A-1, C16-A-4, C18-F-1, C18-G-1, C18-H-1, C22-A-1, C25-A-1, C25-C-1, C25-A-2, C27-A-1	None	Carried to Step 4 (Section 5.4)	<ul style="list-style-type: none"> The channel realignment will result in a permanent loss of habitat with the infilling of the existing channel and a temporary disruption of fish habitat associated with the construction activities. 	<ul style="list-style-type: none"> The channel should be designed following Natural Channel Design Principals and be at least the same length as the existing channel, and Submit a Request for Review to Fisheries and Oceans Canada during the Detail Design phase for the channel realignments.
Berm construction	C10-A-3	None	Carried to Step 4 (Section 5.4)	<ul style="list-style-type: none"> An earthen berm is proposed at the Highway 400/Bradford Bypass interchange to prevent surface flows from directly entering WC-1. The berm will direct flows to a stormwater management pond which, after treatment, will outlet to WC-1 and continue to flow west under Highway 400. This should not disrupt flows downstream, and It is anticipated that a Harmful Alteration, Disruption or Destruction of fish habitat is unlikely. 	<ul style="list-style-type: none"> The berm should be designed to not encroach on the existing watercourse. The stormwater management pond will treat the surface water from the Bradford Bypass interchange before it rejoins the watercourse and continues to flow downstream and out of the Study Area. It is anticipated that there will be minimal impacts to downstream flows and surface water quality should improve, and Submit a Request for Review to Fisheries and Oceans Canada during the Detail Design phase for the new stormwater management pond outlet to WC-1.
New culvert installation	C10-C-1, C10-C-2, C11-A-1, C12-A-1, C13-A-1, C16-A-4, C18-C-1, C18-E-1, C18-F-1, C18-G-1, C18-H-1, C22-A-1, C25-A-1, C25-C-1, C27-A-1	None	Carried to Step 4 (Section 5.4)	<ul style="list-style-type: none"> Culvert installations at new locations will result in a permanent alteration of habitat as a result of the enclosure of a portion of the watercourse and will result in a temporary disruption of fish habitat associated with the construction activities. 	<ul style="list-style-type: none"> New culverts at watercourse crossings that provide fish habitat should consist of open-footed culverts, and Submit a Request for Review to Fisheries and Oceans Canada during the Detail Design phase for the new culverts.
New bridge construction	C17-A-1, C20-A-1,	None	Carried to Step 4 (Section 5.4)	<ul style="list-style-type: none"> It is assumed that there will be no permanent footprint within the typical wetted portion of the Holland River and Holland River East Branch, but a temporary footprint and bank stabilization post construction on both rivers will be required 	<ul style="list-style-type: none"> Piers will be located below the high water mark (2-year return event), but above the typical wetted portion of the Holland River. To protect fish and fish habitat, a small section surrounding the pier will be isolated to facilitate the construction and provide erosion and sediment control measures which will be subject to conditions provided by the various permits and approvals, and Submit a Request for Review to Fisheries and Oceans Canada during the Detail Design phase for the new bridges

However, a small loss of riparian habitat on the bank and a temporary in-water footprint will be required. The temporary footprint is to be confirmed during Detail Design as the design is refined and construction staging/access requirements are established.

In addition, any proposed temporary watercourse crossings required to access areas for construction activities shall be confirmed during Detail Design and implemented in compliance with the Ministry Fish Protocol and Fish Guide, Fisheries Act, Endangered Species Act and any required permits and approvals required.

5.1.2.9 Endangered Species Act and Species at Risk Act Approvals and/or Permits

No records of aquatic Species at Risk that are afforded protection under the *Species at Risk Act* or *Endangered Species Act* are known to occur in the watercourses where culverts are anticipated to be installed; however, there are historical records of Aquatic Species at Risk in the Holland River and Holland River East Branch. Records of American Eel (*Anguilla rostrata*) were returned. It is possible that permits under Endangered Species Act may be required for the proposed works in the Holland River and Holland River East Branch. Consultation with Ministry of the Environment, Conservation and Parks should start early in the Detail Design phase to confirm Endangered Species Act permitting requirements.

5.1.2.10 Potential Fish Habitat Enhancement or Offsetting Opportunities

The Ministry of Natural Resources and Forestry Midhurst and Aurora Districts provided input into potential offsetting opportunities during correspondence in 2022, which have been included where in-water works are proposed. Refer to Appendix B of the Fish and Fish Habitat Existing Conditions and Impact Assessment Report (AECOM, 2023) under separate cover for the correspondence with the Ministry of Natural Resources and Forestry.

5.1.3 Stormwater and Drainage

A Stormwater Management Plan was prepared for the project with the objective to minimize impacts to the existing drainage system and surrounding natural environment in terms of degradation of water quality, increased runoff volumes and minimizing erosion potential. It should be noted that stormwater management measures do not exist under existing drainage conditions along the corridor with the exception of a few scattered ponds along the corridor, however, most of these ponds function as irrigation ponds and/or recreation purposes.

The stormwater management objectives are listed below:

- Assess the required drainage infrastructure to accommodate the Bradford Bypass and compare the assessment results to applicable Design Criteria outlined in the Stormwater Management Plan (under separate cover)
- Complete the hydrology and hydraulics analyses to confirm adequacy of the proposed drainage structures and to identify potential impacts to the existing drainage system and infrastructure
- Identify stormwater management measures to mitigate potential adverse impact in terms of higher flood levels, increased peak flows and flow velocities
- Identify suitable Erosion and Sediment Control measures, and
- Verify positive drainage is provided for runoff generated within upstream lands – across the highway to receiving water bodies.

The Ministry's Highway Drainage Design Standards (February, 2008), and the Ministry of the Environment, Conservation and Parks Stormwater Management Planning and Design Manual (March, 2003) provided the design standards for the selection and Preliminary Design of the Stormwater Management facilities that are required to mitigate the potential impacts of the proposed highway works. Additionally, the Lake Simcoe Region Conservation Authority Stormwater Management Guidelines provided additional design standards and recommendations applied to the proposed stormwater management facilities.

The proposed stormwater management and drainage mosaic is presented in the Stormwater Management Plan (AECOM, 2023) and Drainage and Hydrology Report (AECOM, 2023), under separate covers.

5.1.3.1 Potential Impacts

Typically, without stormwater management treatment of runoff, erosion and sedimentation, and highway improvement works can contribute to a rise in runoff volumes and peak flows. In turn, this can lead to flooding, degraded water quality, and the destruction of aquatic and terrestrial habitat. To address these concerns, it is proposed to treat runoff from the paved areas of the Bradford Bypass corridor with advanced and effective stormwater management runoff treatments. The Ministry is committed to the protection of the natural environment, re-establishment of the benefits of rainfall precipitation, and the protection and enhancement of water quality in the surrounding areas of the Bradford Bypass where achievable.

A summary of the proposed stormwater mitigation, commitment, operation, maintenance and monitoring measures is provided below.

5.1.3.2 Commitments and Recommended Mitigation Measures

It must be noted that Stormwater Management measures do not exist under existing drainage conditions along the right-of-way with the exception of a few scattered ponds along the corridor. However, most of the ponds function as irrigation ponds and/or recreation purposes. The stormwater management strategy for construction includes the following:

- Two existing ponds (R-Ex Pond 1 and R-Ex Pond 2) will be relocated. Given that the area around the ponds is undeveloped, it is assumed that these two ponds do not function as Stormwater Management Ponds per Ministry of the Environment, Conservation and Parks requirements
- Flat-bottom grassed swales to be located along the north and south sides of the Bradford Bypass where longitudinal slopes satisfy Ministry of the Environment, Conservation and Parks requirements of 1% or less. Enhanced grassed swales (wider swales) are recommended along side ditches that will discharge wetlands, marshes, and fish sensitive areas to prevent that untreated runoff from discharging directly to these areas
- Permanent rock flow check dams (i.e., OPSD 219.210) are proposed along the flat bottom grassed swales where longitudinal profile allows it. The permanent flow check dams will further slow down flow velocities, provide some measure of flood attenuation (quantity control) and will promote runoff infiltration and ground water recharge, and
- Nine Stormwater Management Ponds that will provide quantity and quality control of runoff for an area of 130.0 hectares that drains toward the Bradford Bypass. The ponds will provide an enhanced protection levels (80% long-term S.S. removal) or greater. The ponds will not provide water quality treatment for flows generated within external drainage areas.

The Bradford Bypass corridor is proposed to feature over 15,200 metres of flat bottom grassed swales that will provide water quality treatment of runoff generated within the paved areas, not already treated by the proposed nine Stormwater Management Ponds. The ponds will provide enhanced protection level (80% long-term Suspended Solids removal) or greater. This demonstrates the Ministry's commitment to delivering robust water quality and quantity treatment facilities within the Bradford Bypass corridor. Where additional opportunities are present, both treatments are proposed to occur concurrently

The design standards and criteria used in the design and assessment of temporary and permanent stormwater management facilities are based on the criteria outlined in the Ministry of the Environment, Conservation and Parks Stormwater Management Planning and Design Manual (March 2003). The Ministry Highway Drainage Design Standards (2008) provides additional recommendations that can be used in the design of roadside ditches intended to provide quality control of runoff. The Lake Simcoe Region Conservation Authority Technical Guidelines for Stormwater Management Submissions, April 2022, and the Nottawasaga Valley Conservation Authority Stormwater Technical Guidelines, December 2013, were consulted to identify additional stormwater management and Erosion Control requirements. Refer to Section 2 of the Stormwater Management Plan (AECOM, May 2023) (under separate cover) for the specific design standards and criteria used for the design of the Stormwater Management Plan for the project.

Fish and Fish Habitat

Although a permanent alteration of direct and indirect fish habitat is anticipated from the proposed works, mitigation and environmental provisions have been described to reduce the impacts to fish habitat and facilitate the restoration and/or improvement of habitat at each proposed crossing.

Proposed works that should be submitted to Fisheries and Oceans Canada for review are outlined in the Fish and Fish Habitat Existing Conditions and Impact Assessment Report (AECOM, 2023) and summarized in **Section 5.1.2**.

Fluvial – Channel Realignment

The following general fluvial geomorphology realignment recommendations should be considered during Detail Design stages of the project:

- Channel realignment should be designed in accordance with Natural Channel Design principles and should be in compliance with Lake Simcoe Region Conservation Authority Guidelines 9.1 and 9.2, including Guideline 9.2.1 and Nottawasaga Valley Conservation Authority Guideline 4.6.3.1
- Maintain bankfull channel dimensions, hydraulics, and floodplain connectivity. Assume existing bankfull width and depth to be maintained with further assessment completed at the Detail Design stage
- Maintain meandering channel planform, where required
- Reduce impacts to infrastructure in close proximity. Watercourse should be located away from highway embankment to avoid erosion at the embankment

- Improve physical habitat conditions for fish. This includes a low flow channel to improve connectivity during low flows and incorporating habitat features
- Maintain continuity of channel form and process. This includes an appropriate tie-in to the longitudinal profile and channel planform
- Minimize the loss of channel length. There should be no net loss of channel length unless an increase in channel slope is beneficial to the overall design
- Channel should flow perpendicularly through the crossing structure with a straighter path to the culvert which will eliminate erosion risk to the culvert inlet
- A table summarizing the expected realignment work has been included in the Fluvial Geomorphological Assessment Report – Holland River Crossings (AECOM, 2023), and Fluvial Geomorphological Assessment Report – Bradford Bypass Crossings (AECOM, 2023), and
- Final details will be confirmed in subsequent Detail Design phases.

Salt Management

One of the key considerations for salt management for the Bradford Bypass will include the use of the Ministry Salt Management Plan which contains best management practices to facilitate the optimal rate, timing, and location of salt application. The Ministry effectively ensures that the Salt Management Plan meets the objectives of Environment Canada's Code of Practice for Environmental Management of Road Salts. The Ministry Salt Management Plan incorporates the best available winter maintenance practices that are implemented to provide safe driving conditions on the provincial highway network while minimizing environmental impacts. Road salt best management practices have been developed by government and industry, primarily through the Transportation Association of Canada's Syntheses of Best Practices: Road Salt Management framework, and Environment and Climate Change Canada's Code of Practice for the Environmental Management of Road Salts. The best management practices typically included in a Road Salt Management Plan are proven and science-based.

The Ministry works with stakeholders across Ontario, Canada and the United States to invest in research to understand new products and practices to deliver snow and ice control that reduce road salt usage and mitigate environmental impacts while maintaining public mobility and safety on provincial highways. The Ministry has conducted extensive research into winter materials over many years that has led to changes in winter maintenance standards and best practices. In addition, the Ministry actively tracks the research undertaken in other jurisdictions.

Additional Water Quality Objective/Requirements policies (i.e., Chloride) applicable to the Bradford Bypass are listed below:

- Consult the Lakes Simcoe and Couchiching/Black River Source Protection Authority to identify applicable water quality policies and requirements for sensitive areas to chlorine within the Bradford Bypass project limits, and
- Snow removal and disposal will be completed in accordance with guidelines on Snow Disposal and De-icing Operations in Ontario and the Ministry of the Environment, Conservation and Parks guidelines.

Examples of snow removal and de-icing include:

- Plowing, spreading of sand, salt, anti-icing liquid, wet salt, and/or other chemicals and substances to provide safe vehicle traction and to melt ice and snow, application rates for the above chemicals and substances, salt management, and clean-up, and
- Appropriate precautions to prevent salt and treated sand from entering watercourses and salt-sensitive areas will be undertaken.

Consultation with applicable municipalities (i.e., Bradford West Gwillimbury, East Gwillimbury and King Township) in the Lake Simcoe watershed is recommended as these municipalities have developed Salt Management Plans to help navigate the balance between environmental protection and public safety. Municipalities have identified areas where the greatest impact to aquatic habitats are occurring, and that might require appropriate precautions to be taken to prevent salt and treated sand from entering watercourses and salt-sensitive areas are proposed.

Appropriate precautions include:

- Directing stormwater flows from highway paved areas to proposed Stormwater Management facilities for water quality treatment
- Lining ditch bottoms with Geosynthetic Clay Liners or similar material which offer a long-lasting resistance to physical or chemical break-down elements, while the bentonite's high swelling capacity and low permeability provide an effective hydraulic seal, which will reduce infiltration of salt laden runoff
- Protecting sensitive ground water recharge areas such as avoiding direct infiltration
- No direct discharge of flows from highway areas and side ditches to chloride sensitive receiving water bodies

- Protecting streams that support fish habitat through enhanced grassed swale retention and quality treatments
- Utilizing landscape design and snowdrift mitigation strategies to optimize salt application
- Identifying Water Quality Objective/Requirements policies (i.e., Chloride) applicable to the Bradford Bypass
- Use of the Ministry Salt Management Plan which includes implementing a balanced approach (use less salt and yet maintain the same level of public safety) to the highway salt application based on the amount of snow precipitation and highway conditions
- Areas that are particularly sensitive to road salts where additional salt management measures may be necessary to mitigate the environmental effects of road salts in that area. This is done in accordance with the study objectives and utilizing the Code of Practice for the Environmental Management of Road Salts released by Environment Canada, and
- In addition, snow removal and disposal would be utilized in accordance with the Ministry of the Environment, Conservation and Parks guidelines, Guidelines on Snow Disposal and De-icing Operations in Ontario.

5.1.3.3 Operation and Maintenance

The Ministry of the Environment's Stormwater Management Planning and Design Manual, March 2003 (Section 6) provides guidelines for operation, maintenance and monitoring the performance of the proposed stormwater management facilities.

Regular inspection and maintenance are recommended for the proposed stormwater management plan (flat bottom grassed swales, and stormwater management facilities) of the Bradford Bypass to keep the system operating as designed.

Inspections

Regular inspection is essential to assess the condition of the site, provide clean up and maintenance solutions and set goals for the upcoming year, including security fence maintenance and repairs, locking mechanism, inspection and maintenance of the granular (compacted Granular A) access road to the stormwater management facilities.

Maintenance – Flat Bottom Grassed Swales

For the flat bottom grass swales with permanent flow check dams, five main operation and maintenance activities should be completed, which are explained below.

- **Grass cutting:** For flat bottom grass swales, longer grass is more beneficial for quality control of runoff; however, the aesthetics of the property is usually of some concern to the nearby residence. Grass-cutting is provided mainly to keep the property looking neat and tidy but should be limited if at all possible. Appropriate equipment should be identified based on the presence of hills and valley that may restrict the use of the equipment. Maintenance access to provide the required maintenance should be factored into the design
- **Minor landscaping:** to restore seasonal vegetation loss, maintain desired planting densities along side slopes, remove undesirable plant species and improve aesthetics
- **Weed control:** Weeds are referred to as unwanted vegetation species which could be invasive to adjacent areas if it is not controlled or have negative impacts on the stormwater management facility operation. Weed control may be required annually
- **Removal of accumulated sediment:** Sediment removal for grassed swales is required when the aesthetic attributes of the swale indicate so. Discoloration of the soil or the buildup of a “crust” may indicate the need for sediment cleanout. The frequency of sediment removal depends on the drainage catchment area and level of imperviousness. The initial inspections should provide guidance on future removal schedules. The upstream side of flow check dams should be a focus of the inspections as this is likely where sediment buildup will occur. Ministry of the Environment, Conservation and Parks sediment disposal requirements should be consulted for information pertaining to the exact parameters and acceptable levels for different disposal options, and
- **Trash removal:** Trash removal is an integral part of the stormwater management facility maintenance. Generally, a “spring cleanup” is needed to remove trash and debris from all surface stormwater management ponds. Trash removal is then performed as required based on observations during regular inspections.

All remedial works will need be performed within the Ministry right-of-way. Additional monitoring events and/or an increase in inspection frequency may be required to verify the effectiveness of the proposed maintenance program and monitoring works.

Specific inspection guidelines for check dams include the following:

- Regular inspections should be made to ensure that the centre of the dam is lower than the edges
- Check the structural integrity of the check dams – shape, anchoring, and overall condition
- Look for scour underneath the check dam and bypasses on the sides
- Note the amount of sediment deposited upstream of the check dams, and
- Observe erosion of swale segments between check dams – downcutting and side scour.

Specific maintenance guidelines for check dams include the following:

- Remove sediment adjacent to and accumulated behind check dams before it reaches halfway to the top of the dam
- Restore displaced or washed-out check dams to their original configuration
- Fill in or otherwise repair areas where check dam undercutting or bypasses have occurred
- Add stones to rock check dams as needed to maintain design height and cross section. Use larger stone, if necessary, to counter higher-than-expected flow velocities
- Repair swale areas where excessive downcutting or side scour have occurred
- If the selected configuration is not preventing channel erosion, consider other materials or closer spacing in areas experiencing the most problems, and
- If significant erosion occurs between dams, install a protective turf reinforcement mat or section of riprap liner in that portion of the channel.

Maintenance – Stormwater Management Ponds

Maintenance requirements will be identified and scheduled based on observations made during both scheduled inspections and visits to the ponds to collect monitoring data. The types of maintenance activities needed and the frequency with which they are performed will provide the basis for scheduling long-term maintenance operations. Anticipated maintenance requirements have been classified as routine maintenance operations, sediment removal and disposal operations, and remedial works.

Maintenance activities classified as Routine Maintenance Operations include, but are not limited to:

- Removal of trash and debris from inside and surrounding the ponds
- Check for blocked inlet and outlets
- Check for security fences and maintenance/repair of locks on gates
- Trimming and/or clearing of vegetation along both the internal access roads and the adjacent rear property lines
- Minor landscaping to restore seasonal vegetation loss, maintain desired planting densities alongside slopes, remove undesirable plant species and improve aesthetics
- Removal of sediment and biological accumulations from outlet structures including aquatic plant and algae growth
- Minor structural repairs to pond inlet headwalls and components of the outlet structures, and
- Include the use of larvicides to control mosquito growth.

5.1.3.4 Monitoring

All monitoring and maintenance activities will be recorded in a logbook (as a deliverable during a future maintenance contract) kept by the maintenance contract, also including but not limited to, the name of the designated inspector and a record of all activities related to inspection, monitoring and maintenance.

For the grassed swales proposed for the Study Area, during the inspection it should be verified that the grading and vegetation are as designed, and that stormwater will be conveyed where and how it was intended.

The following principles are proposed as the basis of the monitoring framework.

- Monitoring must be directed at fulfilling one or more objective sets, be subject to analysis and lead to potential actions
- Monitoring of receiving watercourses should be for identifying problems, establishing a background reference, and evaluating the effectiveness of controls
- Technology performance monitoring should be to confirm that the stormwater management facility operates as designed, if not, determine if remedial design improvements are needed, or if it needs maintenance. This will assist in improving future designs

- The strategy should recognize and incorporate existing monitoring programs, and
- Reporting on results and taking appropriate follow-up action is a key component that fulfils due diligence expectations.

Recommendations for the subsequent design phase include the following:

- The proponent will collect water samples at the inlet and outlet points of the flat bottom grassed swales to estimate the removal efficiency of the swales in terms of concentration of total suspended solids
- The proponent should propose the water quality target/protection level based on the receiver sensitivity and the Ministry of the Environment, Conservation and Parks' manual when preparing a stormwater management plan. The proponent may also need to consult the local conservation authority to determine which water quality/quantity target is required to protect the receiving waterbody
- Once the water quantity/quality target/protection level has been determined, the proponent should demonstrate in the stormwater management plan that the proposed stormwater management facility is able to achieve the defined "target", and
- As a minimum, the treated effluent should meet a TSS concentration of 25 mg/L before discharging into the receiving waterbody.

5.1.4 Groundwater and Hydrogeology

5.1.4.1 Groundwater Protection and Well Monitoring Plan

As part of the groundwater and hydrogeology works undertaken for the project, three reports have been prepared:

- Groundwater Protection and Well Monitoring Plan
- Water Well Survey Report, and
- Hydrogeology Data Report.

The following sections outline the potential impacts, commitments and mitigation measures, monitoring, permitting requirements, contingency measures and recommendations outlined in each of the reports available under separate cover.

5.1.4.1.1 Potential Impacts

There are two primary groundwater quality effects related to the project construction/road operation. The first are potential spills during construction and the second is the long-term operation of the road. Groundwater quality issues can potentially affect down-gradient shallow domestic water wells and/or surrounding wetland environments.

As per initial data gathered during the Preliminary Design assignment, several inorganic/metal parameters exceeded the Provincial Water Quality Objectives (PWQO) in the groundwater samples collected from groundwater monitoring wells in the vicinity of the proposed groundwater taking locations.

The results of the baseline water quality sampling completed within the Study Area indicates that dewatering effluent may not fulfill the water quality requirements under the Town of Bradford West Gwillimbury's Sewer Use Bylaw 2013-68 for Storm Sewer Discharge without pre-treatment for the exceeded parameters identified by AECOM sampling in 2021 and 2022 (AECOM, 2022A). As a result, it will be the responsibility of the dewatering Contractor to ensure that any discharge to the local sewer system occurs in full compliance with the Town's Sewer Use By-Law (By-Law 2013-68).

The results of the baseline water quality sampling completed within the Study Area indicates that dewatering effluent may not fulfill the water quality requirements under the York Region Sewer Use By-Law (2021-102) as required in the Town of East Gwillimbury's Sewer Use By-Law 2008-54 for Storm Sewer Discharge without pre-treatment for the exceeded parameters identified by AECOM sampling in 2021 and 2022 (AECOM, 2022A). As a result, it will be the responsibility of the dewatering Contractor to ensure that any discharge to the local sewer system occurs in full compliance with York Region Sewer Use By-Law (By-Law 2021-102).

Longer-term effects of roadway operation on groundwater quality are typically associated with spillage associated with accidents that must be directly remediated, and the long-term use of road salt. Road salt dissolves in highway runoff and can then infiltrate into the underlying groundwater system from the roadside ditching. Where the ditching is constructed in low permeability glacial till soils, the potential influence is considered to be small. However, where the directly underlying soils are permeable (sand, sand and gravel), the influences of infiltration by salt-laden water may be more pronounced. The effect of road salt can result in the direct increase of shallow groundwater salinity, or in the case of deeper wells, an increase in water hardness over time. The susceptibility of the soils to infiltration is reflected by the Highly Vulnerable Aquifers designation areas along the entire project construction area. Any runoff and

dewatering discharge should be directed away from these areas unless they meet the Provincial Water Quality Objectives.

5.1.4.1.2 Commitments and Recommended Mitigation Measures

The risk of spills during construction of the project will be primarily limited to petroleum products from machinery (fuels and lubricants). The use of best management practices for handling of hydrocarbons according to the Ministry of Environment, Conservation and Parks and the Technical Standards and Safety Authority of the Ministry of Government Services will reduce the potential of environmental adverse effects associated with petroleum product handling and uses. Spillage of petroleum products must be immediately remediated according to these standards such that groundwater quality is not impacted.

Mitigation plans will be generated in Detail Design for any excavation and structure construction within areas of medium to high significant groundwater recharge areas as shown near the Holland River and Holland River East Branch. Mitigation plans would be specific to each excavation and structure construction and include erosion and sediment control, dewatering treatment and discharge piping away or towards from Significant Groundwater Recharge Areas, or municipal sewer discharge requirements. Dewatering discharge should be directed away from Well Head Protection areas if excavation and dewatering activities are occurring within them.

Based on AECOM's understanding of the regional hydrogeology, the potential effect of road salt runoff from the highway on the shallow groundwater system and shallow surficial materials is considered high. These areas of high aquifer vulnerability could potentially be impacted by saline runoff. As such, berms around the excavated areas are required during dewatering to limit runoff. Additional mitigation measures are identified in the Stormwater Management Plan (AECOM, 2023), which will be instrumental during review of this plan in Detail Design.

Site Mitigation Measures

In addition to the mitigation measures listed above, the following mitigation measures should be considered during the subsequent Detail Design phase of the project, and implemented where appropriate:

- Tilling of soils in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well-traveled areas where soil compaction has occurred in areas that previously permitted infiltration

- Backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage, particularly within wetland areas, and
- Well abandonment will be carried out in compliance with Ontario Regulation 903 Wells (as amended).

Dewatering Discharge

A pre-construction groundwater sampling program should be conducted for the groundwater monitoring wells located in the vicinity of the proposed dewatering locations (at least one well at one dewatering location) to confirm the groundwater quality in the areas. The collected groundwater samples have to be analyzed for general inorganic parameters (including total suspended solids and turbidity), metals, and volatile organic compounds.

The Contractor shall make sure that all control measures implemented, and all materials collected or trapped by those measures are recovered and properly disposed of when they are no longer engaging in the activity or discharge to the sanitary sewer. Expected treatment options for the dewatering discharge potentially include sedimentation tanks and filtration.

Prior to discharging any dewatering effluent, the Contractor will be required to check that all necessary discharge permits have been secured and that the Water Taking Plan, Discharge Plan, a Water Treatment Process and Sampling Plan has been designed and implemented in accordance with the terms and conditions of any such permits and the contract documents.

5.1.4.1.3 Groundwater Monitoring

The Groundwater Monitoring Program includes groundwater level monitoring and groundwater quality monitoring to establish the pre-construction baseline conditions for comparison of data collected during and post-construction.

During the Preliminary Design study, Golder Associates Ltd. (Golder) installed monitoring wells during the ongoing geotechnical investigations. Monitoring is expected to be completed within these same monitoring wells during project construction dewatering. Residential monitoring wells will also be part of this program if they fall within the Radius of Influence of the excavation dewatering and permission to enter is granted to gain access to monitor the well. Groundwater monitoring focuses on the following activities:

- Residential Well Survey Monitoring, and
- Groundwater Level Monitoring.

5.1.4.1.4 Permitting Requirements

Where construction dewatering volumes between 50,000 and 400,000 L/day are expected, filing of the project on Ministry of the Environment, Conservation and Parks' Environmental Activity and Sector Registry system is required in accordance with Ontario Regulation 63/16 (as amended). Where expected construction dewatering volumes that exceed 400,000 L/day, a Permit To Take Water (Category 3) will be required from Ministry of the Environment, Conservation and Parks in accordance with Section 34 of the Ontario Water Resources Act (RSO, 1990). Permitting requirements will be determined during the subsequent Detail Design phase.

Water Taking Volumes

A daily record of the timing, total volumes, and average rate of water-taking at each excavation location shall be maintained by the Contractor during completion of the project. The flow meter(s) shall be calibrated prior to use and installed/operated in accordance with manufacturer specifications.

5.1.4.1.5 Contingency Measures

Spill Response Plan

Contingency plans are to be in place to address groundwater protection associated with the project during construction. The uncontrolled release of dewatering effluent is considered a spill, along with any construction chemical release, and must be managed using the Contractor's Spill Prevention and Response Plan.

If the effluent is released to the natural environment and causes a significant impact on the surrounding soil or waters, this shall be reported to the Ministry of the Environment, Conservation and Parks Local District office in Barrie, ON, Ministry of the Environment, Conservation and Parks Spills Action Centre, and/or the Town of Bradford West Gwillimbury/Town of East Gwillimbury/King Township. If the effluent results in a significant impact or a disturbance to aquatic habitat (i.e., debris/tools/equipment falling into a watercourse, sediment spill, deleterious substance spill, etc.), it must also be managed in accordance with mitigation measures listed in the Detail Design Erosion and Sediment Control Plan.

If the effluent is released to the Town of Bradford West Gwillimbury/Town of East Gwillimbury/King Township's municipal sewer system (sanitary or storm), there may be a requirement to report the release to the Town, subject to the terms of the Discharge Permit. Additional reporting may be required based on the quality and quantity of the spilled effluent and the affected receptors.

Well Interference Complaint

In the event that a well interference complaint is received, the following procedure shall be implemented in a timely manner:

- Upon receipt of a well complaint, either via phone call to the project, or in person to a staff member in the field, it is to be collected and recorded
- The Ministry, Ministry of the Environment, Conservation and Parks, Simcoe Muskoka Public Health and York Region Public Health will be notified immediately. If it occurs during normal business hours, the Ministry of the Environment, Conservation and Parks local district office (Barrie: 1-800-890-8511) will be contacted and the Spills Action Centre (1-800-268-6060) is to be contacted after business hours. The Ministry and Simcoe Muskoka Public Health will also be emailed
- A well complaint investigation will be conducted as per the Ministry of the Environment, Conservation and Parks policies and a qualified expert (P.Geo. or P. Eng.) will undertake and/or oversee the following:
 - Collect a water well sample at the complainant's water well, prior to any treatment systems ("raw"), after allowing the distribution system to flow for approximately five minutes and submit the water sample to a qualified laboratory for an analysis of the general chemistry suite of water quality parameters completed during pre-construction analysis
 - Compare the results of the analysis of the water sample to any pre-construction water sampling analysis (if available) for the residential well
 - Investigate and provide a professional opinion regarding the claimed impact to the well or well water, and
 - Provide a detailed written opinion as to whether the water sampling analysis results demonstrate that the construction or dewatering activities may have caused an adverse effect on the well's water supply.
- If the well issue is confirmed to be a result of the project's activities, the Ministry will provide a letter to the property owner explaining the outcome of the well investigation and detail the recommended mitigation measures (including lowering/replacement of pump inlet, well rehab, new well installed or local watermain connection if available) to remediate the issue. A temporary drinking water supply will be provided and connected to the resident if the project activities are found to be responsible, at the expense of the Ministry, until remediation measures have resolved the issue

- If the well issue is found to be unrelated to the project activities, the Ministry will provide a letter to the property owner explaining the outcome of the well investigation and the rationale for the decision, and
- Notification and a copy of any lab results, letters or communication records will be provided at each step of the above process to the Ministry, Ministry of the Environment, Conservation and Parks, Simcoe Muskoka Public Health and York Region Public Health.

5.1.4.1.6 Recommendations

In addition to the mitigation measures listed above, the following mitigation measures should be considered during the subsequent Detail Design phase of the project, and implemented where appropriate:

- Tilling of soils in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well-traveled areas where soil compaction has occurred in areas that previously permitted infiltration
- Backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage, particularly within wetland areas, and
- Well abandonment will be carried out in compliance with Ontario Regulation 903 Wells (as amended).

The Groundwater Protection and Well Monitoring Plan was completed for the intended purpose of characterizing and assessing possible impacts to local water wells and groundwater dependent environmental features, and to recommend appropriate discharge, mitigation, and monitoring measures, as required. The Plan was prepared in accordance with the requirements of Ontario Regulation 697/21, Section 23. It is recommended that this Plan be updated based on the dewatering assessment that will be completed during subsequent Detail Design of the project.

As part of the Plan, AECOM conducted a water well survey and reviewed the Ministry of the Environment, Conservation and Parks Water Well Database that identifies water wells within the Bradford Bypass corridor that may be impacted by the project. Approximately 260 domestic, livestock, commercial, industrial, or public water supply wells within the Study Area were identified.

Construction dewatering activities have been identified as the primary risk to groundwater fed water wells in the Study Area. Mitigation measures will be implemented to manage adverse effects on adjacent domestic water wells and to avoid reducing groundwater levels to the degree that residential water supply is affected.

A series of groundwater monitoring wells have been installed along the highway corridor within the Study Area to track groundwater quality and quantity before and after construction. A pre-construction groundwater sampling program will be conducted to establish baseline data which will enable effective monitoring of changes within groundwater levels and quality related to construction activities. Contingency plans will be in place for groundwater protection during construction. The Ministry will work with owners of water wells who experience issues during and after construction to determine if the issue is the result of Bradford Bypass project activities. If it is confirmed that the issues are related to the project, the Ministry will take immediate steps to remediate the issue, implementing mitigation measures as required.

The recommendations in the Plan include that residential well water should be sampled for a representative raw (untreated) water sample analyzed to establish general water quality and microbiological parameters prior to the start of construction.

A Construction Dewatering Plan (Water Discharge/Management) shall be prepared, as well as an Erosion and Sediment Control Plan and a Groundwater Quality Monitoring Program. The Construction Dewatering Plan, which shall include details on where and when all groundwater is obtained, stored, transferred, used and returned to the environment (if applicable) and the proper decommissioning of the dewatering wells upon the completion of the construction, must be implemented prior to the discharge to the natural environment. These three reports should be prepared during Detail Design prior to the commencement of the dewatering activities and submitted to Ministry of the Environment, Conservation and Parks when finalizing the draft permit to take water (if one is determined to be required during subsequent Detail Design and construction phases).

The preferable discharging method for the dewatering groundwater is to the municipal sewer system in the vicinity of the Study Area if one exists. However, given the nature of the Study Area opportunities to connect to municipal sewer systems may be limited and challenging.

Appropriate dewatering permits from Ministry of the Environment, Conservation and Parks, depending on water volumes, in accordance with Section 34 of the Ontario Water Resources Act (RSO, 1990) will be obtained.

Dewatering discharge will be managed consistent with best management practices employed by the Ministry and applied to all highway construction projects. Any runoff or dewatering discharge from construction will be directed away from any environmentally sensitive areas identified along the entire length of the highway unless on-site testing indicates that satisfactory provincial water quality standards are met. Any uncontrolled release of dewatering effluent during construction will be treated with the same urgency

as a chemical spill and managed using best practices, as well as protocols in the Contractor's Spill Prevention and Response Plan. If the spill impacts the natural environment, it will also be reported to the Ministry of the Environment, Conservation and Parks Spills Action Centre.

In addition to construction dewatering, there are two other potential risks to primary groundwater quality effects related to the construction and road operation phases of the project:

- potential for spills during construction, and
- potential for spills and salt runoff during the long-term operation of the road.

For potential spill cleanup, the Ministry employs best management practices for handling of hydrocarbons according to Ministry of the Environment, Conservation and Parks and the Technical Standards and Safety Authority of the Ministry of Government Services to reduce the potential of environmental impacts.

Detailed measures to be implemented on the project regarding salt management are included in the Stormwater Management Plan as required under Section 22 of the Regulation.

5.1.4.2 Water Well Survey

The Water Well Survey Report (AECOM, 2023) was prepared to summarize the work undertaken and factual data obtained by AECOM as part of the Preliminary Design assignment to fulfil obligations for the pre-construction assessment of private well supplies in the vicinity of the Study Area.

5.1.4.2.1 Potential Impacts

Upon completion of the initial background information review, a total of 143 properties were identified within a radial distance of approximately 500 metres of the Study Area.

Following the mailing of the water well form and letter to 143 Property Owners, a response was received from a total of 17 Property Owners, or 12% of the identified properties. A general summary of the results of the Door-to-Door Water Well Survey is summarized below:

- Water quality sampling results from 11 of the properties determined that the drinking water sample obtained had exceedances above the Ontario Drinking Water Standards for health-related parameters. Owners were contacted by phone to resample the well water and they were informed to contact the Local Public Health Units to discuss the results further

- Other parameters that were exceeded for the Ontario Drinking Water Standards fell into the aesthetic objectives which may impair the taste, odour, and colour of water which may interfere with good water quality or are operational guidelines that must be controlled to make water treatment systems effective
- Drilled wells were in excellent condition; however, dug wells had historical lid issues or debris/objects blocking assessment of the well lid
- All properties except for one have water softeners and/or some form of water treatment (chlorination, reverse osmosis or ultraviolet lights), and
- A copy of the lab results, including the completed AECOM field investigation and any exceedances, were hand delivered to all respective properties in an envelope.

5.1.4.2.2 Commitments and Recommended Mitigation Measures

It is recommended that, prior to any construction dewatering occurring near the 17 properties that were assessed, the Property Owners be contacted regarding the undertaking of a repeat monitoring and sampling of the residential well during and after construction to confirm that there is no effect on the water quality from the baseline assessed. For the remaining 126 Property Owners for which no response was provided, an attempt shall be undertaken during Detail Design to contact these owners via mail, email, phone calls, site visit, etc. The Door-to-Door Water Well Survey provides a baseline for the water wells prior to the proposed construction to determine existing water quality and quantity of each property.

As the Preliminary Design progresses, and as the project moves into the next phase, there is the potential for Study Area refinements to the project footprint to be made. Should changes be made, a review of water wells shall be completed, and efforts shall be made to contact the Property Owner to inquire about the status of their well. Additionally, it is recommended that during Detail Design, a second round of letters be mailed to all Property Owners within 500 metres of the Study Area to confirm that all impacted and/or concerned Property Owners with wells are monitored during and after construction to capture and ensure potential well issues are addressed and monitored.

5.1.4.3 Hydrogeology

A Hydrogeological Data Report (AECOM, 2023) was prepared for the intent of characterizing the local physical and hydrogeological setting, quantifying potential source water protection areas of concern, and determining preliminary groundwater hydraulic conductivity and groundwater quality with the Study Area.

5.1.4.3.1 Potential Impacts

Groundwater level monitoring was undertaken for nine well locations between February 4, and August 23, 2022 by AECOM.

Based on the monitoring that has been completed to-date, from the western edge near Highway 400 the groundwater elevations within the Study Area have been found to range from 274.57 mASL (1.93 mBGS) at BH 9-1 to 282.49 mASL (0.51 mBGS) at BH 10-1 near County Road 10. Within the Holland River lands, the groundwater elevations range from 223.51 mASL (1.29 mBGS) at BH AIP-3 to 216.8 mASL (0.55 mBGS) at BH HRW-4.

It is anticipated that seasonal fluctuations in groundwater levels will occur that have not been fully captured given the snapshot readings of the monitoring wells completed as part of the current hydrogeological investigation.

Single Well Response Testing was conducted by AECOM at nine monitoring wells between February 16th and August 23rd, 2022. Results of the testing is documented in the Hydrogeology Data Report (AECOM, 2023) under separate cover.

5.1.4.3.2 Commitments and Recommended Mitigation Measures

Significant data gaps currently exist with the monitoring wells installed after AECOM's assessment and access issues previously discussed. It is recommended that the additional groundwater level measurements and missing groundwater assessments from the monitoring wells be obtained during subsequent Detail Design.

It is recommended that additional groundwater level measurements be obtained during subsequent Detail Design phases and that dataloggers be installed within all monitoring wells to obtain the seasonal fluctuations within the groundwater table.

Groundwater Quality

During construction of the project, groundwater pumped to dewater excavations is planned to be discharged directly to the natural environment, or to the nearest sanitary and storm sewer, or it may need to be treated off site. As such, the chemical quality of the pumped water will need to conform with the requirements of the Provincial Water Quality Objectives (PWQO), Town of Bradford West Gwillimbury's Sewer Use By-Law (#2013-68), the York Region Sewer Use By-Law (2021-102) as required in the Town of East Gwillimbury's Sewer Use By-Law 2008-54 and King Township's Sewer Use By-Law 2014-072.

5.1.5 Fluvial Geomorphology

5.1.5.1 Potential Impacts

When crossings are placed over a watercourse without due consideration of the geomorphic processes that are occurring within the watercourse, risks to the crossing structure and/or channel form and function may occur. Such risks could lead to the need for continual or emergency maintenance of the crossing and/or could adversely affect channel stability, fish passage potential and aquatic habitat conditions.

Channel processes that may contribute to impacts at a bridge or culvert crossing include:

- Channel bed degradation/lowering – this can lead to undercutting of bridge/culvert abutments/footings
- Channel migration – movement of meanders could cause erosion of culvert/bridge embankments
- Channel expansion – enlargement of cross-section areas (e.g., in response to urban hydro modification may lead to increased stress around culvert entrance leading to outflanking of a culvert and flow constriction
- Knickpoint regression along the channel bed profile, and
- Loss of riparian vegetation can also greatly diminish bank shear resistance which increases the potential for bank erosion and channel translation.

Bridge crossings situated along a watercourse interact with, and exert an influence on, channel processes. Scientific literature has identified common impacts of watercourse crossings both on channel functions and on aquatic species. In some situations, impacts of a crossing on the channel result in a risk to the crossing. Typical adverse effects attributed to crossings include:

- Bridges with piers situated in the watercourse can pose a barrier to migrating fish if their placement interferes with flows within the channel
- Piers must be adequately spaced to prevent the formation of eddies, which could delay fish migration by causing disorientation, and may prevent fish from continuing to migrate (Cotterell, 1998), and
- Different pier shapes have different eddying effects, so a pier base that minimizes eddies should be incorporated into the design. Scour will also be minimized by preventing eddies.

Reduction in the potential impacts to crossing structures can be achieved through proper design (e.g., sufficiently wide span) and appropriate placement of the crossing structure piers relative to the watercourse.

5.1.5.2 Commitments and Recommended Mitigation Measures

In keeping with the potential impacts to infrastructure, natural channels processes, aquatic habitat and adhering to the conservation authority's guidelines, the following general recommendations should be included as part of appropriate crossing design:

- Avoid, where possible, the need for substantial channel realignment
- Place watercourse crossings perpendicular to flow over relatively straight sections of channel planform
- Ensure that crossing structures are properly sized not only from a hydraulic perspective, but also to ensure minimal impacts to channel form and function
- Maintain continuity of channel form and function through the crossing wherever possible, and
- Ideally, wherever possible, bridge piers should be placed away from the channel and no alteration to the stream bed or banks should occur. Additionally, no infilling of the channel should occur.

5.1.5.2.1 Crossing-Specific Design Recommendations and Considerations

Considering the above statements, the fluvial geomorphology assessment has been used to develop recommendations for the specific river crossings proposed as part of the project.

Initial considerations for the proposed new crossing at the Holland River (HR-01) are:

- Bridge abutments and piers constrain channel function by preventing planform adjustment; watercourse is a sinuous channel. Significance of these controls is accentuated where the channel is adjusting through widening. Siting of bridge crossing should be perpendicular to valley and stream corridors
- Large watercourse - erosive forces of larger watercourses tend to exceed stabilizing properties of vegetation, therefore there is an increased potential for migration
- Lateral migration likely in unconfined valleys (wide, flat floodplains)
- Dense vegetation existing adjacent to channel - removal of vegetation could increase erosion potential
- Based on the Rapid Geomorphic Assessment, the watercourse reach is stable, with dominant process occurring being aggradation. Over time sediment deposition may initiate meander development

- If piers are necessary within the meander belt of the watercourse, pier foundation should be designed with the assumption that it will be in contact with the watercourse in future and an allowance for channel downcutting over time should be considered
- Erosion protection may be required to protect the piers however, erosion protection disturbs natural geomorphological processes and typically has a negative impact on river integrity in the long-term, and
- It is recommended that a fluvial geomorphologist be consulted during the Detail Design stage of the project for the new proposed crossings in order to specifically address the observed geomorphological issues with the watercourses along the proposed Bradford Bypass route.

Initial considerations for the proposed new crossing at the Holland River East Branch (HREB-01) are:

- Bridge abutments and piers constrain channel function by preventing planform adjustment; watercourse is a sinuous channel. Significance of these controls is accentuated where the channel is adjusting through widening. Siting of bridge crossing should be perpendicular to valley and stream corridors
- Large watercourse - erosive forces of larger watercourses tend to exceed stabilizing properties of vegetation, therefore there is an increased potential for migration
- Upstream portion of the watershed is urbanized
- Lateral migration likely in unconfined valleys (wide, flat floodplains)
- Dense vegetation existing adjacent to channel - removal of vegetation could increase erosion potential
- Based on the Rapid Geomorphic Assessment watercourse reach is stable, with dominant process occurring being aggradation. Over time sediment deposition may initiate meander development
- If piers are necessary within the meander belt of the watercourse, their foundations should be designed assuming they will be in contact with the watercourse channel in future, taking into consideration the base elevation of the channel and an allowance for channel downcutting over time
- Erosion protection may be required to protect the piers however, erosion protection disturbs natural geomorphological processes and typically has a negative impact on river integrity in the long-term, and

- It is recommended that a fluvial geomorphologist be consulted during the Detail Design stage of the project for the new proposed crossings in order to specifically address the observed geomorphological issues with the watercourses along the proposed Bradford Bypass route.

Considering the above statements, the fluvial geomorphic assessment has been used to develop recommendations for the proposed pier placements for the crossings located at crossing #'s C17-A-1 (HR-01) and C20-A-1/C22-B-1 (HREB-01). Due to the length of the proposed bridges, it is likely not feasible to keep the piers outside of the meander belt, i.e., the area across which the watercourse could shift over time. Refer to **Figure 2-4** in **Section 2.1.5** for a map of all the watercourse crossings within the Study Area. Considering the site-specific fluvial geomorphic indicators, the following risks were considered in this assessment: feature type, valley setting/confinement, meander belt width, bankfull width, meander amplitude, 100-year erosion rate, observed issues, and RGA score.

Initial recommendations for the proposed new crossings for the remainder of the Bradford Bypass right-of-way are:

- New crossings should span the Meander Belt Width where possible. At a minimum, the new crossings will need to span the bankfull width of the channel, with an additional allowance for localized channel adjustment over the lifespan of the structure (e.g., the next 100 years)
- If the crossing does not span the Meander Belt Width, additional erosion protection will be required to protect the crossing. Erosion protection disturbs natural geomorphological processes and typically has a negative impact on creek integrity in the long-term
- The design of bridges and culverts should maintain the existing channel form and flow as to minimize or eliminate erosion and flood risks upstream and downstream of structures
- Fish movement should not be impeded. It is recommended that open bottom culverts should be used and sized accordingly as per the fluvial specialist recommendations or/and in conjunction with available hydraulic models. Refer to the Fish and Fish Habitat Existing Conditions and Impact Assessment Report, available under a separate cover (AECOM, 2023) for more detailed comments regarding fish and fish habitat recommendations
- It is recommended that a fluvial geomorphologist be directly involved in the Detail Design of the new proposed crossings in order to specifically address the observed geomorphological issues with the watercourses along the proposed Bradford Bypass route

- Removal of vegetation surrounding the feature could impact erosional processes. Small upstream drainage area typically lowers the potential for lateral channel movement and erosion due to stabilization provided by vegetation
- Culverts constrain channel function by preventing planform adjustment and disrupting longitudinal connectivity. Open bottom crossings are preferred to maintain geomorphological processes as closed bottom culverts reduce bed roughness and act as grade controls. Significance of these controls is accentuated where the channel is adjusting through downcutting and widening. Siting of crossings should be perpendicular to valley and stream corridors, and
- Confinement of the watercourse should be considered as lateral migration is likely in unconfined valleys (wide, flat floodplains), whereas in confined valley watercourses, the valley slope in will impact erosion rate by limiting lateral erosion (can be more susceptible to down-cutting and/or channel widening).

Table 5-12 below summarizes the fluvial geomorphological observations and proposed recommendations for the crossings as part of this project. Refer to **Figure 2-4** in **Section 2.1.5** for a map of all the watercourse crossings within the Study Area.

Table 5-12: Summary of Observations and Recommendations for Crossing Size

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
HR-01	C17-A-1	N/A	Lake Simcoe Region Conservation Authority	Permanent defined meandering feature	32,927.4	120	~300	874.2	N/A	Unconfined	Very Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ Dominant processes: Aggradation, degradation, and planimetric form adjustment ■ Erosion Rate from mapping: 25 +/- 3 metres ■ Erosion: Minor (leaning trees) ■ Woody Debris: Present ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ Preferred (100-year erosion rate + Bankfull i.e., 24.5 metres x 2 + 83 metres): 132 metres
HREB-01	C20-A-1 C20-B-1	N/A	Lake Simcoe Region Conservation Authority	Permanent defined meandering feature	20,389.7	130	~ 330	943.4	N/A	Unconfined	Very Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ Dominant processes: Aggradation and planimetric form adjustment ■ Erosion Rate from mapping: 22 +/- 3 metres ■ Erosion: No Active Erosion ■ Woody Debris: Present ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ Preferred (100-year erosion rate + Bankfull i.e., 21.9 metres x 2 +100 metres): 143.8 metres
PC-Trib-01	C10-A-3 C10-A-4	PR-R-BBP-9 PR-R-BBP-10 PR-R-BBP-11 PR-CL-400-2	Nottawasaga Valley Conservation Authority	Permanent defined straight feature	385.5	3.5	Straight (channel likely altered)	25.4	Partially confined - right bank of feature is steep.	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 1 metre ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Likely entrenched ~1 metre ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ Calculated Meander belt width: 25.4 metres ■ Preferred crossing width (100-year erosion rate + bankfull i.e., 1 x 2 + 3.5 metres): 5.5 metres ■ The sediment entrainment formula predicts the following sediment sizes could be moved during the 2-to-100-year flow events: <ul style="list-style-type: none"> – PR-R-BBP-9: Very Coarse Gravel to Large Cobble – PR-R-BBP-10: Medium Gravel to Very Coarse Gravel sized materials – PR-R-BBP-11: Coarse Gravel to Small Cobble sized materials

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
PC-Trib-01 <small>(continued)</small>	-	-	-	-	-	-	-	-	-	-	-	<ul style="list-style-type: none"> PR-CL-400-2: Fine Gravel to Very Coarse Gravel During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel
PC-Trib-02	C10-A-1 C10-A-2	PR-CL-2 PR-R-BBP-4	Nottawasaga Valley Conservation Authority	Permanent defined meandering feature	265.5	2.92	15	30.2	Confined	N/A	Low <ul style="list-style-type: none"> RGA: In Regime TRCA Table 4 100-year Erosion Rate: 1-2 metres Erosion: No Active Erosion Woody Debris: Present Entrenchment: None Historical Assessment: No significant change in planform since 1969 (slight changes in sinuosity only) 	<ul style="list-style-type: none"> Calculated Meander belt width: 30.2 metres Preferred crossing width (100-year erosion rate + bankfull i.e., 2 x 2 +2.92 metres): 4.92 metres The sediment entrainment formula predicts the following sediment sizes could be moved during the 2-to-100-year flow events: <ul style="list-style-type: none"> PR-CL-2: Coarse Gravel to Small Cobble PR-R-BBP-4: Medium Gravel to Very Coarse Gravel During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.
PC-Trib-03	C10-A-C	PR-CL-2 (refer above)	Nottawasaga Valley Conservation Authority	Permanent defined meandering feature	227.2	2.6	5	42.2	Confined	N/A	Low <ul style="list-style-type: none"> RGA: In Regime TRCA Table 4 100-year Erosion Rate: 8-15 metres Erosion: Active (bank undercutting) Woody Debris: None Entrenchment: None Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> No crossing at proposed location – No input required. For PR-CL-2 refer to PC-Trib-02

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
PC-Trib-04	C10-A-B	No Culvert ID	Nottawasaga Valley Conservation Authority	Intermittent defined meandering feature	48.1	2	7	31.6	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 8-15 metres ■ Erosion: Active ■ Woody Debris: None ■ Entrenchment: Entrenched ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No crossing at proposed location – No input required.
PC-Trib-05	C10-A-A	No Culvert ID	Nottawasaga Valley Conservation Authority	Ephemeral undefined feature with no defined planform	26.8	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-01a	C10-A-6	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	23.8	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-01	C10-C-2	PR-R-BBP-6B	Lake Simcoe Region Conservation Authority	Intermittent defined sinuous to meandering feature	531.7	3.97	15	35.9	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 5 to 8 metres ■ Erosion: Active (exposed roots and fallen trees) ■ Woody Debris: Present ■ Entrenchment: None ■ Historical Assessment: Portion of reach that overlaps with the Study Area has experienced changes in planform since 1969. The rest of the reach (upstream) has experienced very little change in planform since 1969 	<ul style="list-style-type: none"> ■ Calculated Meander belt width: 35.9 metres ■ Preferred crossing width (Feature is actively regaining sinuosity. Must recommend at least three times bankfull width): 3x4 = 12 metres ■ <i>*Fluvial hydraulic assessment to be updated during Detail Design stage of the project.</i> ■ The sediment entrainment formula predicts Very Coarse Sand to Coarse Gravel sized materials could be moved for crossing PR-R-BBP-6B during the 2-to-100-year flow events. During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
HR-Trib-02	C10-B-1 C10-B-2	PR-R-BBP-5	Lake Simcoe Region Conservation Authority	Ephemeral undefined feature with no defined planform	20.9	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: None ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: Feature is not visible on aerial photographs 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-03	C10-C-1	PR-R-BBP-6A	Lake Simcoe Region Conservation Authority	Intermittent/permanent defined sinuous feature	411.6	5.72	10	50.8	Confined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 5-8 metres ■ Erosion: Active (exposed roots) ■ Woody Debris: Present ■ Entrenchment: None ■ Historical Assessment: Portion of reach that overlaps with the Study Area has experienced very little change in planform since 1969. The rest of the reach (downstream) has experienced changes in planform since 1969 	<ul style="list-style-type: none"> ■ Calculated Meander belt width: 50.8 metres ■ Preferred crossing width (upstream we recommended 12 metres.) This crossing must be at least 12 metres wide. ■ The sediment entrainment formula predicts Very Coarse Sand to Coarse Gravel sized materials could be moved for crossing PR-R-BBP-6A during 2-to-100-year flow events. During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.
HR-Trib-04	C11-A-1	PR-R-BBP-8B	Lake Simcoe Region Conservation Authority	Intermittent defined slightly sinuous feature	138.3	4.71	Less than 5	39.5	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 1 metre ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched at upstream extent of reach ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ Calculated Meander belt width: 39.5 metres ■ Preferred crossing width (100-year erosion rate + bankfull i.e., 1 x 2 +4.71 metres): 6.71 metres. ■ The sediment entrainment formula predicts Fine Sand to Coarse Sand sized materials could be moved for crossing PR-R-BBP-8B during 2-to-100-year flow events. During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
HR-Trib-05	C11-A-2	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined feature with no defined planform	8.4	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: Feature is not visible on aerial photographs	■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-06	C11-A-1	PR-R-BBP-8A PR-R-BBP-8B	Lake Simcoe Region Conservation Authority	Permanent defined meandering feature	92.4	3.92	8	37.6	Unconfined	N/A	Moderate ■ RGA: Transitional ■ TRCA Table 4 100-year Erosion Rate: 5-8 metres ■ Erosion: Active (leaning trees, exposed roots) ■ Woody Debris: Present ■ Entrenchment: Entrenched ■ Historical Assessment: No significant change in planform since 1969	■ Calculated Meander belt width: 37.6 metres ■ Feature has increased in sinuosity so need a wider crossing. Upstream we would recommend 6.71 metres so this can't be less and really ideally should be more. Three times bankfull is 12 metres . ■ The sediment entrainment formula predicts the following sediment sizes could be moved during the 2-to-100-year flow events: – PR-R-BBP-8A: Fine Sand to Coarse Sand – PR-R-BBP-8B: Fine Sand to Coarse Sand ■ During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.
HR-Trib-07	C12-A-1	PR-R-10IC-3 PR-R-10IC-2	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	40.9	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969	■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-08	C13-A-1	PR-CL-BBP-2	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	78.7	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 (slight increases in sinuosity in central part of reach)	■ No defined feature present. Defer to Drainage and Ecology.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
HR-Trib-09	C14-A-1	PR-CL-BBP-3	Lake Simcoe Region Conservation Authority	Ephemeral undefined sinuous feature	59.1	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: Present however it's likely not from fluvial processes ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-10	C16-A-2 C16-A-3	PR-CL-BBP-5	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	33.7	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
HR-Trib-11	C16-A-1	PR-R-C4IC-7 EX-CL-14	Lake Simcoe Region Conservation Authority	Permanent defined sinuous feature	208.6	3.27	10	26.5	Confined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In RegimeTRCA Table 4 100-year Erosion Rate: 1 to 2 metres ■ Erosion: No Active Erosion ■ Woody Debris: Present ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No crossing proposed - no input required.
HR-Trib-12	C17-B-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Permanent defined straight feature	28.6	8.5 - 9.0	Straight (channel likely altered)	74	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 1 metre ■ Erosion: No Active Erosion ■ Woody Debris: Present however it's likely not from fluvial processes ■ Entrenchment: Entrenched ~ 2 to 3 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No crossing proposed - no input required.
UD-01	C17-C-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~1 metre ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-02	C17-D-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~ 0.7 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
UD-03	C17-E-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~ 0.5 m ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-04	C17-F-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~ 0.25 to 0.5 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-05	C18-A-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~ 0.60 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-06	C18-B-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-07	No Crossing ID	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low Erosion: No Active Erosion Woody Debris: None Entrenchment: Entrenched Historical Assessment: No significant change in planform since 1969	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-08	C18-C-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-09	C18-E-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~ 2-3 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
UD-10	C18-G-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-11	C18-F-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Intermittent/permanent undefined straight feature	N/A	4.65	Straight (channel likely altered)	41.9	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 1-2 metres ■ Erosion: No Active Erosion ■ Woody Debris: Present however it's likely not from fluvial processes ■ Entrenchment: Entrenched (likely due to road embankment and embankment for rural residential property) ~1 to 2 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No crossing proposed - no input required.
UD-12	C18-H-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ~ 2 metres ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UD-13	C23-A-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	N/A	No Bankfull	No defined feature	N/A	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Entrenched ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
HREB-Trib-01	C22-A-1	PR-CL-BBP-11	Lake Simcoe Region Conservation Authority	Permanent defined straight feature	157.6	4.9	Pond	37.3	Unconfined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 1 metre ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: Becomes entrenched closer to pond ~0.5 metre ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ Calculated Meander belt width: 37.3 metres ■ Preferred crossing width (100-year erosion rate + bankfull i.e., 1 x 2 +4.9 metres): 6.9 metres ■ If watercourse does not span online pond at this location, then detailed natural channel design will be required ■ Culvert located at an irrigation pond. Hydraulic assessment to be coordinated with structural team. ■ During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.
UT-01	C24-A-1	PR-CL-BBP-14	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	46.6	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1969 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UT-02	C25-A-1	PR-CL-BBP-16 PR-R-LST-3 PR-R-LST-2	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	65.6	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1981 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UT-03	C25-B-1	PR-CL-BBP-17	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	19.2	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1981 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
UT-04	C25-C-1	PR-R-404-1	Lake Simcoe Region Conservation Authority	Ephemeral undefined straight feature	131.1	No Bankfull	No defined feature	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1981 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology.
UT-05	C25-C-1	PR-R-404-2	Lake Simcoe Region Conservation Authority	Permanent defined pond	121.9	No Bankfull	Pond	N/A	Unconfined	N/A	Very Low <ul style="list-style-type: none"> ■ Erosion: No Active Erosion ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1981 	<ul style="list-style-type: none"> ■ No defined feature present. Defer to Drainage and Ecology. ■ If watercourse does not span online pond at this location, then detailed natural channel design will be required. ■ The sediment entrainment formula predicts Coarse Sand to Fine Gravel sized materials could be moved for crossing PR-R-404-2 during 2-to-100-year flow events. During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.
UT-06	C25-C-1	PR-R-404-3	Lake Simcoe Region Conservation Authority	Permanent defined straight to sinuous feature	114.7	3.36	8	24.1	Confined	N/A	Low <ul style="list-style-type: none"> ■ RGA: In Regime ■ TRCA Table 4 100-year Erosion Rate: 1 metre ■ Erosion: Active (along farm crossing culvert) ■ Woody Debris: None ■ Entrenchment: None ■ Historical Assessment: No significant change in planform since 1981 (slight decrease in sinuosity suggesting possible straightening between 1981 and 2018) 	<ul style="list-style-type: none"> ■ Calculated Meander belt width: 24.1 metres ■ Preferred crossing width (100-year erosion rate + bankfull i.e., 1 x 2 +3.36 metres): 5.36 metres ■ The sediment entrainment formula predicts Very Coarse Gravel to Small Boulder Gravel sized materials could be moved for crossing PR-R-404-3 during 2-to-100-year flow events. During Detail Design, fluvial geomorphic input will be required to ensure fish passage through the crossing, as well as to maintain the stability of the channel.

Reach	Crossing ID	Drainage Culvert ID	Conservation Authority	Feature Type	Drainage Area (ha)*	Bankfull Width	Approx. Meander Amplitude	Final Meander Belt Width (MBW)	Floodplain Characteristics	Valley Setting/ Confinement	Erosion Risk	Fluvial Recommendations
MR-Trib-02a	C28-A-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Intermittent undefined straight feature	307.4	2	20	26.6	Unconfined	N/A	Low <ul style="list-style-type: none">■ RGA: In Regime■ TRCA Table 4 100-year Erosion Rate: 5-8 metres■ Erosion: Active■ Woody Debris: None■ Entrenchment: None■ Historical Assessment: No significant change in planform since 1969	■ Assume no new crossing at this location.
MR-Trib-01	C25-A-2 C26-A-1	PR-R-404-11 EX-CL-404-2 PR-R-404-10	Lake Simcoe Region Conservation Authority	Intermittent undefined sinuous to straight feature	40.2	3.27	10	32.5	Unconfined	N/A	Low <ul style="list-style-type: none">■ RGA: In Regime■ TRCA Table 4 100-year Erosion Rate: 5-8 metres■ Erosion: Active■ Woody Debris: None■ Entrenchment: None■ Historical Assessment: No significant change in planform since construction of Highway 404	■ Assume crossing size will be dictated by existing crossing at this location.
MR-Trib-02	C26-A-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Permanent defined meandering feature	307.4	2.71	20	31.3	Confined	N/A	Very Low <ul style="list-style-type: none">■ RGA: In Regime■ TRCA Table 4 100-year Erosion Rate: 1 metre■ Erosion: No Active Erosion■ Woody Debris: None■ Entrenchment: None■ Historical Assessment: No significant change in planform since 1969	■ Assume no new crossing at this location.
MR-Trib-03	C26-A-1	No Culvert ID	Lake Simcoe Region Conservation Authority	Permanent defined sinuous feature	787.4	2.5	12	22.6	Unconfined	N/A	Very Low <ul style="list-style-type: none">■ RGA: In Regime■ TRCA Table 4 100-year Erosion Rate: 1 metre■ Erosion: No Active Erosion■ Woody Debris: None■ Entrenchment: None■ Historical Assessment: No significant change in planform since 1969	■ Assume no new crossing at this location.

Note: * Drainage areas for the subject reaches were calculated using the Ontario Flow Assessment Tool by the Ministry of Northern Development, Natural Resources and Forestry at the downstream reach break

5.1.5.2.2 Realignment Recommendations and Considerations

The following general fluvial geomorphology realignment recommendations should be considered during Detail Design of the project:

- Channel realignment should be designed in accordance with Natural Channel Design principles and should be in compliance with Lake Simcoe Region Conservation Authority Guidelines 9.1 and 9.2, including Guideline 9.2.1 and Nottawasaga Valley Conservation Authority Guideline 4.6.3.1
- Maintain bankfull channel dimensions, hydraulics, and floodplain connectivity. Assume existing bankfull width and depth to be maintained with further assessment completed at the Detail Design stage
- Maintain meandering channel planform, where required
- Reduce impacts to infrastructure in close-proximity. Watercourse should be located away from highway embankment to avoid erosion at the embankment
- Improve physical habitat conditions for fish. This includes a low flow channel to improve connectivity during low flows and incorporating habitat features
- Maintain continuity of channel form and process. This includes an appropriate tie-in to the longitudinal profile and channel planform
- Minimize the loss of channel length. There should be no net loss of channel length unless an increase in channel slope is beneficial to the overall design, and
- Channel should flow perpendicularly through the crossing structure with a straighter path to the culvert which will eliminate erosion risk to the culvert inlet.

Table 5-13 summarizes the expected alignment work. Final details will be confirmed in subsequent Detail Design phases.

Table 5-13: Watercourses Requiring Realignment Work

Multi-Discipline Crossing ID	Drainage Culvert ID	Culvert Location	Fluvial Geomorphology Reach	Fisheries Watercourse ID	Realignment Necessary?	Fluvial Hydrological Regime	Fisheries Realignment Constraints and Comments
C10-A-1	PR-CL-2	Proposed Sideroad Culverts	PC-Trib-02	WC1	Realignment required to bring feature outside of the limits of grading	Permanent	target 2-year velocity: 1.1 metres per second
C10-A-2	PR-R-BBP-4	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts					target 2-year velocity: 0.8 metres per second
C10-A-3	PR-R-BBP-10	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts	PC-Trib-01		Realignment required to bring feature outside of the limits of grading	Permanent	target 2-year velocity: 0.86 metres per second
C10-A-4	PR-R-BBP-9	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts					-
C10-A-4	PR-CL-400-2	Proposed Highway 400 Culverts					target 2-year velocity: 0.62 metres per second
C10-A-4	PR-R-BBP-11	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts					target 2-year velocity: 0.62 metres per second
C10-A-C	PR-CL-2	Proposed Sideroad Culverts	PC-Trib-03		Realignment required to bring feature outside of the limits of grading	Permanent	target 2-year velocity: 1.1 metres per second
C10-A-B	EX-CL-400-1	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts	PC-Trib-04		No realignment required	Intermittent	not fish habitat
C10-A-A	No Proposed Culvert	No Proposed Culvert	PC-Trib-05		No realignment required	Ephemeral	indirect fish habitat-maintain connectivity to surrounding watercourses
C10-A-6	No Proposed Culvert	No Proposed Culvert	HR-Trib-01a	-	No realignment required	Ephemeral	not fish habitat
C10-C-2	PR-R-BBP-6B	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts	HR-Trib-01	WC-2a	Realignment required to reorient feature so that it crosses at proper alignment under road	Intermittent	target 2-year velocity: 0.70 metre per second
C10-B-1	No Proposed Culvert	No Proposed Culvert	HR-Trib-02	WC-2	Realignment required to reorient feature so that it crosses at proper alignment under road	Ephemeral	not fish habitat
C10-B-2	PR-R-BBP-5	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts					not fish habitat
C10-C-1	PR-R-BBP-6A	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts	HR-Trib-03	WC-2a	No realignment required	Intermittent/Permanent	target 2-year velocity: 0.75 metres per second
-	PR-R-BBP-8B	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts	HR-Trib-04	WC-4	Realignment required to bring feature outside of the limits of grading	Intermittent	target 2-year velocity: 0.81 metres per second
C11-A-2	No Proposed Culvert	No Proposed Culvert	HR-Trib-05		Realignment required at North end of feature to bring it outside of the limits of grading	Ephemeral	not fish habitat
C11-A-1	PR-R-BBP-8A	Bradford Bypass & Highway 400 Interchange – Proposed Ramp Culverts	HR-Trib-06	WC-3	Realignment may be required to bring feature through culvert	Permanent	target 2-year velocity: 0.81 metres per second
	PR-CL-BBP-8B	Proposed Bradford Bypass Transverse Culverts					target 2-year velocity: 0.81 metres per second
C12-A-1	PR-R-10IC-2	Bradford Bypass & 10 th Sideroad Interchange - Proposed Ramp Culverts	HR-Trib-07	WC-5	Existing pond upstream of PR-R-10IC-2 to be retrofitted (if feasible)	Ephemeral	target 2-year velocity: 0.71 metres per second
C12-A-1	PR-R-10IC-3	Bradford Bypass & 10 th Sideroad Interchange - Proposed Ramp Culverts					target 2-year velocity: 0.71 metres per second
C13-A-1	PR-CL-BBP-2	Proposed Bradford Bypass Transverse Culverts	HR-Trib-08			Realignment may be required to bring feature through culvert	Ephemeral
C14-A-1	PR-CL-BBP-3	Proposed Bradford Bypass Transverse Culverts	HR-Trib-09	-	No realignment required	Ephemeral	not fish habitat

Multi-Discipline Crossing ID	Drainage Culvert ID	Culvert Location	Fluvial Geomorphology Reach	Fisheries Watercourse ID	Realignment Necessary?	Fluvial Hydrological Regime	Fisheries Realignment Constraints and Comments
C16-A-2 C16-A-3	PR-CL-BBP-5	Proposed Bradford Bypass Transverse Culverts	HR-Trib-10	WC-8	Realignment required to bring feature through culvert	Ephemeral	not fish habitat
C16-A-1	PR-R-C4IC-7 EX-CL-14	Bradford Bypass & County Road 4 Interchange - Proposed Ramp Culverts	HR-Trib-11	WC-9	Realignment required to bring feature outside of limit of grading	Permanent	target 2-year velocity: 0.6 metres per second
C17-B-1	No Proposed Culvert	No Proposed Culvert	HR-Trib-12	WC-11	No realignment required	Permanent	
C17-C-1	No Proposed Culvert	No Proposed Culvert	UD-01	WC-12	No realignment required	Ephemeral	
C17-D-1	No Proposed Culvert	No Proposed Culvert	UD-02	WC-13	No realignment required	Ephemeral	
C17-E-1	No Proposed Culvert	No Proposed Culvert	UD-03	WC-14	No realignment required	Ephemeral	
C17-F-1	No Proposed Culvert	No Proposed Culvert	UD-04	WC-15	No realignment required	Ephemeral	
C18-A-1	No Proposed Culvert	No Proposed Culvert	UD-05	WC-16	No realignment required	Ephemeral	
C18-B-1	No Proposed Culvert	No Proposed Culvert	UD-06	WC-17	No realignment required	Ephemeral	
-	No Proposed Culvert	No Proposed Culvert	UD-07	WC-18	No realignment required	Ephemeral	
C18-C-1	No Proposed Culvert	No Proposed Culvert	UD-08	WC-19	No realignment required	Ephemeral	
C18-E-1	No Proposed Culvert	No Proposed Culvert	UD-09	WC-20	No realignment required	Ephemeral	
C18-G-1	No Proposed Culvert	No Proposed Culvert	UD-10	WC-23	No realignment required	Ephemeral	
C18-F-1	No Proposed Culvert	No Proposed Culvert	UD-11	WC-24	No realignment required	Intermittent/ Permanent	
C18-H-1	No Proposed Culvert	No Proposed Culvert	UD-12	WC-23	No realignment required	Ephemeral	
C23-A-1	PR-R-2CON-3	Bradford Bypass & 2 nd Concession Road Interchange - Proposed Ramp Culverts	UD-13	WC-27	Realignment may be required to bring feature through culvert	Ephemeral	not fish habitat
C22-A-1	PR-CL-BBP-11	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts	HREB-Trib-01		Realignment may be necessary to move southern end of pond	Permanent	target velocity: 0.47 metres per second (N.pike spawning habitat)
C24-A-1	PR-CL-BBP-14	Proposed Bradford Bypass Transverse Culverts	UT-01	WC-28	No realignment required	Ephemeral	not fish habitat
C25-A-1	PR-CL-BBP-16	Proposed Bradford Bypass Transverse Culverts	UT-02	WC-29	No realignment required	Ephemeral	target velocity: 0.72 metres per second - indirect fish habitat
	PR-R-LST-3						
	PR-R-LST-2						
C25-B-1	PR-CL-BBP-17	Proposed Bradford Bypass Transverse Culverts	UT-03	WC-30	No realignment required	Ephemeral	not fish habitat
C25-C-1	PR-R-404-1	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts	UT-04	WC-31	No realignment required	Ephemeral	not fish habitat
C25-C-1	PR-R-404-2	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts	UT-05		Realignment required to remove pond	Pond	target velocity: 0.39 metres per second
C25-C-1	PR-R-404-3	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts	UT-06		No realignment required	Permanent	target velocity: 0.39 metres per second
C28-A-1	No Proposed Culvert	No Proposed Culvert	MR-Trib-02a	WC-32	No realignment required	Intermittent	direct fish habitat
C25-A-2	PR-R-404-11	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts	MR-Trib-01		No realignment required	Intermittent	target velocity: 0.75 metres per second
	EX-CL-404-2	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts					target velocity: 0.75 metres per second
C26-A-1	PR-R-404-10	Bradford Bypass & Highway 404 Interchange – Proposed Ramp Culverts					target velocity: 0.6 metres per second
C26-A-1	No Proposed Culvert	No Proposed Culvert	MR-Trib-02		No realignment required	Permanent	indirect fish habitat
C26-A-1	No Proposed Culvert	No Proposed Culvert	MR-Trib-03		No realignment required	Permanent	indirect fish habitat

5.1.6 Erosion and Sedimentation Overview Risk Assessment

The purpose of the Erosion and Sedimentation Overview Risk Assessment is to assess site specific erosion potential and to identify appropriate level of protection to minimize any adverse impact on the surrounding environment due to the project, the soils and topographic characteristics of the Study Area, and the sensitivity of the environmental features to sedimentation.

5.1.6.1 Potential Impacts

A summary is provided below about the potential erosion and sedimentation impacts on receiving watercourse/waterbodies, vegetation, and wetlands due to the proposed project works. Full impacts to terrestrial ecosystems and fish and fish habitats and recommended mitigation measures are summarized in **Section 5.1.1** and **Section 5.1.2**.

The Erosion and Sedimentation Overview Risk Assessment Guide states that sedimentation can adversely impact aquatic habitats, affect the aquatic environment, wetlands and ecologically significant areas, including fish and fish habitat, and specialized wildlife habitats, notably those supporting species at risk. Depositing fine sediment in spawning areas can smother eggs and make streambed materials unusable for spawning. Ecologically significant areas and wildlife habitats may be destroyed or significantly impacted by smothering of vegetation and impairment to their ecological functions.

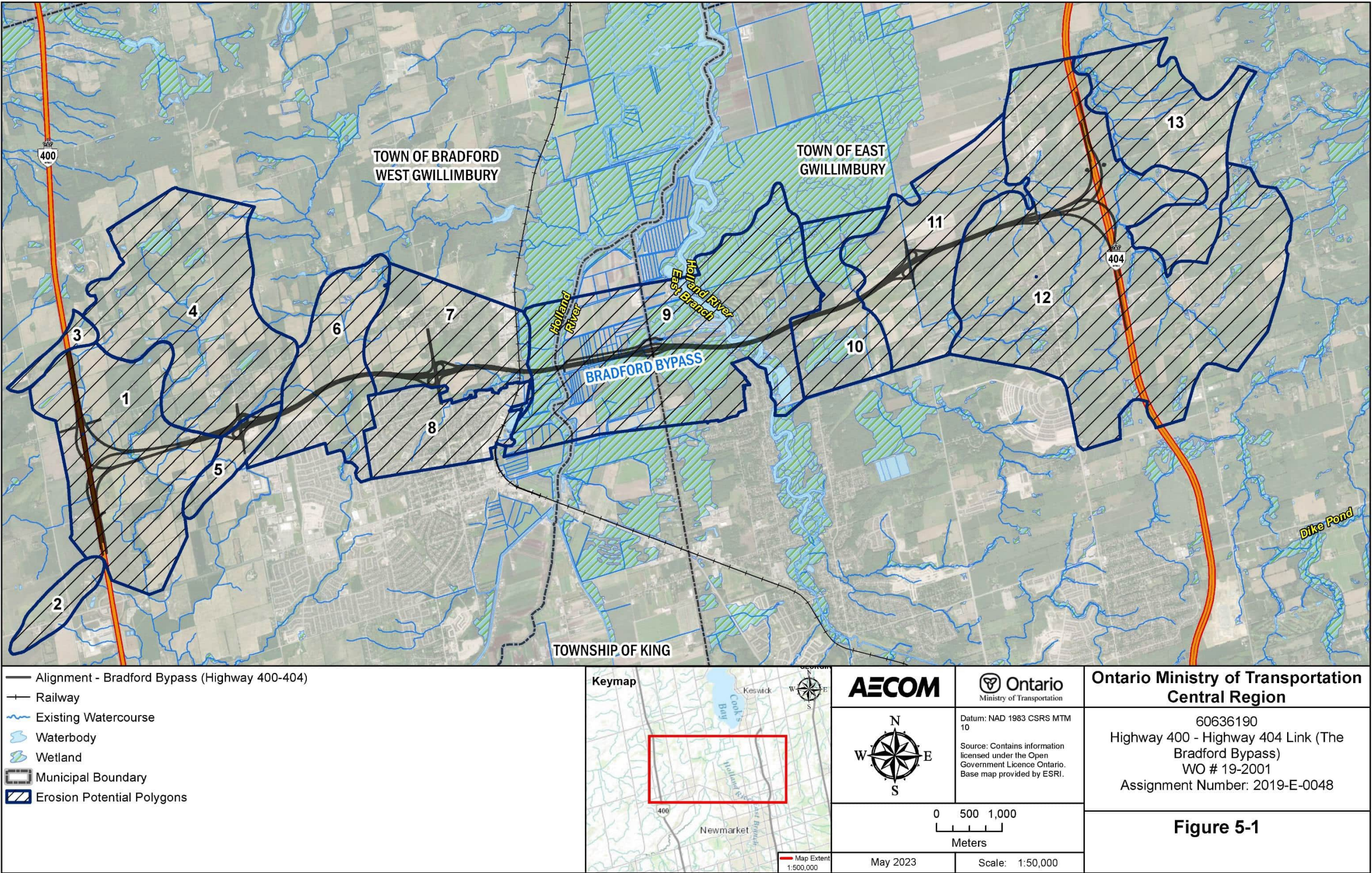
Erosion at construction sites can affect project costs and timelines. For example, repair of damage due to large soil movement or gully formation may require resources to be diverted from other construction activities. Damage to adjacent private properties or receiving waterbodies, caused by soil leaving the site, can be costly to repair. In extreme cases, this can also affect project completion schedules.

Consequence Rating is the potential for sediment to cause unacceptable adverse impacts to environmental sensitive areas and the due to construction activities, and it is expressed in a scale of Low, Moderate and High. The consequence rating is determined from the sensitivity of the receiving environment to sedimentation, and the connectivity that is defined as the likelihood that a significant amount of sediments will reach the receiving environment and it can be Direct, Indirect and No Connectivity. **Table 5-14** provides the consequence rating and potential impact to sensitive areas located along the Bradford Bypass, and these areas are shown on **Figure 5-1**.

Table 5-14: Erosion and Sediment Control Risk Assessment Summary

Polygon No.	Surficial Soil Type	Soil Erodibility Rating	Slope Gradient (%)	Slope Length (m)	Erosion Potential	Rational for Erosion Potential	Consequence Rating	Rationale for Consequence Rating (Receiving Environment Sensitivity)	Erosion and Sedimentation Risk
1	Silty Clay Loam	Medium	2 – 5	>70	Moderate	Moderate risk for both surface soil, slope and slope length.	High	A High risk is adopted due to the presence of the Tributary of Penville Creek which required protection	High
2	Loam	High	2 – 5	>70	High	High risk for surface soil, slope and slope length.	High	High risk due to the presence of the Tributary of Penville Creek to the north	High
3	Loam	High	2 – 5	>70	High	High risk for surface soil, slope and slope length.	High	High risk due to the presence of the Tributary of Penville Creek to the north	High
4	Gravelly Loamy Sand	Low	5 - 9	>70	Low	Low risk for surface soil, slope and slope length.	Moderate	Discharge to a tributary of the Holland River	Moderate
5	Loam	High	2 – 5	>70	High	High risk for surface soil, slope and slope length.	High	The polygon drains to a watercourse and ultimately discharge to Holland River	High
6	Silty Clay Loam	Medium	2 - 5	>70	Moderate	Moderate risk for surface soil, slope and slope length.	Moderate	Discharge to a tributary of the Holland River	Moderate
7	Loam	High	2 - 5	>70	High	High risk for surface soil, slope and slope length.	High	Directly connected to sensitive areas adjacent to Holland River	High
8	Unknown	-	-	>70	High (Assumed)	Unknown risk for surface soil, slope and slope length. No data based available	High	Discharge to sensitive areas adjacent to Holland River	High
9	Sandy Loam (70% and Organic (30%)	Low	0 - 9	>70	Low	Low risk for surface soil, slope and slope length.	High	Discharge to sensitive areas adjacent to Holland River and Holland River East Branch	High
10	Sandy Loam (60% and Organic (40%)	Low	0 - 9	>70	Low	Low risk for surface soil, slope and slope length.	High	Discharge to Holland River East Branch	High
11	Silt Loam	High	0 - 2	>70	High	High risk for surface soil, slope and slope length. However, the slope gradient 0 to 2% and the slope length is >70 metres.	Moderate	Does not discharge directly to sensitive areas	Moderate
12	Sandy Loam (80%) and Clay Loam (20%)	Low	2 - 9	>70	Low	Low risk for surface soil, slope and slope length.	High	High risk due to tributaries of Holland River East Branch that cross the Bradford Bypass and different locations	High
13	Loam	High	2 - 5	>70	Low	High risk for surface soil, slope and slope length.	Moderate	Discharge to tributaries of the Maskinonge Rive that drains away from the Bradford Bypass	Moderate

Figure 5-1: Areas with Erosion Potential Within the Study Area



5.1.6.2 Commitments and Recommended Mitigation Measures

Best Management Practices will be selected and designed following the procedures provided in Tables 8.1, 8.2 and 8.3 in the Ministry's Erosion and Sedimentation Overview Risk Assessment Guide. These tables provide commonly used procedures during the selection of Best Management Practices and the applicability of each Best Management Practice to each construction site, commonly used water management Best Management Practices to control runoff, and the importance of selecting appropriate erosion control methods based on specific area characteristics and mitigation requirements.

Best Management Practices for erosion and sediment control applications are measures implemented to prevent erosion, and if erosion occurs, to reduce and mitigate the release of sediment to receiving water bodies; and they should be selected carefully to make sure that will achieve their intended purpose.

Best Management Practices are included in the contract drawings to ensure that the Ministry regulatory concerns are addressed in terms of erosion potential and sedimentation. The Best Management Practices are documented in Section 7 of the Erosion and Sedimentation Overview Risk Assessment.

5.1.6.2.1 Preliminary Erosion and Sediment Control Recommendations

Based on an assessment of the existing conditions of the Bradford Bypass project, and the proposed highway works the following Ontario Provincial Standard Specifications for erosion and sediment control during construction are recommended. It should be investigated if revised and/or additional provisions/specifications developed in the future would need to be considered during the detail design phase.

■ Ontario Provincial Standard Specifications:

- OPSS Prov.-100: Ministry General Conditions of Contract
- OPSS Prov.-180: Management of Excess Materials
- OPSS Prov.-801: Protection of Trees
- OPSS Muni.-802: Topsoil
- OPSS Prov.-803: Vegetative Cover
- OPSS Prov.-804: Temporary Erosion Control
- OPSS Prov.-805: Temporary Sediment Control
- OPSS Prov.-517: Dewatering, and
- 1SSP 100S59 Amendment to Ministry General Conditions of Contract, November 2016.

■ **Working Area Perimeter - Sediment Control Best Management Practices:**

- OPSD-219.110 Light Duty Straw Bale Barrier
- OPSD-219.130 Heavy Duty Straw Bale Barrier
- MTOD-219.110 Sediment Fence Barrier
- MTOD-219.120 Fibre Roll Barrier
- MTOD-219.131 Wire-Backed Sediment Fence Barrier
- OPSD-219.150 Sandbag Barrier, and
- OPSD-219.160 Fibre Roll Grade Breaks.

■ **Drainage, Check Dams and Sedimentation Basin Best Management Practices:**

- OPSD-219.180: Straw Bale Flow Check Dam (OPSD-219.191, 219.200, 219.210 and 219.211 are favored options over 219.180)
- OPSD-219.191 Fibre Roll Flow Check Dam
- OPSD-219.200 Sandbag Flow Check
- MTOD-219.210 Rock Flow Check Dam V-Ditch
- MTOD-219.211 Rock Flow Check Dam Flat Bottom Ditch
- OPSD-219.220 Sediment Trap in Ditch
- MTOD-219.230 Slope Drain for Sediment Trap
- MTOD-219.231 Berm Barrier for Slope Drain, and
- OPSD-219.240 Sediment Trap for Dewatering.

■ **In-Water and Near-Water Works Best Management Practices:**

- OPSD-219.260 Turbidity Curtain
- OPSD-219.261 Turbidity Curtain, Seam Detail
- OPSD-221.010 Temporary Water Passage System – Culvert in Watercourse
- OPSD-221.020 Temporary Water Passage System – Pumping and Piping, and
- Specific in-water works will need to be designed, which are not depicted through.

In addition to the above-mentioned specifications, the types of Best Management Practices that should be implemented as part of the project are described below:

- ***Project Planning and Design Best Management Practices*** – these Best Management Practices consider erosion potential along the Bradford Bypass corridor, to avoid areas with higher risk of erosion and higher adverse impacts along the highway (wetlands), and waterbody crossings

- **Procedural Best Management Practices** – these measures are considered good housekeeping, and include site management, and scheduling practices; such as, minimize exposed soils, perimeter control, site access management, stockpile management as required, dust management, optimize construction sequence, and install Best Management Practices early and restore early (see Erosion and Sedimentation Overview Risk Assessment Guide Table 8.1)
- **Water Management Best Management Practices** – these Best Management Practices are recommended to minimize watercourse disturbance, keep clean water clean, and anticipate and manage groundwater where possible. (see Erosion and Sedimentation Overview Risk Assessment Guide Table 8.2), and
- **Erosion Control Best Management Practices** – these Best Management Practices are recommended to reduce potential for erosion due to wind, rain splash, and flowing water. Cover is the single most effective erosion control practice. (see Erosion and Sedimentation Overview Risk Assessment Guide Table 8.3).

5.1.6.2.2 Mitigation Measures

Implementation of the following standard mitigation will assist in addressing erosion and sediment control for the project:

- OPSS-180: General Specification for the Management of Excess Materials
- OPSS-201: Construction Specification for the Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders
- OPSS-804: Construction Specification for the Seed and Cover
- Any woody vegetation removed during the proposed works will be replaced with a similar native species
- Areas of herbaceous vegetation disturbed during proposed works will be seeded with Ministry's Custom Roadside Pollinator Mix
- Temporary Flow Diversions shall be conducted in accordance with OPSS-182 and OPSS-517
- Dewatering and the Use of Pumps shall be conducted in accordance with OPSS-182 and OPSS-518 (combined with OPSS-185 and replaced by a revised OPSS-517 in 2017)
- Fish Protection shall be conducted in accordance with OPSS-182
- Preservation of Riparian Vegetation shall be in accordance with OPSS-182

- Erosion and Sediment Controls shall be in accordance with OPSS-182 and OPSS-805, and
- Restoration of Disturbed Areas shall be in accordance with OPSS-182 and OPSS-804.

It will be the responsibility of the contractor to review the preliminary Erosion and Sediment Control Plan and potentially develop a supplementary Erosion and Sediment Control Plan should the contractor use construction staging and methods different from those addressed in this Erosion and Sedimentation Overview Risk Assessment. The contractor should implement the Main and Supplemental Erosion and Sediment Control Plan by adhering to the following recommendations:

- An Erosion and Sediment Control Plan should be designed and implemented to contain/isolate exposed soils, stockpiled materials and unstable areas in the work zone, prevent the release of sediment to a waterbody and assure the work site is stabilized prior to removal following construction
- Sediment fencing should be installed along the construction limits as detailed in the Contract Drawings to prevent contamination of watercourses, waterbodies and wetlands
- Fencing should already be installed around potentially suitable Blanding's Turtle habitat, which should protect it from degradation by sediment deposition or other contaminants
- The extent and duration that disturbed soils are exposed to the elements shall be minimized
- Seed mix and/or mulch, and topsoil shall be placed in areas of soil disturbance to provide adequate slope protection and long-term slope stabilization
- Rock-check dams (or equivalent flow checks) will be placed as necessary at appropriate intervals in roadside ditches down gradient from areas of soil disturbance to trap suspended sediments and reduce the erosive force of runoff
- Delineate storage, stockpiling and staging areas prior to construction and inspect them in accordance with the Ontario Ministry of Transportation Construction Administration and Inspection Task Manual
- Assure that material generated during maintenance of sediment control measures (i.e., silt fence, flow checks dams, etc.) will be taken off-site for disposal, and
- Following construction, once disturbed areas have stabilized, all temporary erosion and sedimentation controls shall be removed.

Erosion and sediment control structures shall be routinely inspected as well as checked after storms and repaired as required. The structures will be cleaned out when accumulated sediment reaches half the design height.

5.1.6.2.3 Erosion and Sediment Control Accountability and Administration

Contractor Responsibility

The contractor will be required to review the preliminary Erosion and Sediment Control Plan and potentially develop a supplementary Erosion and Sediment Control Plan should the contractor use construction staging and methods different from those addressed in this Erosion and Sedimentation Overview Risk Assessment and associated Erosion and Sediment Control Plan. The contractor should implement the Main and Supplemental Erosion and Sedimentation Overview Risk Assessment Plan by:

- Adhering to OPSS 805 and Ministry NSSP: Erosion and Sediment Control
- Reviewing, changing and/or adapting the Erosion and Sediment Control Plan during the life of the project as needed to assure that it continues to be effective (i.e., meets all legislative requirements and project commitments)
- In-water and near-water work should be monitored to assure mitigation measures are properly implemented, functioning, maintained and repaired as needed, and removed following construction
- Dewatering operations should be managed to prevent erosion or the release of sediment-laden water to a waterbody
- An Erosion and Sediment Control Plan should be designed and implemented to contain/isolate exposed soils, stockpiled materials and unstable areas in the work zone, prevent the release of sediment to a waterbody and assure the work site is stabilized prior to removal following construction
- Sediment fencing should be installed along the construction limits as detailed in the Contract Drawings to prevent contamination of watercourses, waterbodies and wetlands
- Fencing should already be installed around potentially suitable Blanding's Turtle habitat, which should protect it from degradation by sediment deposition or other contaminants, and
- Any Species at Risk observations should be reported to Ministry of Natural Resources and Forestry and the Ministry and protection must be implemented immediately to assure compliance with the Endangered Species Act. Should Species at Risk be observed within the work area, works in the immediate vicinity should be stopped and an on-site qualified biologist shall be contacted to confirm the species identification and, if necessary, relocate the individual to suitable habitat outside of the Construction Disturbance Area.

5.2 Social and Economic Environment

5.2.1 Land Use and Property

5.2.1.1 Potential Impacts

The Bradford Bypass serves the significant growth and economic development by providing an appropriate infrastructure connection among settlement areas and improving the movement of goods, while providing a safe commute over a shorter period of time. The overall impact of the Bradford Bypass is expected to be positive as it would relieve congestion on existing east-west local roads and provide a northern freeway connection between Highway 400 and Highway 404.

This review of land use and property focuses on settlement areas and lands that are not protected as natural areas such as wetlands, watercourses etc. Refer to **Section 5.1.1** and **Section 5.1.2** for detail on impacts to the terrestrial ecosystem and fisheries watercourses.

There are a number of existing businesses (commercial/industrial) operating within the Study Area. The overall impact to businesses is expected to be positive as traffic flow and accessibility will be improved. Once completed, the Bradford Bypass would attract more business to the area, creating and sustaining good local jobs.

The project will result in the loss of some lands currently used for agriculture. There is a potential that the agricultural viability of the remaining farmlands will be limited due to land severances and a consequent reduction in parcel size, potential irregular parcel shapes and access issues. Those impacts are being reviewed with further details on impacts to agriculture provided in **Section 5.2.2**.

Potential impacts to local residents and residential properties may include impacts on regular traffic flow (due to temporary traffic congestions) and travel time during construction; however, these effects are all temporary in nature, and will be reduced by the implementation of appropriate mitigation measures and will eventually diminish after completion of construction.

Section 5.2.1.2 below highlights the commitments and recommended mitigation measures related to land use and property.

5.2.1.2 Commitments and Recommended Mitigation Measures

Where possible, the Bradford Bypass will avoid impacts to private properties, such as impacts to driveways and property access. The potential property impacts have been investigated as part of Preliminary Design and will be further confirmed during Detail Design.

Ongoing consultation with emergency services, businesses, local residents, student transportation companies, area municipalities and key stakeholders during future Detail Design and construction regarding traffic staging, detours and other temporary traffic impacts will assist in minimizing adverse effects.

5.2.2 Agriculture

This section outlines the potential impacts and proposed commitments and recommended mitigation measures regarding impacts to agricultural lands and resources.

5.2.2.1 Potential Impacts

The fundamental base used for the evaluation of agricultural lands is land quality, i.e., Canadian Land Inventory soil capability ratings.

The identification and assessment of potential impacts is paramount to determining potential mitigation measures to either eliminate or offset the impact of the project to the extent feasible. A review of the Ontario Ministry of Agriculture, Draft Agricultural Impact Assessment Guidance Document (Ontario Ministry of Agriculture, Food and Rural Affairs, 2018) identified numerous potential impacts to agriculture which may include:

- Interim or permanent loss of agricultural lands
- Fragmentation, severing or land locking of agricultural lands and operations -
The loss of existing and future farming opportunities
- The loss of infrastructure, services or assets
- The loss of investments in structures and land improvements
- Disruption or loss of functional drainage systems
- Disruption or loss of irrigation systems
- Changes to soil drainage
- Changes to surface drainage
- Changes to landforms
- Changes to hydrogeological conditions
- Disruption to surrounding farm operations
- Effects of noise, vibration, dust
- Potential compatibility concerns
- Traffic concerns, and
- Changes to adjacent cropping due to light pollution.

Table 5-15 below describes each potential impact in the context of the project.

Table 5-15: Potential Impacts to Agricultural Lands and Resources

Potential Impacts	Actual Impacts
Interim or permanent loss of agricultural lands	<ul style="list-style-type: none"> There will be a permanent loss of the use of agricultural lands within the Study Area, and The impact is applicable for both the construction and the operation of the project.
Fragmentation, severing or land locking of agricultural lands and operations	<ul style="list-style-type: none"> There will be fragmentation and severing of agricultural lands as a result of the proposed future development of the Bradford Bypass In the Town of Bradford West Gwillimbury, the majority of the proposed corridor for the Bradford Bypass runs along the back property lines in the agricultural area thereby limiting fragmentation and providing for the largest remaining agricultural area In the Town of Bradford West Gwillimbury, a total of six severed parcels were noted Of the six severed parcels, five parcels were considered as landlocked (no access) In the Town of East Gwillimbury, the proposed corridor will sever four parcels (landlocking two parcels) In the Town of King, the proposed corridor will sever one parcel (landlocking one parcel), and The impact is applicable for both the construction and the operation of the project.
The loss of existing and future farming opportunities	<ul style="list-style-type: none"> There will be a loss of existing and future farming opportunities on the Bradford Bypass lands due to the creation of the proposed highway, and The impact is applicable for both the construction and the operation of the project.
The loss of infrastructure, services or assets	<ul style="list-style-type: none"> There will be no loss of infrastructure or services as a result of the project.
The loss of investments in structures and land improvements	<ul style="list-style-type: none"> There is a net loss of investment in agriculture (potentially two buildings, tile drainage, and possibly some irrigation) as a result of the project, and The impact is applicable for both the construction and the operation of the project.
The loss of use of groundwater wells	<ul style="list-style-type: none"> Due to the locations and numbers of water wells in the Study Area, it will be important to either preserve the existing wells, or properly engineer the closing/capping of any wells in the Study Area to prevent potential groundwater contamination, and The impact is applicable for the construction of the project.
Disruption or loss of functional drainage systems	<ul style="list-style-type: none"> There will be a net loss of artificial tile drainage on the Study Area, and there is no net loss or disruption to artificial tile drainage systems in the Study Area In areas where the proposed corridor will impact agricultural fields containing tile drainage, the remaining portions of the tile drainage system in the agricultural fields will need to be maintained and functional, and The impact is applicable for the construction of the project.
Disruption or loss of irrigation systems	<ul style="list-style-type: none"> There may be loss of investment in irrigation systems depending on the type of irrigation system used In areas where the proposed corridor will impact agricultural fields containing irrigation systems, the remaining portions of irrigation system in the agricultural fields will need to be maintained and functional, and The impact is applicable for the construction of the project.
Changes to soil drainage	<ul style="list-style-type: none"> There will be no net change in soil drainage in the Study Area as a result of future development of the Bradford Bypass lands.
Changes to surface drainage	<ul style="list-style-type: none"> There will be no net change in surface drainage within the Secondary Study Area as a result of future development of the Bradford Bypass lands, and The future development of the corridor should take into account the existing agricultural surface drainage and maintain the functionality of the existing drainage.
Changes to landforms	<ul style="list-style-type: none"> There will be no changes to landforms (with respect to agriculture) in the Study Area as a result of future development of the project, and There will be changes in landforms as part of the development of interchanges within the corridor.
Changes to hydrogeological conditions	<ul style="list-style-type: none"> Any potential changes in hydrogeological conditions are documented in the Groundwater Protection and Well Monitoring Plan under separate cover (AECOM, 2023).
Disruption to surrounding farm operations	<ul style="list-style-type: none"> There will be limited disruption for surrounding/adjacent farms as the project will be within the proposed corridor. The impact is applicable for both the construction and the operation of the project.
Effects of noise, vibration, dust	<ul style="list-style-type: none"> There should be limited potential for additional vibration and dust during the operational phase of the project There is a potential for noise, vibration and dust during the initial construction phase, and the potential for increased noise during the operation of the project There is potential for fugitive dust and salt spray during the operation of the project To view applicable mitigation measures pertaining to noise, vibration and dust please reference the following reports under separate cover: Bradford Bypass Noise Report (AECOM, 2023), and Bradford Bypass Air Quality Report (AECOM, 2023), and The impact is applicable for both the construction and the operation of the project.

Potential Impacts	Actual Impacts
Potential compatibility concerns	<ul style="list-style-type: none">■ There should be limited potential for compatibility concerns with the future development of the Bradford Bypass lands and the adjacent agricultural lands as these lands have been identified in the respective Official Plans, with continued planning for compatibility with the adjacent land uses.
Traffic concerns	<ul style="list-style-type: none">■ It is noted that population and employment forecasts are anticipated to rise through the horizon year, and as a result it is anticipated that traffic volumes on the road network are anticipated to increase■ As a result, there may need to be the need for more coordination of agricultural traffic■ The scope of this project study is confined to the Study Area and does not include an assessment of local municipal roads■ To review applicable mitigation measures pertaining to traffic please reference the traffic study under separate cover, and■ The impact is applicable for both the construction and the operation of the project.
Changes to adjacent cropping due to light pollution	<ul style="list-style-type: none">■ There is potential for changes in cropping due to light pollution, as the project will include lighting■ Any use of lighting should take into consideration the impact on adjacent agricultural lands, and■ The impact is applicable for both the construction and the operation of the project.
Fugitive dust, salt spray, de-icing substances / compounds	<ul style="list-style-type: none">■ There is the potential for fugitive dust, salt spray and de-icing compounds to potentially impact the adjacent agricultural areas, and■ The impact is applicable for both the construction and the operation of the project.
Potential shading of Specialty Crop Area from highway bridges	<ul style="list-style-type: none">■ There is the potential for the proposed bridge(s) over the Holland River and Holland River East Branch to create shaded areas over the Specialty Crop Area lands, and■ The impact is applicable for both the construction and the operation of the project.

5.2.2.2 Commitments and Recommended Mitigation Measures

5.2.2.2.1 Avoidance

Any change in land use within or adjacent to an identified or designated prime agricultural area will result in the potential for impacts to the adjacent agricultural area. The severity of the potential impacts is related to the type and size of the change in land use, and the degree of agricultural activities and operations in the surrounding area.

The first method of addressing potential impacts is to avoid the potential impact. In this study, the proposed future development of the Bradford Bypass lands will be a permanent use with portions of the Bradford Bypass being located within designated agricultural areas. As a result, there will be designated agricultural lands lost due to the project, which cannot be avoided.

Similar statements can be made with regard to tile drainage systems, farm buildings, and water wells. The proposed future development of the Bradford Bypass will result in direct impacts (loss) to those agricultural investments. This cannot be avoided. There is a potential to impact irrigation systems.

Further, the proposed future development of the Bradford Bypass will result in the creation of severed agricultural parcels and increased fragmentation of the agricultural land base. This cannot be avoided.

5.2.2.2.2 Minimizing Impacts

When avoidance is not possible, the next priority is to minimize impacts to the extent feasible. As a result, mitigation measures should be developed to lessen any potential impacts. The minimization of impacts may be achieved during the design process and through proactive planning measures that provide for the separation of land uses.

For this project, any potential impacts to agricultural lands will be related to the loss of agricultural land, loss of prime agricultural land, creation of severed parcels, increased fragmentation of the land base on the designated agricultural lands. These potential impacts cannot be avoided. There will also be the potential of impacts on the adjacent agricultural lands and community by virtue of the proposed locations of the interchanges and by the proposed highway lighting.

Impacts may be minimized by directing impacts away from the adjacent agricultural lands. The first method of minimizing impacts was addressed in the 2002 Approved Environmental Assessment whereby efforts were made to reduce impacts by locating the proposed route along lot lines, or property lines where possible, in an effort to minimize severances and fragmentation.

Secondly, the 2002 Approved Environmental Assessment attempted to cross the Provincially designated Specialty Crop Area in as straight a line as possible, and at a narrow location in an effort to minimize loss of Specialty Crop lands.

Thirdly, the 2002 Approved Environmental Assessment attempted to maintain as straight a corridor as possible in an effort to minimize severances and fragmentation.

Finally, the 2002 Approved Environmental Assessment attempted to avoid agricultural investment in agricultural buildings, tile drainage, and irrigation areas.

The Updated Technically Preferred Route has taken into consideration the 2002 Approved Environmental Assessment by maintaining parts of the original alignment and employing similar techniques to minimize the corridor footprint and impact the fewest agricultural buildings, investment and agricultural operations, thereby minimizing the potential impacts to the agricultural land base, agricultural operations, and the agricultural system.

5.2.2.2.3 Mitigating Impacts

When avoidance techniques and minimizing potential impacts to agriculture have not achieved the desired effect the next priority is to mitigate any further impact. Potential mitigation measures may include:

- The creation of berms or vegetated features between the different types and intensities of land uses to reduce the potential for trespassing and potential vandalism. These types of buffers reduce impacts by preventing trespassing and associated problems such as litter and vandalism. Effective buffers between agriculture and transportation/urban uses may combine a separation of uses, vegetation/plantings and berms. Vegetated buffers should include the use of deciduous and coniferous plants, with foliage from base to crown. These types of plantings will be effective in the capture of dust, salt spray, and de-icing compound drift
- The use of salt management plans to reduce the amount of salt required for de-icing (liquid de-icers, broad casting and selective broad casting)
- The use of adequate fencing between different land uses to reduce the potential for trespassing and potential vandalism, where possible
- The use of signage between the different types and intensities of land uses to indicate No Trespassing or Private Property. The use of signage is more suited to the edges of the fields, particularly in the Specialty Crop Areas
- The use of plantings/vegetation as screens and buffers to reduce visual impacts and sounds. Any proposed use of plantings/vegetation as screens and

buffers would require these plantings to be located within the proposed corridor, such that no additional agricultural lands are removed from production

- The use of controlled intersections (stop sign, stop lights) will provide for a safer traffic environment for slow moving agricultural equipment
- Implementation of surface and/or groundwater monitoring in areas where agricultural operations make use of surface or groundwater as part of their normal farm practices
- It is recommended to limit the use of tall streetlights or use lighting that is directed down (light shielding) and away from agricultural lands. Limit the use of any type of lighting (high pressure sodium lights, and LED lights are known to interfere with soybean production) that has a negative effect on agricultural lands, livestock or crops
- The use of design elements to direct traffic away from farming areas
- Construct or replace agricultural buildings to mitigate the loss of agricultural buildings
- Provide new wells or other water access for any potential groundwater disruption
- Restore impacts to tile drainage systems
- Restore impacts to irrigation systems
- Create a traffic plan that identifies closures and open routes to minimize impacts to local traffic, and
- Maintain local roads to allow access for the movement of oversized agricultural equipment.

It should be noted that the use of fencing, signage, berms, vegetation screening, etc. as part of a mitigation effect will require that these types of mitigation are used/created on the lands that are to be developed and not on the adjacent agricultural lands.

It should also be noted that there are opportunities for local agricultural operations with the future development of the Bradford Bypass lands. The future development of the Bradford Bypass lands will bring people closer to the agricultural areas and specialty crop areas/market garden/field vegetable areas which will result in increased potential for expanding sales of local vegetable crops from the farm markets.

5.2.3 Noise and Vibration

The purpose of the Noise Impact Assessment Report is to identify noise sensitive areas and provide recommendations for noise mitigation along the Bradford Bypass right-of-way. The Noise Impact Assessment Report has been prepared in accordance with the

methods and procedures recommended in the Ministry Environmental Guide for Noise (the Ministry Guide). Relevant guidelines from the Ontario Ministry of the Environment, Conservation and Parks and local municipal noise control bylaws are also considered in this assessment.

Results of the assessment indicate that noise mitigation investigation is required for several locations along the proposed Bradford Bypass right-of-way as per the Ministry Guide. Note that there are existing developer-built noise barriers providing noise attenuation in some areas. Noise control investigation has shown that noise barriers are feasible to address noise levels in two areas in accordance with the Ministry's policies and criteria.

5.2.3.1 Potential Impacts

Road geometry and traffic data were input into the Traffic Noise Model to predict the noise levels to assess the requirement for noise mitigation investigation. Assessment results are in the below table. Where noise mitigation investigation is required, the investigation is summarized in **Section 5.2.3.2.3. Table 5-16** below summarizes the results of the noise impact assessment.

Table 5-16: Noise Impact Assessment

Noise Sensitive Area	Mitigation Investigation (Yes/No)	
	≥ 5 dB Increase	≥ 65 dBA
NSA01	No	No
NSA02	Yes (R02, R08, R09, R11)	Yes (R01)
NSA03	Yes (R03, R04)	No
NSA04	Yes (R01 to R06)	No
NSA05	Yes (R02 to R09 and R28 to R33)	No
NSA06	No	No
NSA07	Yes (R03, R04)	No
NSA08	Yes (R07, R08)	No
NSA09	Yes (R01)	No
NSA10	Yes (R01, R02)	No
NSA11	Yes (R01 to R08)	Yes (R07, R08)
NSA12	Yes (R01, R02)	Yes (R02)
NSA13	Yes (R01, R02)	No
NSA14	Yes (R01)	No
NSA15	Yes (R01 to R04)	No
NSA16	Yes (R01, R02)	Yes (R02)
NSA17	Yes (R01)	No

5.2.3.2 Commitments and Recommended Mitigation Measures

5.2.3.2.1 Traffic Noise/Noise Barrier Prediction Results

Results above indicate that noise control investigation is required at several locations. Details of the assessment are in the below subsections. For noise mitigation to be qualified as feasible, Ministry has three metrics which must be satisfied:

- **Administrative Feasibility:** Determine the ability to locate the noise mitigation on lands within public ownership (i.e. provincial or municipal right-of-way)
- **Technical Feasibility:** Review the constructability of the noise mitigation (i.e. design of wall, road side safety, shadow effect, topography, ability to provide a continuous barrier, etc.). As per the Environmental Guide for Noise, if a minimum attenuation of five dB can be achieved in the Outdoor Living Area averaged over first row receivers, the selected measures within the right-of-way are considered technically feasible, and
- **Economic Feasibility:** Carry out a cost/benefit assessment of the noise mitigation (i.e. determine approximate cost per benefited unit).

Noise walls constructed for the Ministry must be chosen from the Ministry approved Designated Sources for Materials list. The Designated Sources for Materials list includes approved noise barrier materials, manufacturers, and material acoustic performance. The maximum allowable height on the Designated Sources for Materials list is 5 metres. As per the Ministry Guide, noise barriers are to be considered/constructed to the maximum height the Ministry allows, this value is currently 5 metres. This is supported with standard industry practices as standard designs typically exist up to 5 metres in height. Barriers greater in height require non-standard designs and have escalating unit costs. As such, barriers higher than 5 metres were not considered in the mitigation investigation.

Where investigated, noise mitigation is required to provide a minimum reduction of 5 dB in noise levels, with a goal of achieving resultant noise levels as close to or below the objective (for the purposes of this report the 'basis of assessment') noise levels. Noise barriers were only investigated within the future Ministry right of way to satisfy the administrative feasibility metric. Generally, the most effective location is next to the edge of pavement. Therefore, noise barrier were not investigated beyond the proposed Ministry right of way for the Preliminary Design project. Should the footprint change or be modified in any way, a review of the changes shall be undertaken, and the Report will be updated to reflect the changes, impacts, mitigation measures, and any commitments to future work.

Additional details regarding potential mitigation for specific Noise Sensitive Areas is included in the Noise Report (AECOM, 2023) under separate cover.

5.2.3.2.2 Construction Noise

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 Guide requires that construction noise be controlled and mitigated. The responsibility of this is typically split between the construction Contractor and contract administrator.

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 Bradford West Gwillimbury noise control By-laws as follows:
 - Although the Ministry does not require a noise bylaw exemption, for works conducted:
 - From 7:00 p.m. from one day to 7:00 a.m. the next day (9:00 a.m. Saturdays), and
 - All day Sundays and holidays.
 - Submit a Notice of Works letter to the Town in advance of the works, which will allow the town to notify area residents through the local councillor
- Stipulate constraints on construction noise with respect to the Town of East Gwillimbury noise control By-laws as follows:
 - Although the Ministry does not require a noise By-law exemption, for works conducted:
 - From 19:00 from one day to 07:00 the next day Saturday, Sunday, or statutory holidays.
 - Submit a Notice of Works letter to the Town in advance of the works, which will allow the City to notify area residents through the local councillor

- Stipulate constraints on construction noise with respect to the Township of King noise control By-laws as follows:
 - Although the Ministry does not require a noise By-law exemption, for works conducted:
 - In a quiet area
 - From 19:00 from one day to 07:00 the next day, and
 - All day Sunday.
 - In a residential area
 - From 21:00 from one day to 07:00 the next day, and
 - All day Sunday.
 - Submit a Notice of Works letter to the Town in advance of the works, which will allow the City to notify area residents through the local councillor
- Equipment shall comply with the sound emission standards for construction equipment outlined in Ministry of Environment, Conservation and Parks publications NPC-115 and NPC-118 (Contractor to confirm latest version by contacting Ministry of the Environment, Conservation and Parks¹), which are the following:
 - NPC-115: Construction Equipment, and
 - NPC-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, and
- 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.

1. Available from the Ontario Ministry of Environment, Conservation and Parks – Client Services and Information Branch or Environmental Assessment and Permissions Branch. Phone: 416-314-8001 or 1-800-461-6290

The contract administrator is required to:

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

Some examples of best practices to be considered for the project include, but are not limited to:

- Avoid nighttime construction where possible
- Use site layout where possible to screen nearby noise sensitive areas from loud construction activities, and where possible orient equipment noise emissions away from noise sensitive areas
- Minimize the use of impact equipment
- Consider lining metal bins/chutes with rubber to minimize sound of falling debris
- Consider the use of localized mobile noise screens, and
- Where multiple construction methods are available, consider using method with the lowest noise emissions.

A construction noise and vibration plan should be prepared during the subsequent Detail Design phase of the project.

5.2.3.2.3 Summary of Proposed Effects and Mitigation Measures

Proposed Mitigation Measures for Construction Activity

Below is a general list of proposed mitigation measures to be complied with during construction:

- During construction, the Contractor will be required to abide by any municipal noise control bylaws where possible, keep idling of construction equipment to a minimum, maintain equipment in good working order to reduce noise from construction activities and be available to address any concerns that may arise with respect to noise during construction. Furthermore, complaints will be investigated according to the provisions of the Ministry Guide. Any initial complaint from the public requires verification by the Ministry that the general noise control measures agreed to are in effect. If not, the Ministry will advise the Contractor of any problems, and enforce its contract

- Construction equipment should 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 should be restricted to the minimum necessary to perform the specified work
- During construction noise complaints will be investigated according to the provisions of the Ministry Guide
- A variety of construction noise mitigation strategies can be employed, depending on a variety of conditions. During the Detail Design process, when construction activities and processes are better defined, potential noise impacts and mitigation measures may be re-visited, and
- Substantial noise impacts could be triggered not just by the general construction of traffic lanes and interchange ramps, but potentially from demolition and preparing the site for construction. Mitigation measures to be reviewed during subsequent Detail Design.

A variety of construction noise mitigation strategies can be employed, depending on a variety of conditions. The appropriateness and application of these types of mitigation strategies will be examined further during subsequent Detail Design when the design and construction details of the Recommended Plan have been determined.

Construction noise mitigation strategies may include the following:

- **Time Periods and Duration:** Time constraints and use of equipment regulations can be effective in reducing the impacts caused during sensitive time periods (especially during nighttime periods). In addition, operating noisy equipment only when necessary and switching off such equipment when not in use can minimize noise impacts
- **Storage Areas:** During the planning and design stages of a project, storage areas may be able to be designated in locations removed from sensitive receptors. Where this is not possible, the storage of waste materials, earth, and other supplies may be able to be positioned in a manner that will function as a noise barrier
- **Early Construction of Noise Barriers:** Ultimately, noise barriers are not recommended on the project; however, if they are deemed required during Detail Design, consideration can be given to possibly install any barriers during the initial stages of construction to reduce the noise impacts of the construction

- **Alternative Construction Methods:** Alternatives to standard construction techniques may also be available and determined to be more practical and/or cost-effective in dealing with construction noise impacts and perceptions
- **Less Noisy Equipment:** One of the most effective methods of diminishing the noise impacts caused by individual equipment is to use less noisy machinery. For example, electric compressors are significantly quieter than diesel or gasoline engine powered compressors. By specifying and/or using less noisy equipment, the impacts produced can be reduced or, in some cases, eliminated. Source control requirements may have the added benefits of promoting technological advances in the development of quieter equipment
- **Enclosures:** Enclosures for stationary work may be constructed of wood or any other suitable material and typically surround the specific operation area and equipment. The walls could be lined with sound absorptive material to prevent an increase of sound levels within the structure. They should be designed for ease of erection and dismantling and provide proper ventilation
- **Temporary Abatement:** Advantage may also be taken of the screening effect of any nearby object such as parapet walls, buildings, trailers, or temporary site offices. Other temporary abatement techniques include the use of temporary and/or movable shielding for both specific and nonspecific operations. Some mobile shielding is capable of being moved intact or being repeatedly erected and dismantled to shield a moving operation. An example of such a barrier utilizes noise curtains in conjunction with trailers to create an easily movable, temporary noise barrier system, and
- **Monitoring Noise Levels:** Regardless of the types of noise abatement strategies and techniques employed on any particular project, successes or failures are ultimately determined by resultant effects on noise levels at sensitive sites and the adherence of the resultant noise levels to the applicable construction noise level criteria.

Proposed Mitigation Measures for the Operations Phase

This Noise Assessment has determined that noise attenuation devices are feasible at two locations for this project. These locations are presented on **Figure 5-2** below. These noise barriers can be optimised during the next phases of design. Grading and existing noise barrier conditions should be confirmed during Detail Design. Should the proposed project design or traffic data change or be altered in any manner from the Updated Technically Preferred Route, an updated review of the Noise Assessment shall be undertaken.

Figure 5-2: Potential Noise Barrier Locations

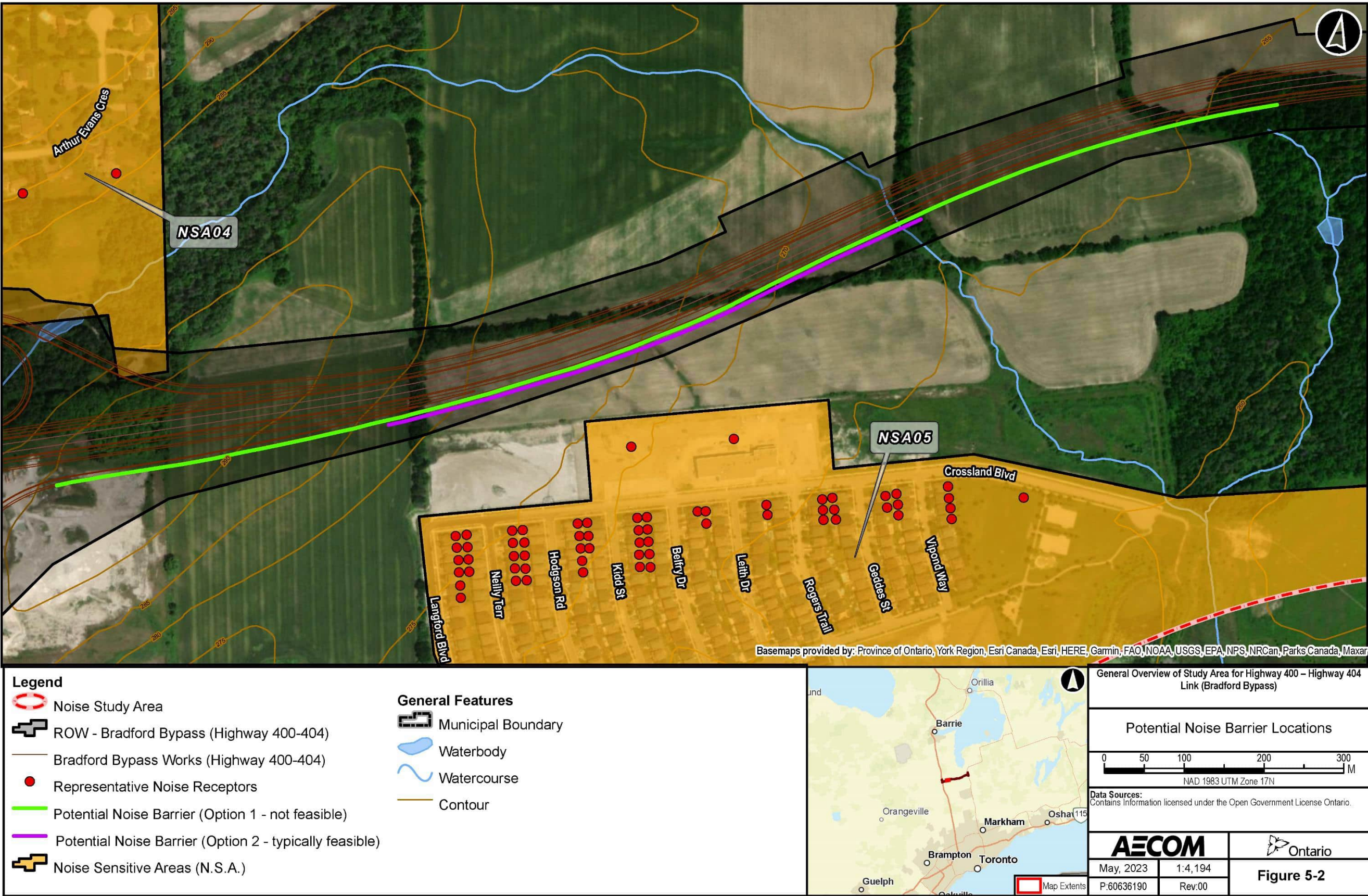
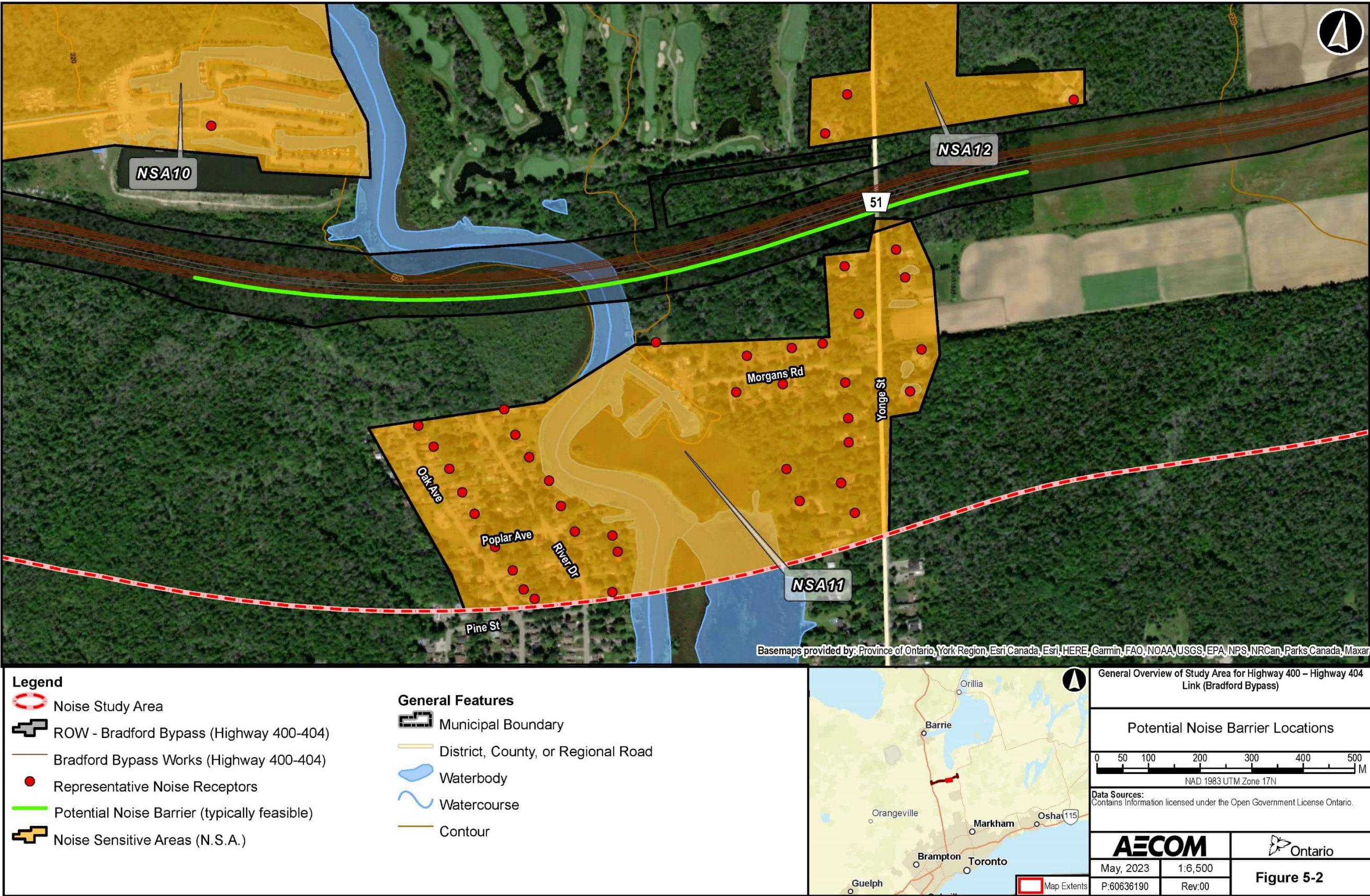


Figure 5-2: Potential Noise Barrier Locations



Vibration

Although not part of this formal noise assessment, vibration is a component sometimes related to noise associated with a construction project. As a result of construction, sometimes temporary vibration concerns resulting from the use of construction equipment may be raised by a stakeholder. Should vibration related concerns be raised, the Ministry and Contractor shall further investigate the source of the vibration and prepare a Noise and Vibration Plan (where and if required).

5.2.3.2.4 Noise Conclusions and Recommendations

The results of the noise assessment indicate that noise levels due to the proposed Bradford Bypass warranted noise mitigation investigation at several locations along the proposed corridor. Feasibility analysis of various noise barrier options has shown that noise mitigation is feasible for implementation with respect to the Ministry's policies and criteria. Should the proposed project design or traffic data change or be altered in any manner from the Recommended Plan that was assessed in May 2023, an evaluation for the need of an updated noise assessment should be conducted; an update to the noise assessment should be conducted as necessary during subsequent Detailed Design phases of the project. Additionally, noise impacts and mitigation measures shall be confirmed during the next Detail Design and construction phase of the project.

With regard to potential vibration as a result of construction, if a concern is raised by a stakeholder, the Ministry and Contractor shall further investigate, and a Noise and Vibration Plan should be prepared during subsequent Detail Design.

5.2.4 Air Quality

The purpose of the Air Quality Impact Assessment was to determine the impacts of the project on regional air quality and greenhouse gases within the Study Area.

Although the Ministry Air Quality Guideline states that three timeframes should be assessed, for a total of seven scenarios:

- Current
- Future Build (i. year of inauguration of the complete facility; ii) ten years from inauguration; iii) 20 years from inauguration), and
- Future No-Build (i. year of inauguration of the complete facility; ii) ten years from inauguration; iii) 20 years from inauguration).

Only the following three conditions were assessed:

1. Existing Conditions (2019) – Assessment of air quality impacts from vehicular emissions on identified sources within 500 metres of the Study Area
2. Future No-Build Conditions (2041) – Assessment of predicted future air quality impacts from vehicular emissions of identified sources within 500 metres of the Study Area, and
3. Future Build Conditions (2041) – Assessment of predicted future air quality impacts from vehicular emissions of identified sources within 500 metres of the Study Area, including new proposed on-ramps, off-ramps, and connecting roads.

The Future Build and Future No-Build scenarios for the years 2051 (ten years from inauguration) and 2061 (20 years from inauguration) were not included in this assessment as traffic data was not available for those horizon years. There are anticipated improvements in vehicle combustion efficiency with older models retired from the vehicle fleet as years progress. Therefore, the expected impact from emissions in 2051 and 2061 should result in greater reductions than presented for the 2041 scenario.

The traffic data and other air quality impact assessment inputs are based on the best available data. In general, predictions of this nature are inherently best estimates and are subject to uncertainties due to variability in key inputs and projections of future traffic conditions. During the preparation of the Air Quality Impact Assessment the following assumptions were made:

1. Vehicle type distributions for passenger vehicles and heavy vehicles were based on MOVES3.0 default database inputs
2. Traffic assessments for the existing conditions year of 2019 remain representative of current-day traffic conditions; COVID-19 traffic influences on today's traffic conditions are excluded
3. The 24-hour distribution of traffic data was assumed to be equal to AADT distribution percentages gathered based on traffic data from previous years (2018 and 2013)
4. Re-suspended particulates from each source were estimated using representative passenger vehicle and heavy truck weights, with weighted average per source matching the identified heavy vehicle percentage for each source

5. Fuel type E-85 (ethanol-based fuels) were excluded from assessment within the emission inventory due to the lack of vehicles supporting this fuel in the Canadian/Ontario vehicle fleet, and
6. Posted speed limits were used to determine speed bins for Existing, Future No Build and Future Build Conditions. Additionally, two different posted speed limits (100 and 110) were used for Future Build Conditions to compare the impact around the Bradford Bypass between both speed limits.

5.2.4.1 Potential Impacts

Construction activity creates and releases fine particulates (fugitive dust) and other vapours into the surrounding community, including diesel combustion exhaust, asphalt volatile contaminant emissions, etc. Emissions from construction activity are temporary and unlikely to have long-lasting effects on the surrounding area.

Fugitive dust emissions can result from movement of construction equipment and transport of materials to and from a construction site. Fugitive dust would generally be a problem during periods of intense construction activity and would be accentuated by windy and/or dry conditions.

Construction activities which potentially prove most impactful to the local air quality include, but are not limited to:

- Clearing and grubbing
- Grading and rock blasting
- Road and surface paving
- Storage of granular material
- Structure construction/deconstruction, and
- Mobile on-site equipment.

Construction activities will result in temporary traffic disruption and detour, which can lead to increased traffic congestion, thereby increasing motor vehicle exhaust emissions on nearby roadways, and could result in elevated localized pollutant concentrations.

Construction equipment operating by diesel fuel combustion or other fuel type combustion emit exhaust contaminants during their operation. Compared with emissions from other motor vehicle sources in the Study Area, emissions from construction equipment and trucks are generally insignificant with respect to compliance with the provincial and federal ambient air quality standards.

The following contaminants are predicted to exceed the federal and/or provincial standards within the Future Build Conditions: nitrous oxide (NO₂) at the 1-hour and annual averaging periods, and benzo(a)pyrene at the 24-hour and annual averaging periods.

Table 5-17 shows a general comparison to highlight the variance in impacts for all contaminants due to the Future Build Conditions compared to Existing Conditions and Future No-Build Conditions. The maximum concentrations at the most impacted receptors were considered for each contaminant to demonstrate the change in impact from one condition to another. of 110 kilometres per hour.

Table 5-18 shows a comparison of all three conditions with Future Build Conditions concentrations based on a posted speed of 110 kilometres per hour.

- In general terms, the main findings from the dispersion modelling results are two key points:
- Impacts from the Future Build Conditions with the new Bradford Bypass on a cumulative basis within the Study Area increases in comparison to a No-Build scenario for several contaminants and their respective averaging periods. This is due predominately due to increased traffic along the Bradford Bypass, where in a No-Build scenario this traffic is dispersed along Holland Street and Bridget Street and within communities to the south of the Study Area (for example, demonstrated in the traffic reporting related to this project), and
- The impacts are modelled at receptor locations close to the Bradford Bypass infrastructure (SR19, SR92, and SR103). For many contaminants, the most impacted receptor in the Future Build Condition is shifted from the Town of Bradford West Gwillimbury along Holland Street and Bridge Street, demonstrating alleviated congestion related air quality impacts within the community of Bradford West Gwillimbury. The Air Quality study is limited to the boundaries of the Study Area, thus any additional alleviated congestion experienced by roads south of the Study Area is not captured in the results.

Table 5-17: Comparison of Cumulative Maximum Concentration and Representative Existing, Future No Build, and Future Build Conditions – 100 kilometres per hour Speed

Contaminant	Averaging Period	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	125.89	SR2	92.43	SR3	94	SR19	-25%	2%
	24	83.41	SR19	25.01	SR83	34.52	SR19	-58%	38%
	Annual	34.72	SR19	8.30	SR19	13.49	SR19	-61%	63%
CO ⁽⁷⁾	1	3772.59	SR19	2044.33	SR19	2196.95	SR19	-42%	7%
	8	1825.39	SR19	697.07	SR19	737.27	SR19	-60%	6%
SO ₂ ⁽⁸⁾	1	3.96	SR109	1.02	CR11	1.26	SR103	-68%	24%
	10 min	6.54	SR109	1.68	CR11	2.08	SR103	-68%	24%
	Annual	0.30	SR19	0.08	SR19	0.11	SR19	-64%	36%
PM ₁₀ ⁽⁹⁾	24	15.08	CR11	16.11	CR11	12.98	SR92	-14%	-19% ⁽¹⁾
PM _{2.5} ⁽¹⁰⁾	24	5.02	CR11	4.75	CR11	3.34	SR92	-34%	-30% ⁽²⁾
	Annual	1.47	CR20	0.93	CR11	1.19	SR19	-19%	28%
Acetaldehyde ⁽¹¹⁾	30 min	3.68	SR109	3.12	SR19	3.89	SR19	6%	25%
	24	0.64	SR83	0.55	SR2	0.84	SR19	32%	53%
Acrolein ⁽¹²⁾	1	0.29	CR11	0.02	CR11	0.02	SR103	-94%	-15% ⁽⁴⁾
	24	0.06	CR11	0.004	CR11	0.00	SR19	-93%	1%
Benzene ⁽¹³⁾	24	0.47	CR11	0.12	CR11	0.12	SR19	-74%	-3% ⁽⁵⁾
	Annual	0.15	SR19	0.03	SR19	0.05	SR19	-68%	48%
Benzo(a) Pyrene ⁽¹⁴⁾	24	3.84E-04	SR83	4.72E-05	CR11	5.53E-05	SR19	-86%	17%
	Annual	1.07E-04	SR19	1.68E-05	SR19	2.22E-05	SR19	-79%	32%
1,3-Butadiene	24	0.06	SR83	Beyond the year 2040, MOVES Emission Factor for this contaminant is 0					
	Annual	0.02	SR19						
Formaldehyde ⁽¹⁵⁾	24	1.16	SR83	0.64	SR2	0.98	SR19	-15%	53%

- Notes:
1. A 22% decrease in impacts for PM10 between Future No-Build and Future Build Conditions is primarily due to a decrease in traffic amounts from Future No-Build Conditions (CR11) to Future Build (SR92).
 2. A 31% decrease in impacts for PM2.5 between Future No-Build and Future Build Conditions is primarily due to a decrease in traffic amounts from Future No-Build Conditions (CR11) to Future Build (SR92).
 3. A 32% increase in impacts for Acetaldehyde between Existing Conditions and Future Build Conditions is due to a high increase in traffic amounts from Existing Conditions (SR83) to Future Build (SR19) for 24-hour averaging period. For 30-minute averaging period, the 6% increase is due to a high increase in traffic amounts from Existing Conditions (SR109) to Future Build (SR19).
 4. A 6% decrease in impacts for Acrolein between Future No-Build and Future Build Conditions is due to a decrease in emission rates from Future No-Build Conditions (CR11) to Future Build (SR103).
 5. A 3% decrease in impacts for Benzene between Future No-Build and Future Build Conditions is due to a decrease in emission rates from Future No-Build Conditions (CR11) to Future Build Conditions (SR19).
 6. Due the implementation of new bypass road infrastructure, the concentration contours for NO2 result in a higher impact at specific receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 7. Due the implementation of new bypass road infrastructure, the concentration contours for CO result in a higher impact at receptor SR103, located 30 metres from the new bypass, for 1-hour averaging period and SR19, located 50 metres from the new bypass, for 8-hour averaging period.
 8. Due the implementation of new bypass road infrastructure, the concentration contours for SO2 result in a higher impact at receptor SR19, located 50 metres from the new bypass, for annual averaging period. For 1-hour and 10-minute averaging periods, the concentrations have a higher impact at receptor SR103, located 30 metres from the new bypass.
 9. Due the implementation of new bypass road infrastructure, the concentration contours for PM10 result in a higher impact at receptor SR92, located 50 metres from the new bypass, for 24-hour averaging period.
 10. Due the implementation of new bypass road infrastructure, the concentration contours for PM2.5 result in a higher impact at the same specific receptor SR92, located 50 metres from the new bypass, for all averaging periods.
 11. Due the implementation of new bypass road infrastructure, the concentration contours for Acetaldehyde result in a higher impact at the same specific receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 12. Due the implementation of new bypass road infrastructure, the concentration contours for Acrolein result in a higher impact at receptors SR103, located 30 metres from the new bypass, and SR19, located 50 metres from the new bypass, for 1-hr and 24-hour averaging periods, respectively.
 13. Due the implementation of new bypass road infrastructure, the concentration contours for Benzene result in a higher impact at receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 14. Due the implementation of new bypass road infrastructure, the concentration contours for BaP result in a higher impact at receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 15. Due the implementation of new bypass road infrastructure, the concentration contours for Formaldehyde result in a higher impact at receptor SR19, located 50 metres from the new bypass, for 24-hour averaging period.
 16. Irregularities are shown in **red** and further information is provided in notes above.

Table 5-18: Comparison of Cumulative Maximum Concentration and Representative Existing, Future No Build, and Future Build Conditions – 110 kilometres per hour Speed

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
NO2 ⁽⁶⁾	1	125.89	SR2	92.43	SR3	94	SR19	-25%	2%
	24	83.41	SR19	25.01	SR83	34.52	SR19	-58%	38%
	Annual	34.72	SR19	8.30	SR19	13.47	SR19	-61%	62%
CO ⁽⁷⁾	1	3772.59	SR19	2044.33	SR19	2461.84	SR103	-35%	20%
	8	1825.39	SR19	697.07	SR19	737.27	SR19	-60%	6%
SO2 ⁽⁸⁾	1	3.96	SR109	1.02	CR11	1.34	SR103	-66%	32%
	10 min	6.54	SR109	1.68	CR11	2.22	SR103	-66%	32%
	Annual	0.30	SR19	0.08	SR19	0.11	SR19	-64%	36%
PM10 ⁽⁹⁾	24	15.08	CR11	16.11	CR11	12.49	SR92	-17%	-22% ⁽¹⁾
PM2.5 ⁽¹⁰⁾	24	5.02	CR11	4.75	CR11	3.29	SR92	-35%	-31% ⁽²⁾
	Annual	1.47	CR20	0.93	CR11	1.18	SR19	-20%	27%
Acetaldehyde ⁽¹¹⁾	30 min	3.68	SR109	3.12	SR19	3.89	SR19	6% ⁽³⁾	25%
	24	0.64	SR83	0.55	SR2	0.84	SR19	32% ⁽³⁾	53%
Acrolein ⁽¹²⁾	1	0.29	CR11	0.02	CR11	0.02	SR103	-93%	-6% ⁽⁴⁾
	24	0.06	CR11	0.004	CR11	0.00	SR19	-93%	1%
Benzene ⁽¹³⁾	24	0.47	CR11	0.12	CR11	0.12	SR19	-74%	-3% ⁽⁵⁾
	Annual	0.15	SR19	0.03	SR19	0.05	SR19	-68%	48%
Benzo(a) Pyrene ⁽¹⁴⁾	24	3.84E-04	SR83	4.72E-05	CR11	5.53E-05	SR19	-86%	17%
	Annual	1.07E-04	SR19	1.68E-05	SR19	2.20E-05	SR19	-79%	31%
1,3-Butadiene	24	0.06	SR83	Beyond the year 2040, MOVES Emission Factor for this contaminant is 0					
	Annual	0.02	SR19						
Formaldehyde ⁽¹⁵⁾	24	1.16	SR83	0.64	SR2	0.98	SR19	-15%	53%

- Notes:
- A 22% decrease in impacts for PM10 between Future No-Build and Future Build Conditions is primarily due to a decrease in traffic amounts from Future No-Build Conditions (CR11) to Future Build (SR92).
 - A 31% decrease in impacts for PM2.5 between Future No-Build and Future Build Conditions is primarily due to a decrease in traffic amounts from Future No-Build Conditions (CR11) to Future Build (SR92).
 - A 32% increase in impacts for Acetaldehyde between Existing Conditions and Future Build Conditions is due to a high increase in traffic amounts from Existing Conditions (SR83) to Future Build (SR19) for 24-hour averaging period. For 30-min averaging period, the 6% increase is due to a high increase in traffic amounts from Existing Conditions (SR109) to Future Build (SR19).
 - A 6% decrease in impacts for Acrolein between Future No-Build and Future Build Conditions is due to a decrease in emission rates from Future No-Build Conditions (CR11) to Future Build (SR103).
 - A 3% decrease in impacts for Benzene between Future No-Build and Future Build Conditions is due to a decrease in emission rates from Future No-Build Conditions (CR11) to Future Build Conditions (SR19).
 - Due the implementation of new bypass road infrastructure, the concentration contours for NO2 result in a higher impact at specific receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 - Due the implementation of new bypass road infrastructure, the concentration contours for CO result in a higher impact at receptor SR103, located 30 metres from the new bypass, for 1-hour averaging period and SR19, located 50 metres from the new bypass, for 8-hour averaging period.
 - Due the implementation of new bypass road infrastructure, the concentration contours for SO2 result in a higher impact at receptor SR19, located 50 metres from the new bypass, for annual averaging period. For 1-hour and 10-minute averaging periods, the concentrations have a higher impact at receptor SR103, located 30 metres from the new bypass.
 - Due the implementation of new bypass road infrastructure, the concentration contours for PM10 result in a higher impact at receptor SR92, located 50 metres from the new bypass, for 24-hour averaging period.
 - Due the implementation of new bypass road infrastructure, the concentration contours for PM2.5 result in a higher impact at the same specific receptor SR92, located 50 metres from the new bypass, for all averaging periods.
 - Due the implementation of new bypass road infrastructure, the concentration contours for Acetaldehyde result in a higher impact at the same specific receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 - Due the implementation of new bypass road infrastructure, the concentration contours for Acrolein result in a higher impact at receptors SR103, located 30 metres from the new bypass, and SR19, located 50 metres from the new bypass, for 1-hour and 24-hour averaging periods, respectively.
 - Due the implementation of new bypass road infrastructure, the concentration contours for Benzene result in a higher impact at receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 - Due the implementation of new bypass road infrastructure, the concentration contours for BaP result in a higher impact at receptor SR19, located 50 metres from the new bypass, for all averaging periods.
 - Due the implementation of new bypass road infrastructure, the concentration contours for Formaldehyde result in a higher impact at receptor SR19, located 50 metres from the new bypass, for 24-hour averaging period.
 - Irregularities are shown in **red** and further information is provided in notes above.

Mobile vehicles emit the following greenhouse gases in significant amounts:

- Carbon dioxide (CO₂)
- Methane (CH₄), and
- Nitrous oxide (N₂O).

Total greenhouse gas emissions were calculated using a combination of MOVES emission rates and total annual vehicle usage projections for the project sources of air quality contaminant emissions.

The project contributions of greenhouse gas in the Future Build year (2041), for a posted speed of 100 kilometres per hour, were compared to the 2019 CO₂ eq contributions from the Ontario Transportation sector, shown below in **Table 5-19**.

Table 5-19: Greenhouse Gas Project Contribution Regional Assessment

Contaminant	Future Build (2041) (Mt) ¹	Ontario 2019 Reported GHG Emissions for the Transportation Sector ³ (Mt CO ₂ eq.)	% Future Build Project Contribution
Carbon dioxide (CO ₂)	2.87	-	-
Methane (CH ₄)	5.68E-03	-	-
Nitrous Oxide (N ₂ O)	3.06E-05	-	-
CO ₂ equivalent ²	3.04	51.8 ³	5.55%

Notes: 1. Mt = Megatonnes

2. CO₂ equivalent was calculated for the Future Build Condition using GWP conversion for N₂O and CH₄ (298 and 25, respectively)

As shown above, the project greenhouse gas contributions are less than 6% compared to the total Transportation 2019 CO₂eq emissions.

5.2.4.2 Commitments and Recommended Mitigation Measures

Construction Equipment and Vehicle Exhaust

Environment Canada adopted amendments to the Off-Road Compression-Ignition Engine Emission Regulations which align Canadian emission standards with the U.S. EPA Tier 4 standards for non-road engines, including the emission limits, testing methods and effective dates.

The Regulations Amending the Off-Road Compression-Ignition Engine Emission Regulations (the Amendments) impose stricter standards and new requirements starting with engines of the 2012 and later model years.

All equipment and vehicles should be kept properly maintained and repaired to minimize exhaust emissions, including odours.

Excessive idling of vehicles and equipment (greater than five minutes) should be minimized. Other potential mitigation measures may include the use of alternative-fuelled or electric equipment where feasible.

Fugitive Dust

Implementing good practices including wetting exposed earth areas; covering dust-producing materials during transport; and limiting construction activities during high wind conditions will minimize the impacts of fugitive dust. Potential mitigation measures that may be employed by the construction contractor to reduce fugitive dust issues include:

- Seeding, paving, covering, wetting, or otherwise treating disturbed soil surfaces
- Minimizing storage and unnecessary transfers of spoils and debris on-site
- Using wind screens or fences
- Covering all truckloads of dust-producing material
- Removing all loose or unsecured debris or materials from empty trucks prior to leaving the site
- Reducing traffic speeds on any unpaved surfaces
- Vacuum sweeping or water truck spraying of all paved surfaces and roadways on which equipment and truck traffic enter and leave the construction areas
- Using wheel washes and truck washes at site egresses, and
- Modifying work schedules when weather conditions could lead to adverse impacts (e.g., very dry soil and high winds).

Fugitive dust from construction activities can be managed through implementation of an Air Quality Management Plan, where mitigation measures are specified for the planned construction activities and implemented on an as-needed basis.

Proposed Mitigation for Construction Activity

Exposure to construction-related emissions can be mitigated by the following:

- Determining if all mobile equipment is in good condition, properly and regularly maintained, and compliant with applicable federal and provincial regulations for off-road diesel engines
- Determining if all machinery is maintained and operated in accordance with manufacturer's specification
- Locating stationary equipment (generators, compressors, etc.) as far away from sensitive receptors as practical

- Minimizing idling time and posting signage to this effect around the construction site
- Determining if stationary and mobile equipment are not operated during early morning (before 6 AM, or sunrise) or evening periods (after 8 PM, or sunset) as often as practical
- Implementing the use of non-chloride dust suppressants
- Temporary seeding or mulching and compression of bare soil and storage piles to reduce erosion
- Implementing an Air Quality Management Plan for the duration of the construction phase, which includes practices to minimize fine particulate release from mobile equipment, materials handling, and wind erosion, and
- Assessing that the areas most impacted by particulate levels are vegetated (e.g., tree planting) or other types of screening/barriers may be considered where possible between the source of emission and the impacted receptor(s) to reduce the cumulative particulate impacts.

Site supervisors during the construction phase should monitor the site for wind direction and weather conditions to ensure that high-impact activities be reduced when the wind is blowing consistently towards nearby sensitive receptors. The site supervisor should also monitor for visible fugitive dust and take action to determine the root-cause in order to counteract this. Specific details to this effect should be included in the Air Quality Management Plan.

It is further recommended that mitigation measures detailed in “*Best Practices for the Reduction of Air Emissions from Construction and Demolition Activities (March 2005)*” prepared by Cheminfo for Environment Canada be implemented, where practical.

Potential Mitigation for Project Contribution

The individual impacts from the proposed project emissions on the local air quality are a result of contributions from both idling vehicles and travelling vehicles within the Study Area. These emissions from roadways and idling vehicles are released with little upward dispersion capacity and are therefore expected to dissipate with increasing distance from the emission source.

Areas of concentrated emission impact are influenced by traffic volumes along a given segment of roadway. The implementation of the Bradford Bypass is expected to redistribute traffic from local roads and freeway corridors surrounding the proposed Bradford Bypass. Reductions in traffic volumes are observed on corridors including Highway 11/1 (Bridge Street), Bathurst Street, Holland Landing Road, Yonge Street, Queensville Sideroad,

Doane Road, Mount Albert Road, Green Lane, and Simcoe County Road 88/Holland Street, among other roads, which benefits the community of Bradford, Town of Bradford West Gwillimbury, by alleviating congestion during peak hours.

Potential mitigation actions to counteract the project emission impacts are limited due to the project's projected increase in vehicular travel along Hwy 400, Hwy 404, and connecting roads to Bradford Bypass. Increased percentage of electric vehicles and fuel-efficient vehicles within the vehicular fleet can provide significant CAC and GHG reduction in the short to medium term. The introduction and increasing popularity and affordability of hybrid and full electric vehicles, as well as transit authority led initiatives to increase the percentage of fuel efficient and hybrid vehicles will continue to reduce emission impacts from vehicles in the future. Additionally, the implementation of High Occupancy Vehicle lanes on the Bradford Bypass to promote the use of carpooling could reduce congestion and traffic on the road. Accordingly, three commuter parking lots for High Occupancy Vehicles have been identified on 10th Sideroad, 2nd Concession, and Yonge Street interchanges. Details regarding the specific layout will need to be determined in subsequent Detail Design phases.

Areas affected by airborne particulates may be benefited by introducing vegetation (e.g., trees, shrubbery, etc.) or other types of screening/barriers may be considered to help reduce cumulative particulate impacts during the operational phase. Vegetation would be best placed, where feasible, between sources of emission (i.e., roadways) and impacted receptor(s).

As part of the project a Preliminary Landscape Conceptual Design Plan (AECOM, 2023) and Terrestrial Existing Conditions and Impact Assessment Report (AECOM, 2023) are being prepared under separate cover.

5.2.5 Contamination, Waste and Excess Materials Management

The Waste and Excess Materials Management Plan (AECOM, 2023) describes appropriate procedures for the management of soil and waste on-site including, if necessary, evaluating and managing potentially impacted and/or excess soils. The Waste and Excess Materials Management Plan will serve to support an Excess Soil Management Plan to be prepared before initiating any construction or development activities and will support verification that conditions of project approval documents, applicable relevant environmental legislation, policies, permitting requirements, protocols and procedures are implemented accordingly.

The Waste and Excess Materials Management Plan has been prepared taking into consideration the contents of the Ontario Regulation 406/19 (last amendment: 555/22), Ministry of the Environment, Conservation and Parks document titled "Rules for Soil

Management and Excess Soil Quality Standards”, Published: August 31, 2020, last updated: December 30, 2022 (Soil Rules) and Ontario Regulation 153/04 (last amendment: Ontario Regulation 214/21).

Under Ontario Regulation 153/04, specific requirements can only be undertaken by a qualified person, including:

- a) conducting or supervising a phase one environmental site assessment
- b) conducting or supervising a phase two environmental site assessment, and
- c) completing the certifications that must be completed by a qualified person in a record of site condition in respect of a property.

Being a “qualified person” means they hold a license, limited license or temporary license under the Professional Engineers Act, 1990 or the qualified person holds a certificate of registration under the Professional Geoscientists Act, 2000 or is a practicing member, temporary member or limited member of the Association of Professional Geoscientists of Ontario per Section 5 of Ontario Regulation 153/04.

5.2.5.1 Potential Impacts

Based on the materials used for buildings, structures and culverts within project right-of-way during construction, there is potential for designated substances to be present. Should buildings be identified for demolition by the Ministry, a Designated Substance Survey will be completed to ensure proper handling and disposal of materials.

The proposed right-of-way will cross/intercept several roadways, such as Highway 400. The asphalt levelling course within the project right-of-way may contain asbestos and prior to construction, asphalt core samples should be collected and tested for asbestos. If asbestos containing materials are found, an Asbestos Abatement Plan should be implemented according to Ministry Standard Special Provision 101 F21 ‘Occupational Health and–Safety Compliance - List of Designated Substances’, that is included in the Ministry construction tender documents in accordance with the *Occupational Health and Safety Act* for the presence of designated substances.

Given the results of the Soils Chemical Analysis as described in **Section 2.2.5.2** above, additional soil sampling programs may be required to investigate the extent of the soil impact based on the proposed locations of the excavation. It is anticipated that most of the excavated soils can be re-used on the project. This will need to be confirmed during the subsequent Detail Design phase. Additionally, the suitability of re-using that soil must be determined before re-using it in accordance with Ontario Regulation 406/19: On-Site and Excess Soil Management.

5.2.5.2 Commitments and Recommended Mitigation Measures

The following sections provide the relevant protocols and procedures for soil management on the project.

Any excavated soil deemed unsuitable for backfill shall be stockpiled in an appropriate location assigned for unsuitable material on site or removed directly from the site for off-site management. Additionally, the following reports are anticipated to be required during the subsequent Detail Design phase: Assessment of Past Use, Sampling and Analysis Plan, Soil Characterization Report as per Soil Rules.

These reports are mandatory if the excavated soil is to be removed from the project area and reused on another owner's site and the Project does not meet applicable exemptions. These reports are not mandatory requirements if the soil is to be reused within the current project area or if the project leader intends to finally place it at a reuse site that is owned by Ministry or a public body and that is part of another undertaking related to infrastructure.

5.2.5.2.1 Soil Excavation and Salvage

Cut/Fill Locations

At the time of the issuing this Report, based on Preliminary Design estimates, the quantity of soil to be excavated is approximately 5,206,000 m³, with approximately 4,680,000 m³ needed as fill material. It has not been calculated how much of the excavated material would be classified as excess soil, if any, as some or all of excavated material not used for fill may be used for grading and landscaping. The estimated quantities for excavation shall be re-evaluated and further defined during each phase of the Detail Design stage.

Topsoil Stripping

The following shall be confirmed during subsequent Detail Design phases for the future Contractor to follow. For the purposes of this Report, topsoil includes those horizons in a soil profile containing organic material typically comprised of deposits of partially decomposed organic matter. Subsoil consists of the soils which occur below the topsoil.

Topsoil stripping will be based on, but not limited to, the following considerations and constraints:

- Topsoil will be stripped and stockpiled in accordance with the Grading Plan (which shall be developed during subsequent Detail Design phases) for all permanent and temporary construction areas after areas have been determined to be cleared of vegetation

- Topsoil stripped during the site preparation program is not considered suitable for reuse in any application other than general landscaping on the site. The topsoil can be used for landscaping within diversion channel and swales, and the construction of landscaped berms
- Any topsoil to be salvaged will be stripped during dry periods to the greatest extent practical. Topsoil will be stored in accordance with the sediment and erosion control measures described in the Environmental Protection Plan (EPP) and contract specifications, until it is required for site reclamation
- Topsoil piles shall be marked with appropriate signage to prevent accidental admixing
- Topsoil from the natural areas will be separated from other topsoil stockpiles so that it may be used for restoration of the areas from which it was removed, to the extent possible, and
- Subsoil will be stored separately from topsoil with a minimum of 1 metre separation of the piles.

5.2.5.2.2 Handling and Storage of On-Site Soil

General Handling and Storage of Soil

Laydown Areas

During subsequent Detail Design, the best strategy for the movement of soil across the Study Area is to be determined. Double handling of soil, that is, moving it from one place to another more than once within the right-of way, is to be minimized to the extent possible.

Soil shall not be placed in locations where there is direct drainage to that location. During Detail Design, drainage at any laydown locations are to be managed appropriately to avoid potential localized flooding and/or erosion of any storage areas.

Site Access and Movement

Soil that has been identified for movement and/or reuse on the project lands must be stored within the project right-of-way during construction. However, excavated soil or crushed rock can also temporarily leave a project area to be transported directly to another part of the project area, if that is the most efficient means of relocating soil within a project area for reuse.

Stockpiles

Stockpiles within the project right-of-way will either be re-used for backfilling, landscaping or for other purposes (e.g., topsoil/slope flattening), with details to be confirmed in subsequent Detail Design.

Stockpile locations will be based on, but not limited to, the following considerations and constraints which are to be confirmed in subsequent Detail Design phases:

- Excavated earth that is not to be utilized immediately shall be temporarily stockpiled in a manner that does not cause an adverse environmental effect or impair water quality
- There shall be minimal stockpiles of earth and granular material on-site in order to limit/avoid double handling of material
- A stockpiling location shall be in proximity to where the material will be ultimately used where possible
- Earth will not be placed in locations where there is direct drainage to that location
- Soil must not be stored within 10 metres of the edge of right-of-way unless any of the following apply:
 - 500 m³ or less will be stored
 - Soil storage will be less than one week, and
 - There is a physical barrier between the excess soil and the edge of right-of-way.
- Soils shall be handled and stored during construction in a manner that protects soil quality for re-use
- Stockpiled materials shall be stored and stabilized at least 30 metres away from any watercourse
- Stockpile management will be based on, but not limited to, the following considerations and constraints:
 - Implement measures to avoid the introduction or spread of invasive vegetation within the right-of-way, including from equipment brought on-site from other worksites and from imported fill. The Ontario Invasive Plant Council's Clean Equipment Protocol for Industry shall be complied with during Detail Design
 - To prevent the spread of invasive plant species, soils with a high proportion of invasive plant species shall be stockpiled separately. On-site stockpiles shall be tarped and managed to prevent any off-site migration of invasive materials

- Stockpiles shall be temporarily seeded to reduce erosion if left exposed or inactive for more than 30 days
- Measures to prevent the mobilization of stockpiles shall be employed using silt fences and other erosion control methods as determined in subsequent Detail Design phases
- Stockpiles left on-site for more than one month shall require erosion and sediment control measures to manage on-site runoff water. The Contractor shall maintain such measures to ensure their effectiveness. Silt fence installed around soil stockpiles must maintain a minimum 1 metre distance from the toe of the stockpile
- Erosion and sediment control measures shall be inspected weekly and following any major precipitation event. The Contractor shall correct any identified deficiencies in a timely manner, and
- Stockpiles shall be monitored to ensure that they remain intact and there are no erosion issues, or other concerns.

On-site Reuse of Soil

The following shall be confirmed during subsequent Detail Design phases. Decisions on re-using stockpiled soil to backfill excavations or for grading within the project right-of-way will be determined in accordance with the project specifications including the suitability of soil for use in backfilling construction excavations or as structural fill. The Contractor shall re-use soil within the project right-of-way to the extent possible.

Environmental Protection Measures

The following provides the relevant environmental protection measures with respect to the management of soil within the project right-of-way. These recommendations should be read in conjunction with other applicable project reports generated in subsequent Detail Design phases such as the Erosion and Sediment Control Plan.

Dust Suppression

The following shall be confirmed during subsequent Detail Design phases. During all phases of the project, the following measures to mitigate fugitive dust emissions must be implemented:

- Use of dust suppressants with the least potential for adverse environmental effects when conducting any project activity that may generate dust
- Avoid handling non-enclosed granular materials during sustained high wind conditions
- Cover or enclose open containers containing granular materials

- Build and manage temporary and permanent roads and parking lots located within the project right-of-way to reduce fugitive dust emissions from dirt surfaces, including through paving and the removal of loose materials on road surfaces, and
- Establish speed limits of no more than 30 kilometres per hour on temporary and permanent roads located within the project right-of-way and require all persons abide by these speed limits.

The Contractor shall implement air quality mitigation measures during construction to minimize and/or eliminate dust generated during construction.

Erosion and Sediment Control

The following shall be confirmed during subsequent Detail Design phases. During all phases of the project, the following measures to mitigate sedimentation and erosion must be implemented with respect to soil management:

- Follow the Erosion and Sediment Control Plan for construction and corresponding Erosion and Sediment Control Plan for the stream realignment work
- No work will be permitted on site until all such erosion and sediment control devices are properly installed
- Maintain all erosion and sediment control devices in accordance with applicable legislation and standards, etc.
- Trapped sediments and controls are to be removed only after the soils of the construction area have been stabilized and adequately re-vegetated, unless sediments have accumulated to a depth of 1/3 the height of the sediment control device
- The Contractor shall remove accumulated sediment to the level of existing grade, in a manner that avoids sediment release to the downstream side of the sediment control device. All sediment control devices shall remain in place until after the surrounding ground has been permanently stabilized according to the Detail Design
- Any stockpiled material shall be deposited, stored, and contained in a manner to ensure sediment does not enter a waterbody. Areas containing exposed soil or stockpiled material will be isolated using appropriated sediment control devices to prevent the entry of sediment into the watercourse
- All activities, including maintenance procedures, will be controlled to prevent the entry of petroleum products, debris, rubble, concrete, or other deleterious

substance into the water. Vehicular refuelling and maintenance will be conducted a minimum of 30 metres away from any aquatic areas to avoid potential impacts in the event that an accidental spill occurs

- Periodically inspect all erosion and siltation control devices in accordance with requirements, and
- Remove temporary erosion control devices upon completion of work.

Restoration

The following shall be confirmed during subsequent Detail Design phases. The project will be restored in phases (i.e., progressive restoration), such that restoration of disturbed areas is completed as soon as possible following the completion of construction activities in the corresponding areas. To achieve this outcome, the following measures will be taken during restoration activities with respect to soil management:

- Regrade areas with vehicle ruts, erosion gullies or where there has been subsidence
- Smooth subsoils that are rutted prior to topsoil replacement
- Damaged Soil: Disc, till or cultivate ripped subsoils to break up lumps and to smooth the surface. To reduce further compaction, limit discing to what is necessary to break up clods. Till or cultivate back the soil and any severely compacted or rutted areas to loosen compacted soil
- Replace topsoil as evenly as possible over areas of the construction area to be reclaimed where topsoil salvage was conducted. Postpone replacing topsoil during wet weather or high winds to prevent damaging soil structure or erosion of topsoil, and
- To prepare restoration areas for seeding, spread loose and fine grade topsoil. Topsoil shall be prepared for planting at a depth of 0.3 metres unless otherwise specified.

5.2.5.2.3 Handling and Storage of Excess Soils (Off-Site)

The following shall be confirmed during the subsequent Detail Design phase.

Re-use soil within the project right-of-way to the extent possible. Remaining soil shall be re-used or placed in the creation of berms at locations to be determined during the subsequent Detail Design phase. In some instances, on-site reuse of soil may not be possible. In these instances, excess soil may potentially be reused or disposed of off-site.

Stockpiles of excess soil deemed unsuitable for use in any application after all construction excavations have been backfilled and grading completed within the project right-of-way must be transported to an off-site disposal facility or approved off-site reuse receiver in accordance with the applicable regulations, including Ontario Regulation 406/19. Transportation and reuse or disposal of excess soil should follow an Excess Soil Management Plan developed by the future Contractor and approved by the Ministry prior to transport of reuse or disposal of the soil. All documentation (bills of lading, waste manifests, waste characterization, etc.) are to be maintained on-site, and copies shall be provided to the Ministry. When required, off-site reuse or disposal details should be included in the Excess Soil Management Plan by the Contractor outlining specific procedures and protocols for soil sampling. No soil removed from the site may be disposed of off-site or re-used at any location other than the project right-of-way and/or off-site location permitted to accept the soil. Preference will be given to reusing soil instead of disposing of soil at a landfill if the geotechnical quality of the soil is deemed appropriate for reuse. Large debris and solid waste material such as foundations, concrete, field stones, cobble stones, wood or metal shall be separated from the soil by mechanical means and salvaged for on-site/off-site reuse or disposed off-site separately as solid waste at a facility permitted to receive construction/demolition debris.

Any excess soil should be sampled according to a Sampling and Analysis Plan that is prepared based on Ontario Regulation 406/19 and at a minimum, soil samples must be analyzed for the following parameters: Petroleum Hydrocarbons fractions s, and metals (including lead), salinity (if there are any intended agricultural receiving sites), inorganics, pH and grain size. Additional analysis may also be required for leachate if any substances with published Leachate Screening Levels in the Soil Rules are identified as contaminants of concern within the project right-of-way. Reuse of excess soil is also dependent on the reuse site standards/excess soil quality standards. Additional analytical parameters may also have to be taken into consideration based on Areas of Potential Environmental Concerns identified within the right-of-way.

Assuming excess soil is stockpiled, appropriate bulk soil sample frequencies should comply—with “Records of Site Condition - Part XV.1 of the Act, Ontario Regulation 153/04 as amended, Table 2 Minimum Stockpile Sampling Frequency”. This is a requirement of Ontario Regulation 406/19.

All sampling and decontamination procedures, laboratory analytical methods, and protocols and procedures will be consistent with those established by the Ministry of the Environment, Conservation and Parks, as documented in “*Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, May 1996*” (MOE 1996 Guidance Manual). Representative samples should be collected in containers supplied by a Canadian Association for Laboratory Accreditation - accredited laboratory.

Based on the results of the analytical testing of soils, excess materials should not be re-used off-site at a residential, commercial, or industrial property without further verification sampling or acceptance of that material according to the Excess Soil Management Regulatory Proposal for the receiver site that is completed by the Contractor and approved by Ministry. It should be noted that the private receiver site may require additional testing and excess soil re-use planning to satisfy the Excess Soil Quality Standards published in the Soil Rules. When soil suspected of being potentially impacted are observed during construction, the Contractor shall inform the Ministry, Contractor Administrator and qualified person. Additional testing should be conducted to further characterize the contamination to determine suitability for reuse on-site or disposal.

Off-site Receiving Sites for Beneficial Reuse

Should on-site reuse not be possible, efforts shall be made to make all reasonable attempts to locate a suitable off-site beneficial reuse receiver. Only as a last resort shall disposal of excess soil at a landfill be undertaken. It should also be noted that a receiver is operating under appropriate by-laws, permits and regulations and that the quality of material being reused is suitable for their operation. Copies of all agreements, hauling record, bills of lading, weigh bills, analytical results shall be collected and forwarded to the Ministry and/or the Contract Administrator. A copy of the hauling record must be retained on behalf of the Ministry and confirmation of receipt of the excess soil at the destination site must be obtained by the hauler and a copy of the final record must be retained by all parties for two years.

Receiving sites identified for beneficial reuse of excess material are to be screened in advance. If excess soil is to be transported off Ministry property for beneficial reuse at a receiving site, each load should be accompanied by documentation that summarizes or provides (as a minimum):

- The sampling and segregating work done
- The excess soil data pertaining to the suitability for the excess soil for reuse, and
- The receiving site soil data pertaining to the suitability of the excess soil for reuse at the receiving site.

A statement noting that the soil should be used for beneficial reuse and is not likely to cause a negative effect on human health or the environment; and a statement confirming the land use of the receiving site matches the intended use/suitability of the excess soil.

If notice must be filed under Section 8, the project leader must develop a tracking system before any excess soil is removed from the project area in compliance with Section 16 of O.Reg. 406/19. The tracking system is required to track each load of excess soil during its transportation and deposit at a reuse site, Class 1 soil management site, local waste transfer facility, landfilling site or dump, and any transportation to and from a Class 2 soil management site. As per subsection 5 (1) in Section B of Part I of the Soil Rules, the tracking system must include:

1. The locations of the project area where the soil was excavated and stockpiled, if applicable, and the quality of the soil associated with those locations and stockpiles
2. The quality of the load of excess soil being removed from the project area, unless the excess soil is to be sampled at a Class 2 soil management site or a local waste transfer facility
3. The quantity of the load of excess soil being removed from the project area
4. The location of the site at which the excess soil is to be deposited as communicated to the driver of the vehicle
5. The date and time the excess soil left the project area
6. The person from the project area responsible for overseeing the loading of the excess soil for transportation
7. The name of the corporation, partnership or firm transporting the excess soil, the name of the driver of the vehicle and the number plates issued for the vehicle under the Highway Traffic Act
8. The date and time the excess soil was received at the site where the excess soil has been deposited
9. The contact information of the person who acknowledged receipt of the load of excess soil on behalf of the site where the excess soil was deposited, and
10. Confirmation that the vehicle that deposited the excess soil and the volume of soil received at the site where the excess soil was deposited is the same as that which left the project area.

Handling and Storage of Contaminated Soil

If potentially impacted soil is encountered based on organic vapour monitor, odours, soil discolouration, buried containers or other materials contributing to a potential release, etc., the Contractor must inform the Ministry. The following provides guidance with respect to impacted soil management within the project right-of-way.

The following shall be confirmed during subsequent Detail Design phases.

Soil Testing

A thorough understanding of the contaminants that may be encountered and appropriate means and measures for handling and managing excavated materials should be contemplated in advance of undertaking excavation activities of suspected impacted soils. Contaminated soil is soil that exceeds the applicable Ministry of the Environment, Conservation and Parks Table 2 Site Condition Standard (Ministry of the Environment, Conservation and Parks, 2011).

A procedure for soil testing, if soil that is observed to be potentially impacted is encountered during excavation shall be developed. If potentially impacted soil is encountered during excavation, the Contractor shall notify the Ministry and the above noted procedure shall be implemented by the Contractor.

Temporary Soil Storage Site

The Contractor shall stockpile all suspected impacted soil in a designated Temporary Soil Storage Site in such a manner as to protect existing surface, materials and structures from contamination, runoff surface water and, as result, erosion. Intermediate staging of impacted soils elsewhere within the project right-of-way is strictly prohibited. If the designated Temporary Soil Storage Site cannot be used for any reason, the Contractor must determine an alternative, if possible.

The Temporary Soil Storage Site should be designed during subsequent Detail Design phases and constructed by the Contractor. Once designated, the surface soils (up to 1.5 metres depth) of the Temporary Soil Storage Site will be sampled to establish a baseline of environmental conditions. The number of samples may vary depending on the size of the Temporary Soil Storage Site, and submitted for chemical analysis of PHCs in F1-F4, VOCs, PAHs, metals and inorganic parameters, including pH. Samples will be collected using either hand auger or by excavation of shallow test pits.

The design of the Temporary Soil Storage Site will include: a minimum of 10-mil (10 thousandth of an inch) nylon reinforced polyethylene sheeting serving as an impermeable/low permeable barrier to contain stockpiled potentially impacted excess soils; a 0.5 to 1 metre high berm of baled hay or clean fill with the 10-mil nylon reinforced polyethylene sheeting extended over the berm, reaching the exterior ground surface; and consider how the potentially impacted soils will be transported and stockpiled without compromising the berms (controlling runoff/run-on) or causing potential cross contamination (e.g., migration of contaminants outside the Temporary Soil Storage Site). If more than one sheet of polyethylene is needed to line the ground beneath the Temporary Soil Storage Site, each section of sheeting must overlap by at

least 1 metre. As necessary, the Temporary Soil Storage Site will be designed with a sump pump to remove any accumulated water from the Temporary Soil Storage Site and temporarily store it for proper discharge. In addition, should impacted soil be encountered then these soils will either be:

- Placed in a separate cell in the Temporary Soil Storage Site, or
- Placed directly into a lined roll-off and properly disposed of at a licensed landfill facility.

Following the use of the Temporary Soil Storage Site, confirmatory surface soil samples (up to 1.5 metres depth) will be collected and submitted for chemical analysis of PHCs, VOCs, PAHs, pH, metals and inorganic parameters to verify the quality of soil in this area. These sample results will be compared to the baseline samples to verify the area was not impacted through the use of the Temporary Soil Storage Site. If needed, shallow remedial excavations can be completed to return the Temporary Soil Storage Site area back to original condition.

Excavation and Management

If necessary, the excavation of impacted soil, segregation and processing may be required, and any additional excavations/removal of impacted soil will require approvals from Ministry, as well as a management plan and document for the additional work.

The Contractor shall ensure that a procedure is developed and applied with respect to what must occur if any person working in the project area makes an observation during soil excavation within the project area, including any visual or olfactory observation, that suggests that the soil being excavated may be affected by the discharge of a contaminant. At a minimum, the project leader or the operator of the project area shall ensure that the procedure includes the following:

1. All soil excavations in the project area must immediately cease upon the observation being made, until such time as the project leader directs that soil excavations may be resumed
2. The Contractor and Ministry must immediately be notified of the observation
3. The Contractor, upon being notified of the observation, must, before directing that soil excavations may be resumed, ensure that all necessary steps are taken to ensure that:
 - i. all excavated soil or excavated crushed rock that is affected by the discharge of a contaminant is identified and is segregated from other excavated soil or excavated crushed rock in the project area

- ii. the portion of the project area that is affected by the discharge of a contaminant is determined, and
- iii. any excess soil from that portion of the project area is disposed of in accordance with Ontario Regulation 406/19.

When excavation and/or trenching are required at a suspected impacted location, appropriate management of the impacted solid or semi-solid material (such as soil or sludge) is required. Concerns for excavation and management of impacted soil relate to the potential for transfer of contaminants during materials handling and transportation activities. Transfer of contaminants may occur due to:

- Excavation, storage, sizing etc. and the potential for dust and volatile emissions from the impacted media
- High potential for fugitive dust emissions due to movement of equipment at the site
- Leaching contaminants from impacted soil to surface and groundwater water can occur from unlined and uncovered stockpiles and excavated pits
- Migration of contaminants to unimpacted areas may occur during transportation, and
- Improper handling and reuse or disposal of impacted soil may allow contaminants to migrate into and pollute unimpacted areas.

Excavation and trenching primarily involves equipment that is widely used in the construction or non-hazardous solid waste disposal industries, such as excavators, earth movers or backhoes, dump trucks, and containers of various shapes, sizes, and materials.

General guidance and best practice measures to prevent potential transfer of contaminants during excavation, material handling and transport of impacted material include the following:

- Entry to the active work area should be limited to avoid unnecessary exposure and related transfer of contaminants
- Traffic should be minimized on impacted soil
- Surface drainage and subsurface utility systems should be identified
- Any runoff should be prevented from entering and mixing with on-site contaminated media by building earthen berms or adopting similar other measures on the Temporary Soil Storage Site and on the site, where needed

- Provisions should generally be made to capture surface water runoff by diverting it to a controlled depression-area or lined pit on the Temporary Soil Storage Site and on-site, where needed
- Fugitive dust emissions should be controlled during excavation both on the Temporary Soil Storage Site and on-site, where needed, by spraying water or other materials to keep the ground moist or covered. During wet weather or rainfall no water spraying would be needed
- Appropriate personnel and equipment and decontamination procedures should be employed as required to keep the site-related contaminants within the Temporary Soil Storage Site
- Covers and liners should be used at all times when contaminated materials are being stored at the Temporary Soil Storage Site. Covers should be used on trucks that are moving materials around and from the site, and
- Any equipment that is involved in earthwork activities or that may have come into contact with waste, or any potentially contaminated material must be decontaminated prior to being removed from the site or Temporary Soil Storage Site.

General guidance and best practice measures for the storage of contaminated soil include the following:

- For contaminated suspected soil, soil must be stored in a manner that prevents potential contaminants from leaching into the groundwater
- Potentially contaminated soil will be protected to prevent the infiltration of precipitation and/or generation of runoff, and
- If necessary, soil from the project right-of-way that requires sampling needs to be kept segregated from soil that has already been sampled.

Reuse of Impacted Soil

In the event that impacted soil is encountered during construction, the suitability of reusing the soil should be determined before its re-use. In general, impacted soil may be re-used on-site for backfilling construction excavations/or as structural fill, as deemed appropriate.

Impacted soil must be stockpiled as close as possible to the location from where it was excavated or placed in a separate cell in the Temporary Soil Storage Site to ensure it is isolated from stockpiled clean material and is clearly identifiable. The Contractor shall maintain a log to document the final disposition of impacted soil re-used on-site, if any.

In the event impacted soil is found below the water table, the Contractor should contact Ministry first for potential remedial actions. This soil should be either:

- Placed in a separate cell in the Temporary Soil Storage Site, and
- Placed directly into a lined roll-off container.

In the event that off-site disposal is required, the Contractor shall dispose of soil not suitable for reuse according to proper disposal requirements, taking into account Ontario's *Management of Excess Soil- A Guide for Best Management Practices* (Ministry of the Environment, Conservation and Parks, 2014) and Ontario Regulation 406/19, including the *Soil Rules*.

Transportation of Soils

It is important that transportation of excess soil is carefully considered prior to the commencement of the project. Transportation of Dangerous Goods, General Waste Management, and other environmental regulations apply to the off-site transportation and of materials.

Soil not suitable for reuse within the project area shall be managed and reuse or disposed of in accordance with all applicable laws, industry standards and best management practices, which may include but are not limited to:

- The *Environmental Protection Act*
- Ontario Regulation 406/19, as amended
- OPSS.PROV- 180 General Specification for the Management of Excess Materials, and
- Management of Excess Soil – A Guide for Best Management Practices (Ministry of Environment, Conservation and Parks, Updated: April 4, 2019, Published: April 5, 2016, as updated).

During all phases of the project, the following measures must be implemented with respect to transportation and reuse or disposal requirements for soil management:

- All shipments must comply with applicable regulatory requirements, including Ontario Regulation 406/19, and all necessary documentation is provided to Ministry in a timely manner
- Only approved disposal facilities for soil (either non-hazardous or hazardous) will be permitted for use
- Acceptance criteria must be met, including but not limited to provision of adequate soil quality data for bulk chemical analysis and Schedule 4 leachate criteria. The origin and volume of contaminated material being transferred to a reuse or disposal site and its final destination shall be tracked

- The Contractor shall arrange for and pay for any additional testing required by the receiver site as a condition of acceptance of the material. The Contractor shall submit to Ministry a copy of the forms provided under OPSS.PROV.-180, signed by the receiver site
- Mitigation measures will be developed to mitigate the mobilization and transport of potential residual agricultural contaminants within the project right-of-way towards waterbodies during all phases of the project, including measures to allow time for increased die-off of pathogenic organisms and volatilization of agricultural contaminants prior to soil disturbance and removal of nutrient compounds through plant harvesting
- Prior to disposing of a subject waste (i.e., liquid industrial waste and hazardous waste, including hazardous soil), the Contractor shall ensure that the subject waste be properly classified as per Regulation 347 and registered in the Ministry of the Environment, Conservation and Parks Resource Productivity and Recovery Authority's Hazardous Waste Program Registry, and a valid waste subject waste generator registration number is obtained. The generator shall ensure that waste manifests are completed correctly for each subject waste transferred and all waste transfers are properly identified and tracked through the Resource Productivity and Recovery Authority's Hazardous Waste Program Registry
- A waste tracking system governing all hazardous waste transfers in accordance with the federal Transportation of Dangerous Goods Regulation and provincial regulations should be implemented by the Contractor
- Soil/fill materials imported to the project right-of-way, including quantity, quality and the source of the imported materials, should also be tracked and documented during the construction activities in accordance with Ontario Regulation 406/19, and
- For the purpose of any record-keeping mentioned in this document, it is recommended that records be retained for a minimum of seven years after the completion of all excess soil management activities or the removal of all excess soil from a Temporary Soil Storage Site, as required by Ontario Regulation 406/19.

5.2.5.3 Monitoring, Evaluation and Reporting

The following describes the protocols and practices to monitor progress, quality and daily activities and shall be confirmed during subsequent Detail Design phases.

Field monitoring for excavated materials is required during and post-construction. Construction monitoring for excavated materials during construction will be focused on

the mitigation measures and management strategies described below. Daily visual inspections of active construction work zones to monitor stockpiles, potential excess soil or work in potentially contaminated areas shall be completed.

The Contractor will be responsible for tracking and managing the quality and quantity of material excavated from or imported to the site using existing information and new information, as needed. Tracking will include quantifying and documenting locations for the beneficial on-site reuse of excavated materials. Management will include:

- Minimizing adverse effects to workers through Best Management Practices, worker health and safety provisions and ensuring that remedial/risk management options are considered during the construction planning process and appropriately incorporated into final designs
- Minimizing soil disturbance and retaining vegetation, including trees, within and around the project right-of-way in accordance with the setbacks/buffers identified on applicable Detail Design drawings, and in other areas to the extent that it is technically feasible or unless required to meet engineering requirements for safe and facility operation. The construction vehicle traffic shall be minimized on contaminated soils
- Manage soil in such a way as to prevent any adverse effects associated with receiving, processing, storage and movement of soil with respect to noise, dust, mud, tracking, leaching, runoff, erosion, outdoor air quality and odour. Monitoring will be completed in accordance with the Contractor's Air Quality Best Management Practices Plan to reduce the potential generation of dust (specifically PM10) and other fugitive air emissions during construction, including daily visual observations and on-site dust monitoring to inform the implementation of mitigation measures
- Handle and store soil during construction in a manner that protects soil quality for re-use. In the event that contaminated soil are encountered during construction, the Contractor shall determine the suitability of reusing the soil before reusing it. The Contractor shall dispose of any soil not suitable for reuse according to proper screening and disposal requirements, taking into account Ontario's Management of Excess Soil - a Guide for Best Management Practices (Ministry of the Environment, Conservation and Parks, 2014) and Ontario Regulation 406/19, including the Soil Rules, and
- Encouraging reuse of soil where appropriate, balancing cut and fill, minimizing grading, and minimizing the need to transport additional soil, where possible.

5.2.6 Climate Change

In 2017, the Ministry of the Environment, Conservation and Parks released a new guide “Considering Climate Change in the Environmental Assessment Process” (Climate Change guide) under the *Environmental Assessment Act*, R.S.O. 1990, chapter E.18. This guidance document demonstrates both quantitatively and qualitatively how proponents should address climate change impacts and mitigation considerations for new projects undergoing the environmental assessment process.

As part of the climate change assessment under the Ministry of the Environment, Conservation and Parks’ Climate Change guide, proponents are required to evaluate and assess:

- the project’s expected production of greenhouse gas emissions and impacts on carbon sinks (climate change mitigation), and
- the resilience or vulnerability of the undertaking to changing climatic conditions (climate change adaptation).

The Qualitative Climate Change Assessment Report focused on both these key areas of assessment for the project and describe possible mitigation options available for reducing the project’s effects on climate change (climate change mitigation), and the effects of climate change on the project (climate change adaption).

5.2.6.1 Potential Impacts

In assessing potential impacts the project may have on the local area and impacts on climate change; based on the Climate Change guide the following key questions must be considered within the planning and design stages of the project:

- How might the project/alternatives generate greenhouse gas emissions or affect carbon storage or the removal of carbon dioxide from the atmosphere
- To what extent have the project/alternatives already considered impacts on climate change in project planning
- Are there alternative methods to implement the project that would reduce any adverse contributions to a changing climate
- How might the project/alternatives give rise to climate change impacts, positive or negative, on Indigenous people and/or communities, and
- What commitments can be made to reduce the impacts on climate change from the project over time, i.e., when the project is implemented?

Each of these questions are addressed in the Qualitative Climate Change Report (provided under separate cover), with suggested mitigation included where appropriate.

A Climate Change Resilience Assessment was undertaken in the context of a preliminary screening to provide input and direction for the design, construction, operation, and maintenance of the project. A Climate Change Resilience Assessment typically involves adopting a risk management approach to:

- anticipate climate change-related risks that may have an impact on the assets or activities under study, and
- identify potential design features or actions to help prevent, withstand, respond to, recover from, and adapt to these risks.

The Climate Change Resilience Assessment was undertaken following the five key steps described by the ISO 31000 Risk Management Standard (i.e., establishing the context, risk identification, risk analysis, risk evaluation, risk treatment, and adaptation measures), as well as the Ministry of the Environment, Conservation and Parks guidance for Considering Climate Change in the Environmental Assessment Process. The Climate Change Resilience Assessment was based on a review of project documents.

For the qualitative climate change resilience assessment, the potential impacts climate change will have on various components and elements of the project were analyzed. Twelve climate indicators were grouped into four themes – temperature, precipitation, wind, and humidity. While analyzing the interactions between climate change represented by these indicators and the list of project components, it was found that certain climate variables introduce high risk levels to the project. While most interactions between the project components and climate change are low and moderate, higher risks originate from hot days and extreme winds.

5.2.6.2 Commitments and Recommended Mitigation Measures

The Ministry of the Environment, Conservation and Parks guidance for considering climate change in the environmental assessment process outlines that the scoping stage should identify the potential impact of the project on the receiving environment, the sensitivity of this environment, and take into account how this project will be affected by a changing climate. As per this guideline, qualitative climate change assessment for these aspects was conducted i.e., climate change mitigation and climate change adaptation (resilience assessment).

From the qualitative climate change mitigation assessment undertaken for the project, there are several mitigation options which may be employed during the construction, operation, and maintenance phases of the project's life span which could reduce the project's impact on climate change and are outlined in Table 2-3 of the Qualitative Climate Change Report, prepared under separate cover.

To increase the resilience of the project, adaptation measures for both moderate-risk and high-risk interactions are offered in Table 3-11 of the of the Qualitative Climate Change Report, provided under separate cover. These measures pertain to both the construction phase of the Bradford Bypass as well as the operations phase. These potential measures include:

- Erection of cooling station, provision of sun-protective outfits, and scheduling the most intensive work package for cooler times
- Considering the new wind patterns on the construction equipment, e.g. cranes (wind speed limit to operate a crane)
- Enhanced grade of concrete and quality of protective surface coatings and barriers, or the use of stainless steel, or galvanized reinforcement
- Use of higher-grade asphalt binders that have higher temperature ranges, and
- Installation of windbreaks and wind fences.

Results of the Qualitative Climate Change Report are to be referenced by the Detail Design and future Contractor to provide recommended guidance on best practices for climate change mitigation and adaptation for all phases of the project.

5.2.7 Human Health

The Human Health Scoping Report is intended to identify potential positive and negative health impacts of the project and can be used to help inform mitigation measures. A risk assessment of the identified health impacts and recommendations are not completed as part of a scoping report.

The Human Health Scoping Report provides a baseline profile of the Study Area, which includes age, education, income, population demographics, occupation, housing status, affordable housing, obesity, disease and mental health, and information on the movement of people (e.g. walkability and transit scores, mode of transportation, commuting duration).

Potential benefits of effective highway infrastructure can support community connectivity, reduce traffic accidents, and influence the wellbeing of individuals by expanding opportunities for job creation and economic growth.

Vehicle emissions from existing and the proposed project was noted as the primary source of air quality concerns within the Study Area and was identified as a potential health impact. A multi-disciplinary approach to reviewing human health implications has therefore been taken with the human health, climate change and air quality specialists

working together to complete a comprehensive analysis of the air quality impacts. Refer to **Section 5.2.4** for the main findings of the air quality impact assessment and related mitigation measures. Also refer to **Section 5.2.6** for a summary of potential impacts and mitigation measures identified through the climate change resiliency assessment.

5.2.8 Snowdrift

5.2.8.1 Potential Impacts

The purpose of the Snowdrift Impact Assessment Report that was undertaken for the project was to determine the severity of snowdrifting at locations along the Bradford Bypass and interchanges. The impact assessment focused on drifting snow on the highway from wind drive events causing winter road hazard.

5.2.8.2 Commitments and Recommended Mitigation Measures

Following the impact assessment, locations were reviewed to recommend the application of mitigation treatment and type of measure to reduce snowdrifting (if warranted).

The snowdrift modeling along with visual interpretation, has identified preliminary selected areas for snow mitigation treatment along the highway route and interchanges. The locations and lengths of treatments have been provided in this Report assuming an ultimate eight lane design. Should the project footprint change in the future Detail Design stages the snowdrift modelling and areas proposed for mitigation are to be reviewed and confirmed.

The mitigation measures were located along the highway route and at interchanges to minimize future snowdrifting conditions using SY2006 snow accumulation season. Snowdrift mitigation is focused on preventing snow that has already fallen in the surrounding fetch area from being transported onto the road from the predominant wind direction.

The reduction in snowdrifting along the highway route is achieved through mitigation treatments trapping snow. Options include temporary snow fences, snow ditches, and living fences in the form of trees and shrubs. Mitigation treatments are designed to break and slow down the wind but not stop it. The implementation of mitigation treatments consists of factors such as set back distance, orientation, height, and porosity. For this project, the mitigation treatment focused on parallel living fences based on the attack angle. The attack angle is the orientation of highway to the dominate wind direction. Temporary snow fences and snow ditches were not considered because of the long-term costs of installing/removing and replacing the snow fences. Snow ditches can create roadside hazards. Furthermore, the amount of snow flux does not warrant a snow ditch which is typically used in areas of high snowdrifting. Living fences provide cost effective treatment, creates an aesthetic

landscape, supports the reduction of greenhouse gases as well as the reduction of winter maintenance/de-icing materials.

Snow mitigation analysis conducted was to identify site specific locations along highway route and at the interchanges for the living fences. The locations were determined by climate analysis using Egbert Environment and Climate Change Canada station, by calculating the PST magnitude and direction, by executing the SnowStream2D model (calculating snow flux Q kilograms per metre), and then by conducting the SnowStream2D Mitigation model to determine the snow flux Q_{out} for the north/south and west/east sides of the highway route and interchange roads. Finally, visual interpretation was conducted using aerial imagery and the modified right-of-way DEM (provided by AECOM). The results of preliminary locations are shown below in **Figure 5-3**. The locations have associated treatment numbers.

Figure 5-3: Snow Mitigation Treatment Locations (4DM, 2023)



A total length of recommended mitigation for highway route, ramps and intersection is 18,380 metres. The expected maximum snowdrift length and treatment is provided below:

■ **Single Row Shrubs**

- 2 metre Shrub north side = 9 metre drift length
- 2 metre Shrub south side = 7 metre drift length
- Average of snow flux reduction from mitigation treatment = 52% to 85%, and
- Recommended minimum setup back = 12 metre > from edge of the shoulder for all treatment locations.

■ Single Row Shrubs

- 5 metre Shrub north side = 10 metre drift length
- 5 metre Shrub south side = 8 metres drift length
- Average of snow flux reduction from mitigation treatment = 52% to 86% reduction, and
- Recommended minimum setup back = 12 metre > from edge of the shoulder for all treatment locations.

■ Single Row Tree

- 15 metre Tree north side = 17 metre drift length
- 15 metre Tree south side = 13 metre drift length
- Average of snow flux reduction from mitigation treatment = 72% to 80% reduction
- Recommended minimum setup back = 19 metre > from edge of the shoulder, and
- If using mix of shrubs and trees or double row shrubs, it recommended to place at >19 metres for all treatment locations as a minimum.

The identification of treatments was based on climate parameters, current land cover and topographic data for the modeling area. The preliminary snowdrift mitigation results were provided to Landscape, Terrestrial Ecosystems and any other teams that may be impacted by the locations proposed for snowdrift mitigation from wholistic perspective. A preliminary terrain modification for the highway route was incorporated into the analysis. Snowdrift exposure is considered moderate to low along the highway route with maximum predicted snow flux of 6,196 kilograms per metre for SY2006, representing a 5-year return period. SY2006 was used as the representative snowdrift year for mitigation because the return period is reasonable occurrence of more intense snow flux than commonly occurrence event. The assessment approach leads to robust snowdrift protection along the highway route. The type of snow mitigation treatment recommended for this area should be living fences of shrubs, trees, or a mixture. The following is a list of recommendations:

- Living fence should consist of coniferous shrub/hedges with 50%-60% porosity, a minimum 2 metre height and a minimum set back of 12 metres from the edge of shoulder for all locations identified in the maps. It is possible to also use deciduous species intermixed with a 50% to 60% porosity in winter periods. Depending on soil conditions and salt tolerance, examples could be Nannyberry and Hornbeam plants

- Increasing the height and doubling the planting shrubs is beneficial to reducing the snow flux. Double planting increases coverage for plants that may die off or grow at different rates. Offset planting should be used and a minimum setback distance of 19 metres from shoulder pavement edge applied and comply with Ministry regulation for sight lines
- A single row of trees can be used as mitigation treatments but should be placed at minimum setback of 19 metres from the edge of the shoulder and comply with Ministry regulation for sight lines. Conifer species is recommended for snowdrifting mitigation; however, deciduous planting can be applied if the 50%-60% porosity is achieved during the winter
- Where possible place mitigation strategy based on 5-year return event or 20% probability of exceedance in any given year near/at the right-of-way property boundary to provide additional buffer for snowdrift length during extreme Snow Accumulation Seasons
- In placing mitigation treatment in the corridor, some locations were identified to have a reduced footprint based on the preliminary mapping data between the edge of pavement and the right-of-way limits. During detail design, the footprint should be verified and confirmed. Mitigation treatments are recommended to be placed in all of these locations. For distances less than 12 metre, treatment should use heights that are less than 2 metres and porosity closer to 60%. The specific height will be based on the confirmed distances during the Detail Design phase. The list below includes the narrow locations identified:
 - Treatment 21 (BBP eastbound on-ramp) portion is approximately 14 metres from the pavement edge for about 30 metres
 - Treatment 2 (Hwy 400 northbound exit ramp) portion is approximately 9 to 12 metres from the pavement edge for about 30 metres
 - Treatment 18 (10th Sideroad southbound on-ramp) portion is approximately 9 to 12 metres from the pavement edge for about 50 metres
 - Treatment 19 (10th Sideroad southbound exit ramp) is approximately 13 metres from the pavement edge for about 10 metres
 - Treatment 12 (2nd Concession Road southbound on-ramp) is approximately 11 to 13 metres from the pavement edge for about 65 metres, and
 - Treatment 13 (2nd Concession Road southbound exit ramp) is approximately 10 to 13 metres from the pavement edge for about 80 metres.

- In general, it is possible that any of the mitigation treatment applied can result in the snow captured by the fence encroaching onto paved areas in severe snow accumulation seasons. Snowdrift mitigation is a balanced risk-based approach that considers technical and practical factors; therefore, it is not possible to mitigate for all scenarios. There are additional strategies or options that can be considered to further enhance mitigation measures to compliment the living fences that include:
 - Enhanced pavement markers, signage, ramp speed warning can improve driver awareness during more extreme conditions in the narrow area
 - Monitoring and increased roadside maintenance will be required in more extreme years
 - The Ministry purchasing additional lands adjacent to the ROW, in narrower areas to accommodate enhancements
 - Coordinate/negotiate with farmers to leave narrow swath of crop residue
 - Explore additional treatments between the mitigation and road such as low plantings to hold the snow in place, and
 - Adjust mitigation treatment design during subsequent Detail Design phases, such as lowering the living fence height and increasing the porosity to shorten the snow capture length.
- During subsequent Detail Design phases, the Preliminary Landscape Composition Plan shall be referenced as it provides levels of recommended mitigation to aid in addressing some identified locations with a reduced right-of-way setback distance flagged in the snowdrift assessment. Final details and recommendations shall be confirmed in subsequent Detail Design phases for both the Snowdrift and Landscaping Reports and considered from a holistic perspective, and
- On going monitoring of mitigation measures is highly recommended to determine if treatments should be lengthened and adjusted such as height and setback as part of highway maintenance. Monitoring should also continue as part operational maintenance to adjust living fences as needed.

In addition to mitigation treatments, to improve driver awareness of hazard conditions, other strategic measures could be considered to improve driver awareness of snowdrifting conditions. Although high priority areas have not been identified, the highway route will still be exposed to snow flux. These measures consist of the following:

- Implementing dynamic variable messaging boards of changing road and environment conditions. Based on the Road Weather Information System, snow on ground and wind conditions can be used to inform drivers of the potential snowdrifting conditions through the messaging boards

- Using sensor technology that includes meteorological, pavement and snow particle sensors for snow drifting measurements for warning of changing condition. A snow flux sensor placed on the north side of the road can be used to quantify the severity of snowdrifting conditions
- High resolution Numerical Weather Prediction data from Environment and Climate Change Canada and National Oceanic Atmosphere Administration can provide forecasted wind, temperature, and precipitation conditions for snowdrift prediction. Data resolution for the High-Resolution Deterministic Prediction System is 2.5 kilometres. The data can provide advanced warning of PST and predicting snowdrift conditions
- At strategic locations on the highway route, place signs of the potential risk of snowdrifting to provide further driver awareness of potential adverse conditions
- Placing road delineation poles in snowdrift areas for providing increased visibility of pavement edges in snowdrift locations, and
- Implement variable speed signage as a “recommend” or “advisory” based on weather and road conditions. Speed recommendation would be between maximum and minimum speed. Signs are electronic and dynamic, link to the dynamic messaging boards, and are posted at all the interchanges. Speed adjustment could be done manually or based on sensing in-situ conditions that include fog, severe precipitation and snowdrifting conditions.

5.2.9 Landscaping

A Preliminary Landscape Conceptual Design Plan was developed to identify opportunities for landscaping enhancement and propose protection and/or restoration treatment of the existing landscape features, for areas affected by the introduction of the proposed Bradford Bypass. The landscape restoration and enhancements are based on the road layout for the interim condition, with consideration towards reducing throwaway costs for the ultimate condition.

5.2.9.1 Potential Impacts

For Preliminary Design purposes, all areas within the Updated Technically Preferred Route right-of-way are assumed to be impacted by the proposed project works. Project refinements during future stages of the project, such as Detail Design, are anticipated to reduce the amount of impacted area within the proposed right-of-way, where feasible. A minimum 15 metre setback (Roadside Design Manual, May 2020) has been maintained from the edge of roadway shoulders, paving edges, access roads, future inner edge of paving from ultimate design, and hydro tower easements for clear lines of sight for the travellers along the Bradford Bypass. The Landscape Plan has been prepared based on

the interim design; however, while planning where plantings are proposed in the Landscape Plan (both within the median and along the outsides of the roadway), the ultimate design (which includes widening into the median only) was taken into account. Therefore, during the interim phase, plantings will be restricted within the median in an effort to minimize future removals of any new plantings as part of implementation of the ultimate design.

In areas requiring snowdrift mitigation, setback distances have been set based on recommendations of the Snowdrift Analysis Report (4DM, 2023), with a setback distance of 19 metres in most areas. In some constrained areas, the setback distance has been reduced to 12 metres, which is still within the parameters of the report recommendations; however, is to be confirmed in subsequent Detail Design phases. Refer to **Section 5.2.8** for details on the snowdrift assessment.

The Preliminary Landscape Conceptual Design Plan is shown in **Figure 5-4** below.

Figure 5-4: Preliminary Landscape Conceptual Design Plan

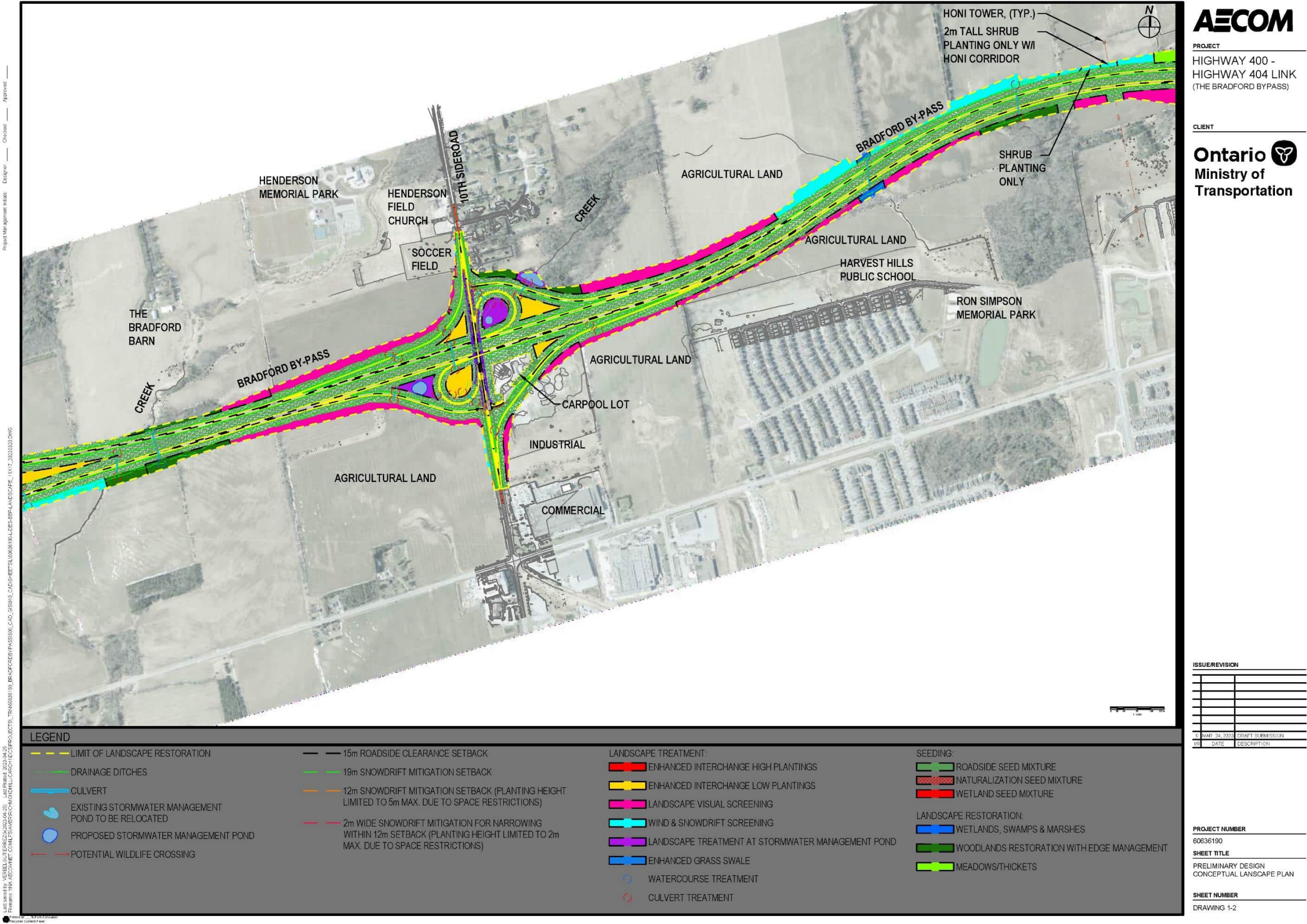


Figure 5-4: Preliminary Landscape Conceptual Design Plan

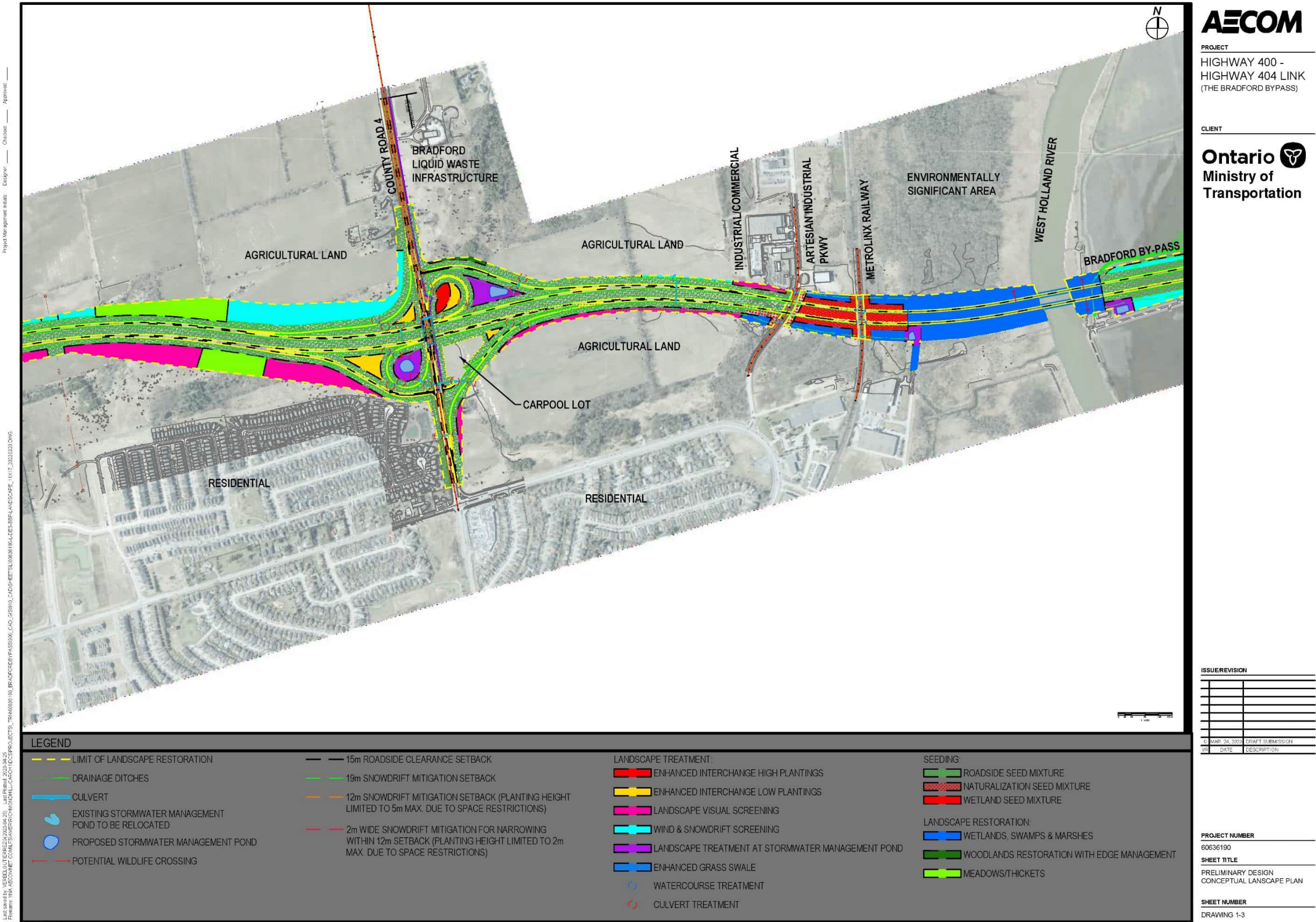


Figure 5-4: Preliminary Landscape Conceptual Design Plan

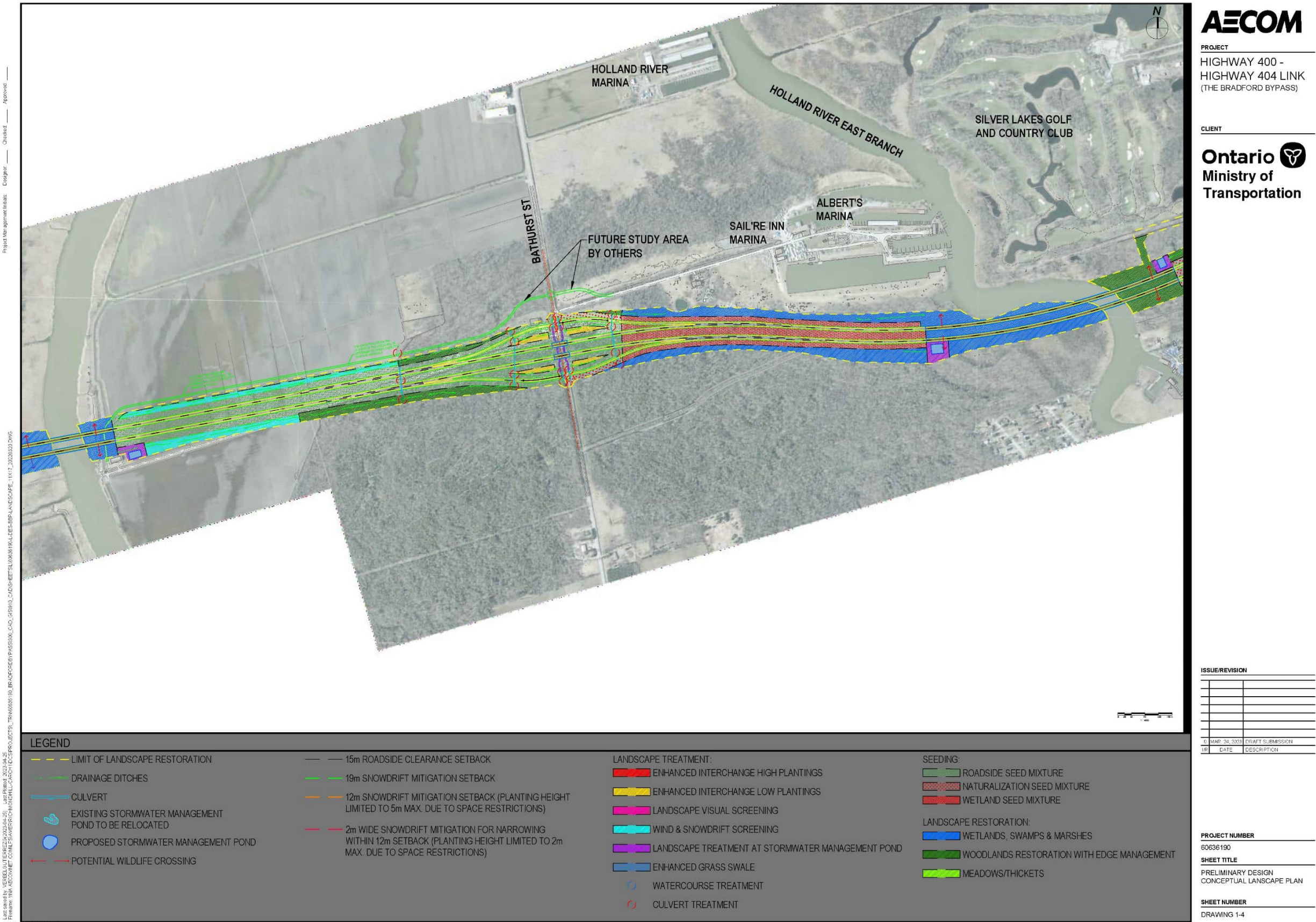


Figure 5-4: Preliminary Landscape Conceptual Design Plan

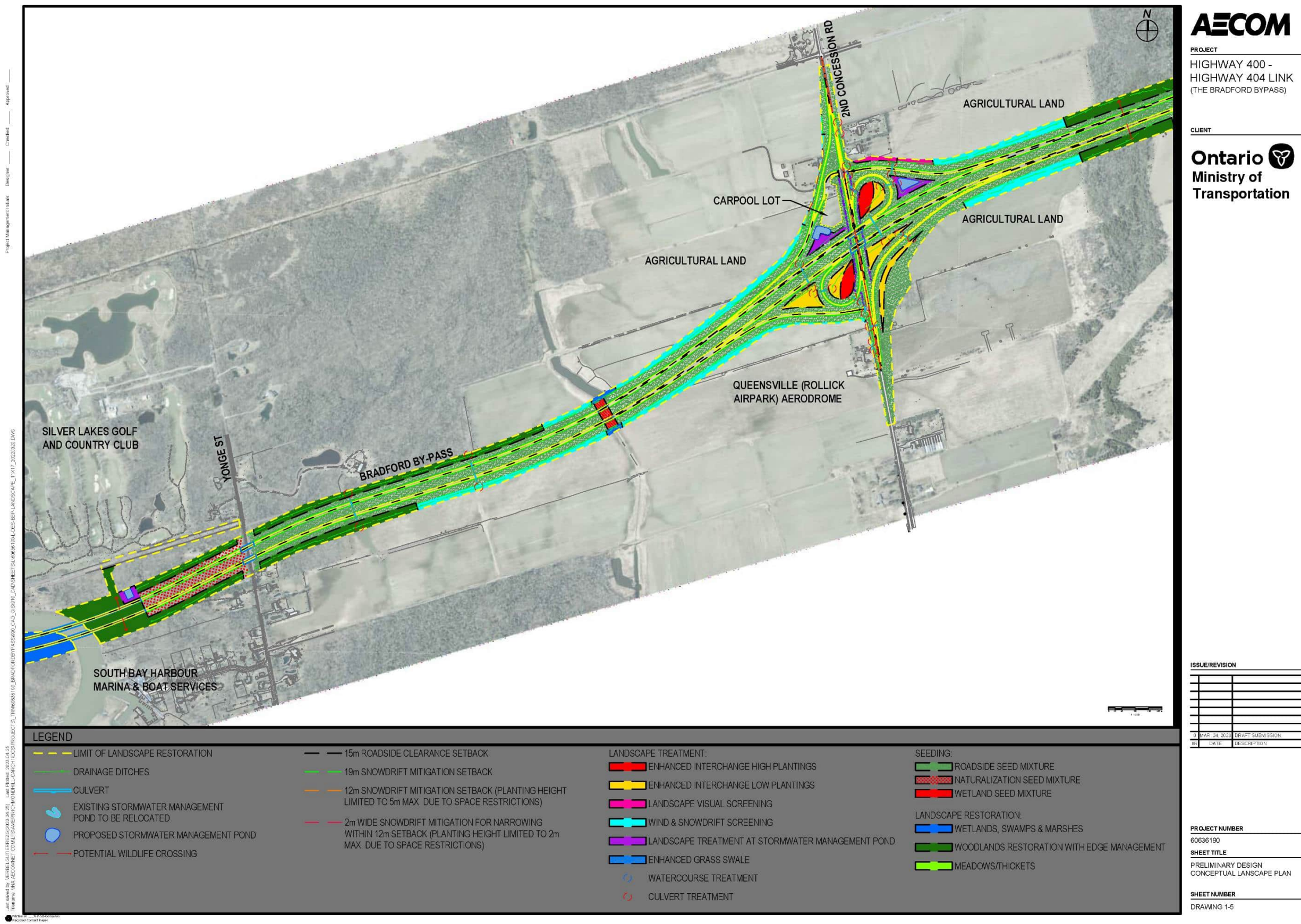
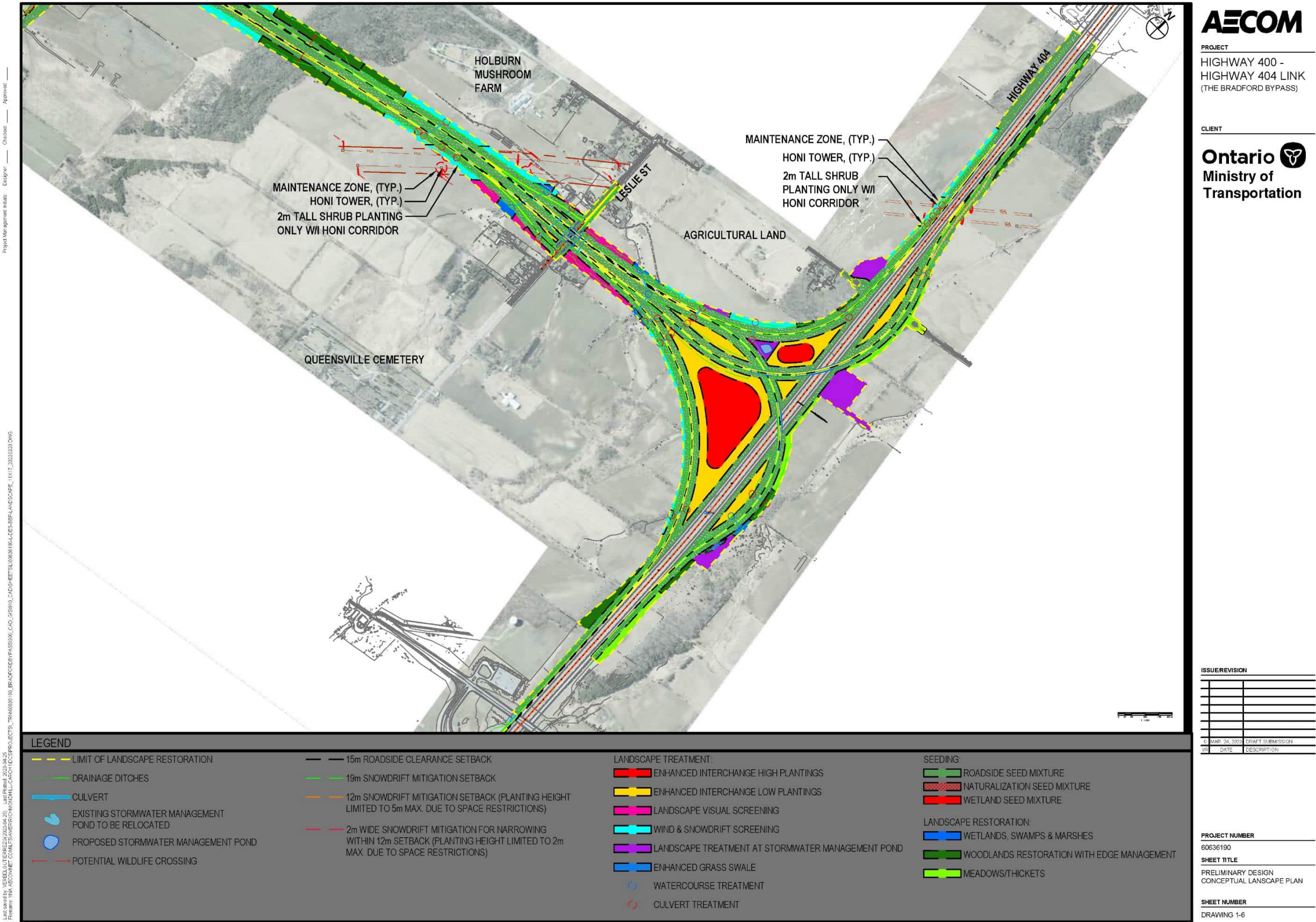


Figure 5-4: Preliminary Landscape Conceptual Design Plan



5.2.9.2 Commitments and Recommended Mitigation Measures

5.2.9.2.1 Landscape Restoration Opportunities

Opportunities for landscape restoration identified in the Preliminary Landscape Conceptual Design Plan are categorized into three restoration types based on the existing vegetative communities confirmed on site:

- Woodlands
- Wetlands, Marshes, and Swamps, and
- Meadow/Thickets.

The Preliminary Landscape Conceptual Design Plan identifies areas where these three vegetative communities can be restored utilising species of native vegetation found on the site, along with supplying planting densities that reflect the vegetative community and provides a native seed mixture reflective of the ground cover prior to disturbance.

Depending on the final space available within the proposed Ministry right-of-way at each individual location illustrated on the Preliminary Landscape Conceptual Design Plan shown in **Figure 5-4**, woodland vegetation will be used as an opportunity for replanting compensation trees (reforestation planting) that have been removed from the site. Additionally, edge management plantings are recommended between the woodlands and urban elements throughout the proposed corridor. Locations identified with limited space will focus on edge management only to limit the disturbance on the preserved woodlands. Reforestation plantings will consist predominately of large growing tree species, while edge management plantings will emulate a natural forest edge with a combination of deciduous and coniferous trees along the existing forest. Additionally, large, and low growing shrub species will be recommended towards the roadway forming a buffer from wind and salt spray.

The landscaping recommendations for wetland, marshes and swamp areas within the corridor that will remain and not be impacted by the project will consist of small deciduous and coniferous trees, deciduous shrubs, tall grasses, and forbs matching the native species observed on site. The proposed wetland planting restoration will extend beneath the bridge crossings of the Holland River and Holland River East Branch where feasible dependant on the availability of sunlight and precipitation. Due to the current recommended bridge designs and height of the bridges, sufficient exposure to sunlight and precipitation would support growth of low vegetative cover around the edges and central gap beneath the bridge structures, as noted in Preliminary Landscape Conceptual Design Plan. Details of the piers and spacings will be determined in subsequent Detail Design phases, which will need to be considered during the preparation of the detailed Landscape Design Plan.

Meadow/Thicket areas are recommended to consist predominately of tall to low growing deciduous shrubs and grass seed mixtures, with some low growing trees as needed. The density of planting at the Meadow/Thickets would be comparatively lower than the Woodland and Wetland Restoration areas.

For Preliminary Design purposes, proposed culverts were recommended to be sized to allow for movement of small amphibians/reptiles or small mammals, where possible, as per the Terrestrial Ecosystems Impact Assessment Report (AECOM, 2023). As such, culvert treatments noted within the Preliminary Design will include appropriate vegetation to provide coverage for wildlife at culvert openings, where feasible. For the purpose of the Preliminary Landscape Conceptual Design Plan, culvert treatments have been divided into two types (Drainage Culvert Treatment and Watercourse Treatment) based on whether the culvert will facilitate watercourse crossings that have been impacted by the highway design. Drainage Culvert Treatments will consist of native shrubs, tall grasses, and seed mixtures suited for periodic wet soil conditions at each end to provide cover for small wildlife. Watercourse Treatments will receive a similar approach as the wetland restoration for areas within 10 metres to 30 metres from watercourse centreline (depending on pre-disturbed conditions), to replicate the watercourse prior to disturbance.

In consultation with AECOM's Terrestrial Team, Wildlife Crossing opportunities have been noted along the banks of both branches of the Holland River. As previously noted, the plantings proposed in these areas have been extended to run underneath the bridges to provide vegetated cover for wildlife through a combination of plantings and seeding listed earlier for wetland restoration opportunities. An additional wildlife crossing is currently noted to connect the impacted woodlands that hosts a deer wintering area between 2nd Concession Road and Leslie Street. Details are to be confirmed during future Detail Design for the size, opening, plantings etc. for potential wildlife crossings. Further consultation between the future Landscaping Team and future Design Teams (Terrestrial, Fisheries, Fluvial, Drainage, Structural, and Highway) is required to determine an appropriate solution for the crossings.

5.2.9.2.2 Landscape Enhancement/Treatment Opportunities

Opportunities for landscape enhancement identified in the Preliminary Landscape Conceptual Design Plan are categorized into Enhanced Interchange Plantings (High and Low) and Landscape Screenings (Visual and Wind/Snowdrift).

Visual screening opportunities have been proposed per AECOM's Land Use Factors Report (AECOM, 2023) for such land use as residential, educational, institutional, strategic employment, and recreational, as well as input from the AECOM Property Impact Mitigation Team. Visual screenings will consist of a combination of large growing

deciduous and coniferous trees, and a range of large and low growing shrubs to form a dense barrier for undesired views from the highway onto the noted land uses. Details are to be confirmed during future Detail Design.

Wind and snowdrift screening opportunities have been proposed in consultation with the Snowdrift Analysis Report prepared by 4DM Inc. (under separate cover). Wind and snowdrift screenings are recommended to consist of a minimum double row of deciduous shrubs ranging from 2 metres to 5 metres at mature height, along with coniferous trees, where appropriate and feasible. Deciduous trees may be added to shrub planting areas for aesthetic enhancement. The planting design should aim to maintain a 50% porosity in the winter.

Note there are instances where Landscape Enhancement/Treatment or Restoration Opportunities other than Wind and Snowdrift screenings have been proposed due to additional factors, such as the presence of vegetative communities requiring restoration or screening for residential areas. These treatments will still be effective to mitigate snowdrift on the future highway by setting back plantings a minimum of 19 metres from the edge of pavement, while maintaining a 50% porosity.

In areas where snowdrift mitigation is required, the permitted height of plantings is dependent on the setback distance from the edge of pavement. Consideration should be undertaken such that a 50% porosity is maintained in the winter.

- Setback distance of 19 metres or more – Trees, shrubs with a height greater than 5 metres
- Setback distance between 12 and 19 metres – - Mature plant heights up to 5 metres, and
- Setback distance less than 12 metres – A 2 metre wide or a staggered row of 2 metre tall shrubs is recommended adjacent to the right-of-way limit.

There are some instances where the snowdrift mitigation is required in areas that fall within the Hydro One corridor. During Detail Design, discussions shall be held with Hydro One to discuss the use of potential Hydro One-approved shrub plantings.

Further refinement and coordination will be required during subsequent Detail Design between the Detail Design Team and a Snowdrift Specialist to confirm the plant combination that is proposed in the areas where snowdrift mitigation is required.

Opportunities for Enhanced Interchange Plantings have been identified to create landmarks along the highway for a sense of place as travelers enter or leave these communities that are connected by the Bradford Bypass. These planting opportunities have been subdivided into High and Low Plantings. High plantings will consist of large

deciduous and coniferous trees and large shrubs that will act as a background for the Interchange Plantings. Low plantings will consist of low shrubs and native flowering seed mixtures to act as a foreground for the Interchange Plantings.

Opportunities for landscape treatments have been identified to treat areas within the proposed Ministry right-of-way that are anticipated to be impacted by the highway design but have not been addressed through the previously noted opportunities. These treatments include roadside seed mixtures, naturalized seed mixtures, and stormwater management facilities.

All areas of disturbance outside of paved surfaces up to the adjacent drainage ditches shall be seeded with an appropriate roadside mixture that consists of native and salt tolerant species. The remaining disturbed areas will be seeded with native species mixtures that reflect the adjacent existing vegetative communities. Opportunities for enhancements at key locations will be explored in the latter by selecting a predominant percentage of flowering species from the mix for seasonal interest.

The Stormwater Management facilities proposed as part of this project are identified in purple hatched areas on the Preliminary Landscape Design. The proposed and existing/relocated Stormwater Management facilities will include deciduous and coniferous trees, deciduous shrubs, grasses, and seed mixtures that range in ideal soil moisture levels from the wet areas adjacent to the pond's normal water level to the higher elevated dryer areas of the pond. Conservation Authorities shall be consulted during future Detail Design stages to determine any input they may have regarding recommendations for plant lists for any local or rare vegetation, and recommendations for appropriate planting species and densities within the Stormwater Management facilities.

5.2.9.2.3 Recommendations

Further mitigation measures and commitments outlined in the Environmental Assessment Report One – Stage Submission: Highway 400 – Highway 404 Extension Link (Bradford Bypass) W.P. 377-90-00 (McCormick Rankin Corporation, 1997), Environmental Conditions Report (AECOM, 2022), and Highway 400 – Highway 404 Link (Bradford Bypass W.O. #19-2001 – Terrestrial Ecosystems Existing Conditions Report (AECOM, 2020) shall be explored and implemented, where appropriate, as the design is refined during future Detail Design stages of the project.

For all restoration opportunities, a detailed review of the list of plantings observed on site within the existing vegetative communities will be required to prepare suggested plant lists for the areas of restoration. During future Detail Design stages, consultation with Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority is recommended to establish their recommendations for consideration of

appropriate species of vegetation and seed mixtures, as well as planting density for the potential restoration areas and stormwater management facilities.

For the wildlife crossing recommended at the deer wintering area between 2nd Concession Road and Leslie Street, continued collaboration between the Landscaping and other design disciplines (Terrestrial, Fisheries, Fluvial, Drainage, Structural, and Highway) will determine appropriate design solutions for the structures and vegetative cover to be implemented to promote a safe means of crossing for wildlife (i.e., white tail deer) in the area. Additionally, opportunity areas exist at the Holland River and Holland River East Branch for wildlife passages. Details for any crossings are to be confirmed during future Detail Design.

Further coordination will be needed for the visual screening landscape treatment during Detail Design. Landscape vegetation screening is to be considered during the future Detail Design stage to mitigate potential air quality impacts for any exceedances, where applicable and feasible.

Refinement of the wind and snowdrift landscape screening recommendations is required during the future Detail Design stage.

Detailed Landscape Plans shall be developed during future Detail Design stages of the project for re-vegetation of disturbed / impacted areas and to provide landscaping enhancements in other areas as well. Refer to the enclosed Preliminary Landscape Conceptual Design Plan to view conceptual recommendations for the corridor based on the current Recommended Plan design.

To view a copy of the Preliminary Landscape Composition Plan, refer to **Figure 5-4** above.

5.2.10 Navigable Waters

This section presents an overview of the efforts undertaken through Preliminary Design to initiate compliance with the federal legislative requirements for the protection of navigation on waterways within the Study Area and advance the requirements for approvals to be obtained prior to construction.

The legislative requirements governing interference and potential impacts to navigation were originally identified in the 2002 Approved Environmental Assessment (McCormick Rankin, 1997). At the time of the 2002 Approved Environmental Assessment, the *Navigable Waters Protection Act*, administered by the Canadian Coast Guard, was identified as applicable legislation for the two crossings of the Holland River (Holland River and Holland River East Branch). The title, along with various elements of the Act, was last amended in 2019. As presented in Section 5.2.4 of the 2002 Approved Environmental Assessment, the twin bridges were proposed to have a 6.86 metre

(22.5 feet) vertical clearance above the water level (718.83 feet GSC) based on Canadian Coast Guard direction.

The Preliminary Design proposed crossings for the Holland River and Holland River East Branch are presented in **Section 4.3**, with relevant navigational design components for the Holland River crossings outlined in **Table 5-20**. This includes the proposed navigational opening (width and height in metres), bridge span length over the active channel, elevation to the underside of the bridge (soffit) and the associated water levels for both normal and highwater levels at the crossing. In comparison to the 2002 Approved Environmental Assessment, the proposed navigational height clearance for the current design allows for approximately 1 metre more vertical clearance, allowing vessels with a height requirement of up to 8 metres to pass safely under the proposed highway.

Further details on the proposed structures as part of this project are documented in **Section 4.3**.

Table 5-20: Summary of Navigational Elements for Bradford Bypass Holland River Crossings (Preliminary Bridge Designs)

Structure Identification	Navigation Width	Navigation Height	Bridge Span	Soffit Elevation	Water Level	Highwater Level
Holland River Crossing	25.0 metres	8.0 metres	115.0 metres	227.83 metres	219.41	219.69
Holland River East Branch Crossing	25.0 metres	8.0 metres	North bridge: 120.0 metres South bridge: 100.0 metres	227.68 metres	219.68	219.77

At the time of initiation of the Preliminary Design in 2020, the *Canadian Navigable Waters Act (R.S.C., 1985, c. N-22)*, administered by Transport Canada, has been applied to the project. Proposed works that may affect navigation are categorized as major or minor works.

The new Holland River crossings are considered major works per Major Works Order SOR/2019-320 as the crossings will involve fixed span bridges with one or more piers below the ordinary high-water mark. The ordinary high-water mark is considered to be the “high- water level”. Additionally, this takes into consideration if a waterway is listed as a Scheduled waterway under the Act. Both rivers are listed as Navigable Waters under the Act (**Table 5-21**). Construction related activities for temporary works are also considered, such that temporary works being installed for a period of at least 30 consecutive days for the construction, placement, alteration, rebuilding, removal,

decommissioning, repair or maintenance of a bridges, unless they are installed during a period when navigation is not possible. An application for approval to the Navigation Protection Program is to be sought and obtained in subsequent Detail Design phases of the project.

Table 5-21: Canadian Navigable Waters Act Schedule of Navigable Waters – Rivers²

Watercourse Name	Approximate Downstream Point	Approximate Upstream Point	Description
Holland River	44°12'10" N, 79°30'52" W	44°06'46" N, 79°32'44" W	From the Bridge Street bridge to Lake Simcoe
Holland River East Branch	44°07'35" N, 79°30'15" W	44°07'35" N, 79°30'15" W	From the Queensville Side Road bridge to the Holland River

Given that the design of the bridges over the Holland Rivers may affect the navigability on the rivers, the Project Team sought information from the public to understand what the predominant uses of the river were, and what vessels typically travelled on the rivers.

At the outset of the project a Study Commencement Letter was prepared and circulated to stakeholders in September 2020. The letter noted, “The design and future construction of the bridges may affect navigability within the Holland River and Holland River East Branch. If you have information on current navigability (timing, types of vessels, etc.) please contact the Project Team or complete the form on the “Contact Us” page of the Project Website.”

Additionally, a comment form asking questions including those focused on navigation was posted on the Project Website “Contact Us” page to solicit feedback from stakeholders regarding navigable waterways and usage within the Study Area. Questions included: Does your organization use the Holland River or Holland River East Branch within the project limits for navigation (i.e., recreation or commercial uses), or are you aware of others doing so? If yes, please indicate the vessel type(s) used? If Other Vessels (please specify)?

A few responses were provided; however, the information received by the Project Team was minimal. Navigation was included as a topic of discussion with Regulatory Agencies and Indigenous communities throughout the study. Refer to **Section 7** for the record of consultation.

2. Source: <https://laws-lois.justice.gc.ca/eng/acts/N-22/page-7.html#h-365179> (19-Jan-2023)

Navigation specific letters were sent January 24, 2023, to Indigenous communities, local marinas and stakeholders who provided initial vessel information. The purpose of the communication was to seek information on their navigational usage of the Holland River and Holland River East Branch, as well as any other watercourses that may be considered navigable within the Study Area. The information received was intended to assist with the development of the Preliminary Design and assessment of navigational impacts, as well as support the *Canadian Navigable Waters Act* approval process for the project. The following are the questions and clarifications sent to these contacts:

Please provide us with the following information:

- Type of vessel(s), including: Vessel height, Clearance height required, Vessel width clearance requirements, Vessel length, keel (if applicable), draft etc., and Other vessel specifications
- Do you host/organize any special events that would require either the Holland River and Holland River East Branch to remain open (not closed for construction) at a specific time each year
- Which months do you see the highest vessel traffic on the rivers
- What times of the day are considered peak hours for vessel traffic
- What type of vessels are launched and removed from the rivers
- What type vessels are moored, docked, or stored at your marina? Please specify heights and required clearances, and
- Please include any additional information you feel is necessary.

The following summarizes the overall understanding of navigational needs within the Study Area:

- Construction staging, and
- Temporary and permanent aids to navigation including signage and lights.

The navigation letters asked that stakeholder information be provided via the Project Team email or toll-free telephone number by February 14, 2023. The information collected was be used for the development of the Preliminary Design, as well as the *Canadian Navigable Water Act* project review and assessment of navigational impacts for the Bradford Bypass. Feedback received in response to the letter focused on stakeholders providing detail on their usage of the waterway, and a request for additional clearance beyond the recommended 8 metres.

As part of this Preliminary Design project, the Project Team has currently designed the bridges over the Holland River and Holland River East Branch, which are listed as

Scheduled Navigable Waters, in compliance with the *Canadian Navigable Waters Act*. Per the Act, the Project Team is actively engaging with Transport Canada and is providing an opportunity for the public to provide input into the use of the waterways.

The minimum vertical and horizontal bridge clearances of the main span of the bridges over the Holland River and Holland River East Branch have been determined during this Preliminary Design phase. In the following Detail Design phase, the bridges will be further refined, and permanent navigational aids and signage will be developed. Before the bridges can be constructed, approval from Transport Canada will be required. During Construction, the Contractor will implement measures and plans related to navigation, including installing temporary navigational aids and signage to protect the public on the waterway.

The preliminary 8.0 metres (~26') vertical (from High Water Level) and 25.0 metres (~82') horizontal bridge clearance over the Holland River and Holland River East Branch was determined as a reasonable improvement to the acceptable 6.86 metres (22.5') vertical clearance above water level 219.1 metres (718.83') Geological Survey of Canada (GSC) and 19.8 metres (65') horizontal clearance provided by the Canadian Coast Guard in the 2002 Approved Environmental Assessment (letter dated April 7, 1995).

The preliminary 8.0 metres vertical clearance exceeds the required Trent-Severn Canal minimum overhead fixed bridge clearance of 6.1 metres (20') per Parks Canada's navigational data. Furthermore, the 8.0 metres vertical clearance exceeds the minimum bridge clearances of the Atherley Narrows Bridge (7.0 metres, 22.8') and Muskoka Road Bridge (6.7 metres, 22.0') on the north side of Lake Simcoe, and the Canadian National Railway Bridge (6.9 metres, 22.7') and Gamebridge Bridge (6.7 metres, 22.0') on the east side of Lake Simcoe which provide access to the Trent-Severn Canal on either side of Lake Simcoe. The 8.0 metres preliminary vertical clearance also exceeds the minimum bridge clearance under the J.D. MacDonald Bridge (7.8 metres, 25.6') and Highway 401 Bridge (7.5 metres, 24.5') providing access to the Trent-Severn Canal at Lake Ontario.

Similarly, the preliminary 8.0 metres vertical clearance exceeds the required Rideau Canal minimum overhead fixed bridge clearance of 6.7 metres (22'). Furthermore, the 8.0 metres vertical clearance exceeds the minimum bridge clearances of the first fixed bridge in Ottawa (7.9 metres, 25.6') providing access to the Rideau Canal at the Ottawa River, and at Highway 401 bridge (6.7 metres, 22.0') providing access to Rideau Canal in Kingston.

In Detail Design, further information gathering will be conducted with Indigenous communities regarding their use of the waterways, as per Transport Canada's requirements.

The information documented in this Report will be carried forward in subsequent Detail Design phases.

5.3 Cultural Environment

5.3.1 Archaeology

5.3.1.1 Potential Impacts

AECOM's Stage 1 background study of the Bradford Bypass Study Area has determined that the potential for the recovery of archaeological resources is high, given the proximity of the Study Area to several indicators of archaeological potential, including previously identified archaeological sites, distance to important water sources, and areas of early Euro-Canadian settlement and early transportation routes. Areas where archaeological potential has been removed include areas determined to have been subject to extensive land alterations that have significantly compromised the recovery of archaeological materials and constructed roadways. All potentially undisturbed areas must be subject to Stage 2 field survey, and those areas where Stage 3 and 4 is required completed prior to any ground disturbance.

Extensive background research was completed for the Sutherland Wesleyan Methodist and Rogers Cemetery located on 8th Line in Bradford West Gwillimbury. This included contacting the Burial Authority of Ontario, contacting the Simcoe County Archives, the Town of Bradford West Gwillimbury, the Bradford West Gwillimbury Library, and the County of Simcoe. Unfortunately, no plans or maps were found of the cemetery.

5.3.1.2 Commitments and Recommended Mitigation Measures

5.3.1.2.1 Summary of Archaeological Assessments (June 1, 2023)

The Stage 2 Archaeology Assessment Reports note the following commitments and recommended mitigation measures for lands within the Study Area that will be impacted by the proposed Bradford Bypass. The following recommendations were made as part of the Stage 2 Archaeological Assessment:

1. The East Holland River site (BaGv-42) required Stage 3 Archaeological Assessment. This assessment has been completed in keeping with *Section 3.3.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). AECOM's results in the southern portion of the site confirm some previous findings from assessments in the central and northern portions of the site indicating it is a complex multi-component site consisting of 1,000 year old Indigenous artifacts and some 19th century Euro-Canadian artifacts. Therefore, the southern portion of the site must be subject to Stage 4 excavation as it will be impacted by construction. Stage 4 Archaeological Assessment excavation plans will be submitted to the Ministry of Citizenship and Multiculturalism and Indigenous communities prior to the Stage 4 excavation being conducted

2. The Bradford Hill site (BaGv-112) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.3.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicate that this site represents a large Late Woodland village that will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. The Ministry has indicated that the site will be avoided through highway realignment
3. The Wheatfield site (BaGv-113) required Stage 3 Archaeological Assessment. The assessment was completed in keeping with *Section 3.2.1 and 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicate that this site represents a small, short-termed occupation in the Late Woodland Period (ca. 900 A.D. – 1650 A.D.) and will therefore require Stage 4 excavation as it will be impacted by construction
4. The River Bend site (BaGv-114) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). AECOM's results indicate it is a complex multi-component site consisting of several thousand-year-old Indigenous artifacts and some 19th century Euro-Canadian artifacts. Therefore, the site must be subject to Stage 4 excavation as it will be impacted by construction. Stage 4 Archaeological Assessment excavation plans will be submitted to the Ministry of Citizenship and Multiculturalism and Indigenous communities prior to the Stage 4 excavation being conducted
5. The Bradford Ridge site (BaGv-115) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicate that it is a small, multi-component Indigenous site that spans from 8,000 B.P. to 1550 A.D. that will require Stage 4 excavation as this site will be impacted by construction
6. The Frazer Creek site (BaGv-116) requires Stage 3 Archaeological Assessment. This assessment should be completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicate that this site represents a small, short-termed occupation in the Late Woodland Period (ca. 1620 A.D. – 1650 A.D.) and will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. The Ministry has indicated that the site will be avoided through highway realignment

7. The Holland Forest West site (BaGv-117) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicate that this site represents a small Late Woodland site that will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. The Ministry has indicated that the site will be avoided through highway realignment
8. The Holland Forest East site (BaGv-148) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicate that this site represents a small, short-termed occupation in the Late Woodland Period (ca. 900 A.D. – 1650 A.D.) and will therefore require Stage 4 excavation as it will be impacted by construction
9. The Goodwin site (BaGv-151) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and *Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2021)*
10. The Doan site (BaGu-215) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and *Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014)*. Since the Stage 2 pedestrian survey was completed to Stage 3 Controlled Surface Pick-up standards, Stage 3 Controlled Surface Pick-up is not required prior to commencing hand excavations. The results indicate that the site is a mid to late 19th century Euro-Canadian homestead that will require Stage 4 excavation as it will be impacted by construction
11. The Holborn site (BaGu-218) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with *Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and *Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014)*

12. The Hollingshead I site (BaGu-219) required Stage 3 Archaeological Assessment. The assessment was completed in keeping with *Section 3.2.1 and 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and *Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014)*
13. The Hollingshead II site (Bagu-220) required Stage 3 Archaeological Assessment. The assessment was completed in keeping with *Section 3.2.1 and 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and *Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014)*
14. The Stage 4 assessment of William Robinson Jr. Site (BaGv-83) has been completed in keeping with Section 4.2.3 of the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The results indicated that a large portion of the site had been previously disturbed by the construction of the nearby residence and the construction of County Road 4. The portion of the site excavated revealed a mid to late 19th century Euro-Canadian site. No further work in this area is recommended
15. It is understood that there will be impacts to the riverbeds of both branches of the Holland River with the construction of bridge footings. Therefore, AECOM recommends that a marine archaeological assessment be undertaken by a licenced archaeologist for the river branches themselves as well as the low-lying wetlands immediately adjacent to the river branches within the study corridor
16. The areas highlighted in yellow on Figure 7 in the Stage 2 Archaeological Assessment (March 2023) contain archaeological potential and require Stage 2 pedestrian survey in keeping with *Section 2.1.2 of the Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011)
17. The areas highlighted in green on Figure 7 in the Stage 2 Archaeological Assessment (March 2023) contain archaeological potential and require Stage 2 test pit assessment as per *Section 2.1.2 of the Standards and Guidelines*
18. Areas labelled as disturbed, sloped, low lying and wet, test pitted at 5 metres or pedestrian surveyed at 5 metres in the Supplementary Documentation in the Stage 2 Archaeological Assessment are considered cleared of further archaeological work. No archaeological resources were found in these areas, and

19. Areas identified as cemeteries will not be directly impacted, however Stage 2 Archaeological Assessment must be completed immediately adjacent to the current cemetery boundaries. The Stage 2 Archaeological Assessment was completed around the Rogers Sunderland Cemetery and no archaeological resources were found. A Stage 3 Archaeological Assessment must be conducted immediately adjacent to the cemetery boundaries to ensure no historic graves are present in these areas.

5.3.1.2.2 Updated Summary of Archaeological Assessments including Stage 3 Recommendations (July 13, 2023)

As noted in **Section 2.3.1**, additional archaeological assessments have been completed for the sites identified in the Stage 2 Archaeological Assessment Reports as requiring additional archaeological works, where access was permitted.

Since the Draft Environmental Impact Assessment Report was made available on June 1, 2023, additional Stage 2 Archaeological Assessments have been completed at 25 properties. These properties have been considered cleared for further archaeological work. No archaeological resources were found in these areas.

Refer to **Figure 2-13** in **Section 2.3.1** for a map of the areas within the Ministry right-of-way where all Stage 2 archaeological assessments were completed for the project.

Since the Draft Environmental Impact Assessment Report was made available on June 1, 2023, additional Stage 3 Archaeological Assessments have been completed. A summary of the recommendations from the additional Stage 3 Archaeological Assessments are included below. Detailed recommendations for mitigation measures and monitoring activities for each site are listed in **Table 5-26**.

- **Frazer Creek II Site (BaGv-152):** Frazer Creek II Site (BaGv-152) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011), the Frazer Creek II Site (BaGv-152) does not contain further cultural heritage value and interest and does not require Stage 4 archaeological assessment. The site should be considered cleared of further archaeological concerns. Refer to **Table 5-26** for detailed recommendations for mitigation measures and monitoring activities.
- **William Robinson Jr. II Site (BaGv-150):** William Robinson Jr. II Site (BaGv-150) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and

Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014). The Ministry has indicated that the site will be avoided through highway realignment. Should there be refinements to the alignment in subsequent phases of the project, the William Robinson Jr. II Site (BaGv-150) will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. Refer to **Table 5-26** for detailed recommendations for mitigation measures and monitoring activities.

- **Panville Site (BaGv-153):** The Panville Site (BaGv-153) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011), the Panville Site (BaGv-153) does not contain further cultural heritage value and interest and does not require Stage 4 archaeological assessment. Refer to **Table 5-26** for detailed recommendations for mitigation measures and monitoring activities.
- **Goodwin Site (BaGv-151):** The Goodwin site (BaGv-151) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (Ministry of Citizenship and Multiculturalism, 2021). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government, 2011), the Goodwin Site (BaGv-151) does not contain further cultural heritage value or interest and does not require Stage 4 archaeological assessment. Refer to **Table 5-26** for detailed recommendations for mitigation measures and monitoring activities.
- **Hollingshead 1 (BaGu-219):** The Hollingshead 1 site (BaGu-219) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (Ministry of Citizenship and Multiculturalism, 2021). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government, 2011), the Hollingshead 1 Site (BaGu-219) does not contain further cultural heritage

value or interest and does not require Stage 4 archaeological assessment. Refer to **Table 5-26** for detailed recommendations for mitigation measures and monitoring activities.

- **Hollingshead 2 (BaGu-220):** The Hollingshead 2 site (BaGu-219) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (Ministry of Citizenship and Multiculturalism, 2021). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government, 2011), the Hollingshead 2 Site (BaGu-220) does not contain further cultural heritage value or interest and does not require Stage 4 archaeological assessment. Refer to **Table 5-26** for detailed recommendations for mitigation measures and monitoring activities.

The Stage 1, Stage 2 and Stage 3 Archaeological Assessment Reports are being provided to Indigenous communities for review and comment. Following Indigenous community review, the commitments and recommended mitigation measures are subject to Ministry of Citizenship and Multiculturalism review and approval and are to be complied with for the project. Additional commitments and recommended mitigation measures will be outlined in future Stage 4 reports prepared for this project and reflecting the Updated Technically Preferred Route.

5.3.2 Cultural Heritage

5.3.2.1 Potential Impacts

The revised Cultural Heritage Resource Assessment Report (AECOM, 2023), available under separate cover, identified a total of 18 potential Built Heritage Resources and Cultural Heritage Landscapes, including four Built Heritage Resources and fourteen Cultural Heritage Landscapes. Potential impacts are outlined below:

- **Further Assessment Required:** Identified Built Heritage Resources and Cultural Heritage Landscapes require further research and evaluation to determine if they possess cultural heritage value or interest if they are anticipated to be adversely impacted by the Updated Technically Preferred Route. This will require the completion of a Cultural Heritage Evaluation Report (**Table 5-22**).

Table 5-22: Summary of the Preliminary Impact Assessment and Next Steps – Cultural Heritage Evaluation Reports

Feature ID	Location/ Address	Heritage Recognition (2022)	Preliminary Impact Assessment	Next Steps/Status
BHR 3	2948 Yonge Street	None (No municipal heritage recognition)	Direct - Displacement	Cultural Heritage Evaluation Report complete. Determined to be a Provincial Heritage Property.
BHR 5	3412 8 th Line, Bradford West Gwillimbury	Listed	Direct – Substantial property disruption, no displacement	Cultural Heritage Evaluation Report ongoing.
BHR 8	2835-2879 Yonge Street	None (No municipal heritage recognition)	Direct - Displacement	Cultural Heritage Evaluation Report complete. Not determined to be a Provincial Heritage Property.
CHL 6	21138 Leslie Street, East Gwillimbury	Listed	Direct – Substantial property disruption, displacement of an outbuilding	Cultural Heritage Evaluation Report ongoing.
CHL 8	3521 9 th Line, Bradford West Gwillimbury	Listed	Direct – Substantial property disruption, no displacement	Cultural Heritage Evaluation Report ongoing.
CHL 10	2779 9 th Line	Listed	Direct – Substantial property disruption, no displacement	Cultural Heritage Evaluation Report ongoing.
CHL 11	2673 9 th Line	None (No municipal heritage recognition)	Direct – Substantial property disruption, no displacement	Cultural Heritage Evaluation Report ongoing.
CHL 17	Holland River Watershed	None (No municipal heritage recognition)	Direct – Substantial property disruption, minor displacement	Cultural Heritage Evaluation Report ongoing.

- **Heritage Impact Assessment:** For properties that are determined by the Ministry to meet the criteria in Ontario Regulation 9/06 or Ontario Regulation 10/06 of the Ontario Heritage Act and that may be adversely impacted by the Updated Technically Preferred Route, it is recommended that an Heritage Impact Assessment is prepared to fully assess impacts on the resource's identified heritage attributes and propose alternatives and mitigation to conserve the property's Cultural Heritage Value or Interest (**Table 5-23**).

Table 5-23: Summary of the Preliminary Impact Assessment and Next Steps – Heritage Impact Assessments

Feature ID	Location/ Address	Municipal Heritage Recognition (2022)	Preliminary Impact Assessment	Next Steps
BHR 3³	2948 Yonge Street, Bradford West Gwillimbury	No municipal heritage recognition. Provincial Heritage Property: Determined by the Ministry to meet the criteria in Ontario Regulation 9/06 of the <i>Ontario Heritage Act</i> based on the recommendations made in the Cultural Heritage Evaluation Report: 2948 Yonge Street (AECOM, 2022).	Demolition due to direct adverse impacts to the shared access driveway.	Heritage Impact Assessment ongoing.

5.3.2.2 Commitments and Recommended Mitigation Measures

Overall heritage commitments and recommended mitigation measures are outlined below:

- Construction activities should be suitably planned and undertaken to avoid impacts to potential Built Heritage Resources and Cultural Heritage Landscapes (i.e., remain within the Ministry proposed right-of-way). Suitable mitigation measures are required to address these deficiencies during construction and may include establishing no-go zones adjacent to all the potential Built Heritage Resources and Cultural Heritage Landscapes identified and issuing instructions to construction crews in order to prevent impacts to existing structures
- To ensure all potential Built Heritage Resources and Cultural Heritage Landscapes identified in the Cultural Heritage Resource Assessment Report (AECOM, March 2023) within and adjacent to the final design are not adversely indirectly impacted by mechanical vibration during construction, a vibration assessment should be developed. Should this vibration assessment determine that the structure(s) or landscape features within the potential Built Heritage Resources and Cultural Heritage Landscapes be subject to adverse impacts due to vibration, a vibration monitoring plan is recommended to be prepared and mitigation measures implemented to lessen vibration impacts related to construction

3. Determined by the Ministry to meet the criteria in Ontario Regulation 9/06 of the Ontario Heritage Act based on the recommendations made in the Cultural Heritage Evaluation Report: 2948 Yonge Street (AECOM, 2022).

- Minister's Consent may be required if a potential Built Heritage Resources or Cultural Heritage Landscape meets Ontario Regulation 10/06 and is anticipated to be impacted by the Bradford Bypass, and
- Should there be refinements to and/or expansion of the Bradford Bypass proposed Ministry right of way, a Qualified Person(s)⁴ should assess if there are any changes in impacts and/or mitigation recommendations to the potential Built Heritage Resources and Cultural Heritage Landscapes identified as part of the field review process for the Cultural Heritage Resource Assessment Report update or to the potential Built Heritage Resources and Cultural Heritage Landscapes identified within the 2020 desktop Cultural Heritage Resource Assessment Report (i.e., those currently outside of the Bradford Bypass right of way but within the Route Planning Study Area, 2019-2020). Identify if mitigation is required (i.e., such as additional heritage studies).

Should there be changes to the Updated Technically Preferred Route and/or potential impacts as assessed in the Cultural Heritage Resource Assessment Report, a Qualified Person(s) should review and provide recommendations.

5.4 2002 Conditions of Approval

The 2002 Approved Environmental Assessment identified a number of Conditions of Approval set out by the Ministry of the Environment, Conservation and Parks. **Table 5-24** below identifies the 2002 Conditions of Approval carried forward through to Preliminary Design and describes any applicable changes to the 2002 Conditions of Approval. The 2002 Conditions of Approval identified in the 2002 Approved Environmental Assessment are to be carried forward to Detail Design phase unless otherwise stated in **Table 5-24** below.

4. For the purposes of the S&Gs, a qualified person may be anyone who individually or working in a team provides advisory or other services for cultural heritage resources – a professional engineer, an architect, a licensed archaeologist, a historian, landscape architect, a specialist in historic preservation, conservator, heritage planner, etc.

Table 5-24: 2002 Ministry of the Environment, Conservation and Parks Notice of Assessment Conditions

Project Stage	Condition Number	Concerned Group/Agency	Changes to Commitment (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
General	1	<ul style="list-style-type: none"> The Proponent shall comply with all the provisions of the Environmental Assessment submitted to MOEE, all of the provisions of which are hereby incorporated in this approval by reference, except as provided in these conditions and as provided in any other approvals or permits that may be issued. 	N/A	<ul style="list-style-type: none"> On October 7, 2021, Ontario Regulation 697/21: Bradford Bypass Project came into effect to exempt the Bradford Bypass Project from the requirements of the <i>Environmental Assessment Act</i>. The regulation sets a streamlined assessment process going forward and for continued environmental protection and consultations for the Bradford Bypass Project, and The Project Team will continue to carry forward previous environmental commitments monitoring the 2002 Approved Environmental Assessment Study as set out in the Regulation.
General	2	<ul style="list-style-type: none"> These conditions do not prevent more restrictive conditions being imposed under other statutes. 	N/A	<ul style="list-style-type: none"> N/A
General	3	<ul style="list-style-type: none"> The Proponent shall advise the Director of the Environmental Assessment Branch in writing every two years from the date of this approval, the status and scheduling of the overall undertaking, design studies, and construction projects including the anticipated date of completion. 	No	<ul style="list-style-type: none"> N/A
General	4	<ul style="list-style-type: none"> The Proponent during the design and construction of the undertaking shall comply with the Ministry 's Class Environmental Assessment for Group A Projects all of the provisions which shall apply to the design and construction of the undertaking. 	Yes	<ul style="list-style-type: none"> On October 7, 2021, Ontario Regulation 697/21: Bradford Bypass Project came into effect to exempt the Bradford Bypass Project from the requirements of the <i>Environmental Assessment Act</i>. The regulation sets a streamlined assessment process going forward and for continued environmental protection and consultations for the Bradford Bypass Project, and The Project Team will continue to carry forward previous environmental commitments made during the 2002 Approved Environmental Assessment Study as set out in the Regulation. Alternatives within the Study Area have been generated and will be evaluated based on technical and environmental factors, and in consultation with Indigenous communities, public stakeholders, municipalities, and government agencies.
General	5	<ul style="list-style-type: none"> The Proponent shall provide to the Ministry of the Environment and Energy for placement on the Public Record Transportation Environmental Study Reports and Design and Construction Reports, required by the Class Environmental Assessment, other documents as identified in the Environmental Assessment or required by these conditions, including notices to the public and Regulatory Agencies regarding study commencements and the availability of Transportation Environmental Study Reports and Design and Construction Reports. The Proponent shall also provide copies of all documents to: <ul style="list-style-type: none"> The Regional Director of the MOE Central Region Office The Clerk of The Corporation of The Town of Bradford West Gwillimbury The Clerk of The Town of East Gwillimbury The Clerk of The Town of Newmarket The Clerk of The County of Simcoe The Clerk of The Township of King The Clerk of The Regional Municipality of York, and Local libraries in Bradford West Gwillimbury, East Gwillimbury, and King Township. These documents will also be provided to other municipalities as considered appropriate by the Proponent. 	Yes	<ul style="list-style-type: none"> In accordance with Ontario Regulation 697/21, the Draft Environmental Impact Assessment Report will be provided to all stakeholders listed in Section 25 (3)(a) of Ontario Regulation 697/21 for review and comment, and In accordance with Section 26 of Ontario Regulation 697/21, the Ministry established an issues resolution process to attempt to resolve any concerns raised by interested persons and Indigenous communities, in a way that does not cause unreasonable delay to the implementation of the project. Upon completion of the consultation and issues resolution process for the Draft Environmental Impact Assessment Report, the Ministry shall update this Draft Environmental Impact Assessment Report in accordance with Section 27 of the Regulation, and The Final Environmental Impact Assessment Report will be distributed to all Section 25 (3)(a) of Ontario Regulation 697/21.

Project Stage	Condition Number	Concerned Group/Agency	Changes to Commitment (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Design Phase – Applied Mitigation Conditions	6	<ul style="list-style-type: none"> The Proponent shall prepare at the commencement of individual design studies a Stage III Archeological Assessment for review and comment by the Ministry of Culture (MC). The Stage III Archeological Assessment shall comply with the Protocol established between the Proponent and MC. The Stage III Archeological Assessment shall be reviewed by the Ministry and reviewed and approved by the MC. The Proponent shall Implement the recommendations and findings of the approved Stage III Archeological Assessment in the design and construction of the undertaking. 	No	<ul style="list-style-type: none"> In accordance with Section 21 of Ontario Regulation 697/21, a Stage III Archeological Assessment will be completed for areas of the updated Study Area that are identified as having archaeological potential in accordance with the Stage II Archeological Assessment and will be completed in accordance with the Ministry of Citizenship and Multiculturalism Guidelines for Consultant Archaeologists As part of the Preliminary Design Study, the Project Team is continuing to undertake Stage III Archeological Assessment work in 2023. The works are being completed in accordance with the Ministry of Citizenship and Multiculturalism Guidelines for Consultant Archaeologists, and Once the archaeological assessments are finalized, a second issuance of the Draft Environmental Impact Assessment Report will be posted for an additional 30 days for public review and comment.
Design Phase – Applied Mitigation Conditions	7	<ul style="list-style-type: none"> The Proponent shall prepare at least 90 days prior to an anticipated construction project, the stormwater management plan identified in section 5.4.6.1 of the Environmental Assessment. The stormwater management plan shall address both water quality and quantity impacts. The plan shall be developed and reviewed by the Regulatory Agencies identified in section 5.4.6.1 the Environmental Assessment. This plan shall include contract specifications that require the preparation of sedimentation and erosion control plans, which provide details of implementation, monitoring, and commitment to undertake modifications, where necessary during construction, to maintain effectiveness. 	No	<ul style="list-style-type: none"> In accordance with Section 22 of Ontario Regulation 697/21, a Stormwater Management Plan will be prepared and provided to the stakeholders listed in Section 22(4) of Ontario Regulation 697/21 for review and comment, and The Final Stormwater Management Plan will be provided to the Director of the Ministry of the Environment, Conservation and Park's Environmental Assessment Branch and posted on the Project Website.
Design Phase – Applied Mitigation Conditions	8	<ul style="list-style-type: none"> The Proponent shall prepare at least 90 days prior to anticipated construction, the groundwater protection plan, and well monitoring program referred to in section 5.4.2.6 of the Environmental Assessment. The plan shall be developed and reviewed by the Regulatory Agencies, municipalities, and property owners referred to in section 5.4.2.6 of the Environmental Assessment. 	No	<ul style="list-style-type: none"> In accordance with Section 23 of Ontario Regulation 697/21, a Groundwater Protection and Well Monitoring Plan has been prepared and provided to the stakeholders listed in Section 23(3) of Ontario Regulation 697/21 for review and comment, and The Final Groundwater Protection and Well Monitoring Plan will be provided to the Director of the Ministry of the Environment, Conservation and Park's Environmental Assessment Branch and posted on the Project Website.
Design Phase – Applied Mitigation Conditions	9	<ul style="list-style-type: none"> The Proponent shall not proceed with construction until the Regional Director has given written notification of satisfaction with the stormwater management plan and groundwater protection plan as requested by conditions 7 and 8. The Proponent shall implement the plans in accordance with the written notification. 	No	<ul style="list-style-type: none"> The Proponent shall not proceed with construction until the Ministry of the Environment, Conservation and Parks Regional Director has been provided the Final Stormwater Management Plan and the Final Groundwater Protection and Well Monitoring Plan.
Design Phase – Applied Mitigation Conditions	10	<ul style="list-style-type: none"> The Proponent shall prepare a detailed noise report and shall submit the report for review to the Director at least 90 days prior to a construction project and shall not proceed with construction until the Proponent has received written notification from the Director that the Report is satisfactory. The report shall be in accordance with the Noise Protocol. The Proponent shall implement the recommendations of the approved detailed noise report in the design and construction of the individual project. 	No	<ul style="list-style-type: none"> In accordance with Section 24 of Ontario Regulation 697/21, a Noise Report has been prepared and provided to the Director of the Ministry of the Environment, Conservation and Park's Environmental Assessment Branch for review and comment, and The Final Noise Report will be provided to the Director of the Ministry of the Environment, Conservation and Park's Environmental Assessment Branch and posted on the Project Website.

Project Stage	Condition Number	Concerned Group/Agency	Changes to Commitment (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Process for Addressing New Concerns	11	<ul style="list-style-type: none">■ The Proponent shall not make any changes to the undertaking as approved unless the changes are made in accordance with the requirements of chapter 10 of the Class Environmental Assessment. Monitoring of Environmental Assessment Commitments and Environmental Assessment Act Conditions of Approval.	Yes	<ul style="list-style-type: none">■ The Proponent will comply with Ontario Regulation 697/21: Bradford Bypass Project which came into effect to exempt the Bradford Bypass Project from the requirements of the <i>Environmental Assessment Act</i>. The regulation sets a streamlined assessment process going forward and for continued environmental protection and consultations for the Bradford Bypass Project, and■ Should any project changes be required during further design and construction that are inconsistent with the Final Environmental Impact Assessment Report, an addendum shall be prepared in accordance with Section 29 of the Regulation.
Monitoring of Environmental Assessment Commitments and Environmental Assessment Act Conditions of Approval	12	<ul style="list-style-type: none">■ Prior to construction, the Proponent shall develop a compliance monitoring plan for each individual construction project that will describe how compliance with all Environmental Assessment commitments, and Environmental Assessment Act conditions of approval will be monitored. The plan shall include a description of what indicators will be used to measure compliance, how compliance will be measured, and what data will be used to demonstrate compliance. The Proponent shall not proceed with construction until the Director has provided written notification of satisfaction with the monitoring plan.	No	<ul style="list-style-type: none">■ The Ministry will develop a compliance monitoring plan during the subsequent Detail Design phase of the project.
Monitoring of Environmental Assessment Commitments and Environmental Assessment Act Conditions of Approval	13	<ul style="list-style-type: none">■ The Proponent shall submit the compliance monitoring plan for each planned construction project to the Director and Regional Director for placement on the Public Record.	No	<ul style="list-style-type: none">■ The Ministry will submit the compliance monitoring plan for each planned construction project to the Director and Regional Director for placement on the Public Record during the subsequent Detail Design phase of the project.
Monitoring of Environmental Assessment Commitments and Environmental Assessment Act Conditions of Approval	14	<ul style="list-style-type: none">■ The Proponent shall prepare an annual compliance report which includes a summary of the results of the compliance monitoring plan for individual construction projects and a statement as to compliance with all conditions of this approval. The compliance report shall cover the previous calendar year. The Proponent shall each year, no later than three months after the end of the previous calendar year, submit to the Director for placement on the Public Record a copy of the annual compliance report. The Proponent shall submit annual compliance reports until all conditions are satisfied or until the Director notifies the Proponent in writing that annual compliance reports are no longer required. The Proponent shall submit a final compliance report indicating that it is the final compliance report and, that all conditions have been satisfied.	No	<ul style="list-style-type: none">■ The Ministry will prepare an annual compliance report during the subsequent Detail Design phase of the project.
Monitoring of Environmental Assessment Commitments and Environmental Assessment Act Conditions of Approval	15	<ul style="list-style-type: none">■ The compliance monitoring plan for individual construction projects and any records required to be kept or created by the plan shall be made available to the Ministry or its designate upon request in a timely manner when so requested by the Ministry during an on-site inspection, audit, or response to an incident report or when information concerning compliance is requested by the Ministry.	No	<ul style="list-style-type: none">■ The compliance monitoring plan shall be made available to the Ministry or its designate upon request in a timely manner when so requested by the Ministry during an on-site inspection, audit, or response to an incident report or when information concerning compliance is requested by the Ministry during the subsequent Detail Design phase of the project.

5.5 2002 Approved Environmental Assessment Commitments

The Bradford Bypass project individual environmental assessment was approved on August 28, 2002. A total of 15 conditions of approval were issued by the then Minister of the Environment and Energy as part of the Notice of Approval. The Regulation:

- Relieves the Ministry from the requirement to fulfill Condition 4 of the 2002 Approved Environmental Assessment Notice of Approval to prepare a Transportation Environmental Study Report for the Preliminary Design and a Design and Construction Report(s) for the Detail Design of the Bradford Bypass
- Sets out a streamlined assessment process for environmental protection and opportunities for continued consultation, and
- Includes additional conditions that would require the Ministry to carry out the Bradford Bypass in line with the general intent of the remaining conditions of the 2002 Approved Environmental Assessment Notice of Approval and key Environmental Assessment principles

The 2002 Approved Environmental Assessment identified a number of proposed mitigation and commitments to future work for the project. **Table 5-25** below identifies the commitments carried forward through to Preliminary Design and describes any applicable changes to the 2002 Approved Environmental Assessment commitment. Commitments identified in the 2002 Approved Environmental Assessment are to be carried forward to Detail Design phase unless otherwise stated in **Table 5-25** below.

Table 5-25: 2002 Approved Environmental Assessment Commitments Table

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Traffic Operating Speed	<ul style="list-style-type: none"> Adequacy of facility to accommodate normal vehicle operating speeds 	<ul style="list-style-type: none"> Ministry of Transportation 	<ul style="list-style-type: none"> There are no segments of the route which fall below 140 kilometres per hour design speed, and The direct ramps at the freeway-to-freeway interchanges use 100 kilometres per hour design speed, thereby allowing smooth free-flow movement between facilities. 	<ul style="list-style-type: none"> None 	N/A	<ul style="list-style-type: none"> No commitments identified Traffic studies involving traffic modelling and analysis have been undertaken through the Preliminary Design The Bradford Bypass will be developed in accordance with current Ministry design and safety standards for posted speeds on urban or rural controlled access freeways. The Ministry may consider alternate design speeds for the freeway-to-freeway interchange ramps based on recent changes to highway posted speeds to meet the requirement for free-flow movement between the Bradford Bypass and both Highway 400 and Highway 404, and The current Preliminary Design is focused on 100 kilometres per hour posted speed; however, there may be opportunities to consider potential design of a 110 kilometres per hour posted speed as the project advances. Additional studies would need-to be completed to assess an increase in potential design speed and its feasibility within the existing Bradford Bypass Study Area.
Traffic Operations	<ul style="list-style-type: none"> Adequacy of facility to accommodate future travel demand 	<ul style="list-style-type: none"> Ministry of Transportation 	<ul style="list-style-type: none"> The 400-404 Link (Bradford Bypass) will accommodate up to 4,000 - 4,500 vehicles per hour per direction; on a daily basis, capacity is in the 70,000 - 100,000 range. There will be considerable flexibility to accommodate seasonal peaks, temporary capacity reductions, peak recreational traffic demand and diverted traffic from congested alternate routes. 	<ul style="list-style-type: none"> None 	N/A	<ul style="list-style-type: none"> No commitments identified Traffic studies involving traffic modelling and analysis have been undertaken through the Preliminary Design, and This commitment will be achieved through the configuration of the proposed Bradford Bypass.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Traffic Operations	<ul style="list-style-type: none"> Provide for adequate Level of Service for vehicular operations 	<ul style="list-style-type: none"> Ministry of Transportation 	<ul style="list-style-type: none"> The 400-404 Link is designed to provide a high standard of operational quality and safety to its users. The road profile grade has been limited to 3% and auxiliary (truck climbing) lanes have been included in the concept design, and By attracting long distance and heavy truck traffic away from the municipal road network, traffic operations along those roads will be improved. Specifically, Queensville Sideroad, County Road 4 (former Highway 11), Holland Street, and Highway 88 will be relieved of a significant portion of through traffic, thereby reducing demand and improving Level of Service at signalized and unsignalized intersections along their length. 	<ul style="list-style-type: none"> All at-grade intersections at the interchange ramp terminals will be signal controlled if justified according to the provisions of the Ontario Manual of Uniform Traffic Control Devices 	No	<ul style="list-style-type: none"> In consideration for updates to Ministry design standards, the Ministry has reviewed the traffic control warrants for ramp terminals to apply appropriate location-specific traffic control measures, and Therefore, a traffic study has been undertaken, and the project will be designed following current design and safety standards for maximum gradients for commercial vehicles. Signalized intersections, roundabouts and appropriate traffic control measures were considered at interchange/road connections, where warranted.
Safety	<ul style="list-style-type: none"> Design for safe operation of the facility 	<ul style="list-style-type: none"> Ministry of Transportation, Ontario Provincial Police 	<ul style="list-style-type: none"> The 400-404 Link will feature all standard safety provisions of the day for high-speed provincial freeways, and The construction of the Bradford Bypass will result in a net reduction in vehicle accidents throughout the Study Area. 	<ul style="list-style-type: none"> The design features related to road safety (pier protection, barriers, illumination, etc.) will reflect fully the Provincial Design Standards and Policies in effect at the time of design. Use of the roadway by bicyclists, pedestrians, and slow-moving farm vehicles will be prohibited, and Emergency routes will be maintained through retention of the existing road network and improved by the presence of a new link in the road network. 	No	<ul style="list-style-type: none"> This Preliminary Design study has reviewed and applied current Provincial Design Standards and current policies for highway design safety standards As a controlled access freeway, the Bradford Bypass will not permit use by bicycles or pedestrians. Where the design interacts with regional and municipal roads, the Ministry has and continues to consult with local municipalities to consider active transportation, including sidewalks, multi-use trail, multi-use paths that are proposed on local roads, and Design considerations and consultation with emergency services is ongoing through Preliminary Design and future Detail Design. The subsequent Detail Design study will consider access for emergency services through construction and the life cycle of the project.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Efficiency	<ul style="list-style-type: none"> Minimize out-of-way travel 	<ul style="list-style-type: none"> Ministry of Transportation, general public 	<ul style="list-style-type: none"> The Link will reduce out-of-way travel in the Study Area by providing a readily accessed new link in the roadway network in a location where no direct east-west routes now exist. Travel on the new route will be high-speed, non-stop steady flow and the efficiency of some existing roads will also improve with the diversion of traffic to the new route. 	<ul style="list-style-type: none"> None 	N/A	<ul style="list-style-type: none"> A traffic study has been undertaken, which has considered out-of-way travel, and As part of the Preliminary Design study, traffic consideration included interchange utilization, overall network delay, and out of way travel. Consideration was also given to the number of above-capacity kilometres under each interchange scenario and diversion of vehicles from highly congested corridors such as Highway 11 and Bridge Street.
Network Aspects	<ul style="list-style-type: none"> Provide for roadway community 	<ul style="list-style-type: none"> Ministry of Transportation 	<ul style="list-style-type: none"> The 400-404 Link will provide a consistent facility type for long distance traffic in the south Lake Simcoe area and will bisect the gap for east-west travel in the provincial highway network between Highway 400 and the proposed extension of Highway 404. The existing municipal roads in the area of the link will be linked to the new route at key points, and all existing crossing roads will remain open. 	<ul style="list-style-type: none"> None 	N/A	<ul style="list-style-type: none"> No commitments identified Highway 404 has now been extended to Woodbine Avenue northerly from its original termination from the 2002 Approved Environmental Assessment. The design does not involve the closure of existing roadway. Also, the design considers accommodations to existing roads and does not preclude the proposed extension to Professor Day Drive, and Through the subsequent Detail Design phase the Ministry will consider construction access and staging, and where the corridor interacts with existing roads. Much of the highway involves greenfield construction, which is anticipated to have minimal to no impact on roadway access.
Financial	<ul style="list-style-type: none"> Affordability of roadway construction cost 	<ul style="list-style-type: none"> General public/ Ministry of Transportation 	<ul style="list-style-type: none"> The project will generate jobs during construction and travel time savings and other economic benefits for many years. 	<ul style="list-style-type: none"> A decision to proceed with construction will be made by the Minister of Transportation in light of the funds available and priority of other provincial projects that time, and Construction can be staged so as to spread the investment over several years. 	No	<ul style="list-style-type: none"> To date, the Design Build contract for the County Road 4 Early Works project was awarded to Brennan and Paving Limited in April 2022, and a Final County Road 4 Early Works Report Addendum was prepared in September 2022. The government has committed to fully funding the Bradford Bypass, with the Detail Design stage immediately following the 2023 completion of the Preliminary Design As part of this Preliminary Design study for the Bradford Bypass, the Ministry underwent a Value Engineering study. A Value Engineering study is a systematic, organized method of design investigation led by a facilitator. A multi-disciplinary team investigates, and analyzed the functional requirements of a project, considering current standards and environmental constraints

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
						<p>to recommend a design function at the lowest cost (capital, operating, maintenance, societal and environmental). Where appropriate, design recommendations generated through this study were incorporated as part of the proposed design</p> <ul style="list-style-type: none">■ The following design recommendations from the Value Engineering study have been incorporated into the current Preliminary Design study:<ul style="list-style-type: none">– Include an overpass at 2nd Concession Road– Include an overpass at 10th Sideroad– Do not preclude an underpass for the Professor Day Drive extension (future Town of Bradford West Gwillimbury initiative)– Include an overpass at Bathurst Street– Include recommended improvements to vertical grades and vertical crest curves (k-values)– Lower the Bradford Bypass profile in the vicinity of Leslie Street, and– Combine redundant culverts under the Bradford Bypass at Leslie Street (with Environmental and Technical considerations being met).
Construction	<ul style="list-style-type: none">■ Constructability of the facility, particularly across the Holland River valley	<ul style="list-style-type: none">■ Ministry of Transportation, general public	<ul style="list-style-type: none">■ The Link crossings of the lowlands surrounding both branches of the Holland River will see a mixture of structure and fill. Structure footings will be on deep piled foundations.	<ul style="list-style-type: none">■ Detailed subsurface investigation along the route will be undertaken as part of the design phase, and embankment design and structural features will reflect the nature and composition of subsurface materials.	No	<ul style="list-style-type: none">■ As part of the Preliminary Design study, geotechnical investigations have been completed to inform the structural foundation design, pavement design and to understand the earth management and soil management requirements of the Bradford Bypass project. This work has been completed for the crossings of the Holland River and Holland River East Branch. Recommended structure footings are proposed on to be on deep piled foundations per the commitment made in the 2002 Approved Environmental Assessment■ Through geotechnical investigations, groundwater data for conditions and characteristics has been collected■ Further geotechnical investigations will be undertaken in subsequent Detail Design phases of the project, and■ A Constructability Review workshop has been undertaken as part of the Preliminary Design study to assess and confirm constructability of the Updated Technically Preferred Route.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Staging	<ul style="list-style-type: none"> Ability to create early benefits, meet immediate needs, and defer expenditure through staged construction 	<ul style="list-style-type: none"> Ministry of Transportation, municipalities, general public 	<ul style="list-style-type: none"> Many of the goals of the project would be achieved with an initial two-lane roadway, and two-stage implementation would allow deferral of a significant proportion of the overall project cost. Conversely, if funding is not available for partial early implementation the result may be that when the project is finally constructed the travel demand at that time would warrant provision of the full four lane freeway and it would be built in a single stage. 	<ul style="list-style-type: none"> Within an overall stage, interim completion of sub-sections may be possible, allowing the early opening of completed segments. 	Yes	<ul style="list-style-type: none"> The approach considered advancement of the Early Works as a sub-section of the project to advance as it accounted for design, construction and cost efficiencies with an existing project underway by the County of Simcoe. The County Road 4 Early Works project is currently under construction For the overall Bradford Bypass project, the Ministry is considering a four-lane interim condition and an ultimate eight-lane design, which includes one high-occupancy vehicle lane and three general purpose travel lanes in each direction The 2002 Approved Environmental Assessment identified County Road 4, Bathurst Street, and Leslie Street as the preferred interchange locations. In consultation with the municipalities, requests from the Town of Bradford West Gwillimbury and Town of East Gwillimbury were made to consider interchanges at 10th Sideroad and 2nd Concession Road. A feasibility assessment was conducted evaluating nine interchange location scenarios to determine the best interchange configuration through the Bradford Bypass corridor. The evaluation was conducted in accordance with satisfying the study objective to improve connectivity of the Study Area between Highway 400 and Highway 404, facilitating the improvement of traffic operations and movement of goods. Consideration included interchange utilization, overall network delay, out of way travel, environmental considerations and constraints, and preliminary costs. It was determined that interchanges at 10th Sideroad, County Road 4, Bathurst Street, 2nd Concession Road, and Leslie Street would be included as part of the Study. While the study will seek approval for all five interchange locations, a phased implementation of these interchanges may be considered pending further design development and consultation in subsequent design stages, and No other Early Works, to advance sub-sections of the highway are identified, or specified under the Regulation.

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General Commitment	<ul style="list-style-type: none">■ High priority given to environmental work as design proceeds	<ul style="list-style-type: none">■	<ul style="list-style-type: none">■ Minimal long term environmental impact of the Link through design and mitigation.	<ul style="list-style-type: none">■ At the outset of the design phase, the proponent will meet with Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, and Fisheries and Oceans Canada staff to discuss concerns, review and update their work plan to current standards, policies, regulations, and approval requirements, and obtain any new information which may be applicable to the design phase■ This will include an assessment of the federal Canadian Environmental Assessment Act requirements and any additional work necessary to finalize and implement the design for the undertaking■ Prior to implementation, the proponent will identify design and construction details for the undertaking. This will include identification of the schedule, the construction activities, the impact of the activities upon adjacent lands or watercourses, and the mitigation that will be employed to minimize the impacts.■ The details of the construction activities will include the location of storage areas, equipment maintenance areas, dewatering areas, and access requirements, and■ Appropriate mitigation will be developed by the proponent during the design phase and will be reviewed with Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, and the federal agencies to address their concerns and legislative requirements prior to implementation. The following sections identify specific commitments to provide	Yes	<ul style="list-style-type: none">■ In 2019, the Ministry advanced preparatory work to update the environmental conditions, which included initial consultation through information requests and reviews of current legislation■ Consultation with Regulatory Agencies, including, but not limited to, the Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, and Fisheries and Oceans Canada has occurred through Preliminary Design and is ongoing throughout the study■ The Impact Assessment Agency of Canada reviewed the project in 2021 and the federal Minister of the Environment and Climate Change determined that the project does not warrant designation under the <i>Impact Assessment Act</i>■ The following project-specific assessment of environmental impact studies have been drafted for the Preliminary Design of the Bradford Bypass project: Agricultural Impact Assessment; Air Quality Impact Assessment; Archaeological Assessment; Cultural Heritage Assessment; Drainage and Hydrology; Erosion and Sedimentation Overview Risk Assessment; Fish and Fish Habitat Impact Assessment; Fluvial Geomorphology; Groundwater Impact Assessment; Land Use Factors Report; Noise Impact Assessment; Snowdrift Assessment; Terrestrial Ecosystems Existing Conditions Impact Assessment (including an assessment of vegetation and vegetation communities, wildlife and wildlife habitat, species at risk and designated natural areas); screening of human health; and development of a Preliminary Landscape Composition Plan and Waste and Excess Materials Management Plan■ Completion of the Draft and Final Environmental Conditions Reports for the Bradford Bypass project per the Regulation■ Holding of Public Information Centre #1 in Spring 2021■ Holding of Preliminary Design Interchange Considerations for 10th Sideroad and 2nd Concession Road in Spring 2022

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				appropriate mitigation for the impacts resulting from the undertaking. Appropriate refers to mitigation that is both practical and reasonable given the site conditions and the degree of impact. Appropriate also recognizes and accepts that the mitigation for one factor may result in additional impacts to another factor. For example, the installation of fencing below grade to discourage wildlife movement will cause some disturbance to vegetation.		<ul style="list-style-type: none"> ■ Holding of Public Information Centre #2 in Fall 2022, and ■ Preparation of this Draft Environmental Impact Assessment Report under the Regulation to document the study and integrated consideration of environmental impacts, mitigation and commitments to future work for the project. Several of the 2002 commitments outlined are applicable to the subsequent Detail Design phases and will be carried out during the next phase.
Surface Water Systems	<ul style="list-style-type: none"> ■ Minimize potential adverse impacts to surface water systems (physical characteristics, water quality and quantity) 	<ul style="list-style-type: none"> ■ Ministry of Transportation, Ministry of Natural Resources and Forestry, Ministry of the Environment, Conservation and Parks, Fisheries and Oceans Canada, Lake Simcoe Region Conservation Authority, interest groups, general public 	<ul style="list-style-type: none"> ■ Long-span bridges will carry the proposed 400-404 Link across both branches of the Holland River. Other stream crossings will use appropriately designed culverts, and ■ The continuity of the surface water system will be maintained. 	<ul style="list-style-type: none"> ■ Where appropriate: <ul style="list-style-type: none"> – design bridges and culverts that: <ul style="list-style-type: none"> ▪ maintain the existing channel form or include a low flow channel where appropriate ▪ do not impede fish movement ▪ do not place piers within the channel as defined by bankfull flow conditions, or are oriented in the direction of water flow to maximize hydraulic efficiency during high flow conditions ▪ minimize erosion and flood risk upstream and downstream of structure, and ▪ utilize open bottomed culverts in upwelling areas. – develop plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction. 	No	<ul style="list-style-type: none"> ■ Bridge and culvert designs have taken into consideration current information related to fish and fish habitat, fluvial geomorphology, hydrogeology, and surface water drainage studies ■ Project-specific assessment of environmental impacts has provided recommendations to the design to avoid, minimize or mitigate potential impacts resulting from new or modified watercourse crossings and structures ■ Where appropriate, environmental approvals will be sought under the <i>Fisheries Act</i>, <i>Endangered Species Act</i>, Ontario Regulation 387/04, etc., and ■ In addition, the Ministry has completed a Stormwater Management Plan (Section 5.1.3), and Groundwater Protection and Well Monitoring Plan (Section 5.1.4) per the Regulation.

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Fisheries and Aquatic Habitat	<ul style="list-style-type: none"> Protect fish habitat during and following construction including no net loss of habitat 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Natural Resources and Forestry, Fisheries and Oceans Canada, Lake Simcoe Region Conservation Authority, interest groups, general public 	<ul style="list-style-type: none"> The 400-404 Link extends east-west and will cross several warmwater streams including two branches of the Holland River where there is the potential for a small loss of wetland area that may currently provide spawning habitat. Within the two affected watersheds (Holland River and Maskinonge River), a number or smaller streams and agricultural drains that provide or may provide habitat for migratory warmwater species and or resident baitfish populations will be affected, and Key concerns during construction are the introduction of sediment, habitat disturbance and alteration of the stream banks and bed during structure placement. 	<ul style="list-style-type: none"> Where appropriate: <ul style="list-style-type: none"> develop a fish management plan that maintains or enhances fish habitat plans that maximize the riparian vegetation protection and the re-establishment as soon as possible after disturbance plans that provide for watercourse realignments in dry timing constraints to restrict construction activities immediately adjacent to or within watercourses to low flow months and that avoid sensitive spawning periods, and plans that minimize the disruption to natural systems and maintain slope stability when developing access roads for construction, including re-establishment or stabilization after construction. 	No	<ul style="list-style-type: none"> The project has been assessed in accordance with the Interim Environmental Guide for Fisheries (Ministry of Transportation, 2020) and the Pilot Ministry of Transportation/Fisheries and Oceans Canada/Ministry of Natural Resources and Forestry Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings, Version 4 (2020), and Environmental management plans related to fish and fish habitat will be developed as required in accordance with the <i>Fisheries Act</i> in subsequent Detail Design phases of the project.
Vegetation	<ul style="list-style-type: none"> Removal and/or disturbance of vegetation and flora, along with fragmentation of large woodland blocks 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Natural Resources and Forestry, interest groups, general public 	<ul style="list-style-type: none"> Where possible, larger blocks of vegetation were avoided. However, 22.1 hectares of higher quality woodlands will be removed. The total area of the Holland Marsh Endangered Species Act affected by the proposed facility is 17.2 hectares. The impact will not affect the status of the Endangered Species Act. The Recommended Plan was routed, where possible, to areas of existing openings, areas of previous disturbance, or along the edge of vegetative blocks. 	<ul style="list-style-type: none"> Where appropriate: <ul style="list-style-type: none"> edge management plans for areas of new disturbance to protect remaining trees and re-establish edge salvage of existing native vegetation, seed, and topsoil for re-establishment in identified areas of significant disturbance relocate rare, threatened or endangered plant species minimize disturbance to remaining vegetation by felling trees into the working easement, and leaving stumps and roots for soil stabilization and natural regeneration, and restricting access with fencing to working areas maximize forest regeneration opportunities on lands which are surplus to transportation needs as mitigation for fragmentation of significant vegetation and to provide linkage to alternate habitat, and 	No	<ul style="list-style-type: none"> The Ministry has assessed potential impacts to vegetation, wildlife habitat and sensitive natural areas to propose appropriate mitigation measures to avoid, minimize and mitigate potential impacts to natural areas along the Updated Technically Preferred Route Environmental management plans such as an Edge Management Plan shall be prepared, which may be a standalone plan, or incorporated into other plans such as clearing and grubbing plans, access management plans, or another specific plan, and Proposed mitigation measures outlined for vegetation shall be carried forward to subsequent Detail Design phases of the project.

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				<ul style="list-style-type: none"> – vegetation removal and protection of residual vegetation should be completed in accordance with Ontario Provincial Standard Specifications. 		
Wetlands	<ul style="list-style-type: none"> ■ Crossing of the Holland Marsh Wetland Complex 	<ul style="list-style-type: none"> ■ Ministry of Transportation, Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority, Ministry of the Environment, Conservation and Parks, interest groups, general public 	<ul style="list-style-type: none"> ■ 9.5 hectares of Provincially Significant Wetlands will be crossed by the right-of-way; the remaining 8.9 hectares are composed of marsh and swamp community types. The above figures refer to the total land area taken by the 100 metres right-of-way to be designated for the route. In fact, the direct physical impacts will be significantly less and will be limited to the construction of widely separated bridge piers, and ■ Fens are the most sensitive land use types along the route, being dependent on the shallow lateral movement of groundwater. Only a small area of degraded fen is potentially affected. 	<ul style="list-style-type: none"> ■ Maintaining of the volume and pattern of water flow through the wetland (both surface water and groundwater) and the post-construction restoration of areas affected by construction related activities will be a focal point of the migration efforts ■ Commitments include, where appropriate: <ul style="list-style-type: none"> – develop restoration plans for areas of wetland temporarily disturbed by construction installation of equalizer culverts to preserve dynamics of wetland hydrology by maintaining sheet flow through the wetland and facilitating wildlife crossing for small mammals and amphibians – delineation of areas to be protected with sediment fences to prevent intrusion during construction – timing constraints that restrict construction activities immediately adjacent to or within wetlands to respect the intent of the federal Migratory Bird Regulations (1994) and the Ontario Game and Fish Act (1980) – salvage of wetland plant material to be used for re-establishment in identified areas of significant disturbance – minimization of dewatering within wetlands and irrigation to maximize survival in disturbed areas that will be re-established, and – retention of lands which are surplus to transportation needs for the 	No	<ul style="list-style-type: none"> ■ Through the project-specific assessment of environmental impacts, the Ministry has completed a Terrestrial Ecosystem Impact Assessment, drainage and hydrology study, Stormwater Management Plan, hydrogeology study, and develop a Preliminary Landscape Conceptual Design Plan ■ Proposed mitigation measures outlined for wetlands shall be carried forward to Detail Design ■ The proposed design has considered potential impacts to wetlands, wildlife habitat, wildlife (including wildlife passage), erosion and sediment control measures, access management for spatial and temporal constraints, landscape and ecological restoration and legislative requirements. The Bradford Bypass will be elevated on structures through this section, and ■ Through the study consultation with the Ministry of Natural Resources and Forestry and Ministry of Environment, Conservation and Parks for wetlands, wildlife, sensitive natural areas and protection of sensitive species will be carried out. Consultation with Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority is ongoing to consider watershed specific environmental constraints and restoration recommendations.

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				purpose of mitigation by allowing reversion to wetland. <ul style="list-style-type: none"> ■ The Ministry has committed to construct the facility as an elevated pier structure through the Provincially Significant Wetlands. Emphasis will be placed on minimizing backwater effects and maintaining groundwater flows and patterns, thereby minimizing longer term effects on the fen wetland type ■ Monitoring of all activities in the wetland along with ongoing site review efforts with the responsible Regulatory Agencies will be key elements of the design and construction process. Where feasible, wetland substrates will be salvaged for use in stormwater management facilities (e.g., substrate and seed bank for wetland creation in stormwater management ponds), and ■ Where other wetlands are encountered, similar mitigative measures will be employed. Efforts will be made to ensure, by way of the road design, that surface water drainage and shallow groundwater patterns are not subjected to major alterations. 		
Wildlife	<ul style="list-style-type: none"> ■ Minimize wildlife habitat disturbance, minimize fragmentation of large habitat blocks and maintenance of wildlife corridors 	<ul style="list-style-type: none"> ■ Ministry of Transportation, Ministry of Natural Resources and Forestry, interest groups, general public 	<ul style="list-style-type: none"> ■ The proposed 400-404 Link will remove 23.7 hectares of significant wildlife habitat, potentially affect two Provincially and Nationally "vulnerable" species (Louisiana Waterthrush and Red-shouldered Hawk) currently nesting in proximity to the recommended plan, and potentially interrupt wildlife movement along some stream corridors and woodlots, particularly in the area between Highway 400 	<ul style="list-style-type: none"> ■ By using available openings skirting the large woodland blocks in the Holland River floodplain and using disturbed edge location, habitat fragmentation in that area is minimized ■ The proposed long-span bridge across the Holland River branches will retain wildlife movement opportunities along the riverbanks ■ The drainage plan will minimize the ponding of salt-laden runoff, and decrease impacts on sensitive 	No	<ul style="list-style-type: none"> ■ Bridge designs for the crossings of the Holland River and Holland River East Branch have considered environmental constraints including, but not limited to, terrestrial ecosystem, including sensitive species and wetlands, fish and fish habitat, archaeological resources, floodplain modelling, and stormwater management, and ■ Design of structures will take into account passage for both small and large mammals where feasible.

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			and Simcoe County Road 4 (Highway 11).	aquatic habitat for breeding amphibians and other species. To minimize road kills, measures will include a wide, grassed, open, median, fencing of the right-of-way, provision of good visibility for drivers, and the consideration of cautionary wildlife crossing signage ■ Commitments include, where appropriate: <ul style="list-style-type: none"> – design bridges and culverts that accommodate terrestrial passage for small mammals at identified locations within specified wildlife corridors; – restrict clearing of trees immediately adjacent to or within significant breeding areas to non-critical periods; and, and – monitor wildlife movement patterns and potential of conflict. 		
Groundwater	■ Potential well impacts and contamination of/interference with groundwater resources	■ Ministry of Transportation, local municipalities, property owners	■ 24 domestic wells are potentially affected either directly (i.e., removal) or indirectly (i.e., potential interference) by the proposed Link. In the area of sandy soils associated with the Holland River, shallow perched groundwater system is susceptible to contamination and/or interference. The Bradford municipal well west of the Holland River will be avoided and otherwise unaffected by the proposed roadway.	■ Tiling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well-travelled areas where soil compaction has occurred in areas that previously permitted infiltrating ■ Backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage particularly at river crossings ■ Detailed stormwater management plans which address both quantity and quality ■ A well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply, and ■ Use of appropriate dewatering and spills avoidance management techniques.	No	■ The Ministry has completed and prepared a Stormwater Management Plan (Section 5.1.3) and a Groundwater Protection and Well Monitoring Plan (Section 5.1.4) per the Regulation, and ■ As a result of the project-specific assessment of environmental impacts, design and construction plans will consider, erosion and sediment control requirements, access management, clearing and grubbing, earth management and landscape and ecological restoration.

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Greenways and Open Space Linkages	<ul style="list-style-type: none"> Minimize the disruption to existing greenways/natural corridors 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Natural Resources and Forestry, York Region, general public 	<ul style="list-style-type: none"> The Link is an east-west route traversing a landscape in which the main natural features are on a north-south axis particularly in the centre of the Study Area, namely, the two branches of the Holland River and the associated wetlands and upland forest, and Where possible, the Link alignment skirts the edges of contiguous forest blocks or follows existing gaps in the forest. Between the CN rail line and Yonge Street, an area that is predominantly naturally vegetated, the route will be on a pier structure for more than one quarter of its length, thereby providing opportunities to maintain the natural corridor function. Similarly, where the Link crosses both branches of the Holland River and its associated wetlands it will be on a pier structure. 	<ul style="list-style-type: none"> Mitigative efforts will be focused on the restoration of natural vegetation disturbed by construction-related activities, thereby ensuring the continuity of the natural vegetation within the central portion of the Study Area. 	No	<ul style="list-style-type: none"> The Preliminary Landscape Conceptual Design Plan and future landscape and ecological restoration will consider recommendations, mitigation measures and commitments identified through the project-specific assessment of environmental impacts (ecological, social and cultural), environmental legislative requirements, and aesthetics. Recommendations have been made to retain and restore natural vegetation where feasible and provide enhanced wildlife connectivity where possible through wildlife passages (culverts and bridges).
Soil	<ul style="list-style-type: none"> Minimize the areas of high capability mineral soils (Class 1, 2, 3, 4) and agricultural organic (muck) soils removed 	<ul style="list-style-type: none"> Ministry of Transportation, Ontario Ministry of Agriculture, Food and Rural Affairs, agricultural property owners, general public 	<ul style="list-style-type: none"> In the segments of the Study Area to the west of the Holland River basin and east of the ridge formation the soils are consistently high capability loam and silty clay loam (Class 1, 2, 3, 4) and there are no distinct areas of lower capability soils where an alternative alignment would have a lesser impact. The proposed Link will remove 190.37 hectares of high capability mineral soils from potential agricultural use, and Between the river branches the soils include poorly drained shallow sandy soil (Class 4) and organic soils, both with excessive water limitations. The underlying clay is evident within the plough layer in some locations indicating that the depth of the organic deposits is being depleted. The proposed Link alignment utilizes an area of 	<ul style="list-style-type: none"> There are no areas where lower capability soils provide a reasonable alternative route. The loss of higher capability soils is unavoidable. The area taken has thus been minimized. 	No	<ul style="list-style-type: none"> Geotechnical investigations have been carried out to understand the sub-surface conditions and inform the structural foundation and pavement design for the project The project has considered soil and groundwater conditions to develop earth and soil management plans with respect to contaminated soils and applied a Groundwater Protection and Well Monitoring Plan (Section 5.1.4) to the project, and To understand and consider soil conditions as they relate to agricultural soils, an Agriculture Impact Assessment was completed (Section 5.2.2).

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			previous disturbance (Hochreiter Road) thereby minimizing although not eliminating impact; 9.3 hectares of organic (muck) soil are removed by the proposed Link.			
Aesthetics	<ul style="list-style-type: none"> Minimize visual intrusion and maximize attractiveness of new roadway 	<ul style="list-style-type: none"> Ministry of Transportation, area residents 	<ul style="list-style-type: none"> The route avoids one of the most sensitive areas in terms of visual impact - the Scanlon Creek Conservation Area - and the woodlots adjacent to the route in the Holland River lowlands will screen most medium-to-long views of the embankment and long bridges Further expansion of urban development north of 8th Line will likely serve to screen the view of the facility from most existing residences. The long view from the hillside residential area north of Bradford (Grandview Estates) cannot be screened. The effect on downtown Bradford of the reduction of through traffic and heavy trucks from the main commercial arteries; this is a key element in the local Heritage Environmental Agricultural Recreational Tourism Committee's efforts to revitalize and beautify the downtown, and Another viewing highlight will be presented to Link users on the approaches to the Holland River valley, as dramatic vistas open up to eastbound travelers as they approach County Road 4 and to westbound motorists as they crest the beach ridge west of Leslie Street. 	<ul style="list-style-type: none"> In open rural territory the freeway will be visible; it is in such areas that landscaping within the right-of-way should be considered, and The two river crossing structures will be designed in an aesthetically pleasing manner using clean, simple, low-profile lines, long spans, and tapered piers; visual appeal to motorists and to those who may see the bridge from below will be a significant factor in selecting and detailing the bridge design. 	No	<ul style="list-style-type: none"> The Ministry has developed a Preliminary Landscape Conceptual Design Plan (Section 5.2.9) for the corridor. The landscape design considers ecological site restoration, snowdrift mitigation, adjacent land uses, municipal landscaping and aesthetics.

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Highway Construction Noise	<ul style="list-style-type: none"> Minimize impact of noise generated by the new highway on nearby residential areas 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of the Environment, Conservation and Parks, municipalities, area residents 	<ul style="list-style-type: none"> Approximately 49 of the 2014 homes currently within 600 metres of the proposed alignment will experience noise level increases greater than five dBA. 	<ul style="list-style-type: none"> Ministry policy indicates that where increases exceed five dBA: <ul style="list-style-type: none"> investigate noise control measures within the right-of-way, and if project cost is not significantly affected, introduce noise control measures within the right-of-way. Noise control measures, where introduced, should achieve a minimum of dBA attenuation averaged over the first row of receivers Mitigation measures relating to noise and vibration will be documented in a Design and Construction Report With regard to construction noise, at the design stage, the Ministry will carry out the following commitments: <ul style="list-style-type: none"> Noise sensitive areas will be identified Applicable municipal noise control by-laws will be identified. Where timing constraints, or any other municipal by-law may cause hardship to Ministry, an exemption will be sought. An initial complain from the public will require verification by Ministry that the general noise control measures agreed to are in effect; Ministry will investigate all noise concerns, warn the Contractor of any problems, and enforce its contract Notwithstanding compliance with the "general noise control measures", a persistent complaint will require a contractor to comply with Ministry of the Environment, Conservation and Parks sound level criteria for construction equipment contained in the Ministry of the Environment, Conservation and Parks Model Municipal Noise Control By-Law. Subject to the results of field investigation, alternative noise control 	No	<ul style="list-style-type: none"> A Noise Impact Assessment is being undertaken in accordance with the Ministry of Transportation’s Environmental Guide for Noise (2022). Noise Sensitive Areas will be identified and an assessment of potential impacts will be completed. Where vibration concerns have been raised, considerations through Detail Design and construction will be factored into the environmental commitments for the project Preparation of a Noise Report per the Regulation Construction related noise and measures to avoid, minimize or mitigate noise generated during construction will be applied. Where appropriate, municipal noise by-laws will be applied to the project, and A human health scoping during Preliminary Design has considered the results of the noise study.

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				measures will be required, where these are reasonably available <ul style="list-style-type: none"> ■ In selecting the appropriate construction noise control and mitigation measures, Ministry will give consideration to the technical, administrative, and economic feasibility of the various alternatives, and ■ Where pile driving or blasting may be necessary in noise sensitive areas monitoring will be determined an adopted Ministry policy pursuant to prevailing provincial legislation at the time of construction. 		
Community Effects	<ul style="list-style-type: none"> ■ Minimize the negative impact of the new road on homes, community features, and recreational areas/practices 	<ul style="list-style-type: none"> ■ Ministry of Transportation, municipalities, interest groups, area residents, general public 	<ul style="list-style-type: none"> ■ Homes: <ul style="list-style-type: none"> – By travelling mid-concession and utilizing available gaps in the developed countryside, the number of individual homes within the 15.3 kilometre long Link right-of-way was kept to six (two each at Younge Street, Bathurst Street and County Road 4). ■ Community Features: <ul style="list-style-type: none"> – The new route avoids entirely the area’s community features such as schools, churches, cemeteries, parks and other public facilities. In improving access to Bradford and providing a new link across the Holland River valley, the facility will improve the attractiveness of existing facilities. ■ Recreational Areas/Practices: <ul style="list-style-type: none"> – The Link avoids the Scanlon Creek Conservation Area. The long-span high-level bridges across the two river branches will allow continuation of all water-based recreational activity such as boating, canoeing, fishing and birdwatching. 	<ul style="list-style-type: none"> ■ Where the bridge passes by Albert’s Marina particular attention will need to be paid to mitigation of noise and visual intrusion on marina users in the design phase (e.g., Location/elimination of expansion joints, pier and substructure aesthetics, road surface drainage, noise deflectors, etc.). Similar consideration will need to be given to the facility design in the vicinity of Silver Lakes Golf Course. 	No	<ul style="list-style-type: none"> ■ The Ministry has reviewed the Updated Technically Preferred Route and developed alignment alternatives at this location, which along with considerations for other environmental constraints, will provide greater separation from these recreational facilities, and ■ Preliminary Landscape Composition Design Plan shall be reviewed and further refined as applicable during Detail Design based on any changes or modifications made to the Updated Technically Preferred Route.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Agriculture	<ul style="list-style-type: none"> Preserve agriculture land and minimizing negative impacts on agricultural operations 	<ul style="list-style-type: none"> Ministry of Transportation, Ontario Ministry of Agriculture, Food and Rural Affairs, agricultural property owners, general public 	<ul style="list-style-type: none"> Thirteen field crop and three livestock farming operations are affected by the proposed facility in the west section Seven specialty crop, three livestock and five field crop operations are directly affected by the proposed Link in the east and central sections, and The total land area, currently in active agricultural production, directly affected by the proposed facility is 84.4 hectares in the western section and 69.9 hectares in the east and central section totaling 154.3 hectares 	<ul style="list-style-type: none"> To minimize the negative effects of the route on agricultural operations and avoid major severances, the alignment is located mid-concession where possible, or along existing lot lines. 	No	<ul style="list-style-type: none"> An Agriculture Impact Assessment (Section 5.2.2) is being prepared to assess potential impacts to agricultural operations, and Refinements and adjustments to the alignment will be identified and evaluated using a reasoned argument (trade-off) method to consider advantages and disadvantages to an alternative, including those related to agricultural lands and operations.
Commercial/ Industrial	<ul style="list-style-type: none"> Enhance commercial/ industrial sector while minimizing negative impact on local businesses, particularly downtown Bradford 	<ul style="list-style-type: none"> Ministry of Transportation, municipalities, interest groups 	<ul style="list-style-type: none"> By the time of the Link construction it would have little net negative effect on the economic viability of the town and would in fact support commercial/ industrial growth through improved access to the provincial freeway system and reduced truck use of local streets, and The route passes through the two lots on Artesian Industrial Parkway currently occupied by commercial businesses; they could be relocated to undeveloped lots nearby. The link will also impact property occupied by parts of Albert's Marina and the Silver Lakes Golf Club on either side of the Holland River East Branch, but the functional and economic viability of both enterprises will remain. 	<ul style="list-style-type: none"> Part of the freeway plan will include signage orienting traffic towards downtown Bradford where appropriate, and Consultation with Albert's Marina and Silver Lakes Golf Club will be necessary during the design stage to minimize impacts to each business; some reconfiguration of the facilities within each property will be needed. 	No	<ul style="list-style-type: none"> Highway signage will be developed in accordance with current Ministry standards, guidelines and policies Through the Preliminary Design alternative alignments has been considered to minimize potential impacts to ecological, cultural and socio-economic areas, which include the two recreational facilities on the banks of the Holland River East Branch, and Consultation with impacted property owners within the Bradford Bypass corridor is ongoing to consider potential impacts to properties.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Property Waste and Contamination	<ul style="list-style-type: none"> Avoidance of waste/contaminated sites 	<ul style="list-style-type: none"> Ministry of Transportation 	<ul style="list-style-type: none"> The Link alignment avoids the only known landfill site in the Study Area (north side of 8th Line, west of the CN Rail line). However, it is possible that landfill waste or other contamination may be discovered during subsequent design or construction phases. 	<ul style="list-style-type: none"> Any waste material or contaminated soils encountered will be managed in accordance with the requirements of applicable legislation, such as the Environmental Protection Act, and with applicable guidelines such as the Ministry of the Environment, Conservation and Parks Guidelines for Use at Contaminated Sites in Ontario, and Measures to ease the contaminant of accidental spills will be considered in the design of stormwater management facilities for the Link 	Yes	<ul style="list-style-type: none"> Sub-surface conditions, including soil characteristics related contamination, and designated substances is being considered. A Waste and Excess Materials Management Plan (Section 5.2.5) has been prepared based on the geotechnical conditions and laboratory results of soil sampling Groundwater monitoring wells have been installed to understand the groundwater characteristics, including the presence of designated substances that may be present within the Study Area. These hydrogeological results will inform future water taking permits and the Groundwater Protection and Well Monitoring Plan (Section 5.1.4) prepared for the project The Stormwater Management Plan will consider spills management during construction and stormwater management, and A monitoring plan shall be in place during the excavation particularly where the contaminated soil identified.
Aggregates	<ul style="list-style-type: none"> Avoidance of taking aggregate deposits out of current or potential production 	<ul style="list-style-type: none"> Ministry of Transportation 	<ul style="list-style-type: none"> There are no significant aggregate deposits on or adjacent to the Link right-of-way. A significant quantity of imported fill will be required for the Link roadbed. 	<ul style="list-style-type: none"> Construction of the Link will support aggregate production in nearby pits and quarries. 	N/A	<ul style="list-style-type: none"> Commitment carried forward.
Archaeology	<ul style="list-style-type: none"> Avoidance of known or potential sites of archaeological significance 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Citizenship and Multiculturalism, interest groups, general public 	<ul style="list-style-type: none"> The route passes well to the north of the early 19th century steamboat landing and transshipment point. A significant prehistoric/early historic site was discovered partly within the proposed right-of-way. The potential exists for other undiscovered archaeological sites at the Holland River East Branch and elsewhere within the proposed freeway right-of way. 	<ul style="list-style-type: none"> Once the specific nature and extent of archaeological resources impacted by the highway are identified, appropriate mitigation measures will be developed in accordance with the Ministry of Transportation/Ministry of Citizenship and Multiculturalism guidelines. 	N/A	<ul style="list-style-type: none"> Stage 2 and 3 Archaeological Assessment work is ongoing. Ongoing works are anticipated to be completed in 2023, and Stage 4 Archaeological Assessment work is to be completed in future years, and The commitments and recommended mitigation measures are subject to Ministry of Citizenship and Multiculturalism review and approval and are to be complied with for the project. These additional details will be captured in future Stage 2, 3 and 4 reports prepared for this project and reflecting the Updated Technically Preferred Route.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Cultural Heritage	<ul style="list-style-type: none"> Minimize impact on significant cultural heritage resources of the built environment 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Citizenship and Multiculturalism, interest groups, property owners, general public 	<ul style="list-style-type: none"> No significant cultural heritage resources are directly affected (within the right-of-way), and One significant Built Heritage Resource (near Simcoe County Road 4) is within 100 metres of the route. 	<ul style="list-style-type: none"> Mitigation of visual impact of the Link through landscaping and other options will be investigated where appropriate. 	No	<ul style="list-style-type: none"> A Preliminary Landscape Composition Plan has been prepared to assess potential impacts and identify proposed mitigation measures, and Impacts to the heritage property located at 2843 Yonge Street on the south side of County Road 4 as a result of the County Road 4 interchange have been assessed. A Cultural Heritage Evaluation Report was completed by AECOM for 2835-2879 Yonge Street in November 2021. Based on the Cultural Heritage Evaluation Report, the Ministry determined that the property does not meet the criteria for Ontario Regulation 9/06 or Ontario Regulation 10/06 of the Ontario Heritage Act (not a Provincial Heritage Property or Provincial Heritage Property of Provincial Significance).
Stormwater Management	<ul style="list-style-type: none"> Management of roadway runoff and stormwater so as to reduce impacts to the quality and quantity of surface and groundwater 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority 	<ul style="list-style-type: none"> Stormwater runoff has the potential to severely impact the quality and quantity of surface and groundwater. 	<ul style="list-style-type: none"> The objectives of the Plan will include: <ul style="list-style-type: none"> When designing Stormwater Management Practices, consideration will be given to measures for reducing adverse environmental impacts to surface and groundwater, and Bridge runoff should be discharged to stormwater management facilities (preferably a pond or swale) prior to discharge to watercourses where this reasonably can be achieved and will not cause unacceptable environmental, highway design, safety or operational problems. 	No	<ul style="list-style-type: none"> The Ministry will prepare a Stormwater Management Plan (Section 5.1.3), and The Ministry has consulted with the Ministry of the Environment, Conservation and Parks, Ministry of Natural Resources and Forestry, Fisheries and Oceans Canada, Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority through Preliminary Design to inform the surface water, hydrology study and Stormwater Management Plan. The design will incorporate their recommendations and current environmental legislation and guidelines for design and construction of the project.
Erosion and Sediment Control	<ul style="list-style-type: none"> Protection of terrestrial and aquatic resources through limitation of soil erosion and sedimentation 	<ul style="list-style-type: none"> Ministry of Transportation, Ministry of Natural Resources and Forestry, Lake Simcoe Region Conservation Authority 	<ul style="list-style-type: none"> Soil erosion and sedimentation can potentially harm terrestrial and aquatic resources. 	<ul style="list-style-type: none"> The identified right-of-way for the Link has been checked at locations of deep cut and fill to ensure that adequate property is shown to accommodate slope benching, and Mitigation will include contract specifications that require the preparation of sedimentation and erosion control plans, which provide the details of implementation, monitoring, and commitment to undertake modifications where necessary during construction to maintain effectiveness. 	No	<ul style="list-style-type: none"> An Erosion and Sedimentation Overview Risk Assessment was undertaken, which recommended specific mitigation and monitoring measures.

Factor/ Criterion	Issue	Concerned Group/Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Assessment Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Assessment Report)	Changes to Mitigation / Protection / Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Sustainable Development	■ Avoidance of contributing to unsustainable development patterns	■ Ministry of Transportation, general public	■ In supporting mobility of people and goods and in supporting the economic development of the Study Area (Bradford in particular), the Link may contribute to a reduction in dependence on long-distance commuting for residents of northern York Region as a significant proportion currently travel to jobs outside the area.	■ None	N/A	■ A traffic study has been undertaken, which has considered out-of-way travel, and ■ As part of the preliminary study, traffic consideration included interchange utilization, overall network delay, and out of way travel. Consideration was also given to the number of above-capacity kilometres under each interchange scenario and diversion of vehicles from highly congested corridors such as Highway 11 and Bridge Street.

5.6 Summary of Preliminary Design Environmental Impacts, Proposed Mitigation Measures, Monitoring Activities and Commitments to Future Work

As outlined in **Section 5.1** through **Section 5.3** of this Report, the Project Team identified existing environmental conditions, potential environmental impacts and recommended mitigation measures to minimize potential impacts as part of the Preliminary Design phase of the project. **Table 5-26** provides a summary of the Preliminary Design environmental impacts that shall be considered and commitments that shall be implemented through further design and construction.

Table 5-26: Summary of Environmental Impacts, Mitigation Measures and Monitoring Activities

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
Terrestrial Ecosystems				
TERR-1.00	■ General impacts	■ Ministry of Natural Resources and Forestry ■ Lake Simcoe Region Conservation Authority, and ■ Ministry of the Environment, Conservation and Parks.	TERR-1.01	■ The need for additional plans (i.e., wildlife management, wildlife monitoring, ecological restoration, environmental management, Invasive Species management, Ministry Salt Management Plan) to support the proposed works should be determined and prepared during Detail Design.
	■ Temporary loss of natural vegetation	■ Ministry of Natural Resources and Forestry ■ Lake Simcoe Region Conservation Authority, and ■ Ministry of the Environment, Conservation and Parks.	TERR-2.01	■ 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.
TERR-2.00	■ Temporary loss of natural vegetation	■ Ministry of Natural Resources and Forestry ■ Lake Simcoe Region Conservation Authority, and ■ Ministry of the Environment, Conservation and Parks.	TERR-2.02	■ OPSS-201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders.
			TERR-2.03	■ OPSS-801: Construction Specification for the Protection of Trees.
			TERR-2.04	■ Where tree removals are required to accommodate the proposed design outside of Ministry owned lands (i.e. areas of Temporary Limited Interest) a tree inventory should be completed in Detail Design by a certified arborist to determine the number and species of trees been that will be removed. The inventory will inform potential restoration works and/or potential permitting requirements under applicable municipal bylaws.
			TERR-2.05	■ OPSS.MUNI-804: Construction Specification for Seed and Cover.
			TERR-2.06	■ A Landscaping and Ecological Restoration Plan shall be prepared and include invasive species management, as outlined in LAND-1.01 and LAND-1.02.
			TERR-2.07	■ 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.
			TERR-2.08	■ Plantings should consist of native tree and shrub species, similar to the native species already present in the Study Area.
			TERR-2.09	■ Wetland boundary delineation where encroachment into wetlands is anticipated.
			TERR-2.10	■ Sections of the Holland River Marsh Provincially Significant Wetland that will be spanned by the project and have been temporarily disturbed due to construction activities should be restored back to wetland habitat where possible in order to retain the function of the wetland. Planted species should consist of native species that are present within the adjacent wetland vegetation communities to ensure the composition of adjacent communities is retained.
			TERR-2.11	■ Species planted directly underneath the new structures that span the Holland River Marsh Provincially Significant Wetland should include species that prefer or tolerate shaded environments. Plantings should be limited to low-growing species to allow the most amount of light to reach underneath the structure given the east-west orientation of the highway.
			TERR-2.12	■ Seeded mixes that include common milkweed and native flowering plants should be used to rehabilitate or restore areas of herbaceous vegetation temporarily disturbed during proposed works.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
TERR-3.00	<ul style="list-style-type: none"> ■ Permanent loss of natural vegetation 	<ul style="list-style-type: none"> ■ Ministry of Natural Resources and Forestry ■ Lake Simcoe Region Conservation Authority, and ■ Ministry of the Environment, Conservation and Parks. 	TERR- 3.01	<ul style="list-style-type: none"> ■ 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.
			TERR- 3.02	<ul style="list-style-type: none"> ■ OPSS-803: Construction Specification for Vegetative Cover
			TERR- 3.03	<ul style="list-style-type: none"> ■ OPSS-201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders.
			TERR- 3.04	<ul style="list-style-type: none"> ■ OPSS-801: Construction Specification for the Protection of Trees
			TERR- 3.05	<ul style="list-style-type: none"> ■ Where tree removals are required to accommodate the proposed design outside of Ministry owned lands (i.e. areas of Temporary Limited Interest) a tree inventory should be completed in Detail Design by a certified arborist to determine the number and species of trees been that will be removed. The inventory will inform potential restoration works and/or potential permitting requirements under applicable municipal bylaws.
			TERR- 3.06	<ul style="list-style-type: none"> ■ OPSS.MUNI-804: Construction Specification for Seed and Cover.
			TERR- 3.07	<ul style="list-style-type: none"> ■ Wetland boundary delineation where encroachment into wetlands is anticipated.
			TERR- 3.08	<ul style="list-style-type: none"> ■ Where wetland habitat cannot be restored or is permanently impacted by the proposed highway the Ministry should consider wetland compensation efforts including enhancement to the adjacent wetland communities or creation of new wetland habitat to maintain wetland function throughout the Study Area.
TERR-4.00	<ul style="list-style-type: none"> ■ Potential for construction fill and sediment runoff to enter vegetation communities 	<ul style="list-style-type: none"> ■ Ministry of Natural Resources and Forestry ■ Lake Simcoe Region Conservation Authority, and ■ Ministry of the Environment, Conservation and Parks. 	TERR- 4.01	<ul style="list-style-type: none"> ■ OPSS-804: Construction Specification for Temporary Erosion Control.
			TERR- 4.02	<ul style="list-style-type: none"> ■ SSP-805: Construction Specification for Temporary Sediment Control.
			TERR- 4.03	<ul style="list-style-type: none"> ■ Erosion and Sediment Control measures should be installed along the construction footprint within 30 metres of any Provincially Significant Wetland. In areas where the construction of the highway is expected to intersect a Provincially Significant Wetland, sediment fencing should be installed along the limits of work. Erosion and Sediment Control measures should be installed in accordance with the project's associated Erosion and Sediment Control plan.
			TERR- 4.04	<ul style="list-style-type: none"> ■ OPSS.MUNI-804: Construction Specification for Seed and Cover.
			TERR- 4.05	<ul style="list-style-type: none"> ■ OPSS-180: General Specification for the Management of Excess Materials.
			TERR- 4.06	<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.
			TERR- 4.07	<ul style="list-style-type: none"> ■ 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 (Ministry of the Environment, Conservation and Parks, 2020) around stockpiles or area of disturbance prior to April 1. Fencing should be installed immediately after stockpiles are created if after April 1.
			TERR- 4.08	<ul style="list-style-type: none"> ■ OPSS-182: General Specification for Environmental Protection for Construction in Waterbodies and on Waterbody Banks.
			TERR- 4.09	<ul style="list-style-type: none"> ■ Watercourse banks disturbed by any activity associated with the project should be immediately stabilized to prevent erosion and/or sedimentation, through re-vegetation with native species suitable for the site.
			TERR- 4.10	<ul style="list-style-type: none"> ■ OPSS-201: Construction Specification for Clearing, Close Cut Clearing, Grubbing and Removal of Surface and Piled Boulders.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
TERR-5.00	<ul style="list-style-type: none"> Potential for oil, gasoline, grease, emissions and other materials from construction equipment, material storage and handling to enter adjacent vegetation communities 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 5.01	<ul style="list-style-type: none"> A Spills Management Plan should 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 (OC – Spill Prevention and Response Contingency Plan as per OPSS-182).
			TERR- 5.02	<ul style="list-style-type: none"> Environmental Incident Management Under Legislation Protecting the Environment and Natural Resources in accordance with OPSS-100.
			TERR- 5.03	<ul style="list-style-type: none"> Special Provision-199S56 Control of Emissions During Structural Work.
TERR-6.00	<ul style="list-style-type: none"> Potential impacts to wetland hydrology 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR-6.01	<ul style="list-style-type: none"> OPSS-517: Construction Specification for Dewatering.
TERR-7.00	<ul style="list-style-type: none"> Potential impacts to species at risk and their habitat 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 7.01	<ul style="list-style-type: none"> Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required if Chimney Swift are found to be nesting within any affected buildings.
			TERR- 7.02	<ul style="list-style-type: none"> Targeted marsh breeding bird call back surveys following approved Ministry of the Environment, Conservation and Parks protocols shall be undertaken in areas where impacts are proposed in candidate habitat for Least Bittern. Should Least Bittern be confirmed habitat should be mapped in accordance with the Recovery Strategy for the Least Bittern (Ministry of the Environment, Conservation and Parks, 2016). Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for Least Bittern if confirmed using the candidate habitat present in the Holland River Marsh Provincially Significant Wetland and impacts to suitable habitat within 500 metres of breeding activity cannot be avoided (Ministry of the Environment, Conservation and Parks, 2016).
			TERR- 7.03	<ul style="list-style-type: none"> Species-specific surveys following the Ministry of the Environment, Conservation and Parks' Species at Risk Bats Survey Note (2022a) and Maternity Roost Surveys (Forest and Woodlands) (2022b) shall be undertaken in areas where tree removal is proposed in suitable bat Species at Risk habitat. Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for bat Species at Risk if confirmed using treed habitats and impacts to habitats or Species at Risk individuals cannot be avoided.
			TERR- 7.04	<ul style="list-style-type: none"> Targeted Species at Risk surveys to determine the presence/absence of grassland Species at Risk bird habitat (Bobolink and Eastern Meadowlark) shall be completed during Detail Design. Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for Bobolink or Eastern Meadowlark if confirmed using the candidate habitats and impacts to protected habitat outlined in the species General Habitat Description (Ministry of the Environment, Conservation and Parks, 2021a & 2021b) or Species at Risk individuals cannot be avoided.
			TERR- 7.05	<ul style="list-style-type: none"> Crepuscular bird surveys following approved Ministry of the Environment, Conservation and Parks protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified. Should Eastern Whip-poor-will be confirmed habitat should be mapped in accordance with the General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013a). Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for Eastern Whip-poor-will if confirmed using the candidate habitats and impacts to protected habitat outlined in the species General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013a) or Species at Risk individuals cannot be avoided.
			TERR- 7.06	<ul style="list-style-type: none"> A detailed plant inventory within the Construction Disturbance Area is required to confirm no additional butternuts or other Species at Risk plants are affected by the proposed works. A Butternut Health Assessment may be required if works are located within 25 metres of a pure butternut. Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act may be required if ground disturbance occurs within 25 or removal of pure or archivable butternuts is required.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			TERR- 7.07	<ul style="list-style-type: none"> A detailed plant inventory within the Construction Disturbance Area may be required to confirm the number of black ash that will be impacted by the proposed works. Authorization requirements for black ash under the Endangered Species Act are currently unknown and will be dependent on how the Ministry of the Environment, Conservation and Parks chooses to protect the species once the temporary suspension of statutory protections has ended in January 2024.
			TERR- 7.08	<ul style="list-style-type: none"> Turtle overwintering and nesting surveys following approved Ministry of the Environment, Conservation and Parks protocols shall be undertaken in areas where impacts are proposed in candidate habitat identified. If Blanding’s Turtle habitat use is confirmed the habitat should be mapped in accordance with the General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013b). Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act may be required for Blanding’s Turtle if confirmed using the candidate habitat identified and impacts to protected habitat outlined in the species General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013b) or Species at Risk individuals cannot be avoided.
TERR-8.00	<ul style="list-style-type: none"> Potential impacts to migratory birds and their habitat 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority Ministry of the Environment, Conservation and Parks, and Environment and Climate Change Canada. 	TERR- 8.01	<ul style="list-style-type: none"> Schedule vegetation removal to occur outside of the overall bird nesting period of April 1st to August 31st to avoid disturbance to breeding migratory birds including Species at Risk and/or damage/destruction of their nest.
			TERR- 8.02	<ul style="list-style-type: none"> Non-Standard Special Provision Operational Constraints (Environmental) - Migratory Bird Protection.
			TERR- 8.03	<ul style="list-style-type: none"> 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’ (e.g., mown vegetation) 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 MBCA and/or the Endangered Species Act.
			TERR- 8.04	<ul style="list-style-type: none"> Permitting under the MBCA will be required if a nest of a bird listed under Schedule 1 of the act is identified within the proposed project footprint. Both Green Heron and Pileated Woodpecker, birds listed under Schedule 1 of the MBCA, were identified within the project Study Area during field investigations. Targeted sweeps/surveys for nests and suitable nesting sites are required during Detail Design and/or prior to vegetation removal to determine potential permitting requirements. Authorization under the MBCA may be required if removal of nests of Schedule 1 species cannot be avoided through Detail Design.
			TERR- 8.05	<ul style="list-style-type: none"> It is recommended that any structure expected to be impacted by the proposed works be examined to confirm the presence or absence of migratory or Species at Risk bird nests the year prior to construction.
			TERR- 8.06	<ul style="list-style-type: none"> If birds are observed nesting in, under or on a structure or building prior to or during rehabilitation or 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 MBCA and/or the Endangered Species Act.
TERR-9.00	<ul style="list-style-type: none"> Removal of potential monarch habitat 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry, and Lake Simcoe Region Conservation Authority. 	TERR- 9.01	<ul style="list-style-type: none"> Limiting vegetation removal to outside of the monarch nesting period will help to protect monarch while they are present as eggs or larvae on milkweed plants (May 25th to August 15th).
			TERR- 9.02	<ul style="list-style-type: none"> Inclusion of milkweed in the species mix for the revegetation of temporary disturbed areas.
TERR-10.00	<ul style="list-style-type: none"> Potential impacts to bats and bat habitat 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 10.01	<ul style="list-style-type: none"> Should impacts to woodlands be confirmed through Detail Design, Ministry of the Environment, Conservation and Parks should be consulted to determine permitting requirements. At a minimum conduct any tree removals outside of the bat roosting season (April 1st to September 30th), following Ministry of the Environment, Conservation and Parks consultation.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
TERR-11.00	<ul style="list-style-type: none"> Potential impacts to turtle overwintering habitat 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 11.01	<ul style="list-style-type: none"> Avoid work within areas of candidate turtle overwintering habitat during the turtle overwintering period (October 31 to April 1), whenever possible.
TERR-12.00	<ul style="list-style-type: none"> Potential impacts to reptile hibernacula 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry, and Lake Simcoe Region Conservation Authority. 	TERR- 12.01	<ul style="list-style-type: none"> If work is required within candidate reptile hibernacula habitat (i.e., rockpiles) work should be completed outside the reptile overwintering period (October 31 to April 1), whenever possible.
TERR-13.00	<ul style="list-style-type: none"> Potential impacts to terrestrial crayfish habitat 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry, and Lake Simcoe Region Conservation Authority. 	TERR- 13.01	<ul style="list-style-type: none"> Wherever possible, avoid changes to hydrology in areas of candidate and confirmed terrestrial crayfish habitat.
TERR-14.00	<ul style="list-style-type: none"> Potential sightings of Species at Risk during construction 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 14.01	<ul style="list-style-type: none"> SP 100S14 Unexpected Species at Risk Occurrence.
			TERR- 14.02	<ul style="list-style-type: none"> Should additional Species at Risk be encountered within the work area, construction activities will cease, and the contracting authority and Ministry of the Environment, Conservation and Parks will be contacted for next steps.
			TERR- 14.03	<ul style="list-style-type: none"> All Species at Risk observations should be reported to the contracting authority and Ministry of the Environment, Conservation and Parks.
TERR-15.00	<ul style="list-style-type: none"> Potential to find wildlife within the work area during construction 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 15.01	<ul style="list-style-type: none"> If wildlife is found within the work area, the wildlife should be permitted to vacate the area.
			TERR- 15.02	<ul style="list-style-type: none"> 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.
			TERR- 15.03	<ul style="list-style-type: none"> If the species is identified as Species at Risk, do not handle the individual unless it is in immediate danger. A Qualified Biologist shall contact the Contracting Authority and Ministry of the Environment, Conservation and Parks immediately. In accordance with the Endangered Species Act, no Threatened or Endangered species can be handled or relocated without the proper approvals/permitting and authorization from Ministry of Natural Resources and Forestry.
			TERR- 15.04	<ul style="list-style-type: none"> If the species is not identified as Species at Risk, direct the species away from the construction zone into the nearest natural area (i.e., woodland, wetland, etc.); if unsure of where to move the species, a Qualified Biologist shall be contacted for guidance.
			TERR- 15.05	<ul style="list-style-type: none"> For Species of Conservation Concern (e.g., a snapping turtle) or other non-Species at Risk wildlife, it may appropriate to request that a qualified biologist move the species for the safety of both the onsite personnel and the species.
			TERR- 15.06	<ul style="list-style-type: none"> Avoid driving within construction zones in proximity to amphibian breeding habitat at night between April 1 and June 30, and any rainy nights from spring to early autumn, whenever possible.
			TERR- 15.07	<ul style="list-style-type: none"> Should an injured or orphaned animal be encountered, a Qualified Biologist will transport the animal to a wildlife rehabilitation centre that is considered to be an approved Wildlife Custodian by the Ministry of Natural Resources and Forestry or a member of the College of Veterinarians. Any amphibians or reptiles unearthed during their hibernation will also be immediately transported to a suitable wildlife rehabilitation centre.

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TERR-16.00	<ul style="list-style-type: none"> Potential for wildlife vehicle collisions within during operation 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 16.01	<ul style="list-style-type: none"> Permanent Wildlife Exclusion Fencing should be considered to be erected along the entire limits of the Bradford Bypass right-of-way where there is opportunity for herpetofauna or mammals to enter the right-of-way.
			TERR- 16.02	<ul style="list-style-type: none"> Jump-outs are recommended at approximately 1.4 kilometre intervals to ensure that wildlife trapped within the right-of-way are able to exit.
			TERR- 16.03	<ul style="list-style-type: none"> It is recommended that fence ends angle away from the right-of-way for a distance up to 100 metres.
			TERR- 16.04	<ul style="list-style-type: none"> It is recommended that culverts be designed to provide openness ratios that would allow for the passage of small mammal and/or herpetofauna where possible. An openness ratio of 0.4 would permit usage by medium-sized mammals, while the minimum openness ratio to be considered should be 0.25, which would permit usage by reptiles.
			TERR- 16.05	<ul style="list-style-type: none"> A larger wildlife passage with an openness ratio of 0.6 or greater should be considered where the proposed right-of-way intersects the Deer Wintering Area situated between 2nd Concession Road and Leslie Street.
			TERR 16.06	<ul style="list-style-type: none"> Implement the commitment made in the 2002 Approved Environmental Assessment to span existing Provincially Significant Wetlands associated with the Holland River and Holland River East Branch. Spanning of the wetland units will provide ample wildlife crossing opportunities for both large and small wildlife to access the natural features present both north and south of the proposed right-of-way.
			TERR- 16.07	<ul style="list-style-type: none"> Winter tracking surveys to determine deer/large mammal movement within the proposed right-of-way is recommended during the Detail Design phase of the project.
			TERR- 16.08	<ul style="list-style-type: none"> Around culvert structures, avoid the use of rip-rap or sharp rock protection and ensure areas on both sides of the watercourse provide substrate materials conducive to animal movement, where possible.
			TERR- 16.09	<ul style="list-style-type: none"> If rip-rap must be used, fill the interstitial space with small materials which would provide appropriate footing for wildlife.
			TERR- 16.10	<ul style="list-style-type: none"> Include natural substrates within culverts structures.
			TERR- 16.11	<ul style="list-style-type: none"> Provide suitable cover elements adjacent to structures (e.g., retained or planted vegetation) that can facilitate wildlife use of the structures (i.e., cover/shelter on route to structure) while not blocking the structure entrance.
			TERR- 16.12	<ul style="list-style-type: none"> Wherever possible, ensure that entrance and exits to the structures are reasonably level (e.g., no major grade changes) to provide an unimpeded view through the structure and habitat beyond.
			TERR- 16.13	<ul style="list-style-type: none"> Ensure that the elevation and slope of the structure does not result in flooding.
			TERR- 16.14	<ul style="list-style-type: none"> Remove or reduce potential predator perches (i.e., ledges) to the extent possible.
			TERR- 16.15	<ul style="list-style-type: none"> Avoid artificial light sources near the entrances/exit of the wildlife passage.
			TERR- 16.16	<ul style="list-style-type: none"> Any landscaping and erosion control materials required shall not include materials known to accidentally entrap snakes or fish.
			TERR- 16.17	<ul style="list-style-type: none"> Restore adjacent vegetation areas disturbed for construction access using native species.
TERR-17.00	<ul style="list-style-type: none"> Potential Impact of lighting on natural areas and wildlife 	<ul style="list-style-type: none"> Ministry of Natural Resources and Forestry Lake Simcoe Region Conservation Authority, and Ministry of the Environment, Conservation and Parks. 	TERR- 17.01	<ul style="list-style-type: none"> Limit the number of lights immediately adjacent to woodlands to the extent possible.
			TERR- 17.02	<ul style="list-style-type: none"> If feasible, turn off lighting or reduce the number of active lights immediately adjacent to woodlands during sensitive timing windows (i.e., April 1 – September 30).
			TERR- 17.03	<ul style="list-style-type: none"> Avoid the use of high-pressure sodium and LED lights immediately adjacent to woodlands.

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Fish and Fish Habitat				
FISH-1.0	■ Near and in-water work	■ Fisheries and Oceans Canada ■ Ministry of Natural Resources and Forestry ■ Ministry of the Environment, Conservation and Parks ■ Lake Simcoe Region Conservation Authority, and ■ Nottawasaga Valley Conservation Authority.	FISH-1.01	■ An Access Management Plan shall be created to prohibit or limit access to banks or areas adjacent to waterbodies to the extent required to protect the structural integrity of banks or shorelines. Where applicable, the plan shall include: <ul style="list-style-type: none"> – Limit machinery fording of the watercourse to a one-time event (i.e., over, and back), and only if no alternative crossing method is available – If repeated crossings of the watercourse are required, construct a temporary crossing structure, and – Use temporary crossing structures or other practices to cross streams or waterbodies with steep and highly erodible (e.g., dominated by organic materials and silts) banks and beds. ■ For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.
			FISH-1.02	■ Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project.
			FISH-1.03	■ Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin, and runoff water is clear. Where applicable, the plan may include: <ul style="list-style-type: none"> – Installation of effective erosion and sediment control measures before work starts to prevent sediment from entering the waterbody – Regular inspection and maintenance of erosion and sediment control measures and structures during construction. Strategies to repair erosion and sediment control measures and structures, if damage occurs, and – Strategies for the removal of non-biodegradable erosion and sediment control materials once the site is stabilized.
			FISH-1.04	■ Environmental Protection during work in watercourses and on watercourse banks shall be conducted in accordance with OPSS-182.
			FISH-1.05	■ Timing of in-water work in accordance with OPSS-802.07.08.01 ■ In-water work below the high-water mark and work on watercourse banks shall be carried out during the appropriate timing window: <ul style="list-style-type: none"> – Permitted in-water warmwater/coolwater timing window of July 16 – March 14 (i.e., no in-water work is permitted from March 15 – July 15), or – Permitted in-water timing window of July 16 – February 28 for areas with sensitive (e.g., spawning or nursery) habitat (i.e., no in-water work is permitted from March 1 – July 15).
			FISH-1.06	■ An in-water work isolation plan should be designed and implemented to maintain clean flow around the work area(s), including the following considerations: <ul style="list-style-type: none"> – Use of appropriately designed and sited temporary settling basin, filter bag, etc., such as sediment is filtered out prior to the water entering a waterbody, and – Use of energy dissipation measures to prevent bank or bed erosion. ■ Erosion and Sediment control shall be monitored in accordance with OPSS-805.
			FISH-1.07	■ 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-182). A License to Collect Fish for Scientific Purposes (LCFSP) shall be obtained prior to the start of any fish relocation works.
			FISH-1.08	■ Whenever possible, operate machinery on land above the high-water level, on ice, or from a floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.

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			FISH-1.09	<ul style="list-style-type: none"> ■ Operate, store and maintain (e.g., refuel, lubricate) all equipment, vehicles and associated materials in a manner that prevents the entry of any deleterious substance from entering the water (refueling and other such tasks should be completed at least 30 metres away from a watercourse).
			FISH-1.10	<ul style="list-style-type: none"> ■ Any part of equipment entering the water or operating on the bank shall be free of fluid leaks, invasive species and noxious weeds. The equipment shall be externally cleaned/degreased to prevent any deleterious substance from entering the water.
			FISH-1.11	<ul style="list-style-type: none"> ■ Ensure work zones are stabilized against high flows at the end of each workday.
			FISH-1.12	<ul style="list-style-type: none"> ■ 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-182).
			FISH-1.13	<ul style="list-style-type: none"> ■ Use only specified amounts and types of fertilizer in areas draining to waterbodies ■ Avoid the use of chemical dust suppressants, pesticides, and herbicides in areas near or draining waterbodies, and ■ Ensure that building material used in a watercourse has been handled and treated in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish.
			FISH -1.14	<ul style="list-style-type: none"> ■ Stabilize and re-vegetate (or use other materials appropriate to site conditions) all areas of disturbed/exposed soil that drain to a waterbody using: <ul style="list-style-type: none"> – Targeted planting of appropriate vegetation, and – Rolled erosion control blankets, topsoil, seed, mulch, etc. ■ Installation of appropriately designed structural materials and vegetation of feasible on steep slopes to maintain slope stability for the long term. Direct drainage away from slopes unless the structure is provided to take drainage into the valley without erosion and risk of sedimentation.
			FISH-1.15	<ul style="list-style-type: none"> ■ Minimize the removal of natural woody debris, rocks, or other materials from below the high-water level ■ Add/re-establish appropriate in-stream structure and cover for habitat, in such a way as to not destabilize the channel through negative impacts to hydraulics. Where possible, match structure/substrate type with previous or adjacent types removed, altered, or disturbed during construction, and ■ This may include salvage and reinstatement of existing in-stream structures such as large woody debris, boulders, or in-stream aquatic vegetation.
			FISH-1.16	<ul style="list-style-type: none"> ■ Design and implement vegetation rehabilitation plan following construction to replant riparian vegetation to pre-construction or better condition (e.g., trees for shade to cool water and provide overhead cover) ■ Considerations: <ul style="list-style-type: none"> – Design and install riparian plantings to avoid or minimize encroachment into and/or alteration of bank and bed profile – Usually includes reinstatement of native soils or replacement with topsoil/suitable planting medium – May include local seed bank or root mass/mat salvage, vegetation transplant or bioengineering (e.g., live stakes, cuttings) techniques – Use native species compatible with site conditions, and – Integrate provision o fish cover where feasible. ■ Integrate appropriate techniques for interim stabilization measures, such as a biodegradable blanket and tackifier, to maintain soil stability until vegetation becomes established.
			FISH-1.17	<ul style="list-style-type: none"> ■ Temporarily store, handle and dispose of all materials used or generated (e.g. organics, soils, uprooted or cut aquatic plants, woody debris, dredging spoils, commercial logging waste, temporary stockpiles, construction waste and materials such as concrete, sheet pile, wood forms, etc.) during site preparation, construction and clean-up in a manner that prevents their entry to the waterbody, including temporarily storing and stockpiling materials a safe distance from the waterbody and stabilizing/containing them.

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			FISH-1.18	<ul style="list-style-type: none"> ■ Design drainage system to avoid diversion of or otherwise minimize changes in drainage to or from a waterbody (do not across watershed boundaries), and ■ Design stormwater management measures to manage runoff to waterbody considering discharge (e.g., velocities to avoid erosion) as well as quality (e.g., formal stormwater management ponds, enhanced ditches, and filtration)
FISH-2.00	<ul style="list-style-type: none"> ■ The potential presence of aquatic Species at Risk 	<ul style="list-style-type: none"> ■ Ministry of the Environment, Conservation and Parks, and ■ Ministry of Natural Resources and Forestry. 	FISH-2.01	<ul style="list-style-type: none"> ■ Works may be subject to approvals under the Endangered Species Act and shall be confirmed during the Detail Design. Consultation with Ministry of the Environment, Conservation and Parks should start early in the Detail Design phase to confirm Endangered Species Act permitting requirements for the American Eel, and ■ Further discussions with Ministry of the Environment, Conservation and Parks are recommended during Detail Design regarding the presence of aquatic Species at Risk and approvals under the Endangered Species Act.
			FISH-2.02	<ul style="list-style-type: none"> ■ Should a permit under the Endangered Species Act and/or Authorization under the Fisheries Act be required, the construction and post-construction monitoring shall incorporate all requirements of these approvals.
FISH-3.00	<ul style="list-style-type: none"> ■ Temporary Alteration, Disruption, or Destruction of fish habitat 	<ul style="list-style-type: none"> ■ DFO ■ Ministry of the Environment, Conservation and Parks ■ Ministry of Natural Resources and Forestry ■ Lake Simcoe Region Conservation Authority, and ■ Nottawasaga Valley Conservation Authority. 	FISH-3.01	<ul style="list-style-type: none"> ■ As the fish and fish habitat assessment was completed for the Preliminary Design, consultation and review of the works by Fisheries and Oceans Canada – Fish and Fish Habitat Protection Program will be required to confirm the approval requirements under the Fisheries Act.
			FISH-3.02	<ul style="list-style-type: none"> ■ Stream bed protection will consist of native material, where possible, and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS.PROV-1005 and NSSP-008.
			FISH-3.03	<ul style="list-style-type: none"> ■ Re-stabilize any portion of the bed of a waterbody disturbed during construction to pre-construction (or better) conditions. This shall include substrates as per OPSS-182 and OPSS.PROV-1005.
			FISH-3.04	<ul style="list-style-type: none"> ■ Re-stabilize the banks of a waterbody that have been disturbed during construction to pre-construction (or better) conditions (as per OPSS-182 and OPSS-804). This shall include riparian vegetation or stone material, temporary measures and the avoidance of hard engineering (where applicable)
			FISH-3.05	<ul style="list-style-type: none"> ■ Stabilize and re-vegetate soils exposed or disturbed during construction, including new or cleaned-out ditches (as per OPSS-182).
			FISH-3.06	<ul style="list-style-type: none"> ■ Minimize the removal of natural woody debris, rocks, or other materials from below the banks or the shoreline of the waterbody ■ Stabilize and reinforce banks of waterbodies to pre-disturbance condition (or better) using properly designed and installed stabilization measures: <ul style="list-style-type: none"> – Avoid hard engineering (sheet pile or other vertical walls) – May include vegetation (e.g., tree and shrub plantings, bioengineering), rock/stone material (e.g., riprap, boulders) – If rock reinforcement/armouring is required, ensure that appropriately sized material is used and is installed at a similar slope to the existing, maintains a uniform bank/shoreline maintains a natural bank/shoreline alignment such that it does not interfere with fish passage or alter the bankful channel profile, and – May incorporate temporary measures (e.g., biodegradable materials, ‘nurse’-crop vegetation) to provide interim stabilization until vegetation is fully established.
FISH-4.00	<ul style="list-style-type: none"> ■ The in-water works timing window for warmwater systems with significant fish habitat 	<ul style="list-style-type: none"> ■ Fisheries and Oceans Canada ■ Ministry of Natural Resources and Forestry ■ Ministry of the Environment, Conservation and Parks, and ■ Lake Simcoe Region Conservation Authority. 	FISH-4.01	<ul style="list-style-type: none"> ■ The construction schedule and in-water work will be planned in order to comply with the in-water work timing window (no in-water works are permitted from March 1 – July 15 at WC-07 to WC-09, WC-16, and WC-21).
			FISH-4.02	<ul style="list-style-type: none"> ■ Minimize the duration of in-water work ■ Conduct in-stream work during periods of low flow to allow work in water to be isolated from flows, and ■ 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.
			FISH-4.03	<ul style="list-style-type: none"> ■ The construction schedule and in-water work will be planned in order to comply with the in-water work timing window (no in-water works are permitted from March 15 – July 15).

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FISH- 5.00	<ul style="list-style-type: none"> Fish Passage 	<ul style="list-style-type: none"> Fisheries and Oceans Canada Ministry of Natural Resources and Forestry Ministry of the Environment, Conservation and Parks Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FISH-5.01	<ul style="list-style-type: none"> Design and install new culverts, extensions, and replacements to prevent the creation of barriers to fish movement and to maintain bankfull channel functions and habitat functions to the extent possible Where permanent in-water structures are placed in fish habitat, naturalize these areas by placing river stone below the 2-year high water mark (as per OPSS-825 and 1005) Design and install in-stream cover to replace or reinstate fish cover removed, altered or disturbed during construction, and Design of culverts should be countersunk a minimum of 10% to maintain fish passage.
			FISH-5.02	<ul style="list-style-type: none"> Watercourses requiring realignment shall be designed using Natural Channel Design principles as discussed in the Fluvial Geomorphological Assessment Report: Holland River Crossings (AECOM, 2023), and Fluvial Geomorphological Assessment Report: Bradford Bypass Crossings (AECOM, 2023).
			FISH-5.03	<ul style="list-style-type: none"> Timing restrictions for in-water works shall be implemented to protect the sensitive life stages/processes of migratory and resident fish.
			FISH-5.04	<ul style="list-style-type: none"> Culvert debris shall be removed, where applicable.
			FISH-5.05	<ul style="list-style-type: none"> Fish screens shall be used to avoid the entrainment of fish in pumps and hoses as per the Fisheries and Oceans Canada Code of Practice for end-of-pipe fish protection screens.
			FISH-5.06	<ul style="list-style-type: none"> It is recommended that culvert design in future stages aim to meet the velocities provided in Section 5.6.
FISH-6.00	<ul style="list-style-type: none"> Impacts to fish associated with dewatering during construction 	<ul style="list-style-type: none"> Fisheries and Oceans Canada Ministry of Natural Resources and Forestry Ministry of the Environment, Conservation and Parks Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FISH-6.01	<ul style="list-style-type: none"> As per OPSS-182, any fish isolated in the work area should be transferred (using appropriate capture, handling and release techniques to prevent harm and minimize stress) downstream or away from the construction area Fish screens shall be used to avoid entrainment of fish in pumps or hoses Use of appropriately designed and sited temporary settling basin, filter bag, etc. shall be used, so sediment is filtered out prior to the water entering a waterbody (as per OPSS-182), and Use of energy dissipation measures to prevent bank or bed erosion.
			FISH-6.02	<ul style="list-style-type: none"> Isolated in-water work areas must be cleared of fish prior to the commencement of work Fish shall 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-182), and A License to Collect Fish for Scientific Purposes shall be obtained prior to the start of any fish relocation works.
			FISH-6.03	<ul style="list-style-type: none"> Construction Specifications for Dewatering in accordance with OPSS 517 shall be followed. This includes the general provisions provided for temporary flow passage systems, both outside and within a waterbody, how to properly discharge of the water, and the minimum monitoring requirements.
FISH-7.00	<ul style="list-style-type: none"> Potential for oil, gasoline, grease and other deleterious substances from construction equipment, material storage and handling to enter adjacent watercourses. 	<ul style="list-style-type: none"> Fisheries and Oceans Canada Ministry of Natural Resources and Forestry Ministry of the Environment, Conservation and Parks Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FISH-7.01	<ul style="list-style-type: none"> A Spills Management Plan should be prepared and 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 (OC – Spill Prevent and Response Contingency Plan as per OPSS-182).
			FISH-7.02	<ul style="list-style-type: none"> The Contractor shall be in compliance with the requirements of all of the applicable environmental legislation as stated in the Environmental Incident Management Under Legislation Protecting the Environment and Natural Resources in accordance with OPSS-100.
			FISH-7.03	<ul style="list-style-type: none"> Operate, store and maintain (e.g. refuel, lubricate) all equipment, vehicles and associated materials in a manner that prevents the entry of any deleterious substance from entering the waterbody (as per OPSS 182), and Any part of equipment entering the waterbody or operating from the bank shall be cleaned, free of fluid leaks and in good working condition.

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FISH-8.00	■ Potential for the spread of invasive species	■ Fisheries and Oceans Canada	FISH-8.01	■ The Contractor shall implement best management practices to prevent the introduction/spread of invasive plants, including proper soil management and equipment cleaning protocols, and
		■ Ministry of Natural Resources and Forestry	FISH-8.02	■ The Contractor shall follow the guidelines outlined in the Ontario Ministry of Natural Resources, Invasive Phragmites – Best Management Practices, Ontario Ministry of Natural Resources, Peterborough, Ontario. Version 2011. 15p.
		■ Ministry of the Environment, Conservation and Parks		FISH-8.03
		■ Lake Simcoe Region Conservation Authority, and		
		■ Nottawasaga Valley Conservation Authority.		
Stormwater and Drainage				
SW-1.00	■ Impacts to Water Quality	■ Ministry of Environment Conservation and Parks	SW-1.01	■ Flat-bottom grassed swales are recommended where feasible to provide additional water quality treatment of runoff
		■ Lake Simcoe Region Conservation Authority, and		■ As per the 2003 Ministry of the Environment, Conservation and Parks design manual, the Design Criteria for flat-bottom grassed swales are:
		■ Nottawasaga Valley Conservation Authority.		– The flow from the 4-hour 25 millimetres Chicago design storm should be ≤ 0.15 metres cubed per second
				– The velocity from the 4-hour 25 millimetres Chicago design storm should be ≤ 0.50 metres per second
				– Grassed swales are most effective when depth of flow is minimized. The flow depth for the 4-hour 25 millimetres Chicago design storm should be ≤ 0.25 metres
				– The longitudinal slope of the swale should be less than 1.0%
				– The swale bottom width should be, at a minimum, 0.75 metres
				– The velocity generated by the 100-year design storm should not exceed 1.5 metres per second (at which point, rock protection should be provided along the swale to prevent erosion potential), and
				– The contributing drainage area should be ≤ 2 hectares (35% of imperviousness).
				■ An assessment of the flow velocities along the grassed swales during the 100-year design storm should be completed during the Detail Design stage to identify where rock protection is required to prevent erosion potential
				■ Regular inspection and maintenance is recommended for the proposed Stormwater Management Plan (flat bottom grassed swales, and stormwater management facilities) of the Bradford Bypass to keep the system operating as designed
				■ For the flat bottom grass swales with permanent flow check dams, five main operation and maintenance activities should be completed: grass cutting, minor landscaping, weed control, removal of accumulated sediment, trash removal
				■ All remedial works will need be performed within the Ministry right-of-way. Additional monitoring events and/or an increase in inspection frequency may be required to verify the effectiveness of the proposed maintenance program and monitoring works
				■ Specific inspection guidelines for check dams include the following:
				– Regular inspections should be made to ensure that the centre of the dam is lower than the edges
				– Check the structural integrity of the check dams – shape, anchoring, and overall condition
				– Look for scour underneath the check dam and bypasses on the sides
				– Note the amount of sediment deposited upstream of the check dams, and
				– Observe erosion of swale segments between check dams – downcutting and side scour.
				■ Specific maintenance guidelines for check dams include the following:
				– Remove sediment adjacent to and accumulated behind check dams before it reaches halfway to the top of the dam
				– Restore displaced or washed-out check dams to their original configuration
				– Fill in or otherwise repair areas where check dam undercutting or bypasses have occurred
				– Add stones to rock check dams as needed to maintain design height and cross section. Use larger stone, if necessary, to counter higher-than-expected flow velocities
				– Repair swale areas where excessive downcutting or side scour have occurred

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				<ul style="list-style-type: none"> – If the selected configuration is not preventing channel erosion, consider other materials or closer spacing in areas experiencing the most problems, and – If significant erosion occurs between dams, install a protective turf reinforcement mat or section of riprap liner in that portion of the channel. <ul style="list-style-type: none"> ■ For the grassed swales proposed for the Study Area, during the inspection it should be verified that the grading and vegetation are as designed, and that stormwater will be conveyed where and how it was intended.
			SW-1.02	<ul style="list-style-type: none"> ■ Stormwater Management ponds are proposed where applicable to provide additional water quality treatment of runoff and to provide quantity control of peak flows. Stormwater Management ponds will be designed as per the Ministry of the Environment, Conservation and Parks design manual during the next design phase, assuming more information is available and appropriate ■ Stormwater Management ponds designed per Ministry of the Environment, Conservation and Parks criteria and the Lake Simcoe Region Conservation Authority Stormwater Management Guidelines ■ Maintenance requirements will be identified and scheduled based on observations made during both scheduled inspections and visits to the ponds to collect monitoring data. The types of maintenance activities needed and the frequency with which they are performed will provide the basis for scheduling long-term maintenance operations. Anticipated maintenance requirements have been classified as routine maintenance operations, sediment removal and disposal operations, and remedial works ■ Maintenance activities classified as Routine Maintenance Operations include, but are not limited to: <ul style="list-style-type: none"> – Removal of trash and debris from inside and surrounding the ponds – Check for blocked inlet and outlets – Check for security fences and maintenance/repair of locks on gates – Trimming and/or clearing of vegetation along both the internal access roads and the adjacent rear property lines – Minor landscaping to restore seasonal vegetation loss, maintain desired planting densities along side slopes, remove undesirable plant species and improve aesthetics – Removal of sediment and biological accumulations from outlet structures including aquatic plant and algae growth – Minor structural repairs to pond inlet headwalls and components of the outlet structures, and – Include the use of larvicides to control mosquito growth.
			SW-1.03	<ul style="list-style-type: none"> ■ All monitoring and maintenance activities will be recorded in a logbook (as a deliverable during a future maintenance contract) kept by the maintenance contract, also including but not limited to, the name of the designated inspector and a record of all activities related to inspection, monitoring and maintenance ■ The following principles are proposed as the basis of the monitoring framework <ul style="list-style-type: none"> – Monitoring must be directed at fulfilling one or more objective sets, be subject to analysis and lead to potential actions – Monitoring of receiving watercourses should be for identifying problems, establishing a background reference, and evaluating the effectiveness of controls – Technology performance monitoring should be to confirm that the stormwater management facility operates as designed, if not, determine if remedial design improvements are needed, or if it needs maintenance. This will assist in improving future designs – The strategy should recognize and incorporate existing monitoring programs, and – Reporting on results and taking appropriate follow-up action is a key component that fulfils due diligence expectations. ■ Recommendations for the subsequent design phase include the following: <ul style="list-style-type: none"> – The proponent will collect water samples at the inlet and outlet points of the flat bottom grassed swales to estimate the removal efficiency of the swales in terms of concentration of total suspended solids – The proponent should propose the water quality target/protection level based on the receiver sensitivity and the Ministry of the Environment, Conservation and Parks' manual when preparing a stormwater management plan. The

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				proponent may also need to consult the local conservation authority to determine which water quality/quantity target is required to protect the receiving waterbody, and <ul style="list-style-type: none"> Once the water quantity/quality target/protection level has been determined, the proponent should demonstrate in the stormwater management plan that the proposed stormwater management facility is able to achieve the defined “target”. ■ As a minimum, the treated effluent should meet a TSS concentration of 25 mg/L before discharging into the receiving waterbody.
SW-2.00	■ Salt Management	■ Ministry of Environment Conservation and Parks.	SW-2.01	■ The use of the Ministry Salt Management Plan which contains best management practices to facilitate the optimal rate, timing, and location of salt application ■ Additional Water Quality Objective/Requirements policies (i.e., Chloride) applicable to the Bradford Bypass are listed below: <ul style="list-style-type: none"> Consult the Lakes Simcoe and Couchiching/Black River Source Protection Authority to identify applicable water quality policies and requirements for sensitive areas to chlorine within the Bradford Bypass project limits, and Snow removal and disposal will be completed in accordance with guidelines on Snow Disposal and De-icing Operations in Ontario and the Ministry of the Environment, Conservation and Parks guidelines. ■ Examples of snow removal and de-icing include: <ul style="list-style-type: none"> Plowing, spreading of sand, salt, anti-icing liquid, wet salt, and/or other chemicals and substances to provide safe vehicle traction and to melt ice and snow, application rates for the above chemicals and substances, salt management, and clean-up, and Appropriate precautions to prevent salt and treated sand from entering watercourses and salt-sensitive areas will be undertaken. ■ Consultation with applicable municipalities (i.e., Bradford West Gwillimbury, East Gwillimbury and King Township) in the Lake Simcoe watershed is recommended as these municipalities have developed Salt Management Plans to help navigate the balance between environmental protection and public safety. Municipalities have identified areas where the greatest impact to aquatic habitats are occurring, and that might require appropriate precautions to be taken to prevent salt and treated sand from entering watercourses and salt-sensitive areas are proposed ■ Appropriate precautions include: <ul style="list-style-type: none"> Directing stormwater flows from highway paved areas to proposed Stormwater Management facilities for water quality treatment Lining ditch bottoms with Geosynthetic Clay Liners or similar material which offer a long-lasting resistance to physical or chemical break-down elements, while the bentonite's high swelling capacity and low permeability provide an effective hydraulic seal, which will reduce infiltration of salt laden runoff Protecting sensitive ground water recharge areas such as avoiding direct infiltration No direct discharge of flows from highway areas and side ditches to chloride sensitive receiving water bodies Protecting streams that support fish habitat through enhanced grassed swale retention and quality treatments Utilizing landscape design and snowdrift mitigation strategies to optimize salt application Identifying Water Quality Objective/Requirements policies (i.e., Chloride) applicable to the Bradford Bypass Use of the Ministry Salt Management Plan which includes implementing a balanced approach (use less salt and yet maintain the same level of public safety) to the highway salt application based on the amount of snow precipitation and highway conditions Areas that are particularly sensitive to road salts where additional salt management measures may be necessary to mitigate the environmental effects of road salts in that area. This is done in accordance with the study objectives and utilizing the Code of Practice for the Environmental Management of Road Salts released by Environment Canada, and In addition, snow removal and disposal would be utilized in accordance with the Ministry of the Environment, Conservation and Parks guidelines, Guidelines on Snow Disposal and De-icing Operations in Ontario.

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Groundwater and Hydrogeology				
GW-1.00	<ul style="list-style-type: none"> Dewatering Effluent Discharge 	<ul style="list-style-type: none"> Ministry of Environment Conservation and Parks, and Lake Simcoe Region Conservation Authority. 	GW-1.01	<ul style="list-style-type: none"> It is recommended that dewatering effluent be directed to the local Town sanitary or storm sewer, if applicable. Any discharge of water would be subject to the terms and conditions of all required permits obtained by the Contractor based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Town. Due to the close proximity of the construction to agricultural drains, it is suggested that the discharge be directed away from the drains to reduce overland flow and promote infiltration, and Discharge the natural environment will be allowed with previously undeveloped areas assuming that the discharge meets Provincial Water Quality Objectives. Further discharge restrictions may occur based on proximity within or nearby Significant Groundwater Recharge Areas and Well Head Protection Areas. Supplemental sampling during dewatering will be required to ensure discharge compliance.
			GW-1.02	<ul style="list-style-type: none"> Prior to discharging any dewatering effluent, the Contractor will be required to check that all necessary discharge permits have been secured and that the Water Taking Plan, Discharge Plan, a Water Treatment Process and Sampling Plan has been designed and implemented in accordance with the terms and conditions of any such permits and the contract documents, and Regular sampling and testing of the discharge and residential wells by the Contractor will be required during construction to verify that the effluent quality continues to comply.
			GW-1.03	<ul style="list-style-type: none"> A visual inspection must be completed by the Contractor along with the collection of in-field turbidity and temperature measurements (both untreated and treated effluent discharge streams) on a daily basis during periods of active discharge for the duration of the dewatering system(s) operation. A visual inspection of terrestrial changes or sedimentation within the HVA area and surface water features within the proposed construction area are also required In the event that a sample is determined to be ‘unacceptable’ based on the applicable water quality standards, field turbidity and/or temperature monitoring activities, additional effluent samples must be obtained by the Contractor immediately upon receipt of the initial laboratory results for verification purposes. In the event of “unacceptable” results, the local Public Health Agencies (Simcoe Muskoka Public Health, York Region Public Health) will be notified immediately, and Where the verification sampling is confirmed, immediate action should be taken by the Contractor to assess and potentially modify their dewatering approach/methodology, rate/duration of pumping, and/or provide additional / alternative pre-treatment prior to resuming any further discharge. Prior to resuming any effluent discharge, a confirmatory sample should be obtained by the Contractor confirming adherence with the applicable water quality standards.
GW-2.00	<ul style="list-style-type: none"> Potential conflicts with monitoring wells 	<ul style="list-style-type: none"> Ministry of Environment Conservation and Parks Ministry of Transportation Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	GW-2.01	<ul style="list-style-type: none"> Should the location of any existing monitoring wells be in conflict with the location(s) of project construction or damaged as a result of project construction activities, it is recommended that a Ministry of the Environment, Conservation and Parks licenced water well contractor be retained by the Contractor to decommission those locations in accordance with Ontario Regulation 903 (Wells), as amended. It is further recommended that replacement well(s) be installed by a licenced environmental drilling contractor to replace any decommissioned monitoring wells and/or piezometers.
			GW-2.02	<ul style="list-style-type: none"> A pre-construction groundwater sampling program should be conducted for the groundwater monitoring wells located in the vicinity of the proposed dewatering locations (at least one well at one dewatering location) to confirm the groundwater quality in the areas. The collected groundwater samples have to be analyzed for general inorganic parameters (including total suspended solids (TSS) and turbidity), metals, and VOCs.
			GW-2.03	<ul style="list-style-type: none"> The wells monitored during the Preliminary Design hydrogeological field program are considered as part of the proposed monitoring program within the dewatering ROI, and is to be used during Detail Design, for each excavation and proposed structure.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
GW-3.00	<ul style="list-style-type: none"> Potential impacts to private wells 	<ul style="list-style-type: none"> Ministry of Environment Conservation and Parks Lake Simcoe and Muskoka Public Health, and York Region Public Health. 	GW-3.01	<ul style="list-style-type: none"> Prior to any construction dewatering occurring, the properties listed Door to Door Water Well Survey Report shall be contacted for monitoring and sampling of the residential well during and after construction to ensure that there is no effect on the water quality from the baseline assessed. The Door-to-Door Water Well Survey provides a baseline for the water wells prior to the proposed construction to determine existing water quality and quantity of each property. Additional mailing of letters to all properties within 500 metres of the study limits is recommended to ensure all concerned homeowners are monitored during and after construction to capture and ensure potential well issues are addressed and monitored.
			GW-3.02	<ul style="list-style-type: none"> Prior to the initiation of the monitoring and sampling of the residential properties listed above, the Contractor will contact local public health (Simcoe Muskoka Public Health, York Region Public Health) to allow for involvement as requested/required.
			GW-3.03	<ul style="list-style-type: none"> Where the monitoring completed above identifies a significant amount of water level drawdown (i.e., in excess of 0.3 metres at a monitored location more than 40 metres radius of influence from the dewatering area), immediate action should be taken by the Contractor to assess and potentially modify their dewatering approach/methodology, and/or rate/duration of pumping, so as to limit the dewatering radius of impact (R) and alleviate the observed groundwater level impact. It is recommended that dataloggers be installed during Detail Design in each identified residential water well and monitoring well and left for the duration of the dewatering period, and Monthly hydrographs will be provided to the Ministry, Ministry of the Environment, Conservation and Parks, Simcoe Muskoka Public Health, and York Region Public Health showing the changes to the local groundwater levels as a result of the proposed construction by the Contractor.
			GW-3.04	<ul style="list-style-type: none"> Residential wells should be sampled for a representative raw (untreated) water sample for analysis of general water quality (pH; total hardness; total alkalinity; calcium, magnesium, sodium; potassium; iron, manganese; chloride; sulphate; nitrate [NO3-N]; nitrite [NO2-N], ammonia/ammonium [NH3-N]; electrical conductivity; total dissolved solids [TDS]; total suspended solids [TSS]; tannins and lignins) and microbiological (E. coli, faecal coliforms, total coliforms) parameters, and Sodium sampling results will be provided to local Public Health Agencies (Simcoe Muskoka Public Health, York Region Public Health) as received by the Detail Design Designer. Adequate pre-treatment shall be provided by the Contractor at each dewatering location to achieve compliance prior to any off-site discharge occurring. Establishing treatment methodology (settling tank) is the responsibility of the Contractor and may be further informed by the raw (pumped) water quality and confirmatory sampling results obtained by the Contractor during construction.
GW-4.00	<ul style="list-style-type: none"> Assumed Excavation Parameters and Radius of Influence 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks, and Ministry of Transportation. 	GW-4.01	<ul style="list-style-type: none"> All groundwater plans should assume the potential for groundwater interference to be limited to those areas where the deeper road alignment (trenches, ditches, and bridge support structures) will cut 1 metre to 15 metres into the subsurface locally and will extend below the existing groundwater table.
			GW-4.02	<ul style="list-style-type: none"> The calculated radius of influence at each dewatering locations shall be summarized and reported on by the subsequent Contractor. If the deep monitoring wells (over 15 metres) are at risk of being affected during Detail Design reporting, additional mitigation measures may need to be considered (domestic well monitoring, caissons, etc.).
			GW-4.03	<ul style="list-style-type: none"> Mitigation plans should be generated for any excavation and structure construction with areas of medium to high significant groundwater recharge areas (SGRA) as shown near the Holland River and Holland River East Branch as shown in Figure 3. Dewatering discharge should be directed away from Well Head Protection (WHPA) areas if excavation and dewatering activities are occurring within them, as shown in Figure 3.
			GW-4.04	<ul style="list-style-type: none"> Based on AECOM's understanding of the regional hydrogeology, the potential effect of road salt runoff from the highway on the shallow groundwater system and shallow surficial materials is considered high. These areas of high aquifer vulnerability could potentially be impacted by saline runoff. As such, berms around the excavated areas are required during dewatering to limit runoff.

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GW-5.00	<ul style="list-style-type: none"> Potential Groundwater Contamination 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	GW-5.01	<ul style="list-style-type: none"> The use of best management practices for handling of hydrocarbons according to the Ministry of Environment, Conservation and Parks and the Technical Standards and Safety Authority of the Ministry of Government Services will reduce the potential of environmental adverse effects associated with petroleum product handling and uses. Spillage of petroleum products must be immediately remediated according to these standards such that groundwater quality is not impacted.
			GW-5.02	<ul style="list-style-type: none"> The effect of road salt can result in the direct increase of shallow groundwater salinity, or in the case of deeper wells, an increase in water hardness over time. The susceptibility of the soils to infiltration is reflected by the Highly Vulnerable Aquifers designation areas along the entire project construction area. Any runoff and dewatering discharge should be directed away from these areas unless they meet the Provincial Water Quality Objectives.
GW-6.00	<ul style="list-style-type: none"> Site Mitigation Measures 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks, and Ministry of Transportation. 	GW-6.01	<ul style="list-style-type: none"> Suggested Mitigation Measures: <ul style="list-style-type: none"> Tilling of soils in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well-traveled areas where soil compaction has occurred in areas that previously permitted infiltration, and Backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage, particularly within wetland areas. Well abandonment will be carried out in compliance with Ontario Regulation 903 Wells (as amended).
GW-7.00	<ul style="list-style-type: none"> Construction Dewatering Plan 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	GW-7.01	<ul style="list-style-type: none"> A Construction Dewatering Plan (Water Discharge/Management) shall be prepared, as well as an Erosion and Sediment Control Plan and a Groundwater Quality Monitoring Program. The Construction Dewatering Plan, which shall include details on where and when all groundwater is obtained, stored, transferred, used and returned to the environment (if applicable) and the proper decommissioning of the dewatering wells upon the completion of the construction, must be implemented prior to the discharge to the natural environment. These three reports should be prepared by the Contractor prior to the commencement of the dewatering activities and submitted to Ministry of the Environment, Conservation and Parks when finalizing the draft permit to take water (if one is determined to be required during subsequent Detail Design and construction phases).
			GW-7.02	<ul style="list-style-type: none"> Any discharge of water would be subject to the terms and conditions of all required permits obtained by the Contractor based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Town of Bradford West Gwillimbury Sewer Use By-Law (By-Law 2013-68), Town of East Gwillimbury's Sewer Use By-Law (2008-54), York Region Sewer Use By-Law (By-Law 2021-102), or PWQO as applicable
GW-8.00	<ul style="list-style-type: none"> Permitting Requirements 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	GW-8.01	<ul style="list-style-type: none"> Where construction dewatering volumes between 50,000 and 400,000 L/day are expected, filing of the project on Ministry of the Environment, Conservation and Parks's EASR system is required in accordance with Ontario Regulation 63/16 (as amended). Where expected construction dewatering volumes that exceed 400,000 L/day, a PTTW (Category 3) will be required from Ministry of the Environment, Conservation and Parks in accordance with Section 34 of the Ontario Water Resources Act (RSO, 1990). Permitting requirements will be determined during subsequent Detail Design.
			GW-8.02	<ul style="list-style-type: none"> A daily record of the timing, total volumes, and average rate of water-taking at each excavation location shall be maintained by the Contractor daily during completion of the project. The flow meter(s) shall be calibrated prior to use and installed/operated in accordance with manufacturer specifications.
GW-9.00	<ul style="list-style-type: none"> Spill Response Plan 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	GW-9.01	<ul style="list-style-type: none"> Contingency plans are to be in place to address groundwater protection associated with the project during construction. The uncontrolled release of dewatering effluent is considered a spill, along with any construction chemical release, and must be managed using the Contractor's Spill Prevention and Response Plan If the effluent is released to the natural environment and causes a significant impact on the surrounding soil or waters, this shall be reported to the Ministry of the Environment, Conservation and Parks Local District office in Barrie, ON, Ministry of the Environment, Conservation and Parks Spills Action Centre, and/or the Town of Bradford West Gwillimbury/Town of East Gwillimbury/King Township. If the effluent results in a significant impact or a disturbance to aquatic habitat (i.e., debris/tools/equipment falling into a watercourse, sediment spill, deleterious substance spill, etc.), it must also be managed in accordance with mitigation measures listed in the Contractor Sediment and Erosion Control Plan, and If the effluent is released to the Town of Bradford West Gwillimbury/Town of East Gwillimbury/King Township's municipal sewer system (sanitary or storm), there may be a requirement to report the release to the Town, subject to the terms of the Discharge Permit. Additional reporting may be required based on the quality and quantity of the spilled effluent and the affected receptors.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
GW-10.0	■ Well Interference Complaint	■ Ministry of Environment, Conservation and Parks ■ Ministry of Transportation ■ Lake Simcoe Region Conservation Authority ■ Nottawasaga Valley Conservation Authority ■ Simcoe Muskoka Public Health, and ■ York Region Public Health.	GW-10.01	■ In the event that a well interference complaint is received, the following procedure shall be implemented in a timely manner: <ul style="list-style-type: none">– Upon receipt of a well complaint, either via phone call to the project, or in person to a staff member in the field, it is to be collected and recorded, and– The Ministry, Ministry of the Environment, Conservation and Parks, Simcoe Muskoka Public Health and York Region Public Health will be notified immediately. If it occurs during normal business hours, the Ministry of the Environment, Conservation and Parks local district office (Barrie: 1-800-890-8511) will be contacted and the Spills Action Centre (1-800-268-6060) is to be contacted after business hours. The Ministry, Simcoe Muskoka Public Health and York Region Public Health will also be emailed. ■ A well complaint investigation will be conducted as per the Ministry of the Environment, Conservation and Parks policies and a qualified expert (P.Geo. or P. Eng.) will undertake and/or oversee the following: <ul style="list-style-type: none">– Collect a water well sample at the complainant’s water well, prior to any treatment systems (“raw”), after allowing the distribution system to flow for approximately five minutes and submit the water sample to a qualified laboratory for an analysis of the general chemistry suite of water quality parameters completed during pre-construction analysis– Compare the results of the analysis of the water sample to any pre-construction water sampling analysis (if available) for the residential well– Investigate and provide a professional opinion regarding the claimed impact to the well or well water– Provide a detailed written opinion as to whether the water sampling analysis results demonstrate that the construction or dewatering activities may have caused an adverse effect on the well’s water supply– If the well issue is confirmed to be a result of the project’s activities, the Ministry will provide a letter to the property owner explaining the outcome of the well investigation and detail the recommended mitigation measures (including lowering/replacement of pump inlet, well rehab, new well installed or local watermain connection if available) to remediate the issue. A temporary drinking water supply will be provided and connected to the resident if the project activities are found to be responsible, at the expense of the Ministry, until remediation measures have resolved the issue, and– If the well issue is found to be unrelated to the project activities, Ministry will provide a letter to the property owner explaining the outcome of the well investigation and the rationale for the decision. ■ Notification and a copy of any lab results, letters or communication records will be provided at each step of the above process to the Ministry, Ministry of the Environment, Conservation and Parks, Simcoe Muskoka Public Health and York Region Public Health.
Water Well Survey				
WW-1.00	■ Impacts to water wells	■ Ministry of Transportation.	WW-1.01	■ For the remaining 126 Property Owners for which no response was provided, an attempt shall be undertaken during Detail Design to contact these owners via mail, email, phone calls, site visit, etc. The Door-to-Door Water Well Survey provides a baseline for the water wells prior to the proposed construction to determine existing water quality and quantity of each property ■ Should changes be made to the Study Area, a review of water wells shall be completed, and efforts shall be made to contact the Property Owner to inquire about the status of their well, and ■ Additionally, it is recommended that during Detail Design, a second round of letters be mailed to all Property Owners within 500 metres of the Study Area to confirm that all impacted and/or concerned Property Owners with wells are monitored during and after construction to capture and ensure potential well issues are addressed and monitored.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
Hydrogeology				
HYDRO-1.00	<ul style="list-style-type: none"> Dewatering Effluent Discharge 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks, and Lake Simcoe Conservation Authority. 	HYDRO-1.01	<ul style="list-style-type: none"> It is recommended that dewatering effluent be directed to the local Town sanitary or storm sewer, if applicable. Any discharge of water would be subject to the terms and conditions of all required permits obtained by the Contractor based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Town. Due to the close proximity of the construction to agricultural drains, it is suggested that the discharge be directed away from the drains to reduce overland flow and promote infiltration, and Discharge the natural environment will be allowed with previously undeveloped areas assuming that the discharge meets PWQO. Further discharge restrictions may occur based on proximity within or nearby SGRA and WHPAs. Supplemental sampling during dewatering will be required to maintain discharge compliance.
			HYDRO-1.02	<ul style="list-style-type: none"> Prior to discharging any dewatering effluent, the Contractor will be required to check that all necessary discharge permits have been secured and that the Water Taking Plan, Discharge Plan, a Water Treatment Process and Sampling Plan has been designed and implemented in accordance with the terms and conditions of any such permits and the contract documents developed during Detail Design, and Regular sampling and testing of the discharge and residential wells by the Contractor will be required during construction to verify that the effluent quality continues to comply.
			HYDRO-1.03	<ul style="list-style-type: none"> A visual inspection must be completed by the Contractor along with the collection of in-field turbidity and temperature measurements (both untreated and treated effluent discharge streams) on a daily basis during periods of active discharge for the duration of the dewatering system(s) operation. A visual inspection of terrestrial changes or sedimentation within the HVA area and surface water features within the proposed construction area are also required In the event that a sample is determined to be ‘unacceptable’ based on the applicable water quality standards, field turbidity and/or temperature monitoring activities, additional effluent samples must be obtained by the Contractor immediately upon receipt of the initial laboratory results for verification purposes. In the event of “unacceptable” results, the local Public Health agencies (Simcoe Muskoka Public Health, York Region Public Health) will be notified immediately, and Where the verification sampling is confirmed, immediate action should be taken by the Contractor to assess and potentially modify their dewatering approach / methodology, rate / duration of pumping, and/or provide additional/alternative pre-treatment prior to resuming any further discharge. Prior to resuming any effluent discharge, a confirmatory sample should be obtained by the Contractor confirming adherence with the applicable water quality standards.
HYDRO-2.00	<ul style="list-style-type: none"> Potential conflicts with monitoring wells 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Lake Simcoe Conservation Authority, and Nottawasaga Valley Conservation Authority. 	HYDRO-2.01	<ul style="list-style-type: none"> Should the location of any existing monitoring wells be in conflict with the location(s) of project construction or damaged as a result of project construction activities, it is recommended that a Ministry of the Environment, Conservation and Parks licenced water well contractor be retained by the Contractor to decommission those locations in accordance with Ontario Regulation 903 (Wells), as amended. It is further recommended that replacement well(s) be installed by a licenced environmental drilling contractor to replace any decommissioned monitoring wells and/or piezometers.
			HYDRO-2.02	<ul style="list-style-type: none"> A pre-construction groundwater sampling program should be conducted for the groundwater monitoring wells located in the vicinity of the proposed dewatering locations (at least one well at one dewatering location) to confirm the groundwater quality in the areas. The collected groundwater samples have to be analyzed for general inorganic parameters (including total suspended solids and turbidity), metals, hydrocarbons, and VOCs.
			HYDRO-2.03	<ul style="list-style-type: none"> The monitoring wells listed in Table 1 were completed during the Preliminary Design program, are considered as part of the proposed monitoring program within the potential dewatering radius of influence and is to be monitored during Detail Design, for each excavation and proposed structure. If the design changes during Detail Design, additional monitoring wells may need to be installed that reflect the revised proposed excavation areas.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
HYDRO-3.00	<ul style="list-style-type: none"> Potential impacts to private wells 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Lake Simcoe and Muskoka Public Health, and York Region Public Health. 	HYDRO-3.01	<ul style="list-style-type: none"> Prior to any construction dewatering occurring the properties listed Door to Door Water Well Survey Report shall be contacted for monitoring and sampling of the residential well during and after construction to confirm that there is no effect on the water quality from the baseline assessed. The Door-to-Door Water Well Survey provides a baseline for the water wells prior to the proposed construction to determine existing water quality and quantity of each property. Additional mailing of letters to all properties within 500 metres of the study limits is recommended to maintain all concerned homeowners are monitored during and after construction to capture and confirm potential well issues are addressed and monitored.
			HYDRO-3.02	<ul style="list-style-type: none"> Prior to the initiation of the monitoring and sampling of the residential properties listed above, the Contractor will contact local public health (Simcoe Muskoka Public Health, York Region Public Health) to allow for involvement as requested/required.
			HYDRO-3.03	<ul style="list-style-type: none"> Where the monitoring completed above identifies a significant amount of water level drawdown (i.e., in excess of 0.3 metres at a monitored location more than 40 metre radius of influence from the dewatering area), immediate action should be taken by the Contractor to assess and potentially modify their dewatering approach / methodology, and/or rate / duration of pumping, so as to limit the dewatering radius of impact and alleviate the observed groundwater level impact. It is recommended that dataloggers be installed during Detail Design in each identified residential water well and monitoring well and left for the duration of the dewatering period, and Monthly hydrographs will be provided to the Ministry, Ministry of the Environment, Conservation and Parks, Simcoe Muskoka Public Health, and York Region Public Health showing the changes to the local groundwater levels as a result of the proposed construction by the Contractor.
			HYDRO-3.04	<ul style="list-style-type: none"> Residential wells should be sampled for a representative raw (untreated) water sample for analysis of general water quality (pH; total hardness; total alkalinity; calcium, magnesium, sodium; potassium; iron, manganese; chloride; sulphate; nitrate [NO3-N]; nitrite [NO2-N], ammonia / ammonium [NH3-N]; electrical conductivity; total dissolved solids [TDS]; total suspended solids [TSS]; tannins and lignins); hydrocarbons and microbiological (E. coli, faecal coliforms, total coliforms) parameters, and Sodium sampling results will be provided to local Public Health Agencies (Simcoe Muskoka Public Health, York Region Public Health) as received by the Detail Design Designer. Adequate pre-treatment shall be provided by the Contractor at each dewatering location to achieve compliance prior to any off-site discharge occurring. Establishing treatment methodology (settling tank) is the responsibility of the Contractor and may be further informed by the raw (pumped) water quality and confirmatory sampling results obtained by the Contractor during construction.
HYDRO-4.00	<ul style="list-style-type: none"> Assumed Excavation Parameters and Radius of Influence 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks, and Ministry of Transportation. 	HYDRO-4.01	<ul style="list-style-type: none"> All groundwater plans should assume the potential for groundwater interference to be limited to those areas where the deeper road alignment (trenches, ditches, and bridge support structures) will cut 1 metre to 15 metres into the subsurface locally and will extend below the existing groundwater table.
			HYDRO-4.02	<ul style="list-style-type: none"> The calculated radius of influence at each dewatering locations shall be summarized and reported on by the subsequent Contractor. If the deep monitoring wells (over 15 metres) are at risk of being affected during Detail Design reporting, additional mitigation measures may need to be considered (domestic well monitoring, caissons, etc.).
			HYDRO-4.03	<ul style="list-style-type: none"> Mitigation plans should be generated for any excavation and structure construction with areas of medium to high significant groundwater recharge areas (SGRA) as shown near the Holland River and Holland River East Branch. Dewatering discharge should be directed away from Well Head Protection (WHPA) areas if excavation and dewatering activities are occurring within them.
			HYDRO-4.04	<ul style="list-style-type: none"> Based on AECOM's understanding of the regional hydrogeology, the potential effect of road salt runoff from the highway on the shallow groundwater system and shallow surficial materials is considered high. These areas of high aquifer vulnerability could potentially be impacted by saline runoff. As such, berms around the excavated areas are required during dewatering to limit runoff.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
HYDRO-5.00	<ul style="list-style-type: none"> Potential Groundwater Contamination 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Lake Simcoe Conservation Authority, and Nottawasaga Valley Conservation Authority. 	HYDRO-5.01	<ul style="list-style-type: none"> The use of best management practices for handling of hydrocarbons according to the Ministry of Environment, Conservation and Parks (MECP) and the Technical Standards and Safety Authority of the Ministry of Government Services will reduce the potential of environmental adverse effects associated with petroleum product handling and uses. Spillage of petroleum products must be immediately remediated according to these standards such that groundwater quality is not impacted.
			HYDRO-5.02	<ul style="list-style-type: none"> The effect of road salt can result in the direct increase of shallow groundwater salinity, or in the case of deeper wells, an increase in water hardness over time. The susceptibility of the soils to infiltration is reflected by the Highly Vulnerable Aquifers (HVA) designation areas along the entire project construction area. Any runoff and dewatering discharge should be directed away from these areas unless they meet the Provincial Water Quality Objectives (PWQO).
HYDRO-6.00	<ul style="list-style-type: none"> Data Gaps and Design Changes 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks, and Ministry of Transportation. 	HYDRO-6.01	<ul style="list-style-type: none"> Significant Data Gaps are listed in this report related to monitoring wells that were not assessed. All monitoring wells listed in Table 1 should continue be assessed again during Detail Design under the following gaps or design changes: <ul style="list-style-type: none"> Missing groundwater monitors will be developed, tested, monitored and sampled for the required discharge option If design changes, the representation of the groundwater monitors to the zone of construction dewatering will be assessed. Additional groundwater monitors may need to be installed, and Well abandonment will be carried out in compliance with O. Reg. 903 Wells (as amended) for any damaged or deemed unnecessary.
Fluvial Geomorphology				
FLUV-1.00	<ul style="list-style-type: none"> Near and In-Water Work 	<ul style="list-style-type: none"> Fisheries and Oceans Canada Ministry of Natural Resources and Forestry Ministry of the Environment, Conservation and Parks Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FLUV-1.01	<ul style="list-style-type: none"> Prohibit or limit access to banks or areas adjacent to waterbodies, to the extent required to protect the structural integrity of banks or shorelines.
			FLUV-1.02	<ul style="list-style-type: none"> Design and implement erosion and sediment controls to contain/isolate the construction zone, manage site drainage/ runoff and prevent erosion of exposed soils and migration of sediment to adjacent waterbody during all phases of the project.
			FLUV-1.03	<ul style="list-style-type: none"> Erosion and sediment control measures should be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The plan should, where applicable, include: <ul style="list-style-type: none"> Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the waterbody Regular inspection and maintenance of erosion and sediment control measures and structures during construction, and Repairs to erosion and sediment control measures and structures if damage occurs. Removal of non-biodegradable erosion and sediment control materials once site is stabilized.
			FLUV-1.04	<ul style="list-style-type: none"> Environmental Protection during Work in Watercourses and on watercourse banks in accordance with OPSS-182.
			FLUV-1.05	<ul style="list-style-type: none"> Timing of in-water work in accordance with SSP101F23.
			FLUV-1.06	<ul style="list-style-type: none"> An in-water work isolation plan should be designed and implemented to maintain clean flow around the work area(s) Considerations: <ul style="list-style-type: none"> Use of appropriately designed and sited temporary settling basin, filter bag, etc. such as sediment is filtered out prior to the water entering a waterbody, and Use of energy dissipation measures to prevent bank or bed erosion.
			FLUV-1.07	<ul style="list-style-type: none"> Whenever possible, operate machinery on land above the high-water level, on ice, or from floating barge in a manner that minimizes disturbance to the banks and bed of the waterbody.
			FLUV-1.08	<ul style="list-style-type: none"> Operate, store and maintain (e.g. refuel, lubricate) all equipment, vehicles and associated materials in a manner that prevents the entry of any deleterious substance from entering the water (refueling and other such tasks should be completed at least 30 metres away from a watercourse).
			FLUV-1.09	<ul style="list-style-type: none"> Any part of equipment entering the water or operating on the bank shall be free of fluid leaks, invasive species and noxious weeds and externally cleaned/degreased to prevent any deleterious substance from entering the water.
			FLUV-1.10	<ul style="list-style-type: none"> Ensure work zones are stabilized against high flows at the end of each workday.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
FLUV-2.00	<ul style="list-style-type: none"> Temporary Alteration, Disruption, or Destruction of Watercourse 	<ul style="list-style-type: none"> Fisheries and Oceans Canada Ministry of the Environment, Conservation and Parks Ministry of Natural Resources and Forestry, and Lake Simcoe Region Conservation Authority. 	FLUV-2.01	<ul style="list-style-type: none"> Stream bed protection will consist of native material where possible and any rock protection below the highwater mark will consist of round riverstone in accordance with OPSS.PROV-1005 and NSSP-008.
			FLUV-2.02	<ul style="list-style-type: none"> Re-stabilize any portion of the bed of a waterbody disturbed during construction to pre-construction (or better) conditions. This shall include substrates as per OPSS-182 and OPSS.PROV-1005.
			FLUV-2.03	<ul style="list-style-type: none"> Re-stabilize the banks of a waterbody that have been disturbed during construction to pre-construction (or better) conditions (as per OPSS-182 and OPSS-804). This shall include riparian vegetation or stone material, temporary measures and the avoidance of hard engineering (where applicable).
FLUV-3.00	<ul style="list-style-type: none"> Erosion Risks 	<ul style="list-style-type: none"> Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FLUV-3.01	<ul style="list-style-type: none"> Inspection of all materials brought on-site for construction of the channels and features therein should be undertaken to ensure that the material is suitable given specifications/gradations outlined on the design drawings Stone sizing gradation and thickness along any designed watercourse will be determined through hydraulic analysis of 2-year return period event through regional scale flow events to minimize risks of erosion and bed degradation (Lake Simcoe Region Conservation Authority Guideline 9.1 & 9.2 and Nottawasaga Valley Conservation Authority Guideline 4.6.3).
FLUV-4.00	<ul style="list-style-type: none"> Ecological Function 	<ul style="list-style-type: none"> Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FLUV-4.01	<ul style="list-style-type: none"> The alteration of a watercourse will not adversely affect the ecological function of the watercourse and surrounding riparian area and will result in a net environmental improvement (LSRCA Policy 9.1 & 9.2 and Nottawasaga Valley Conservation Authority Policy 4.6.3).
			FLUV-4.02	<ul style="list-style-type: none"> Fish movement should not be impeded. It is recommended that open bottom culverts should be used (Lake Simcoe Region Conservation Authority Guideline 9.3 (a) and Nottawasaga Valley Conservation Authority Guideline 4.6.3.7(a)) and sized accordingly as per the fluvial specialist recommendations, aquatic specialist recommendations (refer to AECOM, 2022, available under a separate cover), and in conjunction with available hydraulic models.
FLUV-5.00	<ul style="list-style-type: none"> Channel Realignment 	<ul style="list-style-type: none"> Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	FLUV-5.01	<ul style="list-style-type: none"> Perform all channel realignment according to design drawings provided.
			FLUV-5.02	<ul style="list-style-type: none"> The following realignment considerations and recommendations should be implemented into the channel realignment plans: <ul style="list-style-type: none"> Channel realignment should be designed in accordance with Natural Channel Design principles and should be in compliance with Lake Simcoe Region Conservation Authority Guidelines 9.1 & 9.2, including Guideline 9.2.1 and Nottawasaga Valley Conservation Authority Guideline 4.6.3.1 Maintain bankfull channel dimensions, hydraulics, and floodplain connectivity. Assume existing bankfull width and depth to be maintained with further assessment completed at Detail Design stage Maintain meandering channel planform where required Reduce impacts to infrastructure in close proximity. Watercourse should be located away from highway embankment to avoid erosion at the embankment Improve physical habitat conditions for fish. This includes a low flow channel to improve connectivity during low flows and incorporating habitat features Maintain continuity of channel form and process. This includes an appropriate tie-in to the longitudinal profile and channel planform Minimize the loss of channel length. There should be no net loss of channel length unless an increase in channel slope is beneficial to the overall design Channel should flow perpendicularly through the crossing structure with a straighter path to the culvert which will eliminate erosion risk to the culvert inlet, and Channel realignment will be designed in accordance with Natural Channel Design principles and should be in compliance with Lake Simcoe Region Conservation Authority Guidelines 9.1 & 9.2, including Guideline 9.2.1 and Nottawasaga Valley Conservation Authority Guideline 4.6.3.1.
			FLUV-5.03	<ul style="list-style-type: none"> All surplus excavated fill material must be immediately removed from the work site and placed outside of the regulated area (Lake Simcoe Region Conservation Authority, Guideline 9.1.5).

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
FLUV-6.00	<ul style="list-style-type: none"> ■ Considerations for Crossing Structures 	<ul style="list-style-type: none"> ■ Lake Simcoe Region Conservation Authority, and ■ Nottawasaga Valley Conservation Authority. 	FLUV-6.01	<ul style="list-style-type: none"> ■ Crossing structures will be designed in consultation with Conservation Authority Guidelines including Lake Simcoe Region Conservation Authority Guidelines and Nottawasaga Valley Conservation Authority Guidelines, including the following crossing design recommendations: <ul style="list-style-type: none"> – Minimize the length of channel enclosure – Avoid, where possible, the need for substantial channel realignment – Place watercourse crossings perpendicular to flow over relatively straight sections of channel planform – Ensure that crossing structures are properly sized not only from a hydraulic perspective, but also to ensure minimal impacts to channel form and function, and – Maintain continuity of channel form and function through the crossing wherever possible (e.g., bed morphology under open-bottomed crossings and embedded in closed-bottom crossings). ■ The following crossing-specific design considerations are provided: <ul style="list-style-type: none"> – New crossings should span the Meander Belt Width, where feasible. This approach would allow natural processes to occur over the next 100 years – At a minimum, the new crossings will need to span the bankfull width of the channel, with an additional allowance for localized channel adjustment over the lifespan of the structure – If the crossing does not span the Meander Belt Width, additional erosion protection will be required to protect the crossing. Erosion protection disturbs natural geomorphological processes and typically has a negative impact on creek integrity in the long-term – At a minimum, the placement of bridge piers and open bottom culverts should be beyond the “Preferred” limit (spanning the bankfull of the feature plus the erosion allowance), as per the 100-year erosion rate – The design of bridges and culverts should maintain the existing channel form and flow as to minimize or eliminate erosion and flood risks upstream and downstream of structures – Fish movement should not be impeded. It is recommended that open bottom culverts should be used and sized accordingly as per the fluvial specialist recommendations, aquatic specialist recommendations (refer to AECOM, 2022, available under a separate cover), and in conjunction with available hydraulic models – It is recommended that a fluvial geomorphologist be directly involved in the Detail Design of the new proposed crossings in order to specifically address the observed geomorphological issues with the watercourses along the proposed Bradford Bypass route – Removal of vegetation surrounding the feature could impact erosional processes. Small upstream drainage area typically lowers the potential for lateral channel movement and erosion due to stabilization provided by vegetation – Culverts constrain channel function by preventing planform adjustment and disrupting longitudinal connectivity. Open bottom crossings are preferred to maintain geomorphological processes as closed bottom culverts reduce bed roughness and act as grade controls. Significance of these controls is accentuated where the channel is adjusting through downcutting and widening. Siting of crossings should be perpendicular to valley and stream corridor – Confinement of the watercourse should be considered as lateral migration is likely in unconfined valleys (wide, flat floodplains), whereas in confined valley watercourses, the valley slope in will impact erosion rate by limiting lateral erosion (can be more susceptible to down-cutting and/or channel widening), and – Design of the pier placement, scour protection requirements, and additional design details for the Holland River watercourses will be more closely investigated during the Detail Design stage.

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Erosion and Sediment Control				
ESC-1.00	■ Impacts due to erosion and sedimentation	■ Ministry of Transportation.	ESC-1.01	■ Adhering to OPSS 805 and Ministry NSSP: Erosion and Sediment Control
			ESC-1.02	■ Reviewing, changing and/or adapting the Erosion and Sediment Control Plan during the life of the project as needed to assure that it continues to be effective (i.e., meets all legislative requirements and project commitments)
			ESC-1.03	■ In-water and near-water work should be monitored to assure mitigation measures are properly implemented, functioning, maintained and repaired as needed, and removed following construction
			ESC-1.04	■ Dewatering operations should be managed to prevent erosion or the release of sediment-laden water to a waterbody
			ESC-1.05	■ An Erosion and Sediment Control Plan should be designed and implemented to contain/isolate exposed soils, stockpiled materials and unstable areas in the work zone, prevent the release of sediment to a waterbody and assure the work site is stabilized prior to removal following construction
			ESC-1.06	■ Sediment fencing should be installed along the construction limits as detailed in the Contract Drawings to prevent contamination of watercourses, waterbodies and wetlands
			ESC-1.07	■ Fencing should already be installed around potentially suitable Blanding’s Turtle habitat, which should protect it from degradation by sediment deposition or other contaminants
			ESC-1.08	■ Any Species at Risk observations should be reported to Ministry of Natural Resources and Forestry and the Ministry and protection must be implemented immediately to assure compliance with the Endangered Species Act. Should Species at Risk be observed within the work area, works in the immediate vicinity should be stopped and an on-site qualified biologist shall be contacted to confirm the species identification and, if necessary, relocate the individual to suitable habitat outside of the CDA.
			ESC-1.09	■ Adherence to the mitigation measures outlined in Section 5.1.6 .
			ESC-1.10	■ Types of Best Management Practices that should be implemented as part of the project are described below: <ul style="list-style-type: none"> – Project Planning and Design Best Management Practices – these Best Management Practices were discussed during the design process to consider erosion potential along the Bradford Bypass corridor, to avoid areas with higher risk of erosion and higher adverse impacts along the highway (wetlands), and waterbody crossings – This includes the decision that was taken to shift the right-of-way, to the feasible extent, on the west side of the highway to avoid impacts on the wetland complexes located in the areas adjacent to Holland River and Holland River East Branch – Procedural Best Management Practices – these measures are considered good housekeeping, and include site management, and scheduling practices; such as, minimize exposed soils, perimeter control, site access management, stockpile management as required, dust management, optimize construction sequence, and install Best Management Practices early and restore early (see Erosion and Sedimentation Overview Risk Assessment Guide Table 8.1) – Water Management Best Management Practices – these Best Management Practices are recommended to minimize watercourse disturbance, keep clean water clean, and anticipate and manage groundwater where possible. (see Erosion and Sedimentation Overview Risk Assessment Guide Table 8.2), and – Erosion Control Best Management Practices – these Best Management Practices are recommended to reduce potential for erosion due to wind, rain splash, and flowing water. Cover is the single most effective erosion control practice. (see Erosion and Sedimentation Overview Risk Assessment Guide Table 8.3).

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Land Use and Property				
LUP-1.00	■ Property impacts	■ Ministry of Transportation.	LUP-1.01	■ Potential impacts to local residents and residential properties may include impacts on regular traffic flow (due to temporary traffic congestions) and travel time during construction; however, these effects are all temporary in nature, and will be reduced by the implementation of appropriate mitigation measures and will eventually diminish after completion of construction, and ■ Where possible, the Bradford Bypass will avoid impacts to private properties, such as impacts to driveways and property access. The potential property impacts have been investigated as part of Preliminary Design and will be further confirmed during Detail Design.
LUP-2.00	■ Impacts to businesses and residents	■ Ministry of Transportation.	LUP-2.01	■ Ongoing consultation with emergency services, businesses, local residents, student transportation companies, area municipalities and key stakeholders during future Detail Design and construction regarding traffic staging, detours and other temporary traffic impacts will assist in minimizing adverse effects.
Agriculture				
AGR-1.00	■ Interim or permanent loss of agricultural lands	■ Ministry of Transportation ■ Ontario Ministry of Agriculture, Food and Rural Affairs ■ Agricultural property owners, and ■ General public.	AGR-1.01	■ There will be a permanent loss of the use of agricultural lands within the Study Area, and ■ Mitigation includes design of the corridor to impact the smallest footprint and fewest agricultural operations.
AGR-2.00	■ Fragmentation, severing or land locking of agricultural lands and operations	■ Ministry of Transportation ■ Ontario Ministry of Agriculture, Food and Rural Affairs ■ Agricultural property owners, and ■ General public.	AGR-2.01	■ There will be fragmentation and severing of agricultural lands as a result of the proposed future development of the Bradford Bypass ■ Mitigation includes design of the corridor to impact smallest footprint and fewest agricultural operations, and ■ Mitigation also includes locating the corridor along lot lines, where feasible, to reduce the chance of severing parcels.
AGR-3.00	■ The loss of existing and future farming opportunities	■ Ministry of Transportation ■ Ontario Ministry of Agriculture, Food and Rural Affairs ■ Agricultural property owners, and ■ General public.	AGR-3.01	■ Mitigation includes design of the corridor to impact smallest footprint and fewest agricultural operations, and ■ Mitigation also includes locating the corridor along lot lines, where feasible, to reduce the chance of severing parcels.
AGR-4.00	■ The loss of infrastructure, services or assets	■ Ministry of Transportation ■ Ontario Ministry of Agriculture, Food and Rural Affairs ■ Agricultural property owners, and ■ General public.	AGR-3.01	■ No mitigation, protection, monitoring required as there is no anticipated loss of infrastructure or services as a result of the project. In the event that the design changes, or there is a delay in implementation of the project, anticipated impacts to infrastructure or services should be reviewed.
AGR-5.00	■ The loss of investments in structures and land improvements including tile drainage and irrigation	■ Ministry of Transportation ■ Ontario Ministry of Agriculture, Food and Rural Affairs ■ Agricultural property owners, and ■ General public.	AGR-3.01	■ Recommended mitigation measures include restoration and maintenance of irrigation and tile drainage systems in agricultural fields ■ In areas where the proposed corridor will impact agricultural fields containing tile drainage, the remaining portions of the tile drainage system in the agricultural fields will need to be maintained and functional ■ In areas where the proposed corridor will impact agricultural fields containing irrigation systems, the remaining portions of irrigation system in the agricultural fields will need to be maintained and functional, and ■ Details will be further determined as the Preliminary Design study progress and further details will be confirmed during subsequent Detail Design phases.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
AGR-6.00	<ul style="list-style-type: none"> The loss of use of ground water wells 	<ul style="list-style-type: none"> Ministry of Transportation Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural property owners, and General public. 	AGR-3.01	<ul style="list-style-type: none"> It is recommended to preserve the existing wells, or properly engineer the closing/capping of any wells in the Study Area to prevent potential groundwater contamination Details will be confirmed during subsequent Detail Design phases, and For additional information, refer to the Bradford Bypass Groundwater Protection and Well Monitoring Plan (AECOM, 2023), provided under separate cover.
AGR-7.00	<ul style="list-style-type: none"> Disruption to surrounding farm operations 	<ul style="list-style-type: none"> Ministry of Transportation Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural property owners, and General public. 	AGR-3.01	<ul style="list-style-type: none"> There may be impacts during construction related to traffic (movement of equipment through construction zones, temporary closure of roads), dust emissions, noise Recommended mitigation includes maintaining an operational road system during construction and providing appropriate signage where feasible, and Water or dust suppression materials may be used to control dust, and construction noise may be mitigated through measures such as timing constraints or quieter equipment, as identified through a Noise Study. To view applicable mitigation measures pertaining to noise, vibration and dust impacts, please reference the following reports under separate cover: Noise Report (AECOM, 2023), and Air Quality Report (AECOM, 2023).
AGR-8.00	<ul style="list-style-type: none"> Effects of noise, vibration, dust, salt 	<ul style="list-style-type: none"> Ministry of Transportation Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural property owners, and General public. 	AGR-3.01	<ul style="list-style-type: none"> To view applicable mitigation measures pertaining to noise, vibration, dust and salt impacts, please reference the following reports under separate cover: Noise Report (AECOM, 2023), Air Quality Report (AECOM, 2023) and Stormwater Management Plan (AECOM, 2023).
AGR-9.00	<ul style="list-style-type: none"> Farming Traffic concerns and Equipment Operations in Roundabouts 	<ul style="list-style-type: none"> Ministry of Transportation Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural property owners, and General public. 	AGR-3.01	<ul style="list-style-type: none"> Mitigation measures should note that the use of roundabouts in agricultural areas is inappropriate for the heavy, slow and long equipment and trailers, and The raised curbing associated with roundabouts can also cause farm trailers to tip, spill loads and create safety issues with other road users.
AGR-10.00	<ul style="list-style-type: none"> Changes to adjacent cropping due to light pollution 	<ul style="list-style-type: none"> Ministry of Transportation Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural property owners, and General public. 	AGR-3.01	<ul style="list-style-type: none"> Mitigation measures should take into consideration the impact on adjacent agricultural lands.
AGR-11.00	<ul style="list-style-type: none"> Potential shading of Specialty Crop Area from highway bridges 	<ul style="list-style-type: none"> Ministry of Transportation Ontario Ministry of Agriculture, Food and Rural Affairs Agricultural property owners, and General public. 	AGR-3.01	<ul style="list-style-type: none"> Mitigation measures should consider the overall bridge footprint to mitigate potential shading of Specialty Crop Areas, where feasible.
Noise and Vibration				
NOISE-1.00	<ul style="list-style-type: none"> Noise Bylaws 	<ul style="list-style-type: none"> Ministry of Environment, Conservation and Parks Ministry of Transportation Property Owners Town of Bradford West Gwillimbury Town of East Gwillimbury, and Township of King. 	NOISE-1.01	<ul style="list-style-type: none"> Abide by local noise bylaws where possible. Where not possible, submit a Notice of Works letter to the applicable municipality in advance of the works, which will allow the municipality to notify area residents through the local councillor.

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NOISE-2.00	■ Construction equipment meeting Ministry of Environment Conservation and Parks guideline limits	■ Ministry of Environment, Conservation and Parks, and ■ Ministry of Transportation.	NOISE-2.01	■ Include in construction contract that construction equipment shall comply with Ministry of Environment Conservation and Parks guidelines: NPC-115: Construction Equipment, and NPC-118: Motorized Conveyances.
NOISE-3.00	■ Construction noise complaints	■ Ministry of Environment, Conservation and Parks ■ Ministry of Transportation ■ Property Owners ■ Town of Bradford West Gwillimbury ■ Town of East Gwillimbury, and ■ Township of King.	NOISE-3.01	■ Setup a noise complaint process in accordance with the Ministry Guide, and ■ Investigate and address noise complaints in accordance with the Ministry Guide.
NOISE-4.00	■ Construction Noise and Vibration Effects	■ Ministry of Environment, Conservation and Parks, and ■ Ministry of Transportation.	NOISE-4.01	■ Prepare a construction noise and vibration plan during Detail Design for the construction phase of the project, and include examples of best practices that could be used to address noise/vibration complaints during construction.
NOISE-5.00	■ Updates to the design affecting traffic noise	■ Ministry of Environment, Conservation and Parks, and ■ Ministry of Transportation.	NOISE-5.01	■ If the proposed project design, updated grading and existing noise barrier condition information, or traffic data differs or has been altered in any manner from the Preliminary Design Recommended Plan, evaluate the need for a noise assessment update, and update as necessary during subsequent Detail Design phases of the project.
			NOISE-5.02	■ Optimize the noise barrier design to maximize the number of benefited receivers within the Ministry’s feasibility criteria and input for NSA05 and NSA11.
Air Quality				
AQ-1.00	■ Operating Conditions: Increased Traffic Vehicular Emissions	■ Ministry of Transportation, and ■ Ministry of Environment, Conservation and Parks.	AQ-1.01	■ Implementation of vegetation within the Study Area to decrease ground level dispersion of particulates.
			AQ-1.02	■ Implementation of High Occupancy Vehicle lanes on the Bradford Bypass to promote the use of carpooling. Thereby, reducing congestion and traffic on the road. Carpool lot locations have been identified. However, details regarding the specific layout will be determined in subsequent Detail Design Phases.
			AQ-1.03	■ Continued promotion of increased electric vehicle purchase and infrastructure within Ontario.
AQ-2.00	■ Construction Conditions: Vehicle Operation and Surface Particulate Disruption	■ Ministry of the Environment, Conservation and Parks, and ■ Ministry of Transportation.	AQ-2.01	■ Define the project’s air quality impact zone and identify all sensitive and critical receptors within this area.
			AQ-2.02	■ Assess the requirement for continuous monitoring during project construction.
			AQ-2.03	■ Provide mitigation measures and identify requirements for implementation of these measures.
			AQ-2.04	■ 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 MECP’ Technical Bulletin Management Approaches for Industrial Fugitive Dust Sources.
			AQ-2.05	■ 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).
			AQ-2.06	■ Develop a Communications Protocol and a Complaints Protocol in accordance with the Project Agreement.
			AQ-2.07	■ Regular reporting on any continuous monitoring reports, to be provided to the Ministry of the Environment Conservation and Parks (MECP) for their records.
			AQ-2.08	■ The construction related air contaminants of primary concern are in the form of particulate matter, with the fractions of PM _{2.5} and PM ₁₀ - particulate matter of less than 2.5 and 10 micron in diameter, respectively. Other contaminants of concern include crystalline silica and oxides of nitrogen.

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			AQ-2.09	■ Application of threshold “Action Level” triggers for implementation of specific and increasing intensity mitigation activities.
			AQ-2.10	■ If continuous monitoring is deemed necessary, on-site meteorological monitoring should be performed in conjunction with real-time continuous monitoring representative of receptor impacts.
			AQ-2.11	■ If continuous monitoring is deemed necessary, monitors should be placed both upwind and downwind of construction activities, where possible.
			AQ-2.12	■ If continuous monitoring is deemed necessary, baseline monitoring should be performed for a minimum of one week prior to construction activities
			AQ-2.13	■ If continuous monitoring is deemed necessary, siting of the monitors should generally follow the guidelines provided in the MECP Operations Manual for Air Quality Monitoring in Ontario (2018).
Contamination, Waste and Excess Materials Management				
CW-1.00	■ Potential to encounter contaminated soils during construction	■ Ministry of the Environment, Conservation and Parks ■ Ministry of Transportation ■ Town of Bradford West Gwillimbury, and ■ County of Simcoe.	CW-1.01	■ If impacted soils are encountered during construction, the Contractor must notify the Qualified Person and the Project Leader. The suitability of re-using that soil must be determined before re-using it in accordance with Ontario Regulation 406/19.
			CW-1.02	■ If excavated soil is deemed unsuitable for backfill operations due to environmental conditions, the Contractor shall proceed to stockpile the material in an appropriate location assigned for unsuitable material on site or removed from the site for off-site management. No soil may be transported off-site without authorization from a designated qualified person and the Project Leader.
			CW-1.03	■ The following reports are potentially required during the subsequent Detail Design phase: Assessment of Past Use, Sampling and Analysis Plan, Soil Characterization Report as per Soil Rules.
			CW-1.04	■ The Contractor will prepare an environmental orientation and will be responsible for ensuring all personnel on the site are informed on the contents of the plans and the Environmental Orientation Program. The Contractor must ensure that all new employees and/or subcontractors receive the Environmental Orientation training prior to them conducting any activity on site.
CW-2.00	■ Soil excavation and salvage	■ Ministry of the Environment, Conservation and Parks ■ Ministry of Transportation ■ Town of Bradford West Gwillimbury, and ■ County of Simcoe.	CW-2.01	■ Topsoil will be stripped and stockpiled in accordance with the Grading Plan for all permanent and temporary construction areas after areas have been cleared of vegetation.
			CW-2.02	■ Topsoil stripped during the site preparation program is not considered suitable for reuse in any application other than general landscaping on the site. The topsoil can be used for landscaping within diversion channel and swales and the construction of landscaped berms.
			CW-2.03	■ Any topsoil to be salvaged will be stripped during dry periods to the greatest extent practical. Topsoil will be stored in accordance with the sediment and erosion control measures described in the Environmental Protection Plan and contract specifications, until it is required for site reclamation.
			CW-2.04	■ Topsoil piles shall be marked with appropriate signage to prevent accidental admixing.
			CW-2.05	■ Topsoil from the natural areas will be separated from other topsoil stockpiles so that it may be used for restoration of the areas from which it was removed, to the extent possible.
			CW-2.06	■ Replace topsoil as evenly as possible over areas of the construction area to be reclaimed where topsoil salvage was conducted. Postpone replacing topsoil during wet weather or high winds to prevent damaging soil structure or erosion of topsoil.
			CW-2.07	■ Subsoil will be stored separately from topsoil with a minimum of 1 metre separation of the piles
			CW-2.08	■ Smooth rutted topsoil flat prior to topsoil replacement.
			CW-2.09	■ To prepare restoration areas for seeding, spread, loosen and fine grade topsoil. Topsoil shall be prepared for planting at a depth of 0.3 metres unless otherwise specified.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
CW-3.00	<ul style="list-style-type: none"> ■ Handling and storage of on-site soil 	<ul style="list-style-type: none"> ■ Ministry of the Environment, Conservation and Parks ■ Ministry of Transportation ■ Town of Bradford West Gwillimbury, and ■ County of Simcoe. 	CW-3.01	<ul style="list-style-type: none"> ■ Determine the best strategy for the movement of soil across the project. Double handling of soil is to be minimized to the extent possible.
			CW-3.02	<ul style="list-style-type: none"> ■ Soil shall not be placed in locations where there is direct drainage to that location. The drainage at the laydown located need to be managed appropriately to avoid localized flooding and/or erosion of these storage areas.
			CW-3.03	<ul style="list-style-type: none"> ■ Soil that has been identified for movement and/or reuse on the project lands must be stored within the project right-of-way during construction however, excavated soil or crushed rock can temporarily leave a project area to be transported directly to another part of the project area, if that is the most efficient means of relocating soil within a project area for reuse.
			CW-3.04	<ul style="list-style-type: none"> ■ Stockpiles within the project will either be re-used for engineered or for other purposes (e.g., topsoil/slope flattening) some stockpiles may be required for a short period of time, but in some instances, it may be necessary to stockpile earth material for an extended period.
			CW-3.05	<ul style="list-style-type: none"> ■ Stockpile locations will be based on, but not limited to, the following considerations and constraints which are to be confirmed in subsequent Detail Design phases: <ul style="list-style-type: none"> – Excavated earth that is not to be utilized immediately will be temporarily stockpiled in a manner that does not cause an adverse environmental effect or impair water quality – There will be minimal stockpiles of earth and granular material on-site in order to limit/avoid double handling of material – A stockpiling location will generally be in proximity to where the material will be ultimately used – Earth will not be placed in locations where there is direct drainage to that location, and – Stockpiled materials near any watercourse will be stored and stabilized at least 30 metres away from the watercourse. ■ Soil must not be stored within 10 metres of the construction limits unless any of the following apply: <ul style="list-style-type: none"> – 500 m³ or less will be stored – Soil storage will be less than one week, and – There is a physical barrier between the excess soil and the Construction Limits.
			CW-3.06	<ul style="list-style-type: none"> ■ Stockpile management will be based on, but not limited to, the following considerations and constraints. <ul style="list-style-type: none"> – Implement measures, during construction, to avoid the introduction or spread of invasive vegetation with the Study Area, including from equipment brought on-site from other worksites and from imported fill. In doing so, take into account Clean Equipment Protocol for Industry – Stockpiles with invasive species may be tarped to facilitate the invasive species deterioration. Stockpiles shall be temporarily seeded to reduce erosion if left exposed or inactive for more than 30 days – Measures to prevent the mobilization of stockpiles will be employed using silt fences and other erosion control methods in accordance with the Excess Soil Management Regulatory Proposal – For stockpiles left on-site long-term (more than one month) and where erosion and sediment control measures are required to manage on-site runoff water, the Contractor shall maintain such measures to ensure their effectiveness. Silt fencing installed around soil stockpiles must maintain a minimum 1 metre distance from the toe of the stockpile – Additional erosion and sediment control measures will be inspected on a weekly basis and after a major precipitation event. The Contractor is responsible to correct any identified deficiencies in a timely manner – The stockpiles should be monitored to ensure that stockpiles remain intact and that there are no environmental adverse effects, erosion issues, or other concerns – Soil stockpiles of any type must be stored with slopes 70 degrees or less from April 15 until July 15 to prevent Bank Swallows (<i>Riparia riparia</i>), a bird Species at Risk, from nesting in the stockpiles. If not permissible, the Contractor shall implement exclusion techniques such as tarping of slopes, and – Soils shall be handled and stored during construction in a manner that protects soil quality for re-use.
			CW-3.07	<ul style="list-style-type: none"> ■ Decisions on re-using stockpiled soil to backfill the excavations or for grading within the Study Area will be determined in accordance with the project specifications and will be based strictly on the suitability of soil for use in backfilling construction excavations or as structural fill. The Contractor is responsible for the re-use of soil within the Study Area to the extent possible.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
CW-4.00	<ul style="list-style-type: none"> ■ Handling and storage of excess soils (off- site) 	<ul style="list-style-type: none"> ■ Ministry of the Environment, Conservation and Parks ■ Ministry of Transportation ■ Town of Bradford West Gwillimbury, and ■ County of Simcoe. 	CW-4.01	<ul style="list-style-type: none"> ■ The Contractor shall re-use excess soil within the project to the extent possible. Remaining excess soil shall be re-used or placed in the creation of berms at locations to be determined by the qualified person, Project Leader and the Ministry’s QP. In some instances, on-site re-use of soil may not be possible. In these instances, with the consultation and approval of the QP and Project Leader the soil may be reused off-site.
			CW-4.02	<ul style="list-style-type: none"> ■ Stockpiles of excess soil deemed unsuitable for use in any application after all construction excavations have been backfilled and grading completed within the project and as approved by the qualified person, Project Leader and the Ministry site disposal facility or approved off-site reuse receiver in accordance with the applicable regulations, including Ontario Regulation 406/19 ■ Transportation and reuse or disposal of excess soil should follow an Excess Soil Management Plan (developed by the Contractor and approved by the Ministry prior to transport of reuse or disposal of the soil ■ All documentation (bills of lading, waste manifests, waste characterization, etc.) are to be maintained on-site, and copies shall be provided to the Ministry and the qualified person ■ When required, off-site reuse or disposal details should be included in the Excess Soil Management Plan by the Contractor outlining specific procedures and protocols for soil sampling and disposal ■ No soil removed from the site may be disposed of off-site or re-used at any location other than the Study Area and/or off-site location permitted to accept the soil ■ Approval by the qualified person is required prior to the removal of any soil from the site ■ Preference will be given to re-using soil instead of disposing of soil at a landfill, if the geotechnical quality of the soil is deemed appropriate for re-use, and ■ Large debris and solid waste material such as foundations, concrete, field stones, cobble stones, wood or metal shall be separated from the soil by mechanical means and salvaged for on-site/off-site re-use or disposed off-site separately as solid waste at a facility permitted to receive construction/ demolition debris.
			CW-4.03	<ul style="list-style-type: none"> ■ Any excess soil should be sampled according to a Sampling and Analysis Plan that is prepared by the qualified person based on Ontario Regulation 406/19 and at a minimum, soil samples must be analyzed for the following parameters: Petroleum Hydrocarbons in Fractions F1 to F4, and metals (including lead), salinity (if there are any intended agricultural receiving sites), inorganics, pH and grain size. Additional analysis– may also be required for leachate if any substances with published Leachate Screening Levels in the Soil Rules are identified as contaminants of concern within the project.
			CW-4.04	<ul style="list-style-type: none"> ■ Assuming excess soil is stockpiled, appropriate bulk soil sample frequencies should comply with Condition - Part XV.1 of the Environmental Protection Act, Ontario Regulation 153/04 as amended, Table 2 Minimum Stockpile Sampling
			CW-4.05	<ul style="list-style-type: none"> ■ All sampling and decontamination procedures, laboratory analytical methods, and protocols and procedures will be consistent with those established by the Ministry of the Environment, Conservation and Parks, as documented in Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario, May 1996 Guidance Manual). Representative samples should be collected in containers supplied by a Canadian Association for Laboratory Accreditation - accredited laboratory.
			CW-4.06	<ul style="list-style-type: none"> ■ Based on the results of the analytical testing of soils within the Study Area, excess materials should not be re-used off-site at a residential, commercial, or industrial property without further verification sampling or acceptance of that material according to the Excess Soil Management Plan for the receiver site that is completed by the Contractor and approved by the Ministry, and ■ It should be noted that the private receiver site may require additional testing and excess soil re-use planning to satisfy the Excess Soil Quality Standards published in the Soil Rules. When soil suspected of being potentially contaminated are observed during construction, the Contactor should inform the qualified person. Additional testing should be conducted to further characterize the contamination reuse on-site or disposal off-site.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			CW-4.07	<p>■ Should on-site re-use not be possible, the Contractor shall make all reasonable attempts to locate a suitable off-site beneficial re-use receiver. Only as a last resort shall disposal of excess soil at landfill will be undertaken. Re-use at off-site beneficial re-use receivers shall be communicated to the Ministry and the Contractor shall verify and document that the receiver is operating under appropriate by-laws, permits and regulations and that the quality of material being re-used is suitable for their operation. Copies of all agreements, hauling record, bills of lading, weigh bills, analytical results shall be forwarded to the Ministry and/or Contract Administrator. A copy of the hauling record must be retained on behalf of the Ministry and confirmation of receipt of the excess soil at the destination site must be obtained by the hauler with a copy of the final record to be retained by all parties for two years.</p>
			CW-4.08	<p>■ Receiving sites identified for beneficial re-use of excess material will be screened in advance and will require approval by the qualified person. As part of the screening process, the qualified person will ensure that receiving site criteria, and legislative and regulatory requirements are withheld. If excess soil is to be transported off the right-of-way for beneficial re-use at a receiving site, each load should be accompanied by documentation from the qualified person that summarized or provides (as a minimum):</p> <ul style="list-style-type: none"> – The sampling and segregating work done – The excess soil data pertaining to the suitability for the excess soil for re-use – The receiving site soil date pertaining to the suitability of the excess soil for re-use at the receiving site, and – A statement from the qualified person that the soil should be used for beneficial re-use and is not likely to cause a negative effect on human health or the environment; and a statement from the qualified person confirming the land use of the receiving site matches the intended use/suitability of the excess soil.
			CW-4.09	<p>■ Before the soil has been shipped and received at the receiving site, the Ministry requires written documentation from the owner of the receiving site confirming acceptance of the soil and the owner's understanding of the soil quality and quantity. The following information must be kept on file for future reference as out lined in Soil Rules Document, Section 5:</p> <ul style="list-style-type: none"> – A record of the exact location where the soil is deposited on the Receiving site – Landowner/facility names and civic addresses – Date of disposition – Quantity (bill of lading) – Soil sampling results, and – Qualified person's confirmation of appropriateness of excess soil for Receiving Site.
			CW-4.10	<p>■ If potentially contaminated soil is encountered based on organic vapour monitor, odours, soil discolouration, buried containers or other materials contributing to a potential release, etc., the Contractor must inform the Ministry and the qualified person. The following provides guidance with respect to contaminated soil management within the Study Area.</p>
			CW-4.11	<p>■ A thorough understanding of the contaminants that may be encountered and appropriate means and measures for handling and managing excavated materials should be contemplated in advance of undertaking excavation activities of suspected contaminated soils. Contaminated soil is soil that exceeds the applicable Ministry of the Environment, Conservation and Parks Table 2 Site Condition Standard (Ministry of the Environment, Conservation and Parks, 2011).</p>
			CW-4.12	<p>■ A procedure for soil testing, if soil that is observed to be potentially contaminated is encountered during excavation, shall be developed by the qualified person, in accordance with the project specifications. If potentially contaminated soil is encountered during excavation, the Contractor shall notify the Ministry and the qualified person, and the above noted procedure shall be implemented by the Contractor.</p>
			CW-4.13	<p>■ The Contractor shall stockpile all suspected contaminated soil in a designated Temporary Soil Storage Site in such a manner as to protect existing surface, materials and structures from contamination, runoff surface water and, as result, erosion. Intermediate staging of contaminated soils elsewhere within the Study Area is strictly prohibited. If the designated Temporary Soil Storage Site cannot be used for any reason, the Contractor must consult with the qualified person to determine an alternative, if possible. The qualified person should notify the Ministry of any changes, and</p>

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
				<ul style="list-style-type: none"> ■ The Temporary Soil Storage Site should be designed by the qualified person and constructed by the Contractor. Once designated, the surface soils (up to 1.5 metres depth) of the Temporary Soil Storage Site will be sampled to establish a baseline of environmental conditions. The number of samples may vary depending on the size of the Temporary Soil Storage Site, and submitted for chemical analysis of PHCs in F1-F4, VOCs, PAHs, metals and inorganic parameters, including pH. Samples will be collected using either hand auger or by excavation of shallow test pits.
			CW-4.14	<ul style="list-style-type: none"> ■ The design of the Temporary Soil Storage Site will include: a minimum of 10-mil (10 thousandth of an inch) nylon reinforced polyethylene sheeting serving as an impermeable/low permeable barrier to contain stockpiled potentially contaminated excess soils; a 0.5 to 1 metre high berm of baled hay or clean fill with the 10-mil nylon reinforced polyethylene sheeting extended over the berm, reaching the exterior ground surface; and consider how the potentially contaminated soils will be transported and stockpiled without compromising the berms (controlling runoff/run-on) or causing potential cross contamination (e.g., migration of contaminants outside the Temporary Soil Storage Site). If more than one sheet of polyethylene is needed to line the ground beneath the Temporary Soil Storage Site, each section of sheeting must overlap by at least 1 metre ■ As necessary, the Temporary Soil Storage Site will be designed with a sump pump to remove any accumulated water from the Temporary Soil Storage Site and temporary store it for proper discharge. In addition, should contaminated soil be encountered that the qualified person or the Ministry consider a potential source of groundwater contamination, then these soils will either be: <ul style="list-style-type: none"> – Placed in a separate cell in the Temporary Soil Storage Site, or – Placed directly into a lined roll-off and properly disposed of at a licensed landfill facility. ■ Following the use of the Temporary Soil Storage Site, confirmatory surface soil samples (up to 1.5 metres depth) will be collected and submitted for chemical analysis of PHCs, VOCs, PAHs, pH, metals and inorganic parameters to verify the quality of soil in this area. These sample results will be compared to the baseline samples to verify the area was not contaminated through the use of the Temporary Soil Storage Site. If needed, shallow remedial excavations can be completed to return the Temporary Soil Storage Site area back to original condition.
			CW-4.15	<ul style="list-style-type: none"> ■ The Contractor shall ensure that a procedure is developed and applied with respect to what must occur if any person working in the project area makes an observation during soil excavation within the project area, including any visual or olfactory observation, that suggests that the soil being excavated may be affected by the discharge of a contaminant. At a minimum, the project leader or the operator of the project area shall ensure that the procedure includes the following: <ul style="list-style-type: none"> – All soil excavations in the project area must immediately cease upon the observation being made, until such time as the project leader directs that soil excavations may be resumed – The Contractor and Ministry must immediately be notified of the observation – The Contractor, upon being notified of the observation, must, before directing that soil excavations may be resumed, ensure that all necessary steps are taken to ensure that: <ul style="list-style-type: none"> ○ all excavated soil or excavated crushed rock that is affected by the discharge of a contaminant is identified and is segregated from other excavated soil or excavated crushed rock in the project area ○ the portion of the project area that is affected by the discharge of a contaminant is determined, and ○ any excess soil from that portion of the project area is disposed of in accordance with Ontario Regulation 409/19. ■ When excavation and/or trenching are required at a suspected contaminated location, appropriate management of the contaminated solid or semi-solid material (such as soil or sludge) is required. Concerns for excavation and management of impacted soil relate to the potential for transfer of contaminants during materials handling and transportation activities. Transfer of contaminants may occur due to: <ul style="list-style-type: none"> – Excavation, storage, sizing etc. and the potential for dust and volatile emissions from the contaminated media – High potential for fugitive dust emissions due to movement of equipment at the site; Leaching contaminants from contaminated soil to surface and groundwater water can occur from unlined and uncovered stockpiles and excavated pits – Migration of contaminants to uncontaminated areas may occur during transportation, and – Improper handling and disposal of contaminated soil may allow contaminants to migrate into and pollute uncontaminated areas.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			CW-4.16	<ul style="list-style-type: none"> ■ Excavation and trenching primarily involves equipment that is widely used in the construction or non-hazardous solid waste disposal industries, such as excavators, earth movers or backhoes, dump trucks, and containers of various shapes, sizes, and materials.
			CW-4.17	<ul style="list-style-type: none"> ■ General guidance and best practice measures to prevent potential transfer of contaminants during excavation, material handling and transport of contaminated material include the following: <ul style="list-style-type: none"> – Entry to the active work area should be limited to avoid unnecessary exposure and related transfer of contaminants – Traffic should be minimized on contaminated soil – Surface drainage and subsurface utility systems should be identified – Any runoff should be prevented from entering and mixing with on-site contaminated media by building earthen berms or adopting similar other measures on the Temporary Soil Storage Site and on the site, where needed – Provisions should generally be made to capture surface water runoff by diverting it to a controlled depression-area or lined pit on the Temporary Soil Storage Site and on-site, where needed – Fugitive dust emissions should be controlled during excavation both on the Temporary Soil Storage Site and on-site, where needed, by spraying water or other materials to keep the ground moist or covered. During wet weather or rainfall no water spraying would be needed. Materials for dust control must be approved by the qualified person prior to use on the site – Appropriate personnel and equipment and decontamination procedures should be employed as required to keep the site-related contaminants within the Temporary Soil Storage Site and the project. Covers and liners should be used at all times when contaminated materials are being stored at the Temporary Soil Storage Site – Covers should be used on trucks that are moving materials around and from the site, and – Any equipment that is involved in earthwork activities or that may have come into contact with waste, or any potentially contaminated material must be decontaminated prior to being removed from the Site or Temporary Soil Storage Site.
			CW-4.18	<ul style="list-style-type: none"> ■ General guidance and best practice measures for the storage of contaminated soil include the following: <ul style="list-style-type: none"> – For contaminated suspected soil, soil must be stored in a manner that prevents potential contaminants from leaching into the groundwater, and – Potentially contaminated soil will be protected to prevent the infiltration of precipitation and/or generation of runoff. ■ If determined necessary by a qualified person, soil from the project that require sampling needs to be kept segregated from soil that has already been sampled.
			CW-4.19	<ul style="list-style-type: none"> ■ In the event that impacted soil are encountered during construction, the suitability of reusing the soil should be determined before it's re-use. The Contractor must consult with the qualified person prior to re-using impacted soil on-site. In general, impacted soil may be re-used on-site for backfilling construction excavations/or as structural fill, as deemed appropriate by the Qualified Person.
			CW-4.20	<ul style="list-style-type: none"> ■ Impacted soil must be stockpiled as close as possible to the location from where it was excavated or placed in a separate cell in the Temporary Soil Storage Site to ensure it is isolated from stockpiled clean material and is clearly identifiable. Impacted soil may only be re-used in areas that will be advised by the qualified person with local authority standards. The Contractor shall maintain a log to document the final disposition of impacted soil re-used on-site, if any.
			CW-4.21	<ul style="list-style-type: none"> ■ If impacted soil is encountered that the qualified person, notify the Ministry immediately and then consider a potential long-term source to groundwater contamination, then these impacted soils may not be re-used in the Study Area in their current state. In the event impacted soil is found below the water table, the Contractor should contact the Ministry first for potential remedial actions. This soil should be either: <ul style="list-style-type: none"> – Placed in a separate cell in the Temporary Soil Storage Site, and – Placed directly into a lined roll-off container.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			CW-4.22	<ul style="list-style-type: none"> In the event that off-site disposal is required, with prior approval from the qualified person, Project Leader and the Ministry, the Contractor shall dispose of soil not suitable for re-use according to proper disposal requirements, taking into Management of Excess Soil- A Guide for Best Management Practices (Ministry of the Environment, Conservation and Parks, 2014) and Ontario Regulation 406/19, including the Soil Rules.
			CW-4.23	<ul style="list-style-type: none"> It is important that transportation of excess soil is carefully considered prior to the commencement of the project. Transportation of Dangerous Goods, General Waste Management, and other environmental regulations apply to the off-site transportation and disposal of waste materials.
			CW-4.24	<ul style="list-style-type: none"> Contaminated soil not suitable for re-use within the project area shall be managed and disposed of in accordance with all applicable laws, industry standards and best management practices, which may include but are not limited to: <ul style="list-style-type: none"> The Environmental Protection Act Ontario Regulation 406/19, as amended Ontario Provincial Standard Specification PROV 180 General Specification for the Management of Excess Materials, and Management of Excess Soil A Guide for Best Management Practices (Ministry of Environment, Conservation and Parks, Updated: April 4, 2019, Published: April 5, 2016, as updated).
			CW-4.25	<ul style="list-style-type: none"> The Contractor will ensure that all shipments comply with applicable regulatory requirements, including Ontario Regulation 406/19, and all necessary documentation is provided to the Ministry in a timely manner.
			CW-4.26	<ul style="list-style-type: none"> Only approved disposal facilities for impacted soil (either non-hazardous or hazardous) will be permitted for use.
			CW-4.27	<ul style="list-style-type: none"> Acceptance criteria must be met, including but not limited to provision of adequate soil quality data for bulk chemical analysis and Schedule 4 leachate criteria. The origin and volume of impacted material being transferred to a disposal site and its final destination shall be tracked.
			CW-4.28	<ul style="list-style-type: none"> The Contractor shall arrange for and pay for any additional testing required by the receiver site as a condition of acceptance of the material. The Contractor shall submit to the Ministry a copy of the forms provided under Ontario Provincial Standard Specification PROV. 180, signed by the receiver site
			CW-4.29	<ul style="list-style-type: none"> Mitigation measures will be developed in consultation with the Qualified Person to mitigate the mobilization and transport of potential residual agricultural contaminants within the Study Area towards waterbodies during all phases of the project, including measures to allow time for increased die-off of pathogenic organisms and volatilization of agricultural contaminants prior to soil disturbance and removal of nutrient compounds through plant harvesting.
			CW-4.30	<ul style="list-style-type: none"> Prior to disposing of a subject waste (i.e., liquid industrial waste and hazardous waste, including hazardous soil), the contractor shall ensure that the subject waste be properly classified as per Regulation 347 and registered in the Ministry of the Environment, Conservation and Parks Resource Productivity and Recovery Authority’s Hazardous Waste Program Registry, and a valid waste subject waste generator registration number is obtained. The generator shall ensure that waste manifests are completed correctly for each subject waste transferred and all waste transfers are properly identified and tracked through the Resource Productivity and Recovery Authority’s Hazardous Waste Program Registry.
			CW-4.31	<ul style="list-style-type: none"> A waste tracking system governing all hazardous waste transfers in accordance with the federal Transportation of Dangerous Goods Regulation and provincial regulations should be implemented by the Contractor.
			CW-4.32	<ul style="list-style-type: none"> Soil/fill materials imported to the Study Area, including quantity, quality and the source of the imported materials, should also be tracked and documented during the construction activities in accordance with Ontario Regulation 406/19.
			CW-4.33	<ul style="list-style-type: none"> For the purpose of any record-keeping mentioned in this document, it is recommended that records be retained for a minimum of seven years after the completion of all excess soil management activities or the removal of all excess soil from a Temporary Soil Storage Site, as required by Ontario Regulation 406/19.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			CW-4.34	<ul style="list-style-type: none"> ■ The Contractor will be responsible for tracking and managing the quality and quantity of material excavated from or imported to the site using existing information and new information, as needed. Tracking will include quantifying and documenting locations for the beneficial on-site re-use of excavated materials. Management will include: <ul style="list-style-type: none"> – Minimizing adverse effects to workers and sensitive receptors through Best Management Practices, worker health and safety provisions and ensuring that remedial/risk management options are considered during the construction planning process and appropriately incorporated into final designs – Minimizing soil disturbance and retaining vegetation, including wildlife trees, within and around the Study Area in accordance with the setbacks/buffers identified on applicable design drawings, and in other areas to the extent that it is technically feasible or unless required to meet engineering requirements for safe and facility operation. The construction vehicle traffic will be minimized on impacted soils – Manage soil in such a way as to prevent any adverse effects associated with receiving, processing, storage and movement of soil with respect to noise, dust, mud, tracking, leaching, runoff, erosion, outdoor air quality and odour. Monitoring will be completed in accordance with the Contractor's Air Quality Best Management Practices. Plan to reduce the potential generation of dust (specifically PM10) and other fugitive air emissions during construction, including daily visual observations and on-site dust monitoring to inform the implementation of mitigation measures – Handle and store soil during construction in a manner that protects soil quality for re-use. In the event that impacted soils are encountered during construction, the Contractor, qualified person, with approval from the Ministry, shall determine the suitability of reusing the soil before reusing it. The Contractor shall (with Project Leader and the QP's permission) dispose of any soil not suitable for re-use according to proper screening and disposal requirements, taking into account Excess Soil - a Guide for Best Management Practices (Ministry of the Environment, Conservation and Parks, 2014) and Ontario Regulation 406/19, including the Soil Rules, and – Encouraging re-use of soil where appropriate, balancing cut and fill, minimizing grading, and minimizing the need to transport additional soil to the Study Area where possible.
CW-5.00	<ul style="list-style-type: none"> ■ Based on the age and materials used for buildings on properties and two culverts within the Study Area, there is potential for designated substances to be present. Should buildings be identified for demolition by the Ministry, a Designated Substance Survey (DSS) should be completed to ensure proper handling and disposal of materials. 	<ul style="list-style-type: none"> ■ Ministry of the Environment, Conservation and Parks ■ Ministry of Transportation ■ Town of Bradford West Gwillimbury ■ East Gwillimbury ■ King Township ■ County of Simcoe, and ■ York Region . 	CW-5.01	<ul style="list-style-type: none"> ■ The asphalt levelling course on roadways that are crossed may contain asbestos and prior to construction, asphalt core samples should be collected and tested for asbestos. If asbestos containing materials are found, an asbestos abatement plan should be implemented according to the Ministry standard special provision 101 F21 Occupational Health and Safety Compliance – List of Designated Substances that is included in the Ministry construction tender documents in accordance with the Occupational Health and Safety Act of the presence of designated substances.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
Climate Change				
CC-1.00	<ul style="list-style-type: none">■ Construction Conditions:■ Reduction of natural agricultural land, Embodied carbon management,■ Paving techniques,■ Traffic management, Structural work, and Emissions from diesel/gasoline powered vehicles	<ul style="list-style-type: none">■ Ministry of Transportation, and■ Ministry of the Environment, Conservation and Parks.	CC-1.01	<ul style="list-style-type: none">■ Limiting the requirement of naturalized land to only that which is required to construct the project, including that which is required to appropriately stage construction. Re-naturalizing (e.g. re-sodding, vegetation, and shrub and tree planting, etc.) of staging areas immediately following construction phase end.
			CC-1.02	<ul style="list-style-type: none">■ Sourcing sustainably manufactured materials (i.e., low-carbon concrete) and using recycled materials as opposed to energy-intensive materials such as concrete and asphalt (if feasible).
			CC-1.03	<ul style="list-style-type: none">■ Avoiding the excessive transportation of materials by choosing local/regional materials, as well as materials sources or processed on site.
			CC-1.04	<ul style="list-style-type: none">■ Properly maintaining vehicles and other internal combustion engines used on site (pumps, generators, etc.) to ensure engines are operating as designed with optimal emissions. Minimizing on-site vehicle idling during construction activities and implementing a vehicle maximum idling policy while on site.
			CC-1.05	<ul style="list-style-type: none">■ Use of reclaimed materials in the roadway - aggregate for use in new hot mix asphalt and road base, subbase or shoulders.
			CC-1.06	<ul style="list-style-type: none">■ Use of prefabricated Bridge Elements to improve the efficiency and duration of construction is an option open to the Contractor.
			CC-1.07	<ul style="list-style-type: none">■ Extended life-cycle materials (ASTM 1010 or Corrosion Resistant Steel) to minimize rehabilitation requirements.
			CC-1.08	<ul style="list-style-type: none">■ Precast concrete pavement and rapid set concrete for concrete repairs to minimize congestion.
			CC-1.09	<ul style="list-style-type: none">■ Minimizing double handling of materials and the associated trucks required for hauling is typically desired by contractors to reduce costs, this also has the benefit of reducing fuel requirements and emissions.
			CC-1.10	<ul style="list-style-type: none">■ Retained soil system walls or mechanically stabilized earth rather than concrete retaining walls.
			CC-1.11	<ul style="list-style-type: none">■ LED Traffic Signal Heads, LED Lighting and Variable Message Signs at the signalized intersections along the Bradford Bypass (10th Sideroad, Yonge Street, 2nd Concession, and Leslie Street).
CC-2.00	<ul style="list-style-type: none">■ Operating Conditions:■ Electrical systems design and Intelligent Transportation System	<ul style="list-style-type: none">■ Ministry of Transportation, and■ Ministry of the Environment, Conservation and Parks.	CC-2.01	<ul style="list-style-type: none">■ Implementation of High Occupancy Vehicle lanes on the Bradford Bypass to promote the use of carpooling and avoidance of single-occupant vehicles.
CC-3.00	<ul style="list-style-type: none">■ Maintenance Conditions:■ Emissions from landfilling of any project organic materials, incineration of project materials, or recycling/reuse of project materials may result in temporary increase in associated greenhouse gas releases.	<ul style="list-style-type: none">■ Ministry of Transportation, and■ Ministry of the Environment, Conservation and Parks.	CC-3.01	<ul style="list-style-type: none">■ Three commuter parking lots are being proposed for 10th Sideroad, 2nd Concession, and Yonge Street interchanges to support carpooling uptake and High Occupancy Vehicle lane use.
			CC-3.02	<ul style="list-style-type: none">■ Employing a plan for carbon neutral modes of material disposal and/or recycling programs where possible and feasible.
			CC-3.03	<ul style="list-style-type: none">■ Encouraging reuse of available material for future projects to reduce future material production emissions (e.g., recycling of concrete components into new concrete construction).
Human Health				
HH-1.00	<ul style="list-style-type: none">■ Impacts to human health	<ul style="list-style-type: none">■ Ministry of Transportation.	HH-1.01	<ul style="list-style-type: none">■ Refer to Air Quality (AQ-1.00 and AQ-2.00) and Climate Change (CC-1.00, CC-2.00 and CC-3.00).

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
Snowdrift				
SNOW-1.00	■ Drifting snow on highway from wind drive events causing winter road hazard	■ Ministry of Transportation.	SNOW-1.01	■ Snow mitigation treatment recommended for this area should be living fences of shrubs, trees or a mixture ■ Living fence should consist of coniferous shrub/hedges with 50%-60% porosity, a minimum 2 metres height and a minimum set back of 12 metres from the edge of shoulder for all locations identified in the maps. It is possible to also use deciduous species intermixed with a 50% porosity in winter periods. Depending on soil conditions and salt tolerance, examples could be Nannyberry and Hornbeam plants, and ■ Alternatively, a single row of trees can be used as mitigation treatments but should be placed 19 metres from the edge of the shoulder and comply with the Ministry regulation for sight lines. Conifer species are recommended for snowdrifting mitigation; however, deciduous planting can be applied if the 50%-60% porosity is achieved during the winter.
			SNOW-1.02	■ Monitoring and road maintenance are required for checking the effective of the treatment, and ■ Living fences should be adjusted accordingly in terms of die-off, extending location and checking porosity/height.
SNOW-2.00	■ Living fences will mitigate a portion of snow drifting, other measures can be implemented to provide improve driver awareness	■ Ministry of Transportation.	SNOW-2.01	■ Implement dynamic messaging boards for winter hazard conditions
			SNOW-2.02	■ Using sensor technology that includes meteorological, pavement and snow particle sensors for snow drifting measurements for warning of changing condition during snowstorms and wind dive events.
			SNOW-2.03	■ Implement high resolution Numerical Weather Prediction data from Environment and Climate Change Canada and National Oceanic Atmosphere Administration to provide forecasted wind, temperature, and precipitation conditions for snowdrift prediction.
			SNOW-2.04	■ At strategic locations on the highway route, place signs of the potential risk of snowdrifting to provide further driver awareness of potential adverse conditions.
			SNOW-2.05	■ Placing road delineation poles in snowdrift areas for providing increased visibility of pavement edges in snowdrift locations.
			SNOW-2.06	■ Implement variable speed signage as a “recommend” or “advisory” based on weather and road conditions.
Landscaping				
LAND-1.00	■ Disturbance of vegetative communities (woodlands, wetlands, & meadow / thickets)	■ Ministry of Transportation ■ Town of Bradford West Gwillimbury ■ County of Simcoe ■ Township of King ■ Town of East Gwillimbury ■ Lake Simcoe Region Conservation Authority ■ Nottawasaga Valley Conservation Authority, and ■ Indigenous Communities.	LAND-1.01	■ A Landscape Restoration Plan shall be prepared for disturbed areas that fall within the proposed Ministry right-of-way that builds upon the Preliminary Landscape Composition Design Plan along with consultation with concerned Regulatory Agencies to establish appropriate plant species, seed mixtures, and planting densities.
			LAND-1.02	■ Detailed review of plantings observed on site shall be undertaken during Detail Design in order to prepare suggested plant lists for restoration areas.
			LAND-1.03	■ Vegetative communities are to be restored utilising native species, planting densities, and native seed mixture reflective of the vegetative communities observed on site prior to disturbance.
			LAND-1.04	■ Edge management plantings will be a combination of deciduous and coniferous trees along the existing forests with large and low growing shrub species towards the roadway forming a buffer from wind and salt spray.
			LAND-1.05	■ Wetland Restoration areas adjacent to both branches of the Holland River, propose vegetation to populate areas under the bridge crossings.
			LAND-1.06	■ Planting density for Meadow/Thicket Restoration areas to be comparatively lower than the Woodland and Wetland Restoration areas.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
LAND-2.00	<ul style="list-style-type: none"> Impact on animal and watercourse crossing 	<ul style="list-style-type: none"> Ministry of Transportation Town of Bradford West Gwillimbury County of Simcoe Township of King Town of East Gwillimbury Lake Simcoe Region Conservation Authority, and Nottawasaga Valley Conservation Authority. 	LAND-2.01	<ul style="list-style-type: none"> A Landscape Restoration Plan shall be prepared for disturbed animal and watercourse crossing that fall within the proposed Ministry right-of-way that builds upon the Preliminary Landscape Composition Design Plan along with consultation with Conservation Authorities to provide appropriate vegetative coverage for wildlife at proposed culvert openings and along both branches of the Holland River.
			LAND-2.02	<ul style="list-style-type: none"> Some proposed culverts are assumed to be sized to allow movement of small amphibians/reptiles or small mammals and will receive either a Drainage Culvert Treatment or Watercourse Treatment, depending on if the culvert will facilitate an impacted watercourse crossing.
			LAND-2.03	<ul style="list-style-type: none"> As noted for Wetland Restoration areas, proposed plantings in these areas will extend under the bridges to provide vegetated cover for wildlife.
			LAND-2.04	<ul style="list-style-type: none"> Additional wildlife crossing currently noted to connect the impacted deer wintering area between 2nd Concession Road and Leslie Street. Further consultation is required between the future Landscaping and other design disciplines to determine appropriate crossing solution, and Additionally, opportunity areas exist at the Holland River and Holland River East Branch for wildlife passages. Details are to be confirmed during future Detail Design for the size, opening, plantings etc. Details shall be reviewed in conjunction with the Terrestrial, Fisheries, Fluvial, Drainage, Structural, and Highway reports and design.
LAND-3.00	<ul style="list-style-type: none"> Visual impacts on adjacent existing land developments 	<ul style="list-style-type: none"> Ministry of Transportation Town of Bradford West Gwillimbury County of Simcoe Property Owners Township of King, and Town of East Gwillimbury. 	LAND-3.01	<ul style="list-style-type: none"> A Landscape Screening Plan shall be prepared to address visual impacts on adjacent existing developments for residential, educational, institutional, strategic employment, and recreational land uses.
			LAND-3.02	<ul style="list-style-type: none"> Landscape screenings shall consist of large growing deciduous and coniferous trees, and a range of large and low growing shrubs to form a dense barrier
			LAND-3.03	<ul style="list-style-type: none"> Landscape vegetation screening to mitigate potential air quality impacts shall be considered during the future Detail Design stage.
LAND-4.00	<ul style="list-style-type: none"> Wind and snow drift impacts on commuters 	<ul style="list-style-type: none"> Ministry of Transportation. 	LAND-4.01	<ul style="list-style-type: none"> A Landscape Screening Plan shall be prepared to address wind & snowdrift impacts in locations noted in the Snowdrift Analysis Report (4DM, 2023). Details are to be confirmed during Detail Design.
			LAND-4.02	<ul style="list-style-type: none"> Landscape screenings to consist of a minimum double row of deciduous shrubs ranging from 2-5 metres mature heights, with coniferous trees, where appropriate and feasible. Deciduous trees may be added for aesthetic enhancement.
			LAND-4.03	<ul style="list-style-type: none"> Plantings shall be set back minimum of 19 metres from edge of paving beyond the Ministry clear zone requirements, where feasible. At this setback distance plantings with mature heights of greater than 5 metres are permitted Where a 19 metres setback cannot be maintained, a 12 metres setback is proposed while limiting mature plant heights to 5 metres Where the right-of-way narrows and a 12 metres setback cannot be maintained, a 2 metre wide or single staggered row of 2 metre tall shrubs is recommended immediately adjacent to the right-of-way limit For instances of snowdrift mitigation being required within the Hydro One. corridors, Hydro One approved shrubs shall be used, and Details are to be confirmed during the subsequent Detail Design phase.
			LAND-4.04	<ul style="list-style-type: none"> Consider the introduction of large growing tree species during future Detail Design which may result in further setback distances. Refinement of wind and snowdrift landscape screening needed are to be confirmed during future Detail Design once maximum setbacks have been established.
LAND-5.00	<ul style="list-style-type: none"> Community Aesthetics 	<ul style="list-style-type: none"> Ministry of Transportation Town of Bradford West Gwillimbury County of Simcoe Property Owners Township of King, and Town of East Gwillimbury. 	LAND-5.01	<ul style="list-style-type: none"> A Landscape Interchange Plan shall be prepared to propose Enhanced Interchange Plantings to create landmarks along the highway. Planting opportunities subdivided into High and Low Plantings.
			LAND-5.02	<ul style="list-style-type: none"> High plantings will consist of large deciduous and coniferous trees and large shrubs to act as a background.
			LAND-5.03	<ul style="list-style-type: none"> Low plantings will consist of low shrubs and native flowering seed mixtures to act as a foreground.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
LAND-6.00	■ Disturbed ground cover adjacent to roadway paving	■ Ministry of Transportation ■ Lake Simcoe Region Conservation Authority, and ■ Nottawasaga Valley Conservation Authority.	LAND-6.01	■ Areas of disturbance outside of paved surfaces up to the nearest drainage ditch will be seeded with appropriate roadside seed mixtures that consists of native and salt tolerant species.
			LAND-6.02	■ Remaining disturbed areas will be seeded with native species mixtures that reflects adjacent existing vegetative community.
LAND-7.00	■ Disturbance of vegetation within existing/relocated stormwater management facilities	■ Ministry of Transportation ■ Town of Bradford West Gwillimbury ■ County of Simcoe ■ Township of King ■ Town of East Gwillimbury ■ Lake Simcoe Region Conservation Authority, and ■ Nottawasaga Valley Conservation Authority.	LAND-7.01	■ Landscaping plans for both proposed and existing/relocated Stormwater Management facilities shall be prepared during Detail Design to propose a combination of deciduous and coniferous trees, deciduous shrubs, grasses, and seed mixtures that range in soil moisture level preferences.
			LAND-7.02	■ Conservation Authorities and other concerned Regulatory Agencies will be engaged during future Detail Design stages to establish recommended plant lists and planting densities.
Archaeology				
ARC-1.00	■ Potential impact to an archeology resource, as identified in the Stage 2 Archaeological Assessment	■ Ministry of Transportation, and ■ Ministry of Citizenship and Multiculturalism.	ARC-1.01	■ The East Holland River site (BaGv-42) required Stage 3 Archaeological Assessment. This assessment has been completed in keeping with Section 3.3.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). AECOM’s results in the southern portion of the site confirm some previous findings from assessments in the central and northern portions of the site indicating it is a complex multi-component site consisting of 1,000 year old Indigenous artifacts and some 19th century Euro-Canadian artifacts. Therefore, the southern portion of the site must be subject to Stage 4 excavation as it will be impacted by construction. AECOM makes the following recommendations: – Stage 4 Archaeological Assessment excavation plans will be submitted to the Ministry of Citizenship and Multiculturalism and Indigenous communities prior to the Stage 4 excavation being conducted. – The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Citizenship and Multiculturalism’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).
			ARC-1.02	■ The Bradford Hill site (BaGv-112) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with <i>Section 3.3.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists</i> (Ontario Government 2011). The results indicate that this site represents a large Late Woodland village. The Ministry has indicated that the site will be avoided through highway realignment. Should there be refinements to the alignment in subsequent phases of the project, the Bradford Hill Site (BaGv-112) will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. Therefore, AECOM makes the following recommendations: – During the course of construction activities adjacent to the site, appropriate steps must be taken to protect the site from incidental impacts and/or disturbance. The following measures are recommended as per Section 4.1.1 of the Standards and Guidelines (Ministry of Citizenship and Multiculturalism, 2011): ○ Erect a temporary barrier to obtain a 20-metre buffer around the site area, plus an additional 50-metre monitoring buffer as per Ministry of Citizenship and Multiculturalism requirements. ○ Issue “no go” instructions to all on-site construction crews, engineers, architects or others involved in day-to-day decisions during construction.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
				<ul style="list-style-type: none"> ○ Show the location of the area to be avoided on all contract drawings, when applicable ○ During soil disturbing activities within the 50-metre monitoring buffer, a licensed consultant archaeologist will inspect and monitor the area to be avoided to verify the effectiveness of the avoidance strategy. If alteration of the archaeological site is observed at any time during construction the archaeologist will have the authority to stop work, inspect the area affected and take any required mitigative action. In such circumstances the Ministry of Citizenship and Multiculturalism will be notified. ○ After construction and other soil disturbing activities, the licensed consultant archaeologist must inspect and report to the ministry on the effectiveness of the avoidance strategy in ensuring that the area to be avoided remains intact. ○ Written confirmation from the proponent outlining their commitment to the avoidance and protection strategy will also be provided. ○ Engaged or interested Indigenous communities must be involved in the monitoring process. <ul style="list-style-type: none"> – If the Bradford Hill site (BaGv-112) cannot be avoided by future construction activities associated with the Bradford Bypass project, it must be subject to Stage 4 mitigation. The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Citizenship and Multiculturalism’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).
			ARC-1.03	<ul style="list-style-type: none"> ■ The Wheatfield site (BaGv-113) required Stage 3 Archaeological Assessment. The assessment was completed in keeping with Section 3.2.1 and 3. 2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). The results indicate that this site represents a small, short-termed occupation in the Late Woodland Period (ca. 900 A.D. – 1650 A.D.) and will therefore require Stage 4 excavation as it will be impacted by construction. Therefore, AECOM makes the following recommendations: <ul style="list-style-type: none"> – The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Multiculturalism and Citizenship’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – The Stage 4 excavation should be centred around the positive Stage 3 unit of 500N 300E, which was excavated overtop of the location of the first body sherd. Excavation is to continue until counts drop below 10 and there are no diagnostic artifacts, in keeping with Table 4.1 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – The Study Area does not extend into the remaining parts of the property and lawn. Should development go beyond the present study area, additional Stage 2 assessment will be required. The Stage 2 assessment should consist of pedestrian survey in keeping with Section 2.1 of the Ministry of Multiculturalism and Citizenship’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).
			ARC-1.04	<ul style="list-style-type: none"> ■ The River Bend site (BaGv-114) required a Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3. 2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). AECOM’s results indicate it is a complex multi-component site consisting of several thousand-year-old Indigenous artifacts and some 19th century Euro-Canadian artifacts. Therefore, the site must be subject to Stage 4 excavation as it will be impacted by construction. Therefore, AECOM makes the following recommendations: <ul style="list-style-type: none"> – The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Citizenship and Multiculturalism’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – Stage 4 Archaeological Assessment excavation plans will be submitted to the Ministry of Citizenship and Multiculturalism and Indigenous communities prior to the Stage 4 excavation being conducted. – Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).

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			ARC-1.05	<p>■ The Bradford Ridge site (BaGv-115) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with <i>Section 3. 2.2.</i> and <i>Table 3.1 of the Standards and Guidelines for Consultant Archaeologists</i> (Ontario Government 2011). The results indicate that it is a small, multi-component Indigenous site that spans from 8,000 B.P. to 1550 A.D. that will require Stage 4 excavation as this site will be impacted by construction. Therefore, AECOM makes the following recommendations:</p> <ul style="list-style-type: none"> – The Stage 4 Archaeological Assessment should consist of hand excavation to recover all available archaeological data, in keeping with Section 4.2.2 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).
			ARC-1.06	<p>■ The Frazer Creek site (BaGv-116) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3. 2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). The results indicate that this site represents a small, short-termed occupation in the Late Woodland Period (ca. 1620 A.D. – 1650 A.D.). The Ministry has indicated that the site will be avoided through highway realignment. Should there be refinements to the alignment in subsequent phases of the project, the Frazer Creek Site (BaGv-116) will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. Given the proximity of the project and related construction activities, AECOM makes the following recommendations:</p> <ul style="list-style-type: none"> – During the course of construction activities adjacent to the site, appropriate steps must be taken to protect the site from incidental impacts and/or disturbance. The following measures are recommended as per Section 4.1.1 of the Standards and Guidelines (Ministry of Citizenship and Multiculturalism, 2011): <ul style="list-style-type: none"> ○ Erect a temporary barrier to maintain a 10-metre buffer around the site area, plus an additional 50-metre monitoring buffer as per Ministry of Citizenship and Multiculturalism requirements. ○ Issue “no go” instructions to all on-site construction crews, engineers, architects or others involved in day-to-day decisions during construction. ○ Show the location of the area to be avoided on all contract drawings, when applicable. ○ During soil disturbing activities within the 50-metre monitoring buffer, a licensed consultant archaeologist will inspect and monitor the area to be avoided to verify the effectiveness of the avoidance strategy. If alteration of the archaeological site is observed at any time during construction the archaeologist will have the authority to stop work, inspect the area affected and take any required mitigative action. In such circumstances the Ministry of Citizenship and Multiculturalism will be notified. ○ After construction and other soil disturbing activities, the licensed consultant archaeologist must inspect and report to the Ministry on the effectiveness of the avoidance strategy in ensuring that the area to be avoided remains intact. ○ Written confirmation from the proponent outlining their commitment to the avoidance and protection strategy will also be provided. – If the Frazer Creek Site (BaGv-116) cannot be avoided by future construction activities associated with the Bradford Bypass project, it must be subject to Stage 4 mitigation. Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ministry of Citizenship and Multiculturalism, 2011).
			ARC-1.07	<p>■ The Holland Forest West site (BaGv-117) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with <i>Section 3. 2.2.</i> and <i>Table 3.1 of the Standards and Guidelines for Consultant Archaeologists</i> (Ontario Government 2011). The results indicate that this site represents a small Late Woodland site. The Ministry has indicated that the site will be avoided through highway realignment. Should there be refinements to the alignment in subsequent phases of the project, the Holland Forest West Site (BaGv-117) will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. Given the proximity of the project and related construction activities, AECOM makes the following recommendations:</p> <ul style="list-style-type: none"> – During the course of construction activities adjacent to the site, appropriate steps must be taken to protect the site from incidental impacts and/or disturbance. The following measures are recommended as per Section 4.1.1 of the Standards and Guidelines (Ministry of Citizenship and Multiculturalism, 2011):

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
				<ul style="list-style-type: none"> ○ Erect a temporary barrier to obtain a 10-metre buffer around the site area, plus an additional 50-metre monitoring buffer as per Ministry of Citizenship and Multiculturalism requirements. ○ Issue “no go” instructions to all on-site construction crews, engineers, architects or others involved in day-to-day decisions during construction. ○ Show the location of the area to be avoided on all contract drawings, when applicable ○ During soil disturbing activities within the 50-metre monitoring buffer, a licensed consultant archaeologist will inspect and monitor the area to be avoided to verify the effectiveness of the avoidance strategy. If alteration of the archaeological site is observed at any time during construction the archaeologist will have the authority to stop work, inspect the area affected and take any required mitigative action. In such circumstances the Ministry of Citizenship and Multiculturalism will be notified. ○ After construction and other soil disturbing activities, the licensed consultant archaeologist must inspect and report to the ministry on the effectiveness of the avoidance strategy in ensuring that the area to be avoided remains intact. ○ Written confirmation from the proponent outlining their commitment to the avoidance and protection strategy will also be provided. <p>– If the Holland Forest West Site (BaGv-117) cannot be avoided by future construction activities associated with the Bradford Bypass project, it must be subject to Stage 4 mitigation. The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Citizenship and Multiculturalism’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).</p>
			ARC-1.08	<p>■ The Holland Forest East site (BaGv-148) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3. 2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). The results indicate that this site represents a small, short-termed occupation in the Late Woodland Period (ca. 900 A.D. – 1650 A.D.) and will therefore require Stage 4 excavation as it will be impacted by construction. Therefore, AECOM makes the following recommendations:</p> <ul style="list-style-type: none"> – The Stage 4 excavation should be centred around the Stage 3 unit of 500N:215E:5, which was excavated overtop of the location of the first body sherd. Excavation is to continue until counts drop below 10 and there are no diagnostic artifacts, in keeping with Table 4.1 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). Block excavations must extend 2 metres (i.e., two excavation units) beyond any cultural features, regardless of artifact yield as per Section 4.2.2, Standard 7c..
			ARC-1.09	<p>■ The Goodwin site (BaGv-151) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (MCM 2021). Since the Stage 2 pedestrian survey was completed to Stage 3 Controlled Surface Pick-up standards, Stage 3 Controlled Surface Pick-up is not required prior to commencing hand excavations. The assessment recovered pre-Contact artifacts attributed to a short-term Indigenous campsite during the Late Archaic period (4,500-3,500 B.P.), though the distribution of the material indicated that this component of the site was too ephemeral for Stage 4 mitigation. The results indicate that the site is a mid-nineteenth to early twentieth century Euro-Canadian homestead. Therefore, the following is recommended:</p> <ul style="list-style-type: none"> – In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government, 2011), the Goodwin Site (BaGv-151) does not contain further cultural heritage value or interest and does not require Stage 4 archaeological assessment. The site does not warrant further archaeological mitigation and should be considered cleared of further archaeological concerns.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			ARC-1.10	<p>■ The Doan site (BaGu-215) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with <i>Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists</i> (Ontario Government 2011) and <i>Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014)</i>. The results indicate that the site is a mid to late 19th century Euro-Canadian homestead that will require Stage 4 excavation as it will be impacted by construction. The northern portion of the site will be impacted by the Bradford Bypass Project. Therefore, AECOM makes the following recommendations:</p> <ul style="list-style-type: none"> – AECOM recommends that the northern portion of the Doan site that is within the proposed construction area be subject to Stage 4 archaeological mitigation by a licenced consultant archaeologist as per <i>Section 4.1.6 Alternative strategies for special conditions: Partial long-term avoidance and protection of the Standards and Guidelines</i>. Prior the Stage 4 AA the limits of the proposed construction must be surveyed and staked in so they are visible for the archaeology field crew. The Stage 4 assessment should consist of the mechanical topsoil removal (MTR) of topsoil by a gradall with a smooth-edged bucket in the northern portion of the site within the proposed construction area as well as a 5m buffer to the south of the proposed construction area. If cultural features are present, their locations will be recorded in relation to the site grid and they will be cleaned by shovel shining or trowel and excavated by hand, as per <i>Section 4.2.2 Standard 7 of the Standards and Guidelines</i>. – During the course of construction activities adjacent to the southern portion of the site, appropriate steps must be taken to protect the site from incidental impacts and/or disturbance. The following measures are recommended as per Section 4.1.1 of the Standards and Guidelines (Ministry of Citizenship and Multiculturalism, 2011): <ul style="list-style-type: none"> ○ Erect a temporary barrier along the edge of the area to be avoided. ○ Issue “no go” instructions to all on-site construction crews, engineers, architects or others involved in day-to-day decisions during construction. ○ Show the location of the area to be avoided on all contract drawings, when applicable. ○ During soil disturbing activities within the 50-metre monitoring buffer, a licensed consultant archaeologist will inspect and monitor the area to be avoided to verify the effectiveness of the avoidance strategy. If alteration of the archaeological site is observed at any time during construction the archaeologist will have the authority to stop work, inspect the area affected and take any required mitigative action. In such circumstances the Ministry of Citizenship and Multiculturalism will be notified. ○ After construction and other soil disturbing activities, the licensed consultant archaeologist must inspect and report to the ministry on the effectiveness of the avoidance strategy in ensuring that the area to be avoided remains intact. ○ Written confirmation from the proponent outlining their commitment to the avoidance and protection strategy will also be provided. – If the southern portion of the Doan site (BaGu-215) cannot be avoided by future construction activities, it must be subject to Stage 4 mitigation. The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Citizenship and Multiculturalism’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).
			ARC-1.11	<p>■ The Holborn site (BaGu-218) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011), preliminary results indicate that the Holborn Site (BaGu-218) does not contain further cultural heritage value and interest and does not require Stage 4 archaeological assessment. The site should be considered cleared of further archaeological concerns.</p>

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			ARC-1.12	<ul style="list-style-type: none"> ■ The Hollingshead I site (BaGu-219) requires Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (Ministry of Citizenship and Multiculturalism,2021). Since the Stage 2 pedestrian survey was completed to Stage 3 Controlled Surface Pick-up standards, Stage 3 Controlled Surface Pick-up is not required prior to commencing hand excavations. The results indicate that the site is a mid to late 19th century Euro-Canadian homestead. ■ In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government, 2011), the Hollingshead 1 Site (BaGu-219) does not contain further cultural heritage value or interest and does not require Stage 4 archaeological assessment. The site does not warrant further archaeological mitigation and should be considered cleared of further archaeological concerns.
			ARC-1.13	<ul style="list-style-type: none"> ■ The Hollingshead II site (Bagu-220) required Stage 3 Archaeological Assessment. The assessment was completed in keeping with <i>Section 3.2.1 and 3. 2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists</i> (Ontario Government 2011) and <i>Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014)</i>. Since the Stage 2 pedestrian survey was completed to Stage 3 Controlled Surface Pick-up standards, Stage 3 Controlled Surface Pick-up is not required prior to commencing hand excavations. The results indicate that the site is a mid to late 19th century Euro-Canadian homestead. ■ In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government, 2011), the Hollingshead 2 Site (BaGu-220) does not contain further cultural heritage value or interest and does not require Stage 4 archaeological assessment. The site does not warrant further archaeological mitigation and should be considered cleared of further archaeological concerns.
			ARC-1.14	<ul style="list-style-type: none"> ■ The Stage 4 assessment of William Robinson Jr. Site (BaGv-83) has been completed in keeping with Section 4.2.3 of the <i>Standards and Guidelines for Consultant Archaeologists</i> (Ontario Government 2011). The results indicated that a large portion of the site had been previously disturbed by the construction of the nearby residence and the construction of County Road 4. The portion of the site excavated revealed a mid to late 19th century Euro-Canadian site. No further work in this area is recommended.
			ARC-1.15	<ul style="list-style-type: none"> ■ Frazer Creek II Site (BaGv-152) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011), the Frazer Creek II Site (BaGv-152) does not contain further cultural heritage value and interest and does not require Stage 4 archaeological assessment. The site should be considered cleared of further archaeological concerns.
			ACR-1.16	<ul style="list-style-type: none"> ■ William Robinson Jr II Site (BaGv-150) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011) and Section 3 of the Draft Technical Bulletin for Consultant Archaeologist: The Archaeology of Rural Historical Farmsteads (2014). The Ministry has indicated that the site will be avoided through highway realignment. Should there be refinements to the alignment in subsequent phases of the project, the William Robinson Jr. II Site (BaGu-218) will require Stage 4 mitigation through Avoidance and Protection or full/partial excavation if it cannot be avoided. Therefore, AECOM makes the following recommendations: <ul style="list-style-type: none"> – If the William Robinson Jr II site (BaGv-150) cannot be avoided by future construction activities associated with the Bradford Bypass project, it must be subject to Stage 4 mitigation. The Stage 4 assessment should consist of hand excavation methodology as outlined in Sections 4.2 of the Ministry of Citizenship and Multiculturalism’s Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). – Should cultural features be identified, they must be fully documented and excavated as per Section 4.2.2 Standard 7 in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			ARC1.17	■ Panville Site (BaGv-153) required Stage 3 Archaeological Assessment. This assessment was completed in keeping with Section 3.2.2. and Table 3.1 of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011). In accordance with Section 3.4, Standard 1e of the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011), the Panville Site (BaGv-153) does not contain further cultural heritage value and interest and does not require Stage 4 archaeological assessment. The site should be considered cleared of further archaeological concerns.
			ARC-1.18	■ It is understood that there will be impacts to the riverbeds of both branches of the Holland River with the construction of bridge footings. Therefore, AECOM recommends that a marine archaeological assessment be undertaken by a licenced archaeologist for the river branches themselves as well as the low-lying wetlands immediately adjacent to the river branches within the study corridor.
			ARC-1.19	■ Additional commitments and recommended mitigation measures will be outlined in future Stage 2 (and, if required Stage 3 and 4 reports) for lands where access to complete archaeological assessment was not provided. Additional commitments and recommended mitigation measures will be outlined in future Stage 4 reports for sites requiring Stage 4 assessment. The commitments and recommended mitigation measures are subject to Ministry of Citizenship and Multiculturalism review and approval and are to be complied with for the project.
			ARC-1.20	■ Areas identified as cemeteries will not be directly impacted, however Stage 2 Archaeological Assessment must be completed immediately adjacent to the current cemetery boundaries. The Stage 2 Archaeological Assessment was completed around the Rogers Sunderland Cemetery and no archaeological resources were found. A Stage 3 Archaeological Assessment must be conducted immediately adjacent to the cemetery boundaries to ensure no historic graves are present in these areas.
Built Heritage and Cultural Heritage Resources				
BHCH-1.00	■ Potential impact to cultural heritage resources listed in Section 5.3.2.2.	■ Ministry of Transportation, and ■ Ministry of Citizenship and Multiculturalism.	BHCH-1.01	■ Further Assessment Required: Properties identified with known or potential cultural heritage value or interest require further research and evaluation to clearly determine their Cultural Heritage Value or Interest if determined that they may be adversely impacted by the Updated Technically Preferred Route. In most cases, this will require the completion of a Cultural Heritage Evaluation Report. ■ Refer to Section 5.3.2 to view the list of properties which have been identified during this Preliminary Design study as requiring a Cultural Heritage Evaluation Report.
			BHCH-1.02	■ Heritage Impact Assessment: For properties that are determined by the Ministry to meet the criteria in Ontario Regulation 9/06 or Ontario Regulation 10/06 of the Ontario Heritage Act and that may be adversely impacted by the Updated Technically Preferred Route, it is recommended that a Heritage Impact Assessment is prepared to fully assess impacts on the resource’s identified heritage attributes and propose alternatives and mitigation to conserve the property’s cultural heritage value or interest. Refer to Section 5.3.2 to view the list of properties which have been identified during this Preliminary Design study as requiring a Heritage Impact Assessment Report.
BHCH-2.00	■ Heritage commitments and recommended mitigation measures to be complied with	■ Ministry of Transportation, and ■ Ministry of Citizenship and Multiculturalism.	BHCH-2.01	■ Construction activities should be suitably planned and undertaken to avoid impacts to potential Built Heritage Resources and Cultural Heritage Landscapes (i.e., remain within the Ministry proposed right-of-way). Suitable mitigation measures are required to address these deficiencies during construction and may include establishing no-go zones adjacent to all the potential Built Heritage Resources and Cultural Heritage Landscapes identified and issuing instructions to construction crews in order to prevent impacts to existing structures.
			BHCH-2.02	■ To ensure all potential Built Heritage Resources and Cultural Heritage Landscapes identified in the Cultural Heritage Resource Assessment Report (AECOM, March 2023) within and adjacent to the final design are not adversely indirectly impacted by mechanical vibration during construction, a vibration assessment should be developed. Should this vibration assessment determine that the structure(s) or landscape features within the potential Built Heritage Resources and Cultural Heritage Landscapes be subject to adverse impacts due to vibration, a vibration monitoring plan is recommended to be prepared and mitigation measures implemented to lessen vibration impacts related to construction.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation/Protection/Monitoring
			BHCH-2.03	■ Minister’s Consent may be required if a potential Built Heritage Resources or Cultural Heritage Landscape meets Ontario Regulation 10/06 and is anticipated to be impacted by the Bradford Bypass. Minister’s Consent should be requested as the project progresses.
			BHCH-2.04	■ Should there be refinements to and/or expansion of the Bradford Bypass proposed Ministry right of way, a Qualified Person(s) ⁵ should assess if there are any changes in impacts and/or mitigation recommendations to the potential Built Heritage Resources and Cultural Heritage Landscapes identified as part of the field review process for the Cultural Heritage Resource Assessment Report update or to the potential Built Heritage Resources and Cultural Heritage Landscapes identified within the 2020 desktop Cultural Heritage Resource Assessment Report (i.e., those currently outside of the Bradford Bypass right of way but within the Route Planning Study Area, 2019-2020). Identify if mitigation is required (i.e., such as additional heritage studies).
			BHCH-2.05	■ Should there be changes to the Technically Preferred Route and/or potential impacts as assessed in the Cultural Heritage Resource Assessment Report, a Qualified Person(s) should review and provide recommendations.

5. For the purposes of the S&Gs, a qualified person may be anyone who individually or working in a team provides advisory or other services for cultural heritage resources – a professional engineer, an architect, a licensed archaeologist, a historian, landscape architect, a specialist in historic preservation, conservator, heritage planner, etc.

6. Permits and Approvals

In accordance with Section 20(2)11 of Ontario Regulation 697/21, this section describes the municipal, provincial, federal and other approvals or permits that may be required for the project.

The Ministry has undertaken a wide range of environmental discipline studies including field investigations, as related to natural, socio-economic, cultural, and technical disciplines. All studies have been undertaken in accordance with current legislative requirements, standards and best practices, including the Ministry Environmental Guides and the Environmental Reference for Highway Design (Ministry of Transportation, 2013). These studies assessed the project-specific environmental impacts associated with each discipline, identified mitigation measures and document future commitments as required. The permits and approvals presented in **Table 6-1** are considered applicable to the project and were presented as part of the federal review of the project under the Impact Assessment Act in 2021. This list will be updated as the project progresses in subsequent Detail Design phases of the project.

Table 6-1: Summary of Potential Permits, Licences, Approval or Authorizations Requirements for the Project

Discipline	Legislation	Governing Authority	When Permit, License, Approval or Authorization is to be sought	Anticipated Permits and Approvals
Terrestrial Ecosystems	Species at Risk Act	Environment and Climate Change Canada	Detail Design	<ul style="list-style-type: none"> Not anticipated as the mitigation measures provided to protect Migratory Birds Convention Act-protected birds are sufficient to avoid harm/mortality and destruction of residences (nests) of Migratory Birds Convention Act-protected Species at Risk bird species.
Terrestrial Ecosystems	Migratory Birds Convention Act, 1994	Environment and Climate Change Canada	Detail Design	<ul style="list-style-type: none"> Permitting under the Migratory Birds Convention Act will be required if a nest of a bird listed under Schedule 1 of the Act is identified within the proposed project footprint. Additional Studies to be Completed during Detail Design: <ul style="list-style-type: none"> Both Green Heron and Pileated Woodpecker, birds listed under Schedule 1 of the Migratory Birds Convention Act, were identified within the Study Area during field investigations. Targeted sweeps/surveys for nests and suitable nesting sites will be required during Detail Design and/or prior to vegetation removal to determine potential permitting requirements.
Terrestrial Ecosystems	Endangered Species Act Permit/Approval	Ministry of the Environment, Conservation and Parks	Detail Design	<ul style="list-style-type: none"> Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required if Chimney Swifts are found to be nesting in any affected structures Consultation with Ministry of the Environment, Conservation and Parks and/or Authorization under the Endangered Species Act will be required for Least Bittern if confirmed using the candidate habitat present in the Holland River Marsh PSW and impacts to suitable habitat within 500 metres of breeding activity cannot be avoided (Ministry of the Environment, Conservation and Parks, 2016) Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for bat Species at Risk if confirmed using treed habitats and impacts to habitats or Species at Risk individuals cannot be avoided Consultation with Ministry of the Environment, Conservation and Parks and/or Authorization under the Endangered Species Act for Bobolink and Eastern Meadowlark will be required if impacts to confirmed habitats or Species at Risk individuals cannot be avoided Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for Eastern Whip-poor-will if confirmed and impacts to protected habitat outlined in the species General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013) or Species at Risk individuals cannot be avoided Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act may be required if ground disturbance occurs within 25 metres or removal of pure or archivable butternuts is required Authorization requirements for black ash under the Endangered Species Act are currently unknown and will be dependent on how the Ministry of the Environment, Conservation and Parks chooses to protect the species once the temporary suspension of statutory protections has ended in January 2024, and Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for Blanding’s Turtle if confirmed and impacts to protected habitat outlined in the species General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013b) or Species at Risk individuals cannot be avoided. Additional Studies to be Completed during Detail Design: <ul style="list-style-type: none"> Searches for Migratory Birds Convention Act-protected bird or Species at Risk bird nests in suitable structures (i.e. buildings) prior to construction Targeted marsh breeding bird call back surveys following approved Ministry of the Environment, Conservation and Parks protocols shall be undertaken in areas where impacts are proposed in candidate habitat. Should Least Bittern be confirmed, habitat should be mapped in accordance with the Recovery Strategy for the Least Bittern (Ministry of the Environment, Conservation and Parks, 2016) Species-specific surveys following the Ministry of the Environment, Conservation and Parks’ Species at Risk Bats Survey Note (2022) and Maternity Roost Surveys (Forest and Woodlands) (2022) shall be undertaken in areas where tree removal is proposed in suitable bat Species at Risk habitat

Discipline	Legislation	Governing Authority	When Permit, License, Approval or Authorization is to be sought	Anticipated Permits and Approvals
				<ul style="list-style-type: none"> ■ Due to the number of agricultural fields intersected by the proposed right-of-way, targeted Species at Risk surveys to determine the presence/absence of grassland Species at Risk bird habitat (Bobolink and Eastern Meadowlark) shall be completed during Detail Design. Consultation with Ministry of the Environment, Conservation and Parks and/or authorization under the Endangered Species Act will be required for Bobolink or Eastern Meadowlark if confirmed using the candidate habitats and impacts to protected habitat outlined in the species General Habitat Description (Ministry of the Environment, Conservation and Parks, 2021 and 2021) or Species at Risk individuals cannot be avoided ■ Crepuscular bird surveys following approved Ministry of the Environment, Conservation and Parks protocols shall be undertaken in areas where impacts are proposed in candidate habitats. Should Eastern Whip-poor-will be confirmed habitat should be mapped in accordance to the General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013) ■ Detailed plant inventory within the Construction Disturbance Area will be required to confirm no additional butternuts or other Species at Risk plants are affected by the proposed works ■ A Butternut Health Assessment may be required if works are located within 25 metres of a pure butternut ■ Detailed plant inventory within the Construction Disturbance Area may be required to confirm the number of black ash that will be impacted by the proposed works, and ■ Turtle overwintering and nesting surveys following approved Ministry of the Environment, Conservation and Parks protocols shall be undertaken in areas where impacts are proposed in candidate habitat. If Blanding's Turtle habitat use is confirmed the habitat should be mapped in accordance with the General Habitat Description (Ministry of the Environment, Conservation and Parks, 2013).
Terrestrial Ecosystems	Planning Act, 1990 and Provincial Policy Statement, 2020	Ontario Ministry of Municipal Affairs and Housing	Detail Design	<ul style="list-style-type: none"> ■ There are no permits to be obtained under the Provincial Policy Statement, and development of infrastructure such as transportation corridors and facilities are allowed in and adjacent to natural heritage feature (e.g., Provincially Significant Wetlands) provided that consideration is given to these natural heritage features. Additional Studies to be Completed during Detail Design: <ul style="list-style-type: none"> ■ Wetland boundary delineation where encroachment into wetlands is anticipated is recommended. ■ Wetland compensation should be considered to offset potential impacts to the wetlands.
Terrestrial Ecosystems	Greenbelt Act, 2005 and the Greenbelt Plan, 2017	Ontario Ministry of Municipal Affairs and Housing	Detail Design	<ul style="list-style-type: none"> ■ There are no permits to be obtained under the Greenbelt Act, and development of infrastructure such as transportation corridors and facilities are permitted in and adjacent to natural heritage feature (e.g., Provincially Significant Wetlands).
Terrestrial Ecosystems	Municipal Tree Protection and Forest Conservation Bylaws	County of Simcoe, York Region, Township of King	Detail Design	<ul style="list-style-type: none"> ■ Tree removals completed outside of the proposed right-of-way (i.e. areas of Temporary Limited Interest) may be subjected to applicable municipal tree protection or forest conservation by-laws and permitting process depending on the nature of the proposed disturbance. Additional Studies to be Completed during Detail Design: <ul style="list-style-type: none"> ■ Where tree removals are required to accommodate the proposed design outside of Ministry owned lands (i.e. areas of Temporary Limited Interest) a tree inventory should be completed in Detail Design by a certified arborist to determine the number and species of trees that will be removed. The inventory will inform potential restoration works and/or potential permitting requirements under applicable municipal bylaws.
Fish and Fish Habitat	Fisheries Act Authorization	Fisheries and Oceans Canada	Detail Design	<ul style="list-style-type: none"> ■ Where appropriate, environmental approvals will be sought under the Fisheries Act. Additional Studies to be Completed during Detail Design: <ul style="list-style-type: none"> ■ As the fish and fish habitat assessment was completed for the Preliminary Design, consultation and review of the works by Fisheries and Oceans Canada – Fish and Fish Habitat Protection Program will be required to confirm the approval requirements under the Fisheries Act.
Fish and Fish Habitat	Species at Risk Act	Environment and Climate Change Canada	Detail Design	<ul style="list-style-type: none"> ■ No records of aquatic Species at Risk that are afforded protection under the Species at Risk Act are known to occur in the Study Area.
Fish and Fish Habitat	Endangered Species Act	Ministry of the Environment, Conservation and Parks	Detail Design	<ul style="list-style-type: none"> ■ There are historical records of Aquatic Species at Risk in the Holland River and Holland River East Branch. ■ Permits under Endangered Species Act may be required for the proposed works in the Holland River and Holland River East Branch. Consultation with Ministry of the Environment Conservation and Parks should start early in the Detail Design phase to confirm Endangered Species Act permitting requirements.

Discipline	Legislation	Governing Authority	When Permit, License, Approval or Authorization is to be sought	Anticipated Permits and Approvals
Groundwater Water Well Survey and Hydrogeology	Permit to Take Water	Ministry of the Environment, Conservation and Parks	Detail Design	■ Where expected construction dewatering volumes that exceed 400,000 L/day, a Permit to Take Water (Category 3) will be required from Ministry of the Environment, Conservation and Parks in accordance with Section 34 of the Ontario Water Resources Act (RSO, 1990). Permits are to be sought during the subsequent Detail Design phase.
Groundwater and Hydrogeology	Environmental Activity and Sector Registry for construction dewatering	Ministry of the Environment, Conservation and Parks	Detail Design	■ Where construction dewatering volumes between 50,000 and 400,000 L/day are expected, filing of the project on Ministry of the Environment, Conservation and Parks Environmental Activity and Sector Registry system is required in accordance with Ontario Regulation 63/16 (as amended).
Noise and Vibration	N/A	N/A	N/A	■ As per the Ministry Guide, Municipal noise bylaws do not apply to provincial transportation projects including the Ministry, its agencies or its agents (i.e. contractors) and as such, the Ministry is not required to obtain noise exemption bylaw permits. Although noise exemption bylaw permits are not required, the Ministry will maintain clear and frequent communication with the applicable municipalities, address local concerns on a project-by-project basis, strive to work within the spirit of the municipal noise bylaw, and apply best practices to reduce noise impacts to the community during construction.
Contamination, Waste and Excess Materials Management	Environmental Protection Act, R.S.O. 1990, c. E.	Ministry of the Environment, Conservation and Parks	Detail Design	■ Management of Excess Soil – A Guide for Best Management Practices (January 2014) Ministry of the Environment, Conservation and Parks ■ Management of Excess Materials in Road Construction and Maintenance (1994), Ministry of the Environment and Energy ■ On-Site and Excess Soil Management, R.R.O. 1990, Ontario Regulation 406/19 ■ Rules for Soil Management and Excess Soil Quality Standards (The Soil Rules) ■ General – Waste Management, R.R.O. 1990, Reg. 347 ■ Valid operating licenses and permits for each proposed disposal/receiving facility prior to commencing transportation of materials from the site ■ Valid operating licenses, certifications and permits from each carrier for all proposed transport vehicles/containers prior to entry to the site, and ■ Supporting information, payment of associated fees, and implementing and managing document control procedures and protocols for the appropriate disposal of waste materials generated as part of construction-based activities.
Contamination, Waste and Excess Materials Management	On-site and Excess Soil Management	Receiving Landfill	Detail Design	■ Licensed landfill sites can implement their own requirements beyond those outlined in this Report or Ontario Regulation 406/19 in order to accept excess soil that is designated as waste. These requirements are developed on a landfill-by-landfill basis. As such, supplemental sampling beyond what is outlined in the Excess Soil Management Plan (e.g., additional leachate analysis), may be required to dispose of excess soil that is designated as waste.
Archaeology	Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).	Ministry of Citizenship and Multiculturalism	Preliminary Design and/or Detail Design	■ Ministry of Citizenship and Multiculturalism concurrence of all Archaeological Assessments
Cultural Heritage	Ministry of Citizenship and Multiculturalism Concurrence of the Cultural Heritage Resource Assessment Report, Cultural Heritage Evaluation Reports, Heritage Impact Assessments, and Minister’s Consent.	Ministry of Citizenship and Multiculturalism	Preliminary Design and/or Detail Design	■ Minister’s Consent may be required if a potential Built Heritage Resource or Cultural Heritage Landscape is anticipated to be impacted by the Bradford Bypass and meets Ontario Regulation 10/06.

Discipline	Legislation	Governing Authority	When Permit, License, Approval or Authorization is to be sought	Anticipated Permits and Approvals
Highway Engineering	Application for Approval for Schedule Waterway under Canadian Navigable Waters Act	Transport Canada Navigation Protection Program	Detail Design	<div><div></div>An application for approval to the Navigation Protection Program is to be sought and obtained in subsequent Detail Design phases of the project, and</div> <div><div></div>Refer to Section 5.2.10 for further details on the Canadian Navigable Waters Act applicability to the project.</div>
Highway Engineering	Contract document	Township of King, Town of East Gwillimbury, Town of Bradford West Gwillimbury, York Region, Simcoe County	Detail Design	<div><div></div>Road Occupancy Permit/Road Closure Permits</div>
Highway Engineering	Contract document	Ministry of Transportation and landowner	Detail Design	<div><div></div>Permission to Enter and Construct agreement, Permanent or Temporary Limited Interest agreement</div>
Highway Engineering	Contract document	Ministry of Transportation	Detail Design	<div><div></div>Encroachment Permits</div>

7. Consultation Process

In accordance with Section 20(1)(12) of the Regulation, this section of the Draft Environmental Impact Assessment Report summarizes the consultation plan and consultation efforts undertaken to date for the project since 2020. A Record of Consultation is provided in **Appendix C** of this Report and includes detailed correspondence records, feedback, and comments received up to March 31, 2023.

7.1 Overview of Consultation and Engagement Process

Consultation and engagement are an integral part of the study process and are essential to the successful completion of a project. Consultation for the project is required under the Regulation. Consultation must be inclusive and timely in its approach to make sure stakeholders are engaged and actively participating in the project.

Consultation and engagement provides an opportunity for two-way communication between the Project Team and interested persons. Consultation activities provide a forum to identify potentially significant environmental issues early in the decision-making process and gives them appropriate consideration.

To facilitate a comprehensive consultation program for this project, the Project Team implemented the following engagement and consultation activities to reach Indigenous communities, public stakeholders, municipalities, and government agencies and provide them the opportunity to submit comments and feedback for consideration by the Project Team:

- Project Website (www.bradfordbypass.ca)
- Project Telephone Line (1-877-247-6036)
- Project Contact List
- Emails via the Project Team email address (ProjectTeam@bradfordbypass.ca)
- Mailings/notifications (via physical mail or email)
- Newspaper advertisements
- Distributions of brochure notifications (copy of the Ontario Government Notice) through Canada Post Neighbourhood Mail to residences and businesses within 500 metres of the entire Bradford Bypass Study Area (approximately 13,500 notices at the time of Study Commencement in September 2020)

- Public Information Centre #1 (held virtually in April and May 2021 as a result of government restrictions)
- Preliminary Design Interchange Consultation Event (held virtually between April and May 2022)
- Draft Environmental Conditions Report (Public and consultation period between August 12, 2022 and September 16, 2022)
- Public Information Centre #2 (held virtually in November 2022)
- Outreach regarding engagement and consultation with Indigenous communities, further outlined in **Section 7.4**
- Meetings and correspondence with municipalities, and
- Correspondence with technical stakeholders, local community groups and property owners.

As a result of the public health measures linked to COVID-19 in 2020, 2021 and 2022 that restricted large in-person gatherings, the Project Team has held consultation events (e.g., meetings with technical stakeholders and a Public Information Centre) virtually by leveraging various platforms (i.e., Microsoft Teams/Zoom/the Project Website). Virtual consultation events often include extended opportunities to view materials online, comment periods to provide feedback to the Project Team and opportunities to request one-on-one meetings with the Project Team. Virtual events provide flexibility for those wishing to attend who may have conflicts or restrictions that limit their ability to attend an event in person (e.g., childcare needs, work requirements, transportation, etc.). Within the virtual platform there is an opportunity to also address accessibility needs as they arise.

7.1.1 Record of Consultation

The Project Team maintained a Record of Consultation related to the project through the finalization of this Draft Environmental Impact Assessment Report. The Record of Consultation includes the following:

- Notification materials distributed throughout the project
- Project Contact List
- Presentation materials
- Project Website materials
- Public Information Centre materials and Summary Reports, and
- Record of Consultation and correspondence with external agencies (including provincial ministries and agencies, federal departments and local conservation authorities), municipalities, Indigenous communities and members of the public.

The Record of Consultation is provided in **Appendix C** of this Report. All comments received from the public have been redacted to protect personal information in accordance with the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, c. F.31.

7.2 Project Notices and Letters

Table 7-1 provides an overview of the notices and letters that were prepared and distributed as part of the project. Copies of all notices and letters are provided in **Appendix C** of this Report.

Table 7-1: Summary of Project Notices and Letters

Notice	Date of Notice	Number of Notices Distributed	Distribution Method
Permission to Enter Package	August 28, 2020	55	<ul style="list-style-type: none"> Letters sent to impacted property owners on Project Contact List via email, FedEx Tracked Mail Delivery and Canada Post Mail Delivery.
Notice of Study Commencement	September 24, 2020	13,500	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on the Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Notice of Public Information Centre #1	April 13, 2021	12,459	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on the Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Ontario Regulation 697/21 Letters – Project Update	October 27, 2021	N/A	<ul style="list-style-type: none"> Letters sent to municipalities located within the Study Area via email and mail.
Notice of Publication of Draft Early Works Report	January 7, 2022	9,887	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic) Letters sent to those on the Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Notice of Publication of Final Early Works Report	March 21, 2022	9,887	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic) Letters sent to those on the Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Notice of Consultation: Preliminary Design Interchange Considerations	April 14, 2022	10,246	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on the Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Notice of Publication of Draft Environmental Conditions Report	July 28, 2022	10,246	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Revised Notice of Publication of Draft Environmental Conditions Report	August 12, 2022	10,246	<ul style="list-style-type: none"> Letters sent via email to those on Project Contact List on August 12, 2022, followed by letters sent via Canada Post, including Canada Post Neighbourhood Admail Delivery.
Notice of Publication of Final Environmental Conditions Report	October 27, 2022	13,015	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Notice of Public Information Centre #2	November 10, 2022	13,015	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery.
Property Owner Notification	October 31, 2022 – November 15, 2022	92	<ul style="list-style-type: none"> Letters sent to impacted property owners on Project Contact List via email, FedEx Tracked Mail Delivery and Canada Post Mail Delivery.
Permission to Enter Package	December 23, 2022 – January 27, 2023	88	<ul style="list-style-type: none"> Letters sent to impacted property owners on Project Contact List via email, FedEx Tracked Mail Delivery and Canada Post Mail Delivery.
Navigation Letters	January 24, 2023	40	<ul style="list-style-type: none"> Letters sent to stakeholders who have provided information who have expressed concern for the Holland River and/or Holland River East Branch.
Ontario Regulation 697/21 Letters – Draft Stormwater Management Plan	March 22, 2023	18,487	<ul style="list-style-type: none"> Contact list per the Regulation, and Refer to Section 7.5.3 for further detail on the agency review of the Stormwater Management Plan.
Ontario Regulation 697/21 Letters – Draft Groundwater Protection and Well Monitoring Plan	March 24, 2023	22	<ul style="list-style-type: none"> Contact list per the Regulation, and Refer to Section 7.5.3 for further detail on the agency review of the Groundwater Protection and Well Monitoring Plan.
Ontario Regulation 697/21 Letters – Draft Noise Report Impact Assessment Report	-	-	<ul style="list-style-type: none"> Contact list per the Regulation, and Refer to Section 7.5.3 for further detail on the agency review of the and Noise Report.
Notice of Draft Environmental Impact Assessment Report	May 25, 2023	11,469	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery
Notice of Updated Draft Environmental Impact Assessment Report	July 6, 2023	11,477	<ul style="list-style-type: none"> Newspaper ads (Bradford West Gwillimbury Topic and East Gwillimbury Express) Letters sent to those on Project Contact List via email and mail, and Canada Post Neighbourhood Admail Delivery

7.2.1 Permission to Enter

As part of the preparatory works in advance of the Preliminary Design study for this project, Permission to Enter was sought for properties where field investigations were deemed required. Properties were identified and contact information for the property owners was gathered through a combination of data collected from property ownership and land registry databases by the Ministry. Through a search of property fabric information and available contact details, the identified property owners were contacted by the Project Team to seek Permission to Enter in order to gain access to undertake project specific site investigations. The following contact methods were utilized as required to solicit Permission to Enter from property owners, in order of precedence:

- Emails were sent to property owners using email addresses identified by the Ministry
- A Permission to Enter Package, which includes a Permission to Enter Notice, Permission to Enter Form, and Property Fact Sheet, were sent to property owners using mailing addresses identified by Ministry
- Phone calls were made using telephone numbers identified by Ministry
- Internet searches (e.g., Google, Canada Post, Canada411.com) were undertaken to find missing contact information (mailing addresses, email addresses, telephone numbers) and above listed contact methods were also utilized with the new information
- Municipalities were consulted to obtain revised/updated contact information (e.g., mailing addresses, email addresses, telephone numbers) and above listed contact methods were utilized with the new information
- Hand-delivered Permission to Enter Packages were distributed by Project Team members in accordance with government restrictions and relevant health and safety plans to properties with physical structures who had not responded to previous contact attempts, and
- Public Transportation and Highway Improvement Act Section 6 Letters were distributed, where necessary.

A copy of the permission to enter form is provided in **Appendix C** of this Report.

7.2.2 Project Update Letters

The Ministry provided a letter to all municipalities in the Study Area on October 27, 2021 with information on the implementation of the Regulation. The letters provided an overview of the Regulation along with the Early Works assessment process.

A copy of the project update letter is provided in **Appendix C** of this Report.

7.2.3 Property Owner Notification and Meetings

The Ministry distributed Property Owner Notification letters to all property owners within the Study Area, between October 31, 2022 to November 15, 2022. These letters informed property owners that their property may be impacted by the project. A Property Fact Sheet was included along with the letter to provide property owners with further information regarding the Ministry's property acquisition process.

The Project Team offered property owners an opportunity to meet with the Project Team, including the Ministry's Property Section representative(s), to discuss the anticipated impacts to their property, allow property owners to ask any questions they may have about the project, and to explain the Ministry's property acquisition process.

A Property Owner Meeting was also held on February 23, 2023 with residents to discuss concerns with property within the vicinity of the proposed 10th Sideroad interchange.

7.2.4 Navigation Communication and Letters

At the outset of the project, a Notice of Commencement Letter was prepared and circulated to stakeholders in September 2020 which included information regarding navigability. Additionally, a comment form asking navigation focused questions was posted on the Project Website "Contact Us" page to solicit feedback from stakeholders regarding navigable waterways and usage within the Study Area. In an effort to further understand navigability of waterways within the project limits, the Ministry distributed a Navigation Letter on January 24, 2023 to Indigenous communities and stakeholders that previously indicated that they use watercraft on the Holland River and Holland River East Branch. The letter requested that Indigenous communities and stakeholders provide their historical or current usage of the affected watercourses within the Study Area, including information about the types and sizes of vessels.

The information collected was used for the development of the Preliminary Design, as well as the *Canadian Navigable Water Act* project review and assessment of navigational impacts for the Bradford Bypass.

7.3 Consultation Plans

7.3.1 Bradford Bypass Consultation Plan

A Consultation Plan (AECOM, 2021) was developed to document the communication strategies and details for the project, including the consultation methods,

communication objectives, feedback, and documentation mechanisms. The Consultation Plan enlightens stakeholders about the project and informs the Project Team about stakeholder interests and concerns so they can be resolved in a timely manner.

The Consultation Plan was developed based on the following objectives:

- Review of 2002 Approved Environmental Assessment for prescribed consultation requirements
- Notify stakeholders (Indigenous communities, public and external Regulatory Agencies, etc.) of the intention to carry out the project
- Consult with directly affected stakeholders
- Provide timely opportunities for stakeholder input
- Constructively address input during the project
- Show how input received has been considered for the project
- Use appropriate notification methods to reach the range of stakeholders, and
- Use all reasonable efforts to resolve questions and concerns that may arise.

This process will result in a project that is transparent, open, traceable, timely, accountable and respectful.

7.3.2 Indigenous Consultation Plan

The project has the potential to impact Aboriginal rights such as the rights to hunt, fish, trap and gather. Per Section 15 of the Regulation, an Indigenous Consultation Plan (Ministry of Transportation, 2022) was developed by the Project Team to provide a framework for how the Ministry intends to consult and engage with Indigenous communities on the project, regarding communities' general interests and concerns. Anticipated potential impacts of the project continue to be discussed with the communities and assessed and accommodated/mitigated as appropriate.

The Ministry will continue to provide information and engage with Indigenous communities regarding potential impacts to their rights through the following activities:

- Written communications to Chief and Council and Consultation Departments
- Providing draft environmental and archaeological assessment reports for review and input
- Meetings with Consultation Departments, Community Environmental Committees, etc. (as requested)

- Information sessions in communities (as requested)
- Focus group meetings with sectors of communities (hunters, youth, elders), (as requested)
- Project Website updates
- Discussing mitigation/accommodation measures that could be used to address adverse impacts of the project on Aboriginal and treaty rights (e.g., staging bridge work to avoid fish spawning seasons)
- Reporting back to communities on how their concerns have been addressed/reflected in the project, and
- Hiring Community Field Liaisons from communities for archaeological field work.

7.4 Indigenous Engagement and Consultation

As part of the overall project, Indigenous engagement and consultation was undertaken to assist in the planning and determination of existing environmental conditions related to the project today compared to those previously identified as part of the 2002 Approved Environmental Assessment study for the Bradford Bypass.

7.4.1 Engagement and Consultation with Indigenous Communities

The Ministry remains committed to fulfilling its legal Duty to Consult requirements and will continue to engage and consult with Indigenous communities and consider their interests in the Preliminary Design of this project, as well as future project stages. The Ministry prepared an Indigenous Consultation Plan in accordance with the Regulation and circulated the plan to Indigenous communities and the Ministry of Environmental, Conservation, and Parks. The Indigenous Consultation Plan was provided to Indigenous communities that have or may have existing Aboriginal or treaty rights, as recognized and affirmed in Section 35 of the Constitution Act, 1982, that may be impacted by the project, and Indigenous communities that may otherwise be interested in the project.

The following speaks to the Ministry's understanding of obligations and commitments to satisfy the Duty to Consult.

Section 35(1) of the Constitution Act, 1982 provides that, "The existing Aboriginal and treaty rights of the Aboriginal peoples of Canada are hereby recognized and affirmed." Over the years, the common law has developed as court decisions have determined how governments are to give meaning to the protection of Section 35 rights.

The Ministry is committed to fulfilling its Duty to Consult requirements with Indigenous communities regarding Section 35 rights by the following:

- Meaningfully consulting with First Nations and Métis communities about adverse impacts of the Ministry initiatives on their Aboriginal and treaty rights (fulfilling the Duty to Consult)
- Accommodating, where appropriate, the adverse impacts on Aboriginal and treaty rights, and
- Consideration and discussions between the Ministry and Indigenous communities for project participation through meetings, information sharing and involvement in field investigations.

Throughout this study, engagement and consultation with various communities has included:

- Access to general information and consultation through the Project Website (<https://www.bradfordbypass.ca/>)
- Access to general communication through Project Telephone Line (1-877-247-6036)
- Inclusion on the Project Contact List to receive regular project updates and to ensure that the correct individuals may be consulted by the Project Team
- Receive email communications and contact the Project Team through a dedicated project email address (ProjectTeam@bradfordbypass.ca)
- Receive project specific mailings and notifications (via physical mail or email)
- Newspaper advertisements, and where appropriate, notifications will be provided in Indigenous community newspapers
- Indigenous community information sessions, and/or advance information sharing for Indigenous communities at the Public Information Centre (held virtually), and
- Meetings and correspondence with Chiefs and Councils, or their delegates (see **Section 7.4.1.1**).

The Project Team has engaged with the following Indigenous communities:

- Alderville First Nation
- Beausoleil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Rama First Nation
- Curve Lake First Nation

- Hiawatha First Nation
- Mississaugas of Scugog Island First Nation
- Kawartha Nishnawbe First Nation
- Georgian Bay Métis Council, and
- Huron-Wendat Nation (regarding archaeological resources only).

Initial outreach commenced in 2020, per the list above. Consultation activities related to the project continue to be ongoing.

7.4.1.1 Meetings with Indigenous Communities

Letters requesting to meet with Indigenous community representatives were prepared by the Project Team and distributed to all communities on November 29, 2021 to discuss project updates for the overall Bradford Bypass and County Road 4 Early Works.

Information has been distributed to all Indigenous communities and to date meetings have been held with communities based on the level of interest expressed and availability. Information packages were sent to Indigenous communities that were unable to attend a meeting, ensuring the information sharing process is thorough and transparent. Engagement and consultation with Indigenous communities will continue during and after the publication of this Draft Environmental Impact Assessment Report, including throughout the lifecycle of the project.

Due to the COVID-19 pandemic, all project meetings were held virtually. **Table 7-2** outlines the meetings that were held with Indigenous communities throughout the study process.

7.4.1.2 Field Liaison During Archaeological Assessments

The Project Team is committed to working closely with Indigenous communities when carrying out archaeological assessments for the project. Community Field Liaisons from communities listed in **Section 7.4.1**, that have expressed an interest in participating as a Community Field Liaison were invited to participate in the archaeological assessments. Curve Lake First Nation and Huron-Wendat Nation expressed interest in participating and have been involved in Stage 2 archaeological assessments thus far. Additionally, both Curve Lake First Nation and Huron-Wendat Nation will be involved in future Stage 3 or 4 assessments if it is determined that the sites relate to Indigenous heritage on a site-by-site basis. Chippewas of Georgina Island First Nation and Chippewas of Rama First Nation have also requested to be kept apprised throughout the archaeology works and are sent updates as the assessments progress. In the future, any other Indigenous community listed in **Section 7.4.1** that expresses an interest in participating or receiving updates will be included in the archaeological assessment field liaison process, either through participation or the sharing of information.

Table 7-2: Summary of Meetings with Indigenous Communities

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
December 2, 2020	<ul style="list-style-type: none"> Huron-Wendat Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, the Study Area, environmental components of the project, specifically relating to archaeological investigations, and discussed any questions or concerns expressed by the community, and Attendees from Huron-Wendat First Nation expressed interest in the consultation process, the Ministry's policy review process and Archaeological Assessments underway for the project. 	<ul style="list-style-type: none"> Huron-Wendat Nation requested to be respected and notified about Stage 2 and Stage 3 Archaeological Assessments, and Huron-Wendat Nation requested a meeting with the Ministry regarding the Ministry's policy review process. 	<ul style="list-style-type: none"> The Project Team will keep Huron-Wendat Nation informed about ongoing archaeological assessments, and The Project Team welcomes the opportunity to discuss the Huron-Wendat Nation's interest and feedback, regarding the policy review process.
July 15, 2021	<ul style="list-style-type: none"> Curve Lake First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided a project update and discussed any questions or concerns expressed by the community. 	<ul style="list-style-type: none"> Curve Lake First Nation requested that the Ministry continue with the Class Environmental Assessment process and noted they would like to understand the purpose of the Regulation, and Curve Lake First Nation requested to be involved in field investigations, in particular investigations at the Holland River crossings. 	<ul style="list-style-type: none"> The Project Team noted that environmental studies will be proceeding regardless of which regulation is followed, and The Project Team will keep Curve Lake First Nation informed about ongoing archaeological assessments and create a working group with Williams Treaties First Nations.
September 23, 2021	<ul style="list-style-type: none"> Williams Treaties First Nations Chippewas of Georgina Island First Nation Kawartha Nishnawbe First Nation Hiawatha First Nation Mississaugas of Scugog Island First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided a project update and discussed any questions or concerns expressed by the communities. 	<ul style="list-style-type: none"> Hiawatha First Nation requested for a meeting summary to be circulated to communities that were unable to attend, and Mississaugas of Scugog Island First Nation requested a list of specialist reports that are being prepared as part of the project. 	<ul style="list-style-type: none"> The Project Team circulated a meeting summary to all invitees and attendees, and The Project Team directed attendees to the Project Website for a list of specialist reports.
October 26, 2021	<ul style="list-style-type: none"> Huron-Wendat Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided a project update and discussed any questions or concerns expressed by the community. 	<ul style="list-style-type: none"> Attendees from Huron-Wendat Nation expressed their expectation to continue to be involved in the archaeological assessments throughout the Early Works and the Bradford Bypass studies. 	<ul style="list-style-type: none"> The Project Team committed to including Huron-Wendat Nation in the archaeological assessments on both the Early Works and the Bradford Bypass project
December 7, 2021	<ul style="list-style-type: none"> Mississaugas of Scugog Island First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided a project update and discussed any questions or concerns expressed by the community, and Attendees expressed interest in being actively involved in the project and to be kept apprised of all reports once available. 	<ul style="list-style-type: none"> Mississaugas of Scugog Island First Nation requested to be kept informed of all reporting in relation to the project. 	<ul style="list-style-type: none"> The Project Team will keep Mississaugas of Scugog Island First Nation informed about all reports for the project.
March 23, 2022	<ul style="list-style-type: none"> Huron-Wendat Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an update on the County Road 4 Early Works and the overall Bradford Bypass project. 	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> N/A
March 25, 2022	<ul style="list-style-type: none"> Chippewas of Rama First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an update on the County Road 4 Early Works and the overall Bradford Bypass project, and Attendees expressed an interest in being actively involved in the archaeological assessments throughout the Bradford Bypass studies. 	<ul style="list-style-type: none"> Chippewas of Rama First Nation requested a link to environmental studies and reports be provided Chippewas of Rama First Nation requested to be included on the weekly distribution list to keep the Chippewas of Rama First Nation updated with the latest project information, and Chippewas of Rama First Nation requested to be present for the Stage 3 Archaeological Assessment. 	<ul style="list-style-type: none"> The Project Team will keep Chippewas of Rama First Nation informed about all reports for the project The Project Team included the Chippewas of Rama First Nation on weekly project updates, and The Project Team will give advance notice to the Chippewas of Rama First Nation of when Stage 3 Archaeological Assessments will be undertaken.

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
March 30, 2022	<ul style="list-style-type: none"> Mississaugas of Scugog First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an update on the County Road 4 Early Works and the overall Bradford Bypass project, and Attendees from Mississaugas of Scugog First Nation expressed an interest in the Archaeological Assessments underway for the project and alignment refinement areas. 	<ul style="list-style-type: none"> Mississaugas of Scugog First Nation requested information on specific archaeological sites, and Mississaugas of Scugog First Nation requested to review all completed archaeology reports. 	<ul style="list-style-type: none"> The Project Team provided the requested information, and The Project Team distributed the archaeology reports.
April 27, 2022	<ul style="list-style-type: none"> Williams Treaties First Nations Co-ordinator, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an update on the County Road 4 Early Works and the overall Bradford Bypass project, and Attendees expressed an interest in being actively involved in archaeological assessments and requested to be informed of waste management, drainage, stormwater management assessments. 	<ul style="list-style-type: none"> Williams Treaties First Nations requested for meeting materials to be distributed Williams Treaties First Nations noted that contact information for Chippewas of Georgina Island First Nation had recently changed Williams Treaties First Nations requested for bimonthly consultation sessions with each of the seven Williams Treaties First Nations Williams Treaties First Nations requested a meeting with the Project Team archaeologists to get updated archaeological site information Williams Treaties First Nations requested contact information for the Ministry of the Environment, Conservation and Parks Williams Treaties First Nations requested materials from previous meetings Williams Treaties First Nations requested copies of all completed archaeological reports, and Williams Treaties First Nations Co-ordinator indicated an all Chiefs meeting was scheduled for May 2022 and would carry this information to the Chiefs, and report back to the Ministry on any feedback/ information requests. 	<ul style="list-style-type: none"> The Project Team distributed meeting materials and a meeting summary to all invitees and attendees The Project Team updated the contact information for Chippewas of Georgina Island First Nation The Project Team agreed and will reach out to Williams Treaties First Nations once more details are available following the writ period The Project Team agreed to set up a meeting to discuss archaeological sites The Project Team agreed to provide Ministry of the Environment, Conservation and Parks contact information The Project Team agreed to provide previous meeting materials and archaeological reports, and Williams Treaties First Nations Co-ordinator to follow-up with the Ministry on results on May 2022 all Chiefs briefing.
July 29, 2022	<ul style="list-style-type: none"> Curve Lake First Nation Hiawatha First Nation Mississaugas of Scugog Island First Nation Williams Treaties First Nations, and Ministry/Project Team 	<ul style="list-style-type: none"> Provided an update on the County Road 4 Early Works and the overall Bradford Bypass project, and Attendees expressed an interest in being involved with the impact assessments for the various environmental disciplines. 	<ul style="list-style-type: none"> Williams Treaties First Nations requested the Draft Environmental Conditions Report be provided to Indigenous communities in advance of the public Williams Treaties First Nations and Curve Lake First Nation requested to review impact assessment reports Curve Lake First Nation asked if the 2020 Fish and Fish Habitat Existing Conditions Report (AECOM, 2020) and 2020 Terrestrial Ecosystems Existing Conditions Report (AECOM, 2020) were a desk-top review only with no in-field sampling Williams Treaties First Nations requested all artifacts removed be repatriated to the Indigenous communities Williams Treaties First Nations stated they will provide the Project Team an Indigenous consultation plan highlighting details on how they wish to be consulted with, along with a draft workplan and budget, and Williams Treaties First Nations has requested a database to share and review reports for this project. 	<ul style="list-style-type: none"> The Project Team provided the Draft Environmental Conditions Report the morning of August 12, 2022 prior to going live to the public The Project Team confirmed environmental technical reports will be made available for review upon request by Indigenous communities, and the Ministry will arrange additional meetings to provide updates and details on the reports The Project Team confirmed that desktop reviews were completed during the 2020 environmental assessment, and field investigations took place during the Preliminary Design phase The Project Team explained that collection management is mandated by the Ministry of Tourism, Culture and Sport. There is an artifact collection transfer process which will be discussed at a later time The Project Team acknowledged the Indigenous Consultation Plan, and is awaiting Williams Treaties First Nations' submission, and The Project Team is looking into the request to provide the database.

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
August 23, 2022	<ul style="list-style-type: none"> Chippewas of Georgina Island First Nation Hiawatha First Nation Curve Lake First Nation Chippewas of Rama First Nation Williams Treaties First Nations, and Ministry/Project Team 	<ul style="list-style-type: none"> Provided an update on the County Road 4 Early Works and the overall Bradford Bypass project, and Summarized findings in the Draft Environmental Conditions Report. 	<ul style="list-style-type: none"> Curve Lake First Nation expressed concerns with a 30-day review period for the entire Bradford Bypass project Chippewas of Rama First Nation requested information on the archaeological findings of the East Holland River Site Chippewas of Georgina Island First Nation requested a copy of the 2002 Route Planning and Environmental Study Report Curve Lake First Nation identified the Northern Sunfish throughout the Holland River and Holland River East Branch Curve Lake First Nation requested Ecological Land Classification to be provided in an Excel table format Hiawatha First Nation asked what the colour-coordinated areas represented for the terrestrial mapping Chippewas of Georgina Island First Nation asked if the air quality assessment is limited to impacts during the construction phase Hiawatha First Nation asked if any Indigenous communities provided field liaisons, and Hiawatha First Nation requested a doodle poll be circulated for future meetings. 	<ul style="list-style-type: none"> The Project Team clarified the 30-day review period is strictly for the Draft Environmental Conditions Report, and Indigenous communities can submit their comments at any time throughout the Preliminary Design The Project Team confirmed the findings consisted of pre-contact pottery and historic Euro-Canadian materials The Project Team provided a copy of the 2002 Route Planning and Environmental Study Report The Project Team forwarded the information on the Northern Sunfish to the Fish and Fish Habitat specialists The Project Team to provide Ecological Land Classification data The Project Team confirmed the blue area represents potential Butternut, green represents potential Bat species at risk, and purple represents whip-poor-will The Project Team confirmed the air quality assessment will assess impacts during the construction phase, and air quality modelling is being completed to assess impacts following construction The Project Team confirmed that Huron-Wendat Nation, Curve Lake First Nation, and Chippewas of Georgina Island First Nation provided field liaisons, and The Project Team confirmed a doodle poll will be circulated with a list of dates for future meetings.
September 8, 2022	<ul style="list-style-type: none"> Huron Wendat Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an update on the Archaeological Assessment work conduct to date. 	<ul style="list-style-type: none"> Huron-Wendat Nation asked what Archaeological Assessments were conducted at the Holland Marsh Huron-Wendat Nation expressed they would like to have staff working on Stage 4 Archaeological Assessments sites Huron-Wendat Nation asked if any Huron-Wendat Nation ceramics have been found where Stage 4 work is required, and Huron-Wendat Nation asked if construction monitors will be included to help identify ossuaries. 	<ul style="list-style-type: none"> The Project Team explained that Stage 1 Archaeological Assessment was completed and Stage 2 will be completed when the Holland Marsh field conditions allow The Project Team stated the Ministry will follow up with contracting discussions, not project specific The Project Team stated once analysis is completed they will be able to confirm if ceramics found are from the Late Woodland period, and The Project Team explained that they have standard guidelines and policies for discovery of archaeological remains during construction. The Project Team stated if anything is found during construction, all work would stop immediately.
October 6, 2022	<ul style="list-style-type: none"> Chippewas of Georgina Island First Nation Rama First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an overview of the status of the Stage 2 Archaeological Assessments and showed the locations of the Stage 2 sites on a map. 	<ul style="list-style-type: none"> Chippewas of Georgina Island First Nation inquired about the Bradford Bypass alignment and the assessment process. 	<ul style="list-style-type: none"> The Project Team provided an overview of the Regulation and the process the project is following, and The Project Team noted that a Stage 1 Archaeological Assessment was completed and can be shared.

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
November 24, 2022	<ul style="list-style-type: none"> Georgian Bay Métis Council and Métis Nation of Ontario, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an overview of the updates made to the assessment process in regard to Indigenous rights, and Provided an overview of the study process, assessment process, project schedule and summarized the project consultation activities to date. 	<ul style="list-style-type: none"> Georgian Bay Métis Council asked if revisions have been made to the scope of the 2002 Approved Environmental Assessment to reflect changes of Indigenous rights from 2002 – 2022 Georgian Bay Métis Council asked if they are represented equally as other Indigenous communities Georgian Bay Métis Council asked for funding capacity to review the environmental reports as they have limited staff in their MNO Land and Resources Consultation Branch, and Georgian Bay Métis Council asked if ongoing assessments for Environmental Impact Assessment Report are prepared through desktop-studies or field-studies. 	<ul style="list-style-type: none"> The Project Team explained that the scope of consultation has changed since 2002 and the Georgian Bay Métis Council is included in the Project Contact List The Project Team confirmed that all Indigenous communities have representation The Project Team will set up a future meeting to discuss further The Project Team discussed the benefits of the projects, evaluation of alternatives, environmental conditions, activities, mitigation strategies, next steps for the environmental disciplines and presented the Updated Technically Preferred Route The Project Team noted that the ongoing assessments consists of a mixture of desktop-studies and fieldwork. The Final ECR was issued in October and more information can be found there, and The Project Team added that meetings can be arranged to answer any questions Georgian Bay Métis Council may have regarding the study methodology.
December 1, 2022	<ul style="list-style-type: none"> Chippewas of Georgina Island First Nation Chippewas of Rama First Nation Curve Lake First Nation Hiawatha First Nation Mississaugas of Scugog Island First Nation, and Ministry/Project Team. 	<ul style="list-style-type: none"> Provided an overview of the drainage plan, archaeological sites, impact to aquatic species, mitigative measures and each of the environmental disciplines. Post Public Information Centre #2 Milestone Meeting with Williams Treaty First Nations 	<ul style="list-style-type: none"> Chippewas of Georgina Island First Nation asked if the drainage plan considered the avoiding of archeological sites Curve Lake First Nation asked where footings for overpass and the bridge will go Curve Lake First Nation requested to change the wording on the Fish and Fish Habitat slide from ‘potential present’ to ‘confirmed’ for the American Eel. Also requested Northern Sunfish be added to the Existing Conditions list Chippewas of Georgina Island First Nation noted that traditional First Nations Lands are still used for ceremonies and should be reflected as such in the environmental studies. Hiawatha First Nation asked if there are any avoidance or protection plans implemented or scheduled for the Holland Forest West Site Hiawatha First Nation would like AECOM to prove more details on the ‘2 components’ mentioned previously Hiawatha First Nation requested AECOM to provide the reports once available for review Chippewas of Georgina Island First Nation asked if there will be fencing to protect the right-of-way and archaeological sites from the public Hiawatha First Nation requested to visit archaeology sites. Chippewas of Georgina Island First nation asked to be involved in the site visits 	<ul style="list-style-type: none"> The Project Team confirmed that the drainage plans avoid direct impact to the archaeological sites The Project team explained that technical river crossing and footing consideration includes input from a variety of engineering and environmental disciplines. The specific location of the footings and crossing will be subject to Detail Design through subsequent phases based on feedbacks on Public Information Centre #2 and comments received The Project Team offered to touch base with Chippewas of Georgina Island First Nation to ensure inclusion of appropriate information The Project Team summarized the archaeological assessments conducted and underway. Clarified that the Project Team is working to mitigate impacts to sites and using avoidance and protection approach. The Project Team confirmed the Holland Forest West Site would not be impacted. The Project Team stated that the highway has been realigned to avoid the majority of the East Holland River Site The Project Team stated that the two components mentioned, represents the 19th century pioneer artifacts and the early-late woodland ceramics discovered on the site, which all require Stage 3 archaeological assessment. The reports will be completed in 2023

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
			<ul style="list-style-type: none"> ■ Hiawatha First Nation requested a map of the preferred route which includes all arch sites within 50 metres of the Bradford Bypass and Study Area buffers. Hiawatha First Nation noted concern with the buffers after seeing the Holland Forest site impacts ■ Williams Treaties First Nations are preparing a Work Plan and budget, and ■ Curve Lake First Nation requested Ecological Land Classification data. Project Team to provide. 	<ul style="list-style-type: none"> ■ The Project Team stated that they do not have details regarding fencing at the Preliminary Design stage. There are Transport Canada guidelines that can be referred to for more information. The Ministry’s best practice is to prevent the right-of-way corridor from public access. Fencing is usually provided along the corridor. This will be taken into consideration in subsequent phases of the project ■ The Project Team outlined the project schedule, next steps, confirmed actions and status from previous meetings ■ The Project team confirmed to coordinate site visits with archaeologist or consultation staff from Hiawatha First Nation and Chippewas of Georgina Island First Nation ■ The Project Team confirmed to provide mapping of the preferred route ■ The Project Team requested a confirmation email for Indigenous communities contact access to the Indigenous file share portal. Williams Treaties First Nations to provide, and ■ The Project Team requested confirmation if Chippewas of Georgina First Nation have received weekly archaeological work update emails. Chippewas of Georgina Island First Nation stated that they have not been receiving weekly updates and would like to receive weekly updates. The Project Team will coordinate to ensure they receive weekly updates.
April 17, 2023	<ul style="list-style-type: none"> ■ Kawartha Nishnawbe First Nation, and ■ Ministry/Project Team. 	■ N/A	■ N/A	<ul style="list-style-type: none"> ■ For those unable to attend, the Project Team provided the slide deck to invitees via email, and remain available to answer questions at any time.
April 17, 2023	<ul style="list-style-type: none"> ■ Georgian Bay Métis Council ■ Ministry/Project Team. 	■ N/A	■ N/A	<ul style="list-style-type: none"> ■ For those unable to attend, the Project Team provided the slide deck to invitees via email and remain available to answer questions at any time.
April 18, 2023	<ul style="list-style-type: none"> ■ Chippewas of Georgina Island First Nation ■ Chippewas of Rama First Nation ■ Curve Lake First Nation ■ Hiawatha First Nation ■ Mississaugas of Scugog Island First Nation, and ■ Ministry/Project Team. 	<ul style="list-style-type: none"> ■ Provided an overview of the Study Area, Ontario Regulation 697/21, project consultation to date, and the environmental impact studies. 	<ul style="list-style-type: none"> ■ Hiawatha First Nation stated that Archaeological Assessment Reports, records of previous meetings, and archaeology mapping was requested in late 2022 and have not yet been provided ■ Hiawatha First Nation requested mapping. Specifically, overview mapping of sites with buffers along the corridor ■ Chippewas of Georgina Island First Nation asked if the Technically Preferred Route will be reassessed as a result of the impacts to the East Holland Landing Archaeological Site. Chippewas of Georgina Island also requested to know what days the Project Team will be on site completing field work 	<ul style="list-style-type: none"> ■ The Project Team noted completed Archaeological Assessment Reports and mapping will be provided shortly. The Project Team is currently working on completing the draft report. ■ The Project Team noted the mapping is included in the Draft Stage 2 and Stage 3 reports. The Project Team is working on the reports currently and will provide once available for review. ■ The Project Team explained that the Technically Preferred Route has been adjusted south to preserve the archaeological sites. The Project Team will provide updates on when they expect to be on site

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
			<ul style="list-style-type: none"> ■ Hiawatha First Nation asked if it is possible for the Bradford Bypass to be rerouted north of Albert’s Marine to completely avoid the East Holland Landing Site ■ Hiawatha First Nation noted that Stage 3 was completed on the Holland River East Branch and discovered the Lower Landing site and would like to know when the Ministry will reassess the sites ■ Hiawatha First Nation asked if they will be compensated for the loss of archaeological resources as a result of the project. Hiawatha do not feel their culture and history are being given adequate emphasis ■ Hiawatha First Nation noted they have issues with any Stage 4 assessments going ahead and would like to know when the works will occur ■ Hiawatha First Nation asked if the discipline impact assessment reports could be provided through email or hard copy via courier. Hiawatha wishes to have versions provided in advance of the draft and final reports in order to provide feedback ■ Hiawatha First Nation stated they often do not have the resources to provide sufficient feedback before final reports are completed ■ Hiawatha First Nation do not feel they have been adequately consulted on Archaeological Assessments for the for the project ■ William’s Treaties First Nations noted that the location of the highway should not be based on the 2002 Environmental Assessment as it is outdated ■ William’s Treaties First Nations inquired further about the possibility of realigning the project north of Albert’s Marina ■ Chippewas of Georgina Island First Nation asked what measures are being taken to prevent salt from draining into the spawning area ■ William’s Treaties First Nations noted there are lots of archaeological artifacts in the water ■ William’s Treaties First Nations noted that the Ministry may need to modify the timeline of the Project to accommodate requests to re-consider a northerly alignment to avoid sensitive historical sites ■ Hiawatha First Nation asked if there was a species inventory of the Holland Marsh ■ Hiawatha First Nation, Chippewas of Georgina Island First nation, Chippewas of Rama First Nation and Mississauga of Scugog Island First Nation asked to receive a copy of the species list 	<ul style="list-style-type: none"> ■ The Project Team the Technically Preferred Route is selected to reduce the impact to ecological features, fish and fish habitats, navigation on the Holland River and Holland River East Branch, impacts to Albert’s Marine, and minimize impacts from erosion and sediment control ■ The Project Team noted they have completed the Stage 3 of the eastern/southern portion of the site. This site has not been positively identified as the Lower Landing site to date. ■ The Project team will thanked Hiawatha First Nation’s for their comments and will take them into consideration. The Ministry takes all factors into consideration when determining the final route. ■ The Project Team stated they will let Hiawatha First Nation know when the Stage 4 works have been planned. ■ The Project Team stated they will provide Hiawatha First Nation with physical versions via courier going forward ■ The Project Team stated they are working on capacity funding that will allow for additional resources when reviewing impact assessment reports. ■ The Project Team noted that Curve Lake First Nation and Huron Wendat First Nation representatives have been on site for Stage 3 consultation. Any interested Indigenous communities are able to partake in field investigations or weekly and monthly meetings ■ The 2020 studies aim to update environmental investigations from the 2002 Environmental Assessment. Findings are documented in the Environmental Conditions Report (2022). Routing decisions were based on recent technical discipline studies conducted over the past two years. A summary of which was included in the Final Environmental Conditions Report. ■ The Project Team noted they would like William’s Treaties First Nations to participate in the Cultural Heritage Evaluation Report for the Holland River Watershed ■ The Project Team explained that the highway was aligned south for many reasons including to avoid a backwater bay that is a specialized habitat for fish spawning. Adjusting the route much further north could have a greater impact to the Holland Marsh Wetland Complex

Meeting Date	Meeting Attendees	Meeting Summary	Key Issues Raised	Project Team Response/Action
			<ul style="list-style-type: none">■ Curve Lake First Nation asked to receive Project Information Form numbers for Archaeological Assessments, and■ William’s Treaties First Nation asked if the meetings are being recorded.	<ul style="list-style-type: none">■ The Project Team explained that there are no deck drains over the Holland River. Stormwater facilities will treat runoff water before it is discharged■ The Project Team noted that Marine Archaeology will be conducted where required■ The Project Team noted William’s Treaties First Nations’ comments■ The Project Team explained that they have a species inventory that was created during Ecological Land Classifications assessment for the project■ The Project Team will develop mitigation measures for the species identified by the William’s Treaties First Nations and noted that the Indigenous information provided will be kept confidential■ The Project Team provided the Project Information Form number for Stage 1 in the Teams meeting–will provide the others via email, and■ The project Team explained that the Crown does not record meetings. The Ministry is investigating whether this can be permitted.

7.5 Stakeholder Engagement and Consultation

7.5.1 Engagement with Municipal Stakeholders and Elected Officials

Staff from the following municipalities and Elected Officials were engaged throughout the project participated in briefings with the Ministry during key milestones, were provided with the opportunity to review this Draft Environmental Impact Assessment Report, and were also provided with the Notice of Draft Environmental Impact Assessment Report:

- County of Simcoe
- Bradford West Gwillimbury
- East Gwillimbury
- York Region
- King Township
- Scot Davidson, Minister of Parliament – York – Simcoe
- Caroline Mulroney, Minister of Provincial Parliament – York – Simcoe
- Steve Pellegrini, Mayor – Township of King
- Rob Keffer, Mayor – Town of Bradford West Gwillimbury
- Virginia Hackson, Mayor - Town of East Gwillimbury
- James Leduc, Mayor - Town of Bradford West Gwillimbury
- Jordan Cescolini, Councillor Ward 1 – Township of King
- David Boyd, Councillor Ward 2 – Township of King
- Jakob Schneider, Councillor Ward 3 – Township of King
- Bill Cober, Councillor Ward 4 – Township of King
- Debbie Schaefer, Councillor Ward 5 – Township of King
- Avia Eek, Councillor Ward 6 – Township of King
- Raj Sanhu, Councillor Ward 1 – Town of Bradford West Gwillimbury
- Gary Lamb, Councillor Ward 3 – Town of West Gwillimbury
- Ron Orr, Councillor Ward 4 – Town of West Gwillimbury
- Peter Ferragine, Councillor Ward 5 - Town of West Gwillimbury
- Mark Contois, Councillor Ward 6 - Town of West Gwillimbury
- Peter Dykie Jr., Councillor Ward 7 - Town of West Gwillimbury
- Lorelea Carruthers, Councillor Ward 1 - Town of East Gwillimbury
- Terry Foster, Councillor Ward 1 - Town of East Gwillimbury

- Tara Roy-DiClemente, Councillor Ward 2 - Town of East Gwillimbury
- Joe Persechini, Councillor Ward 2 - Town of East Gwillimbury
- Jonathan Scott, Councillor Ward 2 - Town of East Gwillimbury
- Scott Crone, Councillor Ward 3 - Town of East Gwillimbury, and
- Cathy Morton, Councillor Ward 3 - Town of East Gwillimbury.

In addition to the municipalities above, the Town of Newmarket also received a copy of the Notice of Publication of Draft Early Works Report, Notice of Publication of Final Early Works Report, Notice of Publication of Draft Environmental Conditions Report, Notice of Publication of Final Environmental Conditions Report, Notice of Public Information Centre #2, Notice of Draft Groundwater Protection and Well Monitoring Plan, Notice of Publication of Draft Environmental Impact Assessment Report and Notice of Publication of Updated Draft Environmental Impact Assessment Report in accordance with the Regulation.

Due to the COVID-19 pandemic, all project meetings were held virtually. **Table 7-3** summarizes the meetings that took place with Municipal Stakeholders and Elected Officials throughout the project. Meeting materials as well as all correspondence records with Municipal Stakeholders and Elected Officials until March 31, 2023, are provided in **Appendix C** of this Report.

Table 7-3: Summary of Meetings with Municipal Stakeholders

Meeting Date	Meeting Attendees	Meeting Summary
July 29, 2020	<ul style="list-style-type: none"> Simcoe County, and Project Team. 	<ul style="list-style-type: none"> Discussed the proposed Simcoe County widening project on County Road 4, and an overview of the project, and Key discussion items included acquiring additional properties, permits, and roundabouts.
October 13, 2020	<ul style="list-style-type: none"> Simcoe County Town of Bradford West Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided an introduction to the project, upcoming project milestones, public consultation activities and key objectives of the project, and Key discussion items included support for the project, project funding, project naming, interchange locations, impacts to municipal roads, and intersection reconfigurations.
October 20, 2020	<ul style="list-style-type: none"> Town of East Gwillimbury York Region King Township, and Project Team. 	<ul style="list-style-type: none"> Provided an introduction to the project, upcoming project milestones, public consultation activities and key objectives of the project, and Key discussion items included existing utilities, information requests, construction timelines and project funding.
March 30, 2021	<ul style="list-style-type: none"> Simcoe County Town of Bradford West Gwillimbury Town of East Gwillimbury York Region King Township, and Project Team. 	<ul style="list-style-type: none"> Provided a project overview, overview of the design, consultation activities, study process, and ongoing environmental and engineering studies, and Key discussion items included locations of interchanges and interchange design, early works approvals, existing noise walls, funding, traffic impacts, Impact Assessment Agency of Canada decision, and consultation activities.
July 19, 2021	<ul style="list-style-type: none"> Brock Township, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project and the Environmental Assessment process, and Key discussion items included the timeline of project, discipline studies (traffic, agricultural, navigation, recreation), and modelling process.
July 27, 2021	<ul style="list-style-type: none"> Town of East Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project and the Environmental Assessment process, and Key discussion items included Holland River East Branch archaeology investigation, and discipline studies (traffic, natural environment, socio-economic), heritage homes, interchange design, and modelling process.
July 28, 2021	<ul style="list-style-type: none"> Town of Bradford West Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, and Key discussion items included active transportation, municipal road crossings, proposed cross-sections of Professor Day Drive, proposed culverts, watercourse crossings, wildlife crossings, and property acquisition.
July 29, 2021	<ul style="list-style-type: none"> Town of East Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, and Key discussion items included active transportation, water transportation, project alignment, and future correspondence with the Town of East Gwillimbury.
August, 11, 2021	<ul style="list-style-type: none"> Town of Georgina and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, the Environmental Assessment process, existing conditions, potential impacts on Lake Simcoe, and Key discussion items included Town of Georgina 2019-2022 Strategic Plan, Transportation Environmental Study Report, Design and Constructions Report.
September 22, 2021	<ul style="list-style-type: none"> Town of Bradford West Gwillimbury County of Simcoe, and Project Team. 	<ul style="list-style-type: none"> Provided a project overview, project schedule, existing conditions, the design, construction staging, potential impacts and approvals for Country Road 4, and Key discussion items included changes in design speed, co-ordination of the widening of County Road 4 on behalf of the County of Simcoe, construction limits, realignments, and potential impacts were also discussed.
November 16, 2021	<ul style="list-style-type: none"> Town of East Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, project schedule and deliverables, the Regulation, and Key discussion items included potential project impacts and benefits, Whitebelt Lands boundaries and the Town’s Strategic Plan.
November 25, 2021	<ul style="list-style-type: none"> Town of Bradford West Gwillimbury, and Project Team 	<ul style="list-style-type: none"> Provided an overview of the project, and Key discussion items included opportunities for incorporating active transportation elements (e.g., trail facilities) as the study continues to advance.
December 10, 2021	<ul style="list-style-type: none"> Town of East Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, and Key discussion items included cross-sections, updates to the Transportation Master Plan, active transportation, property acquisition, and interchange locations.
January 20, 2022	<ul style="list-style-type: none"> York Region County of Simcoe King Fire and Emergency Services South Simcoe Police Bradford West Gwillimbury Fire & Emergency Services Township of King Town of Bradford West Gwillimbury Town of East Gwillimbury, and Project Team. 	<ul style="list-style-type: none"> Provided a project overview, overview of the Regulation, project schedule, County Road 4 Early Works, and current status of the project, and Key discussion items included County Road 4 issues resolution process, interchange design alternatives, construction timelines and stages, existing rail lines and hydro towers, and potential impacts.

Meeting Date	Meeting Attendees	Meeting Summary
June 30, 2022	<ul style="list-style-type: none">King TownshipTown of East GwillimburyCounty of SimcoeYork RegionBell CanadaVia Net, andProject Team.	<ul style="list-style-type: none">Meeting summary provided in Table 7-4.
August 24, 2022	<ul style="list-style-type: none">King Township, andProject Team.	<ul style="list-style-type: none">Key discussion items included consideration for utilizing the Hochreiter Road allowance connected to Bathurst Steet.
November 14, 2022	<ul style="list-style-type: none">Township of KingYork Region, andTown of East Gwillimbury	<ul style="list-style-type: none">Provided an overview of the information that would be presented at Public Information Centre #2, an overview of the project, an overview of the study process, the project schedule, the Regulation, and the project consultation activities to dateKey discussion items included the proposed carpool lots, an overview of the Updated Technically Preferred Route (Recommended Plan), anticipated property impacts, an overview of the noise impacts, the project schedule and next steps, andFollowing the November 14 meeting, minutes of the meeting were circulated and the Project Team followed up to offer any support to upcoming council meetings.
November 14, 2022	<ul style="list-style-type: none">Town of Bradford West Gwillimbury, andCounty of Simcoe.	<ul style="list-style-type: none">Provided an overview of the information that would be presented at Public Information Centre #2, and overview of the project, an overview of the study process, the project schedule, Ontario Regulation 697/21, and the project consultation activities to dateKey discussion items included an overview of previous consultation events, reporting, design alternatives, proposed carpool lots, an overview of the Updated Technically Preferred Route, anticipated property impacts, and overview of noise impacts, the project schedule and next steps, andFollowing the November 14 meeting, minutes of the meeting were circulated and the Project Team followed up to offer any support to upcoming council meetings.
February 7, 2023	<ul style="list-style-type: none">Town of Bradford West Gwillimbury Council, andProject Team.	<ul style="list-style-type: none">Provided an update on the project, andKey discussions items included the project update, previous council meeting minutes, approved grants and by-laws that will be enacted in regards to the project.
February 17, 2023	<ul style="list-style-type: none">Town of Bradford West GwillimburyTown of East GwillimburyCounty of SimcoeYork RegionInvited: King Township, andMinistry of Transportation.	<ul style="list-style-type: none">Discussed the proposed approach to address the municipal request for trail networks adjacent to the Bradford BypassIt was confirmed that the municipalities would take the lead for the planning, design and environmental assessment studies required for trail networks adjacent to the Bradford BypassKey discussion items: cost sharing, the ministry providing technical support and resources, andNext steps: the interested municipalities would review the study scope and provide an initial cost estimate for the work. The development of a Memorandum of Understanding to outline roles and responsibilities of each party would follow.

7.5.2 Engagement with Technical Stakeholders

Technical stakeholders engaged throughout the project to-date include federal, provincial and municipal agencies, Conservation Authorities and other technical stakeholders (e.g., utility companies). For the full list of technical stakeholders, refer to the list below:

■ Federal Agencies

- Fisheries and Oceans Canada
- Indigenous and Northern Affairs Canada
- Transport Canada
- Impact Assessment Agency of Canada
- Environment and Climate Change Canada
- Canadian Transportation Agency
- Public Health Agency of Canada
- Historic Sites and Monuments Board of Canada, and
- Environment and Climate Change Canada.

■ Provincial Agencies

- Ministry of Indigenous Affairs
- Ministry of the Environment, Conservation and Parks
- Ministry of Municipal Affairs and Housing
- Ontario Ministry of Agriculture, Food and Rural Affairs
- Ministry of Citizenship and Multiculturalism
- Ministry of Health and Long-Term Care
- Ministry of Natural Resources and Forestry
- Ministry of Energy
- Ministry of the Solicitor General
- Infrastructure Ontario
- Metrolinx
- Ministry of Economic Development, Job Creation and Trade
- Ontario Provincial Police, and
- Ontario Federation of Agriculture.

■ Municipal Agencies

- Town of East Gwillimbury
- County of Simcoe
- Township of King

- Town of Bradford West Gwillimbury
- York Region
- Central York Fire Services
- York Regional Police
- South Simcoe Police Services
- Queensville Fire
- King Fire and Emergency Services
- Bradford West Gwillimbury Fire and Emergency Services
- East Gwillimbury Fire Services
- York Catholic District School Board
- York Region District School Board
- Simcoe County District School Board
- Conseil scolaire catholique MonAvenir
- Conseil scolaire Viamonde
- Student Transportation Services of York Region
- York Region Transit
- Bradford West Gwillimbury Public Library
- King Chamber of Commerce
- East Gwillimbury Chamber of Commerce
- Bradford Board of Trade
- The Corporation of the County of Simcoe, and
- Holland Marsh Drainage System Joint Municipal Services Board.

■ **Conservation Authorities**

- Lake Simcoe Region Conservation Authority, and
- Nottawasaga Valley Conservation Authority.

■ **Other Technical Stakeholders**

- Ontario Trucking Association
- Oak Ridges Moraine Foundation
- Canadian National Rail
- Canadian Pacific Rail
- The Friends of the Greenbelt Foundation, and
- York Simcoe Naturalists.

An Environment, Community and Agriculture Committee was also formed for the project to understand and address community concerns and gather input on how to best implement the project in a context sensitive manner. The committee is comprised of

representatives from local communities and stakeholder groups that have focused interest or lands within the Study Area. **Table 7-4** summarizes the meetings that took place on December 8, 2021, and December 6, 2022 with the Environment, Community and Agriculture Committee.

In addition to the stakeholders listed above, consultation and meetings with utility companies is ongoing to confirm potential impacts to existing utilities within the Study Area.

The Project Team met with the Environment, Community and Agriculture Committee on December 8, 2021 to address community concerns and gather input on how to best implement the proposed Bradford Bypass in a context sensitive manner. The Project Team provided an overview of the Bradford Bypass Project and County Road 4 Early Works, a project timeline and refinement locations.

The Project Team met with the Environment, Community and Agriculture Committee on December 6, 2022 to gain feedback on how best to implement the Bradford Bypass based on the committee's perspectives. The Project Team provided an overview of the evaluation of alternatives, the Recommended Plan and project-specific assessment of environmental impacts, and proposed mitigation measures for the project.

Due to the COVID-19 pandemic, all project meetings were held virtually. **Table 7-4** summarizes the meetings that took place with Technical Stakeholders throughout the project. Meeting materials as well as all correspondence records with Technical Stakeholders until March 31, 2023, are provided in **Appendix C** of this Report.

Table 7-4: Summary of Meetings with Technical Stakeholders

Meeting Date	Meeting Attendees	Meeting Summary
May 3, 2021	<ul style="list-style-type: none"> Hydro One, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project and an overview of each of the three alternatives at Leslie Street. Hydro One noted preference for Alternative 1 as it appears to avoid impacts to transmission towers, and Key discussion items included horizontal and vertical clearances from the towers, and Hydro One access to towers for maintenance.
May 10, 2021	<ul style="list-style-type: none"> Hydro One, and Project Team. 	<ul style="list-style-type: none"> Provided overview of the Preliminary Design schedule, and Discussion items included three key tower crossing locations near Professor Day Drive, east of County Road 4 in Bradford, hydro towers west of Leslie Street (north of Queensville Sideroad), and hydro crossing at Highway 404 (north of Holborn Road).
September 29, 2021	<ul style="list-style-type: none"> Bradford West Gwillimbury Fire and Emergency Services King Fire and Emergency Services South Simcoe Police Services, and Project Team. 	<ul style="list-style-type: none"> Provided a project overview, and overview of the design and construction staging, and Key discussion items included construction staging and the implementation of the new detour route to ensure continued access to County Road 4 and communication plans for advance notice to emergency services of any changes as the project progresses.
November 26, 2021	<ul style="list-style-type: none"> Hydro One, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the materials previously provided by the Project Team, and Key discussion items included clearance requirements for crossings at Leslie Street and Highway 404 and continued consultation with Hydro One as the design advances.
December 8, 2021	<ul style="list-style-type: none"> Environment, Community and Agriculture Committee, and Project Team. 	<ul style="list-style-type: none"> Provided an overview on the Bradford Bypass Project, the County Road 4 Early Works, Ontario Regulation 697/21 and refinement locations, and Key Discussion Items included Ontario Regulation 697/21, County Road 4 studies, engagement with Indigenous communities, archaeological resources, and impacts to woodlands, wetlands and water.
January 25, 2022	<ul style="list-style-type: none"> Lake Simcoe Region Conservation Authority Nottawasaga Valley Conservation Authority Ministry of Tourism, Culture and Sport Ministry of Natural Resources and Forestry Ministry of Energy Ministry of the Environment, Conservation and Parks Ministry of Agriculture, Food and Rural Affairs Ministry of Health and Long-Term Care Transport Canada Ontario Federation of Agriculture Metrolinx, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the project, study process, project schedule, proposed interchanges, and an update on the County Road 4 Early Works, and Key discussion items included the floodplain hazards and modelling, archaeological assessments at the Holland River East Branch, design alternatives, and agricultural impact assessment requirements.
February 17, 2022	<ul style="list-style-type: none"> Lake Simcoe Region Conservation Authority, and Project Team. 	<ul style="list-style-type: none"> Presented the results from hydraulic modelling for the Holland River and Holland River East Branch, and Key discussion items included technical details related to the Polder Area for the Holland River, the County Road 4 Stormwater Management Plan, and ongoing consultation with the Lake Simcoe Region Conservation Authority.
March 9, 2022	<ul style="list-style-type: none"> Lake Simcoe Region Conservation Authority Ministry of the Environment, Conservation and Parks Fisheries and Oceans Canada Transport Canada, and Project Team. 	<ul style="list-style-type: none"> Discussed preliminary structural designs and environmental constraints for the proposed Holland River and Holland River East Branch crossings, and Key discussion items included maintenance and footprints for a stormwater management facility, infiltration measures, culverts and fisheries, and environmental permits and approvals.
March 28, 2022	<ul style="list-style-type: none"> Metrolinx, and Project Team. 	<ul style="list-style-type: none"> Discussed the Bradford Bypass and Metrolinx rail crossing, specifically existing conditions, impacts to the Barrie GO Expansion crossing assumptions, clearances, access, structures, and drainage.
March 29, 2022	<ul style="list-style-type: none"> Hydro One Bell Canada Rogers, and Project Team. 	<ul style="list-style-type: none"> Provided an overview of the Statement of Completion for the County Road 4 Early Works, the project bid process, and the impacts to properties and utilities within the Study Area, and Key discussion items included Lake Simcoe Region Conservation Authority and County of Simcoe permits, drilling near impacted properties, property acquisition, hydro poles and preliminary drawings of utilities.

Meeting Date	Meeting Attendees	Meeting Summary
April 12, 2022	<ul style="list-style-type: none">■ Nottawasaga Valley Conservation Authority, and■ Project Team.	<ul style="list-style-type: none">■ Discussed the existing and proposed drainage conditions of the tributary of Penville Creek, and■ Key discussion items included guidelines and design standards for stormwater management facilities, modelling requirements for a flood hazard assessment, and Erosion and Sediment Control checklists.
May 4, 2022	<ul style="list-style-type: none">■ Hydro One■ Bell Canada■ Rogers, and■ Project Team.	<ul style="list-style-type: none">■ Provided an overview of the utility work to be done in summer 2022, and■ Key discussion items included relocation plans, updates from contractors and utilities, and current progress of utility work.
May 13, 2022	<ul style="list-style-type: none">■ Hydro One, and■ Project Team.	<ul style="list-style-type: none">■ Provided an overview of the design, the 2002 Approved Environmental Assessment Route, project schedule and Study Area and refinement locations, and■ Key discussion items included review of the alternatives for the Leslie Street and the Highway 404 crossings, and the required clearances and elevations for the Hydro One transmission lines and crossings to be taken into consideration in the design.
June 30, 2022	<ul style="list-style-type: none">■ King Township■ Town of East Gwillimbury■ Central East Region■ County of Simcoe■ York Region■ Hydro One■ Bell Canada■ Via Net, and■ Project Team.	<ul style="list-style-type: none">■ Discussed the preferred design of utilities relocation, interchange locations, and preparation of the Environmental Conditions Report and the Environmental Impact Assessment Report, and■ Key discussion items included review of Hydro One assets at 10th Sideroad, review of Via Net assets at 10th Sideroad, review of York Region sewage and waste water lines on 2nd Concession Roads and Storm Sewer on Leslie Street and the review of Bell's relocation requirement at each crossing.
December 6, 2022	<ul style="list-style-type: none">■ Environment, Community and Agriculture Committee■ Project Team	<ul style="list-style-type: none">■ Discussed the Updated Technically Preferred Route, evaluation of alternatives, project-specific assessment of environment impacts and proposed mitigation measures for the project, and■ Key discussion items included engagement with Indigenous communities, route alternatives, Environmental Conditions Report contents, noise impacts, water impacts and consultation with Regulatory Agencies.

7.5.3 Ontario Regulation 697/21 Reports and Letters

In accordance with Section 22, 23 and 24 of the Regulation, a Draft Stormwater Management Plan, Draft Groundwater Protection and Well Monitoring Plan and Draft Noise Impact Assessment Report were prepared and distributed for agency review. The following sections summarize the agency consultation on each report.

7.5.3.1 Stormwater Management Plan

A Draft Stormwater Management Plan (AECOM, 2023) was prepared and distributed along with a cover letter on March 22, 2023 to the following for review and comment via the Project Team email and registered mail:

- The Ministry of Natural Resources and Forestry
- The Lake Simcoe Region Conservation Authority
- Fisheries and Oceans Canada, and
- The Ministry of the Environment, Conservation and Parks.

Following the agency review period between March 22, 2023 to April 12, 2023, the Draft Stormwater Management Plan was updated, and the Final Stormwater Management Plan will be distributed to Ministry of the Environment, Conservation and Parks Director of Environmental Assessment Branch. The Final Stormwater Management Plan will also be posted on the Project Website. A summary of comments provided during the agency review period is provided in **Table 7-5** below.

Table 7-5: Summary of Feedback from the Draft Stormwater Management Plan

Comment Theme	Summary of Comments Received	Project Team Response
General	<ul style="list-style-type: none"> ■ Requested to receive a new link to access the Draft Stormwater Management Plan as the previous one expired ■ Requested to update main contact on contact list, and ■ Requested to review the Drainage, Hydraulic and Stormwater Management Report. 	■ Project Team to provide response.
Engineering	<ul style="list-style-type: none"> ■ Requested to implement water volume control mitigation measures ■ Requested to model the 12-hour SCS Type II and the four-hour Chicago storm events ■ Requested to ensure water quantity control can be demonstrated with all selected measures, if there is no downstream Stormwater Management facility ■ Requested clarification if the nine Stormwater Management ponds have been designed for the ultimate scenario ■ Requested to implement and design the nine Stormwater Facilities to address erosion control/extended detention ■ Requested to ensure all proposed Stormwater Management ponds have sufficient outlets ■ Requested to pay attention to Lake Simcoe Region Conservation Authority's design requirements for Stormwater Management ponds ■ Requested for clarification on the location and service of Stormwater Management facilities and ponds ■ Recommended that Table 3.2 of the report include information of the proposed permanent storage volumes of the Stormwater Management ponds to show they meet the Ministry of the Environment Conservation and Parks' enhanced water quality protection level ■ Recommended that Table 4 of the Stormwater Management Report include the outlet/receiver information of the proposed Flat Bottom Grassed Swales, and ■ Recommended to include model schematic design for each simulation scenario in the appendices. 	■ Project Team to provide response.

7.5.3.2 Groundwater Protection and Well Monitoring Plan

A Draft Groundwater Protection and Well Monitoring Plan (AECOM, 2023) was prepared and distributed along with a cover letter on March 24, 2023 to the following for review and comment via the Project Team email, Project Website (<https://www.bradfordbypass.ca/draft-groundwater-gpwmp/>), and unaddressed Canada Post mail drop:

- The Director of the Ministry's Central Regional Office
- The Director of the Ministry's Conservation and Source Protection Branch
- The Lake Simcoe Region Conservation Authority
- The Nottawasaga Valley Conservation Authority
- The Ministry of Natural Resources and Forestry
- The York Regional Health Unit
- The Simcoe Muskoka District Health Unit
- The Town of Bradford West Gwillimbury
- The Town of East Gwillimbury
- The Town of Newmarket
- The County of Simcoe
- The Township of King
- The Regional Municipality of York
- Any other municipalities considered appropriate by the proponent, and
- Every assessed owner of land within the updated Study Area and within 500 metres of the borders of the updated Study Area.

Following the review period between March 24, 2023 to April 14, 2023, the Draft Groundwater Protection and Well Monitoring Plan was updated, and the Final Groundwater Protection and Well Monitoring Plan will be distributed to Ministry of the Environment, Conservation and Parks Director of Environmental Assessment Branch. The Final Groundwater Protection and Well Monitoring Plan will also be posted on the Project Website. A summary of comments provided during the review period is provided in **Table 7-6** below.

Table 7-6: Summary of Feedback from the Draft Groundwater Protection and Well Monitoring Plan

Comment Theme	Summary of Comments Received	Project Team Response
General	<ul style="list-style-type: none"> Requested clarification on which technical reports have been provided to the Ministry of the Environment, Conservation and Parks for review Stated they had measured the well depth on their property and asked if the information would be of use to the Project Team Asked if a well is included on the Draft Groundwater Protection and Well Monitoring Plan Several stakeholders asked if their well located outside of the Study Area would be impacted by the Bradford Bypass Requested additional geologic and hydrogeologic information to be provided in the report Stated that a Permit to Take Water will be required for construction dewatering. As a result, pre-consultation with the Ministry of the Environment, Conservation and Parks hydrogeologists should be initiated by the Project Team Requested to include location of all constructed monitoring wells, and Requested a copy of the Draft Stormwater Management Plan. 	<ul style="list-style-type: none"> Project Team to provide response.
Environmental Concerns – Natural Environment	<ul style="list-style-type: none"> Requested confirmation that dewatering material will be disposed of properly to avoid an impact to the environment Requested confirmation on salt runoff mitigation measures Requested for additional soil and groundwater sampling to be completed during Detail Design Requested for monitoring wells to be sampled for hydrocarbons Noted that if the Ministry acquires ownership of a property known to be contaminated above applicable standards that Ontario Regulation 153/04 may be applicable Requested to provide detailed calculations regarding the calculated radius of influence at each source dewatering location, and Requested to include a commitment to identify former and land uses to identify potential contaminating activities within the Study Area. 	<ul style="list-style-type: none"> Project Team to provide response.
Environmental Concerns – Social and Economic Environment	<ul style="list-style-type: none"> Requested confirmation that the wells located within the Study Area effective protection Asked if any wells close to the Early Works project are currently being monitored Stated that it is unknown if monitoring wells will be sufficient since no geologic or hydrogeologic information on borehole logs of the completed monitoring wells were provided Requested for an additional Door-to-Door well survey to be completed during Detail Design Requested to include dataloggers in select residential wells to establish baseline conditions and usage with respect to fluctuating water levels prior to construction, and Requested to include a Complaint Protocol to ensure all complaints made during construction and operation are recorded and addressed in an expeditious and effective manner. 	<ul style="list-style-type: none"> Project Team to provide response.

7.5.3.3 Noise Impact Assessment Report

A Draft Noise Impact Assessment Report (AECOM, 2023) was prepared and distributed along with a cover letter to the following for review and comment via the Project Team email:

- Director of the Ministry of Environment, Conservation and Parks' Environmental Assessment Branch.

Following the agency review period, the Draft Noise Impact Assessment Report will be updated and the Final Noise Impact Assessment Report will be provided to the Director of the Ministry of the Environment, Conservation and Parks' Environmental Assessment Branch. A summary of comments provided during the agency review period will be included in the Final Environmental Impact Assessment Report.

7.6 Public Consultation Opportunities

7.6.1 Public Information Centre #1

A Public Information Centre was held for the project in April and May 2021. The Public Information Centre was held virtually in two parts via the Project Website.

- **Public Information Centre Part 1:** The purpose of the first Public Information Centre was to showcase the overall project, update and summarize the existing conditions since 2002, illustrate the new Preliminary Design refinements as compared to the 2002 Approved Environmental Assessment for the Technically Preferred Route of the Bradford Bypass, outline the evaluation criteria, and solicit input, feedback, and comments on the Preliminary Design refinements. The materials presented at the Public Information Centre were made available on the Project Website for a two-week stakeholder review period beginning April 22, 2021 and ending on May 6, 2021
- **Public Information Centre Part 2:** Additionally, as part of Public Information Centre #1, the Project Team hosted a Public Information Centre Webinar presentation on May 18, 2021 held from 7:00 p.m. to 10:00 p.m. where stakeholders were able to learn more about key topics raised during the first Public Information Centre, and comments submitted during the stakeholder review period. Stakeholder were also able to receive additional project information.

7.6.1.1 Engagement Materials

The following section provides an overview of the materials used for communication and engagement tools with participants as part of the Public Information Centre #1.

7.6.1.1.1 Part 1 – Information Webpages

A welcome video was included on the Public Information Centre #1 landing page (<https://www.bradfordbypass.ca/pic1/#1>), which provided a brief overview of the project, the format of the Public Information Centre, and how stakeholders could participate and submit feedback on the materials presented. The information pages presented at Public Information Centre #1 Part 1 included the following:

- Project Overview
- Study Process
- Refinements and Alternatives Evaluation Process

- Overall Considerations for Bradford Bypass Project
- Considerations for the Bradford Bypass Project
- Overall Environmental Considerations Bradford Bypass
- Environmental Protection and Mitigation Measures
- Environmental Protection and Mitigation Measures – Examples from other Ministry Projects
- General Design Refinements
- Bradford Bypass Mainline Refinement – Holland River East Branch Crossing
- Bradford Bypass Mainline Refinement – Hydro Tower Relocation
- 2002 Approved Environmental Assessment Highway 400 Interchange
- Highway 400 Refinement Alternatives
- 2002 Approved Environmental Assessment Highway 404 Interchange
- Highway 404 Refinement Alternatives
- County Road 4 Interchange
- Bathurst Street Interchange
- Leslie Street Interchange, and
- Thank You and Next Steps.

After reviewing the above website pages, stakeholders were virtually guided and encouraged to complete a poll to obtain information about the demographics of respondents, their key concerns, and how they plan to use the Bradford Bypass. The questions consisted of the following:

- Please rank these factors in order of importance to you:
 - Transportation & Engineering
 - Natural Environment
 - Socio-Economic Environment, and
 - Cultural Environment.
- Please select the top five (5) most important evaluation criteria to you:
 - Active Transportation, Recreation and Navigation
 - Archaeological and Built Heritage Resources
 - Climate Change and Air Quality
 - Environmentally Sensitive Areas and Wetlands
 - Highway Operations and Safety

- Human Health
 - Noise and Vibration
 - Land Use, Economics and Agriculture
 - Plants and Wildlife (Species at Risk), and
 - Surface Water and Groundwater.
- Where do you live (select the most appropriate)?
- Bradford West Gwillimbury
 - East Gwillimbury
 - King Township
 - County of Simcoe
 - Regional Municipality of York, and
 - None of the above.
- How often do you anticipate using the Bradford Bypass for personal travel?
- Frequently
 - Occasionally
 - Rarely, and
 - Not Applicable.
- How often do you anticipate using the Bradford Bypass for work or business travel?
- Frequently
 - Occasionally
 - Rarely, and
 - Not Applicable.

Materials from Public Information Centre #1 Part 1 are provided in **Appendix C** of this Report.

7.6.1.1.2 Part 2 – Webinar

To provide another layer of engagement with stakeholders in the absence of in-person consultation events, the Project Team held a webinar (through the Zoom platform) on May 18, 2021. Members of the Project Team attended the webinar and provided a live presentation accompanied by a PowerPoint slide deck. Information presented included a brief overview of the study, results of Public Information Centre #1 Part 1, and questions/answers developed based on stakeholder feedback received during the review period.

The questions presented at the webinar were selected based on feedback received from stakeholders during the Public Information Centre #1 review period (April 22 – May 6, 2021). The Project Team identified common themes from stakeholder comments and questions and developed answers to address as many of these themes as possible. The intent was not to provide a response to every question, but to speak to the common individual themes and topics as a way of supplementing the virtual Public Information Centre and to provide an initial response to a larger group. The wording of the question was phrased using the theme or topic of several questions to avoid potential privacy concerns and to best capture a broader range of questions.

A recording of the webinar was made available on the Project Website for those unable to attend the live event and shall remain available for the duration of the project.

7.6.1.2 Summary of Feedback Received

Data identified that 1,665 individuals visited the virtual Public Information Centre #1 webpage from April 22, 2021 - May 6, 2021. During that period 65 comments were received, and 49 individuals completed the poll. Registry details recorded 130 individuals registered in advance for the Public Information Centre #1 webinar presentation through Zoom, whereas only 76 individuals attended the presentation on May 18, 2021. During the presentation, 27 new comments were received via the Zoom platform chat function. The 92 comments received comprise the total public comment participation for this event. The following section highlights the key findings and level of public interest related to topics/questions identified through Public Information Centre #1. The following eight themes emerged from the feedback and comments received:

- Community Engagement Process and Activities
- Environmental Concerns – Natural Environment
- Environmental Concerns – Social and Economic Environment
- Engineering, Transportation and Design
- Project Planning and Timelines
- Interchange Locations and Design
- Environmental Assessment Process, and
- General Project and Proposed Alignment.

Table 7-7 summarizes the key questions, comments, issues, and concerns raised during Public Information Centre #1 and the Project Team's response. Prepared responses were issued directly to the commenter via email.

A copy of the Public Information Centre #1 Summary Report is provided in **Appendix C** of this Report.

Table 7-7: Summary of Feedback from Public Information Centre #1

Comment Theme	Summary of Comments Received	Project Team Response
Community Engagement Process and Activities	<ul style="list-style-type: none"> ■ Several individuals requested to be added to the contact list ■ A few individuals expressed concern regarding the level of detail presented during Public Information Centre #1 and the questions asked during the survey ■ A few individuals inquired about how to participate in the webinar portion of Public Information Centre #1, and ■ One individual expressed disappointment in their view that Huron-Wendat's concerns were not fully being represented in the Federal Impact Assessment. 	<ul style="list-style-type: none"> ■ Individuals were added to the Project Contact List and acknowledgement provided ■ Concerns with the material presented during Public Information Centre #1 were acknowledged and additional information was provided to supplement project data/studies ■ Individuals who had technical issues with the Public Information Centre #1 materials were provided with assistance and links to the webinar registration, as required, and ■ Confirmation that the Project Team has engaged and consulted with and continues to engage and consult with Indigenous communities as part of this project.
Environmental Concerns – Natural Environment	<ul style="list-style-type: none"> ■ Several individuals expressed concerns regarding surface water and runoff from the Bradford Bypass into Lake Simcoe and the Holland River ■ Two individuals expressed concerns about groundwater and if the construction of the Bradford Bypass will impact the quality of well water ■ Several concerns were raised regarding impacts to the surrounding environment, specifically flora and fauna, wetlands, trees, wildlife corridors and habitats, and Species At Risk ■ One individual noted that there are 11 locations within the area of interest for Lake Simcoe Region Conservation Authority and provided suggestions and recommendations to mitigate impacts, and ■ Two individuals expressed concern regarding environmental impacts and assessments at the Holland River East Branch Crossing. 	<ul style="list-style-type: none"> ■ Provision of details outlining the approach taken to conduct surface water assessment as part of the project, confirmation that Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority will be conducted throughout the project, and confirmation that the Ministry will assess impacts with respect to the Lake Simcoe Protection Act ■ Provision of details outlining the approach taken to conduct a groundwater assessment as part of the project ■ Provision of details outlining the approach taken to conduct a terrestrial assessment that includes evaluation of wildlife crossings/exclusion fence, and confirmation that the Project Team is continuing to consult with Regulatory Agencies throughout all project phases ■ Confirmation that the project involves completing surface water, groundwater, terrestrial, and fisheries assessments, and the Project Team will consult with Lake Simcoe Region Conservation Authority to discuss any key issues related to the project, and ■ Concerns regarding the Holland River East Branch Crossing will be factored into evaluation criteria, where appropriate.
Environmental Concerns – Social and Economic Environment	<ul style="list-style-type: none"> ■ Several individuals expressed concern regarding impacts to adjacent properties, expropriation of land and the legislative process for land expropriation ■ Several individuals expressed concern regarding impacts to prime agricultural lands and specialty crop areas and requested to know where local produce will be grown once the land is paved ■ Several individuals expressed concern regarding impacts to adjacent land uses ■ Several individuals expressed concern regarding noise and vibration levels and mitigation measures to reduce these impacts, and ■ A few individuals expressed concern regarding air quality during construction and operation of the Bradford Bypass. 	<ul style="list-style-type: none"> ■ Confirmation that the Ministry works directly with impacted property owners to discuss property-specific concerns and noted that land expropriation is only used when agreements cannot be reached within suitable project timeframes. ■ Confirmation that an Agricultural Impact Assessment will be completed, and consultation with local farming communities and the Ontario Ministry of Agriculture, Farming and Rural Affairs is ongoing ■ Confirmation that various studies are being undertaken as part of the project, including Land Use, Noise, Air Quality, etc., which identify potential impacts on directly impacted or adjacent residents ■ Confirmation that the Ministry is undertaking a noise and vibration assessment as part of the project and will follow the Ministry's Noise Guide to evaluate noise barrier types and locations, and ■ Confirmation that the Ministry is undertaking an air quality assessment as part of the project in accordance with the Air Quality guidelines.
Engineering, Transportation and Design	<ul style="list-style-type: none"> ■ One individual asked if a Value Engineering study is being completed ■ One individual inquired about installing dynamic charging stations for electric vehicles ■ One individual noted that the majority of the webinar survey respondents said they would not use the Bradford Bypass and requested to know why the project is being carried forward rather than improving congestion on Highway 404 ■ One individual inquired about the overpass at 10th Sideroad ■ One individual expressed concern regarding impacts to a sanitary trunk sewer that is proposed along Highway 400 and County Road 88 ■ Several individuals requested further information on the reduction of travel time and traffic congestion, and ■ A few individuals provided suggestions for municipal/regional roads, including the number of lanes, speed limits, carpool lots, and pedestrian access. 	<ul style="list-style-type: none"> ■ Confirmation that a Value Engineering Workshop will be held in Spring 2022 where applicable ■ Confirmation that dynamic charging stations are not included in current plans for the project but may be explored at a later stage of design for the project ■ Details provided regarding the rationale for the Bradford Bypass including, travel time savings and population projections ■ Confirmation that the proposed overpass structure at 10th Sideroad represents a design refinement allowing the freeway to best fit within the topography of the area ■ Confirmation that the Project Team is consulting with municipalities and will take into consideration land use planning and sewer information within the Study Area ■ Explanation that travel-time savings were calculated using the Provincial Greater Golden Horseshoe Transportation Model and the location of the Bradford Bypass was chosen following evaluations as part of the 2002 Approved Environmental Assessment, and ■ Road recommendations were acknowledged, and a noted that suggested provided will be factored into the evaluation criteria, where appropriate.

Comment Theme	Summary of Comments Received	Project Team Response
Project Planning and Timelines	<ul style="list-style-type: none"> Several individuals inquired about project and construction timelines, and Several individuals inquired about implications to the project as a result of changes in government. 	<ul style="list-style-type: none"> Details provided on the schedule for this Preliminary Design, as well as subsequent design and construction stages, and Confirmation that, at the time of Public Information Centre #1 the Ministry is proceeding with the Preliminary Design study, and that project-related decisions resulting from a change in government are not yet known.
Interchange Locations and Design	<ul style="list-style-type: none"> Several individuals provided support for interchange locations, and requested more information on interchange alternatives and design, specifically at Highway 400 and County Road 88 Several individuals provided suggestions on interchange locations and design, specifically at Bathurst Street, Leslie Street, Yonge Street and County Road 4 Support provided for the Highway 400 Interchange Alternative Refinement 3, Highway 404 Interchange Alternative Refinement 1 and 3, Bathurst Street Interchange Alternative 2, and Holland River East Branch Crossing Refinement Alternative 2, and A few individuals suggested including an interchange at 10th Sideroad. 	<ul style="list-style-type: none"> Acknowledgement for the support and suggestions provided and confirmation that they will be considered during the interchange alternatives evaluation Details provided on the interchange locations and alternatives design. Support/recommendations acknowledged with a note that they will be factored into evaluation criteria, where appropriate, and Noted that a traffic demand analysis has been undertaken as part of this project, which confirmed the locations of the interchanges and traffic modelling.
Environmental Assessment Process	<ul style="list-style-type: none"> Two individuals requested that all applicable land use policies are followed, including policies set out in the Lake Simcoe Protection Plan, the Greenbelt Plan, and the Provincial Policy Statement Several individuals requested clarification on the affect of the proposed project exceptions to the environmental assessment process One individual requested to know if project deliverables will be submitted to Lake Simcoe Region Conservation Authority or Nottawasaga Valley Conservation Authority for voluntary review, and Several individuals expressed concern regarding the environmental assessment process and noted that the environmental assessment is out of date. 	<ul style="list-style-type: none"> Provided confirmation that the impact assessments undertaken as part of this project will follow appropriate policies/legislations and several provincial and federal Regulatory Agencies will be consulted Confirmation that, at the time of Public Information Centre #1, the proposed Ministry of the Environment, Conservation, and Parks' exemption was being considered by the Ministry of the Environment, Conservation, and Parks, but environmental impact assessments and required consultation with Indigenous communities and other stakeholders will be completed regardless of the outcome Confirmation that Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority comments and consideration for the design/engineering refinements and approaches to mitigation will be implemented, and Confirmation that 15 environmental studies are being undertaken as part of the project. Impact assessments undertaken as part of the project will follow appropriate policies/legislations and several provincial and federal Regulatory Agencies will be consulted throughout the project.
General Project and Proposed Alignment	<ul style="list-style-type: none"> A few individuals provided support for the project A few individuals requested consistency for the name of the project (Bradford Bypass vs. 400-404 Link) Two individuals inquired about the Bradford Bypass being a toll highway One individual requested information on where the alignment begins in relation to Queensville Sideroad Concerns regarding impacts to recreational canoeing, kayaking and boating Several individuals noted they do not support the Bradford Bypass One individual noted that the COVID-19 pandemic has changed the needs in the region and the Bradford Bypass is no longer needed One individual expressed concern about littering and asked what is being done to prevent littering One individual suggested including a property in the project Study Area in order to reduce traffic congestion Several individuals provided suggestions on the Bradford Bypass alignment, and One individual requested information on the materials that will be used to build the Bradford Bypass. 	<ul style="list-style-type: none"> Support for the project acknowledged Confirmation that at the time of Public Information Centre #1, an official name or highway designation had not been selected Confirmation that at the time of Public Information Centre #1, decisions regarding tolls have not been made Provision of links to the Project Website showing project mapping and alignment Confirmation that consultation with Transport Canada is ongoing regarding navigation requirements Explanation that the Bradford Bypass is required to help address road congestion and improve connectivity in the Greater Golden Horseshoe Confirmation that littering is prohibited under the Highway Traffic Act and the Ministry has contractors to remove litter along freeways Recommendations acknowledged and a note that suggestions will be factored into the evaluation criteria, where appropriate Rationale provided for the location of the Bradford Bypass highway alignment following evaluations of alternate locations undertaken during the 2002 Approved Environmental Assessment, and Noted that the Ministry is continually searching for innovative engineering opportunities for highway design/construction materials.

7.6.2 Public Consultation: Preliminary Design Interchange Considerations

A consultation event referred to as the Preliminary Design Interchange Considerations Consultation Event was held for the project between April and May 2022. The purpose of the consultation event was to present updated information on the Preliminary Design Interchange Considerations at 10th Sideroad and 2nd Concession Road, solicit feedback and comments on the additional interchange design alternatives, provide updates on key objectives, and provide an update on project milestones and next steps.

The Preliminary Design Interchange Considerations were posted virtually through the Project Website so interested persons were able to learn more about the additional interchanges for the project.

The materials included updated information for the project, key objectives, and Preliminary Design alternatives for the interchanges at 10th Sideroad and 2nd Concession Road. Materials were made available for a two-week public consultation review period on the Project Website between April 21, 2022, and May 5, 2022.

Prepared responses were issued to the commentors via email.

7.6.2.1 Engagement Materials

The Preliminary Design Interchange Considerations Consultation Event was undertaken as a virtual event as there were limitations on in-person gatherings and events at the time of the event. The display panels presented as part of the event included the following information:

- Project Introduction
- Key Objectives
- How to Participate
- Project History
- Interchange Considerations (what we heard; what we are doing)
- Technically Preferred Route and Interchanges under Consideration
- Study Process
- Evaluation Criteria and Process
- Environmental Protection and Mitigation Measures
- Interchange Alternatives: 10th Sideroad Base Case

- 10th Sideroad Preliminary Design Interchange Options
 - 10th Sideroad Interchange – Alternative 1
 - 10th Sideroad Interchange – Alternative 2, and
 - 10th Sideroad Interchange – Alternative 3.
- Key Considerations
- Summary: Interchange Design Preference for 10th Sideroad
- Interchange Alternatives: 2nd Concession Road
- 2nd Concession Road Base Case
- 2nd Concession Road Preliminary Design Interchange Options
 - 2nd Concession Road Interchange – Alternative 1
 - 2nd Concession Road Interchange – Alternative 2, and
 - 2nd Concession Road Interchange – Alternative 3.
- Key Considerations
- Summary: Interchange Design Preference 2nd Concession Road
- Feedback and Comments, and
- Project Milestones and Next Steps.

After stakeholders had an opportunity to review the above presentation materials, they were encouraged to complete a Comment Form to provide feedback on the interchange alternatives proposed at 10th Sideroad and 2nd Concession Road. The comments included the following:

1. Does your organization wish to participate in the study and continue to receive notices of project activities or information as this study progresses? If you do not wish to participate, you will be removed from the mailing list, and
2. Please provide your feedback on the interchange alternatives that will be designed for 10th Sideroad and 2nd Concession Road.

Materials from the Preliminary Design Interchange Consultation Event are provided in **Appendix C** of this Report.

7.6.2.2 Summary of Feedback Received

Data identified that 99 individuals visited the Preliminary Design Interchange Considerations Consultation Event webpage between April 21, 2022 and May 5, 2022. The following section highlights the key findings and level of public interest related to

topics/questions identified through the consultation event. The following seven topics emerged from the feedback and comments received:

- Natural Hazards and Environmental Features
- 10th Sideroad Interchange
- 2nd Concession Road Interchange
- Cultural Heritage and Archaeological Impacts
- General Project Alignment and Interchanges
- Property Impacts, and
- Public Consultation Event.

Table 7-8 summarizes the key questions, comments, issues, and concerns raised during the Preliminary Design Interchange Considerations Consultation Event and the Project Team's response. Prepared responses have been issued directly to the commenter via email.

A copy of the Public Consultation: Preliminary Design Interchange Considerations Summary Report is provided in **Appendix C** of this Report.

Table 7-8: Summary of Feedback Received from Public Consultation: Preliminary Design Interchange Considerations

Comment Theme	Summary of Comments Received	Project Team Response
Natural Hazards and Environmental Features	<ul style="list-style-type: none"> ■ Lake Simcoe Region Conservation Authority provided information about the location of floodplain and erosion hazards, environmental features (e.g., significant woodlands, ecologically significant groundwater recharge areas, etc.) and mapping at the proposed interchanges at 10th Sideroad and 2nd Concession Road ■ Provided a list of suggested avoidance and mitigation measures ■ Recommended further consultation through the Detail Design or environmental discipline studies which will be carried out through the design including: <ul style="list-style-type: none"> – Drainage and Hydrology – Floodplain Studies – Erosion and Sediment Control – Fish and Fish Habitat Existing Conditions and Impact Assessment Report – Fluvial Geomorphology – Groundwater Impact Assessment – Landscape Plan – Environmental Impact Studies – Engineered Drawings, and – Grading Plans. 	<ul style="list-style-type: none"> ■ Thank you for providing comments on behalf of Lake Simcoe Region Conservation Authority. The Preliminary Design for the Bradford Bypass project is still underway and will complete several comprehensive studies related to the natural, socio-economic, cultural environment, and engineering design. These studies will update and document existing conditions, identify and evaluate potential impacts of the project and recommend mitigation measures to reduce these impacts to meet current environmental legislative requirements. For stormwater management controls, the project will follow the Ministry of the Environment, Conservation and Parks Stormwater Management guidelines, and will consider Lake Simcoe Region Conservation Authority guidelines where appropriate ■ Thank you for providing the information on natural hazards, environmental features, and mapping at the proposed interchanges, as well as the list of suggested avoidance and mitigation measures. We have circulated this information to the appropriate technical disciplines for consideration of project-specific environmental impacts. Additionally, the location of the natural hazards and environmental features identified at 10th Sideroad and 2nd Concession Road will also be documented and taken into consideration as part of these studies. Thank for further clarification on the HEC-RAS modelling information. This analysis is being carried out as discussed at the February 17, 2022 meeting with Lake Simcoe Region Conservation Authority ■ The results of these studies will be presented during the next Public Information Centre (PIC) #2 anticipated to be held during the fall of 2022 and documented in a Draft Environmental Conditions Report and Draft Environmental Impact Assessment Report, to be prepared in accordance with the Regulation, and ■ The Project Team will continue to consult with the Lake Simcoe Region Conservation Authority and environmental agencies throughout the Preliminary Design. In accordance with the Regulation, Lake Simcoe Region Conservation Authority will receive copies of the Draft Groundwater Protection and Well Monitoring Plan, Draft Stormwater Management Plan, Draft Environmental Conditions Report and Draft Environmental Impact Assessment Report for review. Following Preliminary Design, the Ministry will continue to consult with Lake Simcoe Region Conservation Authority for Detail Design and construction.
Support of 10th Sideroad Interchange	<ul style="list-style-type: none"> ■ Expressed support for the 10th Sideroad interchange and noted it is essential to balance the local traffic in the Town of Bradford. 	<ul style="list-style-type: none"> ■ The Project Team acknowledges and appreciates your support for the proposed interchange at 10th Sideroad.
Needs justification at 2nd Concession Road	<ul style="list-style-type: none"> ■ Requested details and asked for clarification on justification and need for an interchange at 2nd Concession Road. 	<ul style="list-style-type: none"> ■ The Bathurst Street and Leslie Street interchanges were identified in the 2002 Approved Environmental Assessment which was developed, evaluated, and selected through that evaluation process ■ The Ministry is developing and considering the feasibility of interchanges at 10th Sideroad and 2nd Concession Road as part of the Preliminary Design based on feedback received from municipalities in 2020. It was requested that interchanges be considered at these locations based on municipal and regional development and transportation planning within Simcoe County and York Region. For each interchange, configuration options are also being considered as shown in the materials for the Preliminary Design interchange considerations for 10th Sideroad and 2nd Concession Road on the Project Website (https://www.bradfordbypass.ca/wp-content/uploads/2022/04/2022-21-04_MTG-PublicConsultationInterchanges.pdf), and ■ The interchanges will be evaluated through a reasoned-argument method to consider the five broad factors: Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment. Your feedback, along with others received through consultation, will be incorporated into the evaluation as part of these factors. The interchange evaluation will consider highway geometrics, traffic modelling, and structural and environmental factors.
2nd Concession Road Interchange	<ul style="list-style-type: none"> ■ Opposed the proposed interchange at the 2nd Concession Road and deemed it excessive on a rural residential road. Noted that anyone from this area wanting to access the Bradford Bypass could just as easily do so from the 404 via either Green Lane or Queensville Road and another interchange to come at Doane Road. 	<ul style="list-style-type: none"> ■ The Ministry is developing and considering the feasibility of interchanges at 10th Sideroad and 2nd Concession Road as part of the Preliminary Design based on feedback received from municipal staff and councils in 2020 ■ Through consultation with York Region and the local municipalities, it has been requested that the Ministry specifically consider including an interchange at 2nd Concession Road based on municipal and regional development and transportation planning. Since the 2002 approved Environmental Assessment, the Region has continued to update their Transportation Master Plan and consider future planning improvements to 2nd Concession Road ■ The Ministry is evaluating the interchanges considering five broad factors for the selection of the interchange design for the Bradford Bypass, including: Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment. The Project Team will continue to consult with and work closely with the municipalities throughout design and construction to co-ordinate municipal road improvements with the Bradford Bypass, and ■ The preferred interchange configuration at 2nd Concession Road will be presented at Public Information Centre #2, which will highlight the overall preferred Preliminary Design.

Comment Theme	Summary of Comments Received	Project Team Response
Support for 2nd Concession Road Interchange	<ul style="list-style-type: none"> ■ Phoned to express support for interchange at 2nd Concession Road and noted this proposed interchange is long overdue. 	<ul style="list-style-type: none"> ■ Project Team received the phone call and appreciated support for the project.
Cultural Heritage and Archaeological Impacts	<ul style="list-style-type: none"> ■ Archaeology and cultural heritage comments from the Ministry of Citizenship and Multiculturalism regarding decision making for the design and selection of alternatives when comparing the impacts of different interchange configurations and locations. 	<ul style="list-style-type: none"> ■ The Project Team is updating the Stage 1 Archaeological Assessment report to address Ministry of Citizenship and Multiculturalism comments. Through the Preliminary Design, the Ministry continues to complete Stage 2 Archaeological Assessments. The results of these assessments will include any archaeological findings for the interchanges at 10th Sideroad and 2nd Concession Road and will be documented in Stage 2 Archaeological Assessment Report(s) for the project. Based on the findings of the Stage 2 investigations, the Ministry will advance Stage 3 and Stage 4 investigations, with involvement from Indigenous communities. The archaeological assessment documentation will be provided to Indigenous communities for review and consideration, then submitted to the Ministry of Citizenship and Multiculturalism for review and acceptance ■ The Project Team consulted with Ministry of Citizenship and Multiculturalism regarding the Cultural Heritage Resource Assessment Report prepared in 2020. The 2020 Cultural Heritage Resource Assessment Report for the Bradford Bypass is being revised to reflect comments and discussions with Ministry of Citizenship and Multiculturalism. The revised Cultural Heritage Resource Assessment Report will include a field review and update the requirements identified in the Ministry Environmental Reference for Highway Design (2013), the Environmental Guide for Built Heritage and Cultural Heritage Landscapes (Ministry of Transportation, 2007) and Ministry of Citizenship and Multiculturalism comments received on February 11, 2022. The updated report covers the Preliminary Design, including the proposed interchanges at 10th Sideroad and 2nd Concession Road. Once complete, the revised Cultural Heritage Resource Assessment Report will be resubmitted to the Ministry of Citizenship and Multiculturalism, and ■ Both archaeology assessments and cultural heritage evaluations are ongoing for the project. The results of these studies will be documented in corresponding reports. For archaeology, updated Stage 1, and new Stage 2, 3 and 4 archaeology reports will be prepared, where required, and submitted to the Ministry of Citizenship and Multiculturalism. For Cultural Heritage, the Cultural Heritage Resource Assessment Report will be updated, and resource-specific Cultural Heritage Evaluation Reports and Heritage Impact Assessment Reports will be prepared, where required. Findings will be factored into the evaluation of the Preliminary Design alternatives and a summary of the studies will be presented in the fall of 2022 at the next Public Information Centre #2 and documented in both the Environmental Conditions Report and the Environmental Impact Assessment Report, in accordance with the Regulation.
Against the Interchanges and Project	<ul style="list-style-type: none"> ■ Opposed the project and noted that five interchanges in addition to the ones at Highway 400 and Highway 404 seem excessive and land intensive. 	<ul style="list-style-type: none"> ■ The Ministry is developing and considering the feasibility of interchanges at 10th Sideroad and 2nd Concession Road as part of the Preliminary Design based on feedback received from municipal staff and councils in 2020. It was requested that interchanges be considered at these locations based on municipal and regional development and transportation planning within Simcoe County and York Region. For each interchange, configuration options are also being considered as presented in the interchange consultation material, and ■ The interchanges will be evaluated through a reasoned-argument method to consider the five broad factors: Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment. Your feedback, along with others received through consultation, will be incorporated into the evaluation as part of these factors. The interchange evaluation will also consider highway geometrics, traffic modelling, and structural and environmental factors.
Feedback on the new Interchanges	<ul style="list-style-type: none"> ■ Provided feedback on the 10th Sideroad Interchange and design configurations in order to minimize property impacts, and ■ Provided design configuration feedback on the 2nd Concession Road given current and future traffic volumes 	<ul style="list-style-type: none"> ■ The Ministry is developing and considering the feasibility of interchanges at 10th Sideroad and 2nd Concession Road as part of the Preliminary Design based on feedback received from municipal staff and councils in 2020. It was requested that interchanges be considered at these locations based on municipal and regional development and transportation planning within Simcoe County and York Region. Interchange configuration refinements at the proposed locations within the Study Area are being considered based on five broad factors: Transportation, Natural Environment, Social Environment, Economic Environment, and Cultural Environment. Each design alternative presented was developed to meet highway standards such as sight distance, weaving distance, and other governing criteria. The Project Team considers the design standards in a balanced approach to other constraints, including property impacts, and ■ Your feedback aligns with the Ministry's plans for evaluating interchange design, and will be taken into consideration, along with other feedback received, for evaluation of the interchange alternatives for 10th Sideroad and 2nd Concession Road, and future design refinements.
Support for Bathurst Street Interchange	<ul style="list-style-type: none"> ■ Expressed support for the interchange at Bathurst. 	<ul style="list-style-type: none"> ■ The Project Team acknowledges and appreciates your expressed support for the Bathurst Street interchange.

Comment Theme	Summary of Comments Received	Project Team Response
Property Impacts	<ul style="list-style-type: none">Expressed concern for property impacts and noted the location of the future York Region Water Reclamation Centre site, andRequested further clarity on residual land use capability and the location of driveway entrances.	<ul style="list-style-type: none">Your feedback will be taken into consideration on the interchange design refinements and alternatives presented. Through previous consultation with East Gwillimbury and York Region, the Project Team is aware of the future studies for the Upper York Sewer Solution and appreciates further confirmation of the proposed water reclamation centre on 2nd Concession Road, andProperty access and modifications to existing entrances will continue to be reviewed as part of the evaluation of alternatives and future construction staging for the project. The Ministry will work with property owners to consider these potential impacts to access and identify where accommodations and access impact mitigations can be implemented. The preferred alternative for the Bradford Bypass will be presented at Public Information Centre #2 scheduled for the fall of 2022. Land use and acquisition (if required) will be determined based on Ministry directives.
General PIS Event Question Opposition to the Project & feedback on design decisions & alternative solutions	<ul style="list-style-type: none">Questioned why the Interchange Considerations were only available for consideration for a 2-week period (e.g., why not a 30-day review period) given the public has little knowledge about the design and implementation of various interchange configurationsThe real question to be consulting on is: Should we add interchanges at 10th Sideroad and 2nd Concession? And if so, are there other interchanges, such as Leslie St, where a proposed interchange can or should be removed?Provided historical and policy context around the Ministry’s mandate for addressing the need and justification for building Bedford Bypass in the absence of inter-regional arterial roads. Noted that the Bypass will have significant negative impacts to the natural environment while costing more per kilometre than most highways due to the added costs of building this highway on structurally unsound substrate. Concluded that this highway will also not satisfy the Ministry’s original planned objective of separating local from long distance travelStrongly recommended that the travel demands to be generated in this area be served by arterial roads connecting existing roads on either side of the Holland River. These would be located to connect Bradford’s 8th Line with Queensville Sideroad via Hochreiter Rd. and Bathurst St. and immediately south of Cook’s Bay connecting Ravenshoe Rd. to Hwy 89 via 13th Line and 20th Sideroad, andRecommended that a controlled access highway to link Highways 400 with 404 would be built south of Newmarket along one of the “Outer Ring Road” routes depicted on the Ministry’s Exhibit E-5 to their 2002 Approved Environmental Assessment.	<p>Consultation Process – Interchange Consultation Event</p> <ul style="list-style-type: none">The Preliminary Design Interchange Considerations Event materials were available for a two-week review period, in place of a one day in-person event. This was intended to allow people the flexibility to review the information at any time between April 21 and May 5, 2022. While this was the focused duration of the event to be considered as part of the evaluation, the materials remain on the Project Website and comments can be submitted at anytime during the study. <p>Interchange Design and Location Evaluations</p> <ul style="list-style-type: none">Thank you for your question and personal insight into the evaluation process. This is consistent with the evaluation process that the Project Team is currently undertaking. As part of the Route Planning Study, interchanges were considered at each major road crossing. In consultation with local municipalities and regional government representatives during the current Preliminary Design study, it has been requested that the Ministry reconsiders options to provide these two interchanges based on current transportation master planning and municipal planning efforts, andThe Ministry will evaluate the feasibility of interchanges at 10th Sideroad and 2nd Concession Road as part of the Preliminary Design and continue to engage with local municipalities and regional government representatives throughout the study. <p>Preliminary Design Study and Process</p> <ul style="list-style-type: none">The Bradford Bypass was proposed as one part of the response to this dramatic growth in population and travel demand in the area and to the forecasted increase in congestion on key east-west roadways linking Highway 400 to Highway 404. The Technically Preferred Route was selected based on highway network expansion, ease of construction, relationship to provincial and municipal land use planning (Official and Transportation Master Plans, Places to Grow Act), as well as having fewer negative impacts to residential and natural areas when compared to other route options, andThrough the study, traffic modelling is carried out to evaluate potential alternatives with respect to traffic demand and level of service. This information is considered along with the evaluation of design, environmental, social, and cultural criteria. Geotechnical investigations are part of the structural design of the bridges and highway design to understand the foundational requirements of the project. The local municipalities and regional governments continue to review and update their transportation master plans to reflect local transportation needs and provide recommendations and planning for roadway improvements within their jurisdiction. Alternatives that involve municipal and regional transportation planning for non-provincial roadways are beyond the scope of considerations for this project.
10 th Sideroad Interchange	<ul style="list-style-type: none">Expressed preference for Alternative #2 as it limits the number of properties required compared to Alternative #1 and provided design configuration feedback for a pedestrian sidewalk under the Bypass to access Henderson Park which will be a large community park.	<ul style="list-style-type: none">Thank you for advising us of your preference for Alternative #2. The Project Team will continue to consult with you and other property owners along the right-of-way throughout design and construction with respect to potential property impacts and appropriate mitigation opportunities. If you wish to meet with the Project Team to discuss your property-specific concerns as it relates to the design, please let us know and we can arrange a time to meet with you.

7.6.3 Environmental Conditions Report Public Review Period

The Ministry issued the Notice of Publication of the Draft Environmental Conditions Report on July 28, 2022. The Draft Environmental Conditions Report was available for public review on the Project Website from August 12, 2022, to September 16, 2022, to obtain further feedback on the project. In accordance with Section 19 of the Regulation, the feedback received during the Draft Environmental Conditions Report public review period was considered and incorporated into the Final Environmental Conditions Report, and the Ministry issued the Notice of Publication of the Final Environmental Conditions Report and posted the Final Environmental Conditions Report on the Project Website on October 27, 2022.

For more information on the comments received during the Draft Environmental Conditions Report public review period and the Project Team response, refer to Table 7-1 of the Final Environmental Conditions Report on the Project Website.

7.6.4 Public Information Centre #2

A Public Information Centre was held virtually on November 24, 2022. The purpose of Public Information Centre #2 was to provide an overview and study process, consultation, outcome of the evaluation process, the Updated Technically Preferred Route, an overview of the anticipated environmental impacts and proposed mitigation measures, and next steps, followed by a live question and answer period. The Preliminary Design alternatives were generated and evaluated based on technical and environmental factors, and engagement and consultation with Indigenous communities, municipalities, government agencies and public stakeholders, including feedback received from Public Information Centre #1, the Preliminary Design Interchange Considerations for 10th Sideroad and 2nd Concession Road, and the Draft Environmental Conditions Report.

The Public Information Centre #2 materials were made available on the Project Website after the event.

7.6.4.1 Engagement Materials

For the purpose of the Public Information Centre #2 webinar, a condensed version of the Public Information Centre #2 slide deck was presented. The full slide deck is available on the Project Website. The Public Information Centre #2 presentation deck included the following:

- Welcome and Introduction
- Introductions
- Land Acknowledgement

- Agenda
- Purpose of Public Information Centre #2
- Bradford Bypass Project Overview
- Study Process and Schedule
- Ontario Registration 697/21: Bradford Bypass Project
- Project Consultation Activities
- Overview of Public Information Centre #1
- Overview of Preliminary Design Interchange Considerations for 10th Sideroad and 2nd Concession Road
- Overview of the Environmental Conditions Report
- Impact Assessments
- Overview of Benefits
- Overview of Selected Alternatives
- Development of Alternatives and Evaluation Process
- Evaluation Summary
 - Highway 400 Freeway to Freeway Interchange
 - Between 10th Sideroad and County Road 4
 - Holland River East Branch
 - Hydro Towers
 - Highway 404 Freeway to Freeway Interchange
 - 10th Sideroad Interchange
 - County Road 4 Interchange
 - Bathurst Street Interchange
 - 2nd Concession Road Interchange, and
 - Leslie Street Interchange.
- Screening Assessment – Carpool Lots
- Overview of the Recommended Plan
- The Recommended Plan
 - End to End
 - Mainline Cross-Section
 - Highway 400 Freeway to Freeway Interchange
 - 10th Sideroad Interchange
 - Between 10th Sideroad and County Road 4
 - County Road 4 Interchange
 - Bathurst Street Interchange
 - Holland River East Branch

- 2nd Concession Road Interchange
- Hydro Towers
- Leslie Street Interchange
- Highway 404 Freeway to Freeway Interchange
- Crossing Road Sections
- Active Transportation
- Structures
- Navigation
- Drainage and Hydrology, and
- Other General Items.
- Summary of Anticipated Property Impacts
- Terrestrial Ecosystems
- Holland Marsh and Lake Simcoe Watershed
- Designated Natural Areas
- Fish and Fish Habitat
- Fluvial Geomorphology
- Groundwater and Hydrogeology
- Noise and Vibration
- Noise Receptor Locations
- Air Quality
- Air Quality Critical and Sensitive Receptors
- Human Health
- Land Use
- Agriculture
- Preliminary Landscaping Composition Plan
- Snowdrift Assessment
- Waste and Contamination
- Cultural Heritage Assessment
- Status of Stage 2 Archaeological Assessments
- Project Schedule and Next Steps
- Questions and Answers, and
- Thank You.

The presentation was followed by a live question and answer period using the chat function of Zoom. Materials from Public Information Centre #2 are provided in **Appendix C** of this Report and available on the Project Website.

7.6.4.2 Summary of Feedback Received

A total of 152 comments were submitted through the live webinar chat feature. Additionally, four comments were submitted through the Project Team's voicemail.

Public Information Centre #2 materials were made available on the Project Website for a two-week review period between November 24, 2022, and December 8, 2022. Stakeholders were able to provide comments on the Public Information Centre #2 materials during this time. The Public Information Centre #2 comment box was removed from the Project Website on December 9, 2022. Any comments made after this time were included as part of the general consultation record for the project.

The following topics emerged from the feedback and comments received:

- Project Consultation
- Natural Environment
- Socio-economic
- Noise and Vibration
- Air Quality
- Traffic
- Engineering
- Property Impact
- Provincial/Federal Legislations and Policies
- Project Planning, and
- General Interest, Support and Opposition.

Table 7-9 summarizes the key questions, comments, issues, and concerns raised during the Public Information Centre #2 and the Project Team's response. Prepared responses were issued to the commentors via email.

A copy of the Public Information Centre #2 Summary Report is provided in **Appendix C** of this Report.

Table 7-9: Summary of Feedback Received from Public Information Centre #2

Comment Theme	Summary of Comments Received	Project Team Response
General	<ul style="list-style-type: none"> Inquiries about the format of Public Information Centre #2 Requests to be added to the Project Contact List and registration for Public Information Centre #2 Zoom Webinar Inquiries about project and construction timing Inquiries about land expropriation and questions regarding individual property impacts Inquiries about project funding, and Support for the Project Team on Public Information Centre #2 and vehicle technology improvements. 	<ul style="list-style-type: none"> Public Information Centre was presented online as a virtual consultation event to provide opportunities to view materials and provide flexibility for those wishing to attend who may have conflicts or restrictions that limit their ability to attend an event in person. Within virtual platforms there is also an opportunity to address accessibility needs Individuals added to the Project Contact List and provided PIC #2 registration instructions The Preliminary Design and project specific assessment of environmental impacts for the overall Bradford Bypass Project is anticipated to be completed in 2023. Subsequent Detail Design and construction phases will follow The Ministry aims to acquire property through amicable negotiation as early as possible and to reach agreements for the acquisition of any properties needed to support important infrastructure improvements. Expropriation is only used when agreements can't be reached within suitable project timeframes. The Ministry will continue to meet with individual landowners to discuss impacts to individual properties, understand concerns from landowners and identify opportunities to mitigate impacts The Ontario government is committed to fully funding the construction of the Bradford Bypass and is following through on its promise to improve and invest in the Province's transportation corridors to get people moving within the region, connect people to jobs, make life easier and support a strong economy, and Support for the project and technology improvement acknowledged.
Project Consultation	<ul style="list-style-type: none"> Inquiries regarding accessing the virtual platform Inquiries regarding the Indigenous communities the Project Team is engaging and consulting with Inquiries about Public Information Centre #2 stakeholder and Project Contact List, Public Information Centre #2 attendee list, and Preliminary Design Interchange Considerations invite list Concerns related to the consultation process and activities and the length of the review period for Public Information Centre #2 materials Questions regarding if answers to the questions asked during Public Information Centre #2 will be posted on the Project Website, and Inquiry regarding which external environmental agencies have input on the environmental studies currently underway. 	<ul style="list-style-type: none"> Links to Public Information Centre #2 registration were provided Names of Indigenous communities that were engaged and consulted by the Project Team were provided The number of Public Information Centre #2 attendees was provided. Project Contact List and Attendee List were not disclosed due to the protection of personal information; Preliminary Design Interchange Considerations were provided along with the materials and consultation event details for Preliminary Design Interchange Considerations for 10th Sideroad and 2nd Concession Road on Project Website The Project Team detailed that the review period is two-weeks from November 24 to December 8; however, comments and consultations are welcomed throughout the entire Preliminary Design study Questions and comments will be included in the Public Information Centre #2 Summary Report and made available on the Project Website once completed, and Details of environmental agencies have been provided.
Natural Environmental	<ul style="list-style-type: none"> Inquiries about the noise and air quality assessments and mitigation measures Question regarding the scope of the project-specific assessment of environment impacts Inquiries about impacts to wildlife and farmland Inquiries about impacts of road salt Concerns about the scope of environmental studies and language surrounding environmental mitigation measures Concerns about traversing the Holland Marsh and the Greenbelt Concerns about the effects to wetlands and mitigation measures Inquiries regarding winter maintenance, salt run-off mitigation, groundwater contamination standards, groundwater mitigation, water quality treatment, natural channel design and considerations 	<ul style="list-style-type: none"> An Air Quality Impact Assessment and Noise Assessment are underway to identify potential impacts and recommend mitigation measures and future commitments The project-specific assessment of environmental impacts for the Bradford Bypass considers the entire project footprint (which includes the highway itself) and its anticipated impacts to existing conditions in the Study Area A Terrestrial Ecosystems Impact Assessment and Agricultural Impact Assessment are underway to identify potential impacts and recommend mitigation measures and future commitments Appropriate mitigation measures to prevent salt and treated sand from entering watercourses and salt-sensitive areas will be proposed based on various factors including the use of the Ministry's Salt Management Plan and the Ministry of Environment, Conservation and Parks Guidelines on Snow Disposal and De-icing Operations in Ontario Usage of language/terms are related to the maturity of the mitigation and protection measures determined. The measures will be detailed in the subsequent phases of project as studies progresses. Link to the Final Environmental Conditions Report was provided, and the Project Team noted that the environmental studies are underway and will be documented in the Draft Environmental Impact Assessment Report The Greenbelt Plan acknowledges the necessity of building infrastructure to serve significant population growth in the area. Concerns with Provincially Significant Wetlands were addressed with considerations and reflected the Terrestrial Ecosystem Existing Conditions and Impact Assessment Report. The results of the report will be summarized in the Draft Environmental Impact Assessment Report which will be posted for public review and feedback

Comment Theme	Summary of Comments Received	Project Team Response
	<ul style="list-style-type: none">■ Inquiries regarding tree planting plan, mature trees maintenance and reforestation planting timeline■ Questions regarding endangered species, and■ Inquiries regarding light pollution and mitigation plan.	<ul style="list-style-type: none">■ The Stormwater Management Plan will focus on water quality and quantity control of run off and erosion. Sensitive area such as marshes and wetlands will be protected by installing features such as flat-bottom swales or enhanced grassed swales with flow check dams to increase pollutant retention, infiltration, and decrease flow velocities and erosion potential, where feasible■ Concerns with salt, groundwater, snow disposal and de-icing operations, water quality were addressed with detailed considerations and reflected the following plans: Ministry Salt Management Plan, Ministry Climate Change Guide, Ministry of the Environment, Conservation and Park Guidelines on Snow Disposal and De-icing Operations, Stormwater Management Strategy, Lake Simcoe Protection Act, Guidelines on Snow Disposal and De-icing Operations in Ontario and Lake Simcoe Protection Plan. Concerns with salt damage in sensitive areas were addressed with detailed considerations and reflected in The Code of Practice for Environmental Management of Road Salts. Link to The Code of Practice for Environmental Management of Road Salts was provided■ Concerns with vegetation and vegetation communities were assessed via the Terrestrial Ecosystem Existing Conditions and Impact Assessment and a Conceptual Landscape Plan is also being prepared for the project■ Concerns regarding impacts to endangered species have been reviewed with a conservation approach and will be refined as project progresses. Any required permits and approvals will be sought during subsequent phases, and■ Concerns regarding light pollution and mitigation plan are being assessed and an electrical report will be prepared along with a Terrestrial Ecosystem report to discuss the potential impacts of lighting. Detailed information regarding the 15 environmental studies and related mitigation policies were provided. The Project Team noted that the results of the studies will be included in the Draft Environmental Impact Assessment Report.
Engineering	<ul style="list-style-type: none">■ Inquiries regarding the rationale for preferred alternatives■ Inquiries regarding implementation and plans for additional interchanges.■ Inquiries and concerns regarding evaluation criteria and preferred alternatives, specifically interchanges at 10th Sideroad and 2nd Concession Road, and East Holland River Crossings■ Questions and concerns about the selection of the location of the Bradford Bypass■ Questions regarding future additional lanes, including HOV lanes and toll routes■ Inquiries regarding the implementation of roundabouts■ Inquiries regarding water well and monitoring criteria■ Inquiry regarding provisions for an eight-lane highway and vehicle technology improvements, and■ Inquiries regarding proposed elevation changes.	<ul style="list-style-type: none">■ The evaluation process and comprehensive criteria of the Technically Preferred Route were provided, along with noting an explanation that alternate route options were not included in the Environmental Conditions Report as it was ruled out during the 2002 Approved Environmental Assessment■ It was determined that interchanges at 10th Sideroad, County Road 4, Bathurst Street, 2nd Concession Road, and Leslie Street would be included as part of the Study. While the Study will seek approval for all five interchanges locations, a phased implementation of these interchanges may be considered pending further design development and consultation in subsequent design stages. Considerations for additional interchanges is relative to the demand projected over time■ Noted that evaluation process to select a preferred alternative were based on a Reasoned Argument (trade off) method of evaluation based on key factors including: Transportation and Engineering, Socio-Economic, Natural Environment, and Cultural Environment. Links to related reports and materials were provided for more information■ Noted that the location of the project was determined in the 2002 Approved Environmental Assessment■ Provided confirmation that the project will feature six general purpose lanes and two HOV lanes in its ultimate configuration projected in 2041. Details of HOV lanes will be determined as the project progresses. The freeway will not be operated as a toll route per Premier Ford's announcement on November 4, 2021■ Noted that the alternatives that utilized roundabouts were not preferred due to increased property impacts and concerns from key stakeholders on their implementation■ Noted that a Door-to-Door Water Well Survey was completed for some registered domestic/commercial/ livestock/industrial water wells within 500 metres of the proposed preferred route where permission was granted. Impacted owners with water wells will be contacted before dewatering and monitored for water quantity and quality throughout subsequent Detail Design and construction phases of the project■ Noted that the options for vehicle technology and eight-lane highway are under review. Preliminary configurations and design will be determined as the study progresses, and■ Noted that the location of the project was determined in the 2002 Approved Environmental Assessment. Links and explanation of proposed cross sections regarding elevation changes provided. Furthermore, evaluation process to select a preferred alternative were based on a Reasoned Argument (trade off) method of evaluation based on key factors including: Transportation and Engineering, Socio-Economic, Natural Environment, and Cultural Environment. Links to related reports and materials were provided for more information.

Comment Theme	Summary of Comments Received	Project Team Response
Provincial/Federal Legislations and Policies	<ul style="list-style-type: none"> ■ Inquiries regarding the More Homes Built Faster Act (2022) ■ Inquiry regarding Metrolinx's Electrification Plans ■ Question regarding Special Policy Areas and their applicability to existing schools ■ Inquiry regarding status of Bradford West Gwillimbury Transportation Master Plan, and concerns regarding the 2002 Approved Environmental Assessment and its relevancy/applicability to the current project, and ■ Inquiry about if there is a legal obligation for the Ministry to meet air quality standards and greenhouse gas emission targets. 	<ul style="list-style-type: none"> ■ Confirmation that the <i>More Homes Built Faster Act</i> (2022) is not applicable to the project ■ Noted that the Bradford Bypass Metrolinx overpass crossing will not preclude electrification of the rail line ■ Noted that Special Policy Areas 12 (School Boards Lands) and 13 (Special Office/Commercial/Institutional) are identified within the Study Area. Due to the location of the active schools, they are not included in the Town's SPAs, as noted in Bradford West Gwillimbury Official Plan - Schedule B-1 ■ Noted that the Ministry is undertaking 15 environmental studies to update, document, identify and evaluate potential impacts of the project and recommend mitigation measures to reduce potential impacts and meet current environmental legislative requirements. The Bradford West Gwillimbury Transportation Master Plan is a municipal initiative being undertaken by the Town of Bradford West Gwillimbury. The Project Team continues to consult and coordinate with the municipality as part of the Preliminary Design and the results of the studies will be included in the Environmental Impact Assessment Report. The Draft Environmental Impact Assessment Report will be made available for public review and comment prior to finalization, and ■ The Ministry will endeavour to minimize impact on air quality and greenhouse gas emission where applicable. An Air Quality Impact Assessment is underway and takes into account the Ministry of the Environment, Conservation and Parks Climate Change Guide, the Ministry's Air Quality Impact Assessment, Provincial Ambient Air Quality Criteria, and the Canadian Ambient Air Quality Standards. The Air Quality Impact Assessment will be summarized in the Environmental Impact Assessment Report.
Social Economic	<ul style="list-style-type: none"> ■ Question regarding the selection of socio-economic scope and criteria. 	<ul style="list-style-type: none"> ■ Noted that a list of Summary of Refinement Evaluation Factors and Criteria is included in Section 5.1 of the Final Environmental Conditions Report. The evaluated scope of the project included transportation, natural environment, socio-economic environment, and cultural environment.
Culture Heritage and Archaeology	<ul style="list-style-type: none"> ■ Inquiry regarding the protection and number of Indigenous archaeological sites. 	<ul style="list-style-type: none"> ■ Avoidance and protection of Indigenous archaeological resources were acknowledged and considered within the Ministry of Citizenship and Multiculturalism guidelines. For any outstanding archaeological sites which cannot be avoided by design refinements, the Ministry is committed to undertaking Stage 4 Mitigation in order to recover artifacts and record relevant data within the Study Area. The documentation for all currently identified archaeological sites and areas of potential is currently underway and will be available for public review once accepted into the Public Register by the Ministry of Citizenship and Multiculturalism.
Noise and Vibration	<ul style="list-style-type: none"> ■ Inquiries regarding noise and sound reduction, barrier specification, barrier location, and mitigation strategies for property owners and wildlife. 	<ul style="list-style-type: none"> ■ Noted that a Noise Impact Assessment is underway and will include timing constraints and equipment management practices, which will be summarized in the Draft Environmental Impact Assessment Report.
Air Quality	<ul style="list-style-type: none"> ■ Question regarding sensitive receptors and if a critical air quality receptor be added at the location of Harvest Hills Public School. This school is now open in Bradford at the north end of the subdivision between 10th Sideroad and County Road 4 (400 Crossland Blvd.). The individual noted that the slide did not appear to have a critical sensor location on the map shown. 	<ul style="list-style-type: none"> ■ A critical air quality receptor will not be added at Harvest Hills Public School as there are five existing sensitive receptors in the area that outlined and covered both sides of the streets surrounding the school. Please note an Air Quality Impact Assessment is underway and takes into account the Ministry of the Environment, Conservation and Parks Climate Change Guide, the Ministry's Air Quality Impact Assessment, Provincial Ambient Air Quality Criteria, and the Canadian Ambient Air Quality Standards. The Air Quality Impact Assessment will be summarized in the Draft Environmental Impact Assessment Report.
Traffic	<ul style="list-style-type: none"> ■ Inquiries regarding traffic studies' projection, scope, timeline, and availability for public review ■ Inquiries regarding the travel time and modelling horizon, traffic operations maps and street level renderings, specifically Crossland Boulevard, Chelsea Crescent, and Wyman Crescent ■ Question regarding treatment to support active transportation on minor streets at the proposed interchanges ■ Inquiry regarding considerations for pedestrian pick-up and drop-off areas at proposed carpool lots, and ■ Comment regarding congestion issues resulting from underuse of the Highway 407 toll route. 	<ul style="list-style-type: none"> ■ Noted that the Travel Demand Forecast and Future Conditions 2031/2041 Aimsun Microsimulation Model Analysis is underway. This traffic study and other impact assessments are ongoing and will be completed in 2023. Results of the studies, including commitments to future work, and will be documented in the Draft Environmental Impact Assessment Report per Ontario Regulation 697/21. Commitments and required permits and approvals identified in the studies will be carried forward to future Detail Design and Construction phases ■ Noted that the travel time savings were calculated using an area-wide transportation model with a 2041 horizon year. The renderings are not developed as part of the current design stage and that plans and sections of the areas of interest are available on the Project Website ■ Noted that further details on types of facilities and crossing treatments would be determined in the next subsequent design phases in accordance with applicable standards and on-going consultation with municipalities ■ Noted that the considerations and specifications will be studied in subsequent design phases and noted that the objective of the study is to improve traffic operations within the Bradford Bypass corridor, and ■ Noted that the project has been proposed as a response to increases in population and travel demand in the area, including forecasted congestion increases.

Comment Theme	Summary of Comments Received	Project Team Response
Property Impact	<ul style="list-style-type: none">■ Inquiries regarding property impacts on Arthur Evans Crescent, Morgan’s Road, and Old Yonge Street, and■ Opposition and concerns about property impacts, property acquisition and acquisition timelines.	<ul style="list-style-type: none">■ Property owners with properties required to be partially or fully acquired were contacted by the Project Team in Fall 2022, and■ Opposition of project was acknowledged. Links of Project Website were provided for details. Impacted property owners were offered specific property owner meetings with the Project Team to address any concerns regarding the property impacts and the acquisition process.
Project Planning	<ul style="list-style-type: none">■ Inquiries regarding project budget, specific contract value for Brennan Paving and Construction Ltd for the County Road 4 Early Works Project, and project approvals, and■ Inquiry regarding a third PIC following the Environmental Impact Assessment Report, and construction timelines.	<ul style="list-style-type: none">■ Noted that the project budget cannot be disclosed to ensure best value is retained and protect the procurement process. The contract awarded to Brennan Paving and Construction Ltd. is valued at just over \$30 million, and■ Noted that the Preliminary Design and project-specific assessment of environmental impacts for the overall project is anticipated to be completed in 2023. Detail Design and Construction Phases will follow which will have additional consultation opportunities.

7.6.5 Draft Environmental Impact Assessment Report Public Review Period

The Draft Environmental Impact Assessment Report was made available to the public, technical stakeholders, elected officials, Indigenous communities, and other interested persons for review on the Project Website from June 1, 2023 to June 30, 2023.

Additional archaeological investigations have been completed to finalize the impact assessments in accordance with Ontario Regulation 697/21 and are included in this Updated Draft Environmental Impact Assessment Report.

The Updated Draft Environmental Impact Assessment Report with completed archaeological studies is available for review on the Project Website from **July 13, 2023**, until **August 14, 2023**. During this time, Indigenous communities and interested persons have the opportunity to submit written comments to the Project Team through the Project Website.

Consultation on the Updated Draft Environmental Impact Assessment Report shall be carried out in accordance with Section 20 and Section 26 of the Regulation. Further information on the issues resolution process for this Draft Environmental Impact Assessment Report is provided in **Section 7.8**.

7.6.6 Final Environmental Impact Assessment Report

Upon completion of engagement and consultation on the Draft Environmental Impact Assessment Report and completion of the issues resolution process, the Ministry will update this Draft Environmental Impact Assessment Report to include a description of concerns raised by Indigenous communities and interested persons; a description of what actions may be undertaken with respect to the concerns raised; and include a description of any changes to the Environmental Impact Assessment Report as a result of addressing these concerns. The updated Environmental Impact Assessment Report will then be issued as Final in accordance with Section 27 of the Regulation and published on the Project Website.

7.7 Correspondence

This section summarizes the record of comments, feedback, communications received during the study, and corresponding responses with Indigenous communities, Regulatory Agencies, municipalities, key stakeholders and the public.

7.7.1 Correspondence with Indigenous Communities

Table 7-10 summarizes all correspondence with Indigenous communities and the Project Team's response. Prepared responses were issued directly to the Indigenous community via email. All correspondence records with Indigenous communities until March 31, 2023, are provided in **Appendix C** of this Report.

7.7.2 Stakeholder and Public Correspondence

Table 7-11 summarizes the key questions, comments, issues, and concerns raised by stakeholders and the public, and the Project Team's response. Prepared responses were issued directly to the individual via email. All correspondence records with stakeholders and the public until March 31, 2023, are provided in **Appendix C** of this Report.

Table 7-10: Summary of Correspondence with Indigenous Communities

Indigenous Community	Comment Date	Summary of Comments Received	Project Team Response or Information Conveyed in the Correspondence
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	September 23, 2020	<ul style="list-style-type: none"> Not Applicable. 	<ul style="list-style-type: none"> Notice of Study Commencement sent via mail and email.
Huron-Wendat Nation	September 30, 2020	<ul style="list-style-type: none"> Huron-Wendat Nation acknowledged receipt of the Notice of Study Commencement for the Bradford Bypass Huron-Wendat Nation requested to be engaged with further archaeological studies that are initiated as part of the project, and Huron-Wendat requested a copy of the Stage 1 Archaeological Assessment Report. 	<ul style="list-style-type: none"> The Project Team acknowledged Huron-Wendat Nation’s response The Project Team provided a digital copy of the archaeological assessment and noted it was completed by the Ministry in 2020 in advance of the Preliminary Design, and The Project Team noted they look forward to engaging with Huron-Wendat Nation and to reach out with further questions or meeting requests.
Huron-Wendat Nation	November 4, 2020	<ul style="list-style-type: none"> Huron-Wendat Nation requested a meeting with the Project Team and asked the Project Team to provide possible meeting dates. 	<ul style="list-style-type: none"> The Project Team noted they will confirm the Ministry’s availability and provide Huron-Wendat Nation with potential meeting dates, and The Project Team provided three possible meeting dates and asked which dates work for Huron-Wendat Nation attendees.
Huron-Wendat Nation	November 10, 2020	<ul style="list-style-type: none"> Huron-Wendat Nation provided their preference on a meeting date and time. 	<ul style="list-style-type: none"> A meeting was held on December 2, 2020.
Curve Lake First Nation	February 2, 2021	<ul style="list-style-type: none"> Curve Lake First Nation acknowledged receipt of the Notice of Study Commencement for the Bradford Bypass with a letter dated November 23, 2020, and Curve Lake First Nation requested to be kept informed throughout the duration of the project 	<ul style="list-style-type: none"> The Project Team provided a summary of the project and studies that will be undertaken, and Offered opportunities to schedule meetings to describe the process and for Curve Lake First Nation to discuss any concerns.
Hiawatha First Nation	February 8, 2021	<ul style="list-style-type: none"> Hiawatha First Nation requested to review the Environmental Assessment for the project, and noted that they have not been provided any additional information on the project or consultation with Williams Treaties First Nations communities. 	<ul style="list-style-type: none"> The Project Team thanked the Hiawatha First Nation for their interest in the project and noted that their request has been forwarded to the appropriate parties and a response will be provided as soon as possible, and The Project Team encouraged Hiawatha First Nation to visit the Project Website to review project information.
Huron-Wendat Nation	February 22, 2021	<ul style="list-style-type: none"> Huron-Wendat Nation noted that they have not received an update on the next steps for the archaeological studies for the project, and requested to know if archaeological studies are being pursuing in 2021. 	<ul style="list-style-type: none"> The Project Team noted that they will confirm the details of the upcoming field season and provide a response, and The Project Team provided digital copies of the archaeological assessment completed in 2020.
Mississaugas of Scugog Island First Nation	November 19, 2021	<ul style="list-style-type: none"> Mississaugas of Scugog Island First Nation confirmed receipt of the Notice of Study Commencement Mississaugas of Scugog Island First Nation noted that their Consultation Specialist has reviewed the Notice of Study Commencement and has no comments, as the project is occurring in the Territory of the Chippewas Mississaugas of Scugog Island First Nation asked to be kept informed throughout the duration of the project, and Mississaugas of Scugog Island First Nation provided contact details for their Communications Specialist. 	<ul style="list-style-type: none"> The Project Team acknowledged Mississaugas of Scugog Island First Nation’s response and thanked them for their interest in the project The Project Team encouraged Mississaugas of Scugog Island First Nation to visit the Project Website to review project information, and The Project Team noted they look forward to engaging with Mississaugas of Scugog Island First Nation and to reach out with further questions or meeting requests.

Indigenous Community	Comment Date	Summary of Comments Received	Project Team Response or Information Conveyed in the Correspondence
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	April 13, 2021	■ Not Applicable.	■ Notice of Public Information Centre #1 was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	January 7, 2022	■ Not Applicable.	■ A Notice of Publication of Draft Early Works Report was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	March 21, 2022	■ Not Applicable.	■ A Notice of Publication of Final Early Works Report was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	April 14, 2022	■ Not Applicable.	■ A Notice of Consultation: Preliminary Design Interchange Considerations was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	July 28, 2022 (August 12, 2022)	■ Not Applicable.	■ A Notice of Publication of Draft Environmental Conditions Report was sent via mail and email, and ■ A revised Notice of Publication of Draft Environmental Conditions Report was sent via email on August 12, 2022, with follow up by mail.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	October 27, 2022	■ Not Applicable.	■ A Notice of Publication of Final Environmental Conditions Report was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	November 10, 2022	■ Not Applicable.	■ A Notice of Public Information Centre #2 was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	May 25, 2023	■ Not Applicable.	■ A Notice of Publication of Draft Environmental Impact Assessment Report was sent via mail and email.
Alderville First Nation, Chippewas of Georgina Island First Nation, Chippewas of Rama First Nation, Curve Lake First Nation, Hiawatha First Nation, Huron-Wendat First Nation, Kawartha Nishnawbe First Nation, Georgian Bay Métis Council, Métis Nation of Ontario, Mississaugas of Scugog Island First Nation	July 6 2023	■ Not Applicable.	■ A Notice of Publication of Updated Draft Environmental Impact Assessment Report was sent via mail and email.

Table 7-11: Summary of Public and Stakeholder Correspondence

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Government Agencies	Community Engagement Process and Activities	<ul style="list-style-type: none"> The Ministry of Natural Resources and Forestry requested to continue to receive information and environmental reports from the Project Team Transport Canada requested to only receive project notifications if it impacts federal properties or waterways The Ontario Federation of Agriculture requested to be added to the Project Contact List Enbridge Gas provided updated contact information. Fisheries and Oceans Canada requested contact information for Project Team members to send consultation packages to, and Impact Assessment Agency of Canada requested to be removed from the Project Contact List. 	<ul style="list-style-type: none"> Confirmation that Ministry of Natural Resources and Forestry will continue to receive updates, and environmental reports will be provided for review Confirmation that Transport Canada will receive project notifications specific to federal property impacts and waterways, and requesting contact information for Navigation Protection Program Staff Provision of information on the upcoming Public Information Centre #1 and confirmation that Ontario Federation of Agriculture has been added to the Project Contact List Confirmation that the Project Team has updated Enbridge Gas contact information Provided contact information for members of the Project Team, and Confirmation that the Impact Assessment Agency of Canada has been removed from the Project Contact List.
Government Agencies	Environmental Concerns- Natural Environment	<ul style="list-style-type: none"> Fisheries and Oceans Canada provided their comments and mitigation measures on the Stormwater Management Plan for the County Road 4 Early Works. 	<ul style="list-style-type: none"> Confirmation Fisheries and Oceans Canada’s suggested mitigation measures will be carried forward in subsequent phases of the project.
Government Agencies	Environmental Concerns – Social and Economic Environment	<ul style="list-style-type: none"> The Ontario Ministry of Agriculture, Food and Rural Affairs noted the project may impact agricultural areas, including speciality crop areas, and requested to review a draft of the Agricultural Impact Assessment The Ministry of Economic Development, Job Creation and Trade expressed concern regarding impacts to transport and logistics as a result of lane closures and detours, and The Ministry of Citizenship and Multiculturalism requested information on the archaeological resources, and built heritage resources assessed as part of the project. 	<ul style="list-style-type: none"> Confirmation that consultation with Ontario Ministry of Agriculture, Food and Rural Affairs and local farming communities are ongoing, and an Agriculture Impact Assessment will be completed in accordance with Ontario Ministry of Agriculture, Food and Rural Affairs’ Draft Agriculture Impact Assessment Guidance Document (2018), and provided to the Ontario Ministry of Agriculture, Food and Rural Affairs for review Confirmation that the Project Team will work with municipalities and stakeholders to minimize travelling impacts during all phases of the project Confirmation that a Stage 1 Archaeological Assessment Report and a Project Information Form for Stage 2 Archaeological Assessment work (P123-0454-2020) for the project are underway and will be shared with Ministry of Citizenship and Multiculturalism for review, and Confirmation that a Cultural Heritage Resource Assessment Report was prepared during a pre-work retainer assignment which identified a number of cultural resources. The Project Team noted that further built/cultural heritage work may be undertaken as the Preliminary Design progresses.
Government Agencies	Engineering, Transportation and Design	<ul style="list-style-type: none"> Hydro One confirmed the locations of high voltage transmission facilities within the Study Area, and requested the facilities be completely avoided or provide enough time to relocate. 	<ul style="list-style-type: none"> Confirmation the Project Team is reviewing Hydro One’s existing facilities network to avoid or mitigate infrastructure and requested available information for Hydro One’s future lines or secondary uses, and The Project Team confirmed that consultation with Hydro One regarding infrastructure interactions with the project is ongoing through regular meetings.
Government Agencies	General Project and Proposed Alignment	<ul style="list-style-type: none"> Infrastructure Ontario requested the Ministry to verify if there are any impacted provincial government properties within the Study Area, and The Impact Assessment Agency of Canada noted they have received numerous public correspondence expressing concerns regarding the project, including requests to reconsider the project’s designation under the Impact Assessment Act. Impact Assessment Agency of Canada provided copies of the correspondence received and encouraged the Project Team to add the individuals to the Project Contact List. 	<ul style="list-style-type: none"> Confirmation that Ministry will inform Infrastructure Ontario if any government land (non-Ministry owned land) will be required for the project, and The Ministry responded with a letter to Impact Assessment Agency of Canada.
Municipal	Community Engagement Process and Activities	<ul style="list-style-type: none"> Several municipal staff members requested to be added to the Project Contact List, and Town of Bradford West Gwillimbury Fire and Emergency Services requested updating the Project Contact List to reflect new staff. 	<ul style="list-style-type: none"> Acknowledgement provided and contacts were added to the Project Contact List, and Confirmation the Project Contact List has been updated to reflect new Town of Bradford West Gwillimbury Fire and Emergency staff.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Municipal	■ Environmental Concerns – Natural Environment	<ul style="list-style-type: none"> ■ Nottawasaga Valley Conservation Authority noted the Study Area is within an area regulated by the Nottawasaga Valley Conservation Authority and is therefore subject to Ontario Regulation 172/06, and provided suggestions regarding stormwater management, hydraulics, erosion and sediment control and restoration ■ Nottawasaga Valley Conservation Authority noted that the western-most interchange falls within Nottawasaga Valley Conservation Authority's jurisdiction in which the footprint falls within one or more tributaries of Penville Creek. Nottawasaga Valley Conservation Authority noted that there are agriculture lands and/or cultural environments adjacent to the existing Highway 400 may serve as a habitat for one or more Species at Risk. Nottawasaga Valley Conservation Authority noted that further details may be required regarding encroachment into regulated features ■ Nottawasaga Valley Conservation Authority noted the footprint of the proposed interchange for Highway 400 overlaps the existing alignment of one or more tributaries of Penville Creek ■ Lake Simcoe Region Conservation Authority noted the Study Area falls within areas government by Ontario Regulation 179/06, and noted there are woodlands and wetlands that should be examined. Lake Simcoe Region Conservation Authority noted that they would like to set up a meeting with the Project Team to discuss the project and Memorandums of Understanding of member municipalities, and ■ The Ministry of Natural Resources and Forestry provided input regarding Provincially Significant Wetlands and natural heritage features, following a meeting with Regulatory Agencies on March 9, 2022 in which the Ministry of Natural Resources and Forestry were unable to attend. 	<ul style="list-style-type: none"> ■ Acknowledgement of Nottawasaga Valley Conservation Authority's comments, confirmation that the Project Team is conducting a number of environmental studies. Project Team confirmed that Nottawasaga Valley Conservation Authority will be consulted throughout the project ■ Directed Lake Simcoe Region Conservation Authority to the Project Website to view the full list of environmental studies being conducted as part of the project, and asked for Lake Simcoe Region Conservation Authority drainage modelling to be provided in order to complete drainage analysis, and ■ The Ministry of Natural Resources and Forestry provided supplemental wetland information and mapping to the Project Team through agency consultation and in response to the Draft Environmental Conditions Report. The supplemental data was additional information on evaluated wetlands, supplemental to the Provincially Significant Wetland information in Land Information Ontario. In follow-up correspondence, the Ministry of Natural Resources and Forestry clarified that Land Information Ontario is the authoritative source for Provincially Significant Wetlands information.
Municipal	■ Environmental Concerns – Social and Economic Environment	<ul style="list-style-type: none"> ■ The Town of Bradford West Gwillimbury noted manufacturers and companies associated with transportation, logistics, and distribution are in favour of the project, and the Town would like to provide them with updates. 	<ul style="list-style-type: none"> ■ Confirmation that the Town of Bradford West Gwillimbury is on the Project Contact List and will continue to receive updates which can be relayed to the businesses. Alternatively, businesses can request to be added to the Project Contact List.
Municipal	■ Engineering, Transportation and Design	<ul style="list-style-type: none"> ■ The Town of Bradford West Gwillimbury noted that the Holland River is used as a legal outlet for municipal drains under the Ontario Drainage Act, and designs that will not impede on hydrological capacities or function should be considered ■ The Town of Bradford West Gwillimbury inquired about design details at Artesian Industrial Parkway specifically regarding sewers and pipes ■ York Region noted the project may impact existing or future underground water and wastewater infrastructure, and ■ King Township asked if the Early Works included intersection improvements and signalling at 9th Line and Country Road 4. 	<ul style="list-style-type: none"> ■ Confirmation that the Ministry will conduct a Hydrology and Drainage Assessment and an Erosion and Sedimentation Overview Risk Assessment ■ Acknowledgement of future utility crossings at the project to service proposed developments in the vicinity of Artesian Industrial Parkway ■ Confirmation the Project Team will consult with York Region to identify and avoid where possible existing and future facilities as the design progresses ■ Provision of links to available information on the Project Website, and ■ Confirmation that improvements to the 9th Line intersection are not part of the Ministry's scope of work.
Municipal	■ Project Planning and Timelines	<ul style="list-style-type: none"> ■ The Town of East Gwillimbury requested confirmation that the project is included in Ontario's 2021 Budget and if that budget will fund the Environmental Assessment and Preliminary Design. The Town requested information on the budget for Detail Design and construction phases. 	<ul style="list-style-type: none"> ■ Meeting held on March 30, 2021 with municipalities discussing funding.
Municipal	■ Interchange Locations and Design	<ul style="list-style-type: none"> ■ The Town of Bradford West Gwillimbury requested an interchange at 10th Sideroad and noted no concerns with the proposed interchange at County Road 4/Yonge Street. 	<ul style="list-style-type: none"> ■ Acknowledgement of request for an interchange at 10th Sideroad, and ■ Acknowledgement of no concerns with interchange at County Road 4.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Municipal	■ Environmental Assessment Process	<ul style="list-style-type: none"> ■ The York Region requested clarification on the affect of the proposed project exceptions to the environmental assessment process, and ■ York Region Public Health asked to review the Draft Environmental Impact Assessment Report including the Air Quality Impact Assessment and Noise Impact Assessment Report. 	<ul style="list-style-type: none"> ■ Confirmation that at the time of this correspondence, the Ministry was following the approved planning process for a Group 'A' project under the Ministry Class Environmental Assessment for Provincial Transportation Facilities unless there is an exemption, and ■ The Project Team explained that the results of Air Quality Impact Assessment and Noise Impact Assessment Report will be presented as part of the Draft Environmental Impact Assessment Report that will be posted on the Project Website for public review and comment.
Municipal	■ General Project and Proposed Alignment	<ul style="list-style-type: none"> ■ The Town of East Gwillimbury provided a link to a municipal staff memo which discussed the Bradford Bypass Environmental Status Update. The Town of East Gwillimbury noted that it has been provided to Council on April 7, 2021, and ■ York Region forwarded to the Project Team the Impact Assessment Agency of Canada's response to the designation request for the project. 	<ul style="list-style-type: none"> ■ Thanked the Town of East Gwillimbury for providing the memo and noted it has been circulated to the broader Project Team.
Interest Group	■ Community Engagement Process and Activities	<ul style="list-style-type: none"> ■ Several individuals requested to be added to the Project Contact List. ■ One individual inquired about providing expertise, comments and suggestions to the Project Team ■ One individual requested the date and timing of Public Information Centre #1 ■ Several individuals requested information on upcoming public consultation events and review periods for the Environmental Assessment ■ One individual noted that they cannot locate a link to register for Public Information Centre #1 and requested to know why Public Information Centre #1 materials will only be available for two weeks. The individual also inquired about what information will be provided at the Public Information Centre #1, and ■ One individual inquired about traffic studies and potential connections with GO Transit. The individual expressed concern about the consultation process and the Environmental Registry of Ontario exemption for the Bradford Bypass, noting that the exemption should be removed for improved public consultation. 	<ul style="list-style-type: none"> ■ Contacts were added to the Project Contact list and acknowledgement provided ■ Confirmation that comments from all stakeholders are encouraged and welcome at anytime ■ Confirmation that Public Information Centre #1 will be held in Spring 2021, and the individual will be notified through email of Public Information Centre #1 and other project updates ■ Details on Public Information Centre #1 provided ■ Confirmation that the two-week period was instituted to gather feedback from stakeholders however the materials will remain on the website and comments are accepted at any time. The Project Team confirmed that results of the environmental studies will be presented at Public Information Centre #2 and a formal response will be provided to each commenter, relating to each specific question, and ■ Confirmation that the traffic study will be summarized in the Environmental Conditions Report and Environmental Impact Assessment Report, and provision of links for further information on planned GO services. Details provided on the Environmental Registry of Ontario decision for the Bradford Bypass, the Regulation and the County Road 4 Early Works.
Interest Group	■ Environmental Concerns – Natural Environment	<ul style="list-style-type: none"> ■ One individual requested to know how many acres of farmland will be lost as a result of the project, and ■ One individual expressed concern about impacts to wetland and forested areas and requested to know if an elevated roadway is under consideration. The individual also requested the western portion of the alignment to be moved further north to avoid impacts to residential communities. 	<ul style="list-style-type: none"> ■ Confirmation that various environmental studies are being undertaken to identify environmental concerns, commitments and mitigation measures, including an Agricultural Impact Assessment, and results of assessments will be presented at future Public Information Centres and posted to the Project Website, and ■ Confirmation that the Preliminary Design will consider minimizing impacts to wetland areas through engineering refinements, and the Ministry continues to engage with Regulatory Agencies throughout the project.
Interest Group	■ Environmental Concerns – Social and Economic Environment	<ul style="list-style-type: none"> ■ One individual noted that an elementary school is in the process of being designed on lands adjacent to the Study Area ■ One individual inquired about impacts to properties adjacent to the proposed interchange at Highway 400 and requested to set up a meeting to discuss further project details, providing possible available dates ■ Ontario Federation of Agriculture inquired about an Agricultural Impact Assessment being completed for the project, and ■ One individual requested the Project Information Forms numbers for the Bradford Bypass archaeological reports under Ministry of Citizenship and Multiculturalism's portal. 	<ul style="list-style-type: none"> ■ Noted that alignment refinements are ongoing, considering existing and approved developments ■ Project Team provided details on the upcoming Public Information Centre #1 and noted that a meeting invite on May 21, 2021 will be provided ■ Confirmation that an Agricultural Impact Assessment will be completed, and consultation with local farming communities and the Ontario Ministry of Agriculture, Farming and Rural Affairs is ongoing, and ■ Project Team provided Project Information Forms numbers for the archaeological reports.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Interest Group	■ Engineering, Transportation and Design	<ul style="list-style-type: none"> ■ One individual requested the bridge heights for the overpass at Holland River East Branch, and ■ One individual noted that their boat requires a minimum bridge height of 8 metres. 	<ul style="list-style-type: none"> ■ Confirmation that the design of the highway and bridge structures are underway and will take into consideration navigability and maintaining proper access to the Holland River and Holland River East Branch, and ■ Confirmation that the vessel size will be considered during the design of the bridge structures.
Interest Group	■ Environmental Assessment Process	<ul style="list-style-type: none"> ■ One individual noted that the Project Website has not been updated to reflect the decision of the Environmental Registry of Ontario on the project. 	<ul style="list-style-type: none"> ■ Details provided on the Environmental Registry of Ontario decision for the Bradford Bypass, the Regulation and the County Road 4 Early Works. A link to the Environmental Registry of Ontario decision was added to the Project Website.
Interest Group	■ General Project and Proposed Alignment	<ul style="list-style-type: none"> ■ One individual requested to know the financial cost to the taxpayer as a result of the Bradford Bypass, and inquired about travel time reductions between Keswick to Barrie ■ One individual requested to know if the Ministry will proceed with the Bradford Bypass prior to determining cost estimates ■ One individual requested a study showing travel time predictions and requested a traffic study to review, and ■ Ontario Provincial Police requested to know if they will be monitoring the highway during construction or local police. 	<ul style="list-style-type: none"> ■ Details provided on travel time projections for the project. Project Team noted that details of cost forecasts for the project have not yet been determined and the Ministry only releases costs once the procurement process is complete ■ Explained that some components of the project may advance before others based on need. Confirmation that the 2021 Budget allocated funding for the Early Works. ■ Details provided regarding rationale for the project including, travel time savings and population projections, and confirmation that a traffic summary will be summarized in the Environmental Conditions Report and Environmental Impact Assessment Report, and ■ Confirmation that the Ontario Provincial Police will be monitoring the highway as the proponent is the Ministry.
Elected Officials	■ Community Engagement Process and Activities	<ul style="list-style-type: none"> ■ A representative from the office of Member of Parliament Scot Davidson requested to be added to the Project Contact List. 	<ul style="list-style-type: none"> ■ Contacts were added to the Project Contact list and acknowledgement provided.
Elected Officials	■ General Project and Proposed Alignment	<ul style="list-style-type: none"> ■ Township of King Councillor Avia Eek (Ward 6) provided support for the project, noting that the project will benefit landowners who experience high volume traffic and agricultural business owners moving products. 	<ul style="list-style-type: none"> ■ Support acknowledged and confirmation that comments will be reviewed and considered.
Other Stakeholders	■ Community Engagement Process and Activities	<ul style="list-style-type: none"> ■ A few individuals requested to be added to the Project Contact List ■ Several property owners and tenants provided signed Permission to Enter forms ■ Several property owners requested they be notified in advance of any property visits, and ■ Three property owners requested a mailed copy of a Permission to Enter package. 	<ul style="list-style-type: none"> ■ Contacts were added to the Project Contact List and acknowledgement provided ■ Confirmation that the Project Team has received their signed Permission to Enter form ■ Confirmation that the Project Team will notify all individuals listed in connection to a property a minimum of two days in advance, and ■ Confirmation that a hard copy of the individual's Permission to Enter package was sent via mail, however an electronic copy was attached to the email for convenience.
Other Stakeholders	■ Environmental Concerns – Natural Environment	<ul style="list-style-type: none"> ■ Several property owners requested clarification on the environmental field work that will be conducted on their properties, and ■ Several property owners requested assistance in filling out their Water Well Survey Form. 	<ul style="list-style-type: none"> ■ Confirmation that the field work will consist of non-intrusive and physical work related to engineering, geotechnical, and environmental testing, and any disturbance to the property will be restored to the original condition, and ■ Connected with groundwater specialist to assist in filling out the Water Well Survey Form.
Other Stakeholders	■ Environmental Concerns – Social and Economic Environment	<ul style="list-style-type: none"> ■ Several individuals provided property details and expressed concern regarding impacts to adjacent properties and the legislative process for land expropriation ■ Several individuals requested meetings with the Project Team regarding impacts to their property ■ One individual requested to know if any areas within and adjacent to the preferred route are currently restricted from redevelopment ■ One property owner informed the Project Team their house is historically designated and requested a seismic survey as vibration equipment would damage the rubble foundation, and ■ One individual inquired about an Order-in-Council designation for a property. 	<ul style="list-style-type: none"> ■ Acknowledgment of the information provided for individual properties, and confirmation that the Ministry works directly with impacted property owners to discuss property-specific concerns. The Project Team noted that land expropriation is only used when agreements cannot be reached within suitable project timeframes ■ Facilitation of meetings with impacted property owners ■ Directed to the Project Website to view the alignment and proposed interchanges and details provided on the controlled-access highway designation for lands deemed required for future construction of the project ■ Acknowledgement of the historical designation and confirmation construction activities and equipment have not yet been determined, and ■ Explained an Order-in-Council designation will require any development applications proposed for the subject lands to be reviewed by the Ministry.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Other Stakeholders	<ul style="list-style-type: none"> Engineering, Transportation and Design 	<ul style="list-style-type: none"> Telus Mobility confirmed they do not have underground infrastructure in the Study Area, and Several utility companies confirmed they have underground and above ground infrastructure in the Study Area. 	<ul style="list-style-type: none"> Acknowledgement of the information provided for the utilities in the Study Area, and Acknowledgement of the information provided for the utilities in the Study Area, and further co-ordination discussions will follow.
Other Stakeholders	<ul style="list-style-type: none"> Interchange Locations and Design 	<ul style="list-style-type: none"> One individual requested detailed mapping of the proposed interchange at County Road 4/Yonge Street. 	<ul style="list-style-type: none"> Directed to the Project Website to view details on the interchange at County Road 4/Yonge Street.
Public	<ul style="list-style-type: none"> Community Engagement Process and Activities 	<ul style="list-style-type: none"> Several individuals requested to be added to the Project Contact List Several individuals requested to change their contact information on the Project Contact List Several individuals requested to be removed from the Project Contact List Two individuals expressed privacy concern with the emailing of the Public Information Centre #1 notices One individual requested the link to the Public Information Centre #1 materials on the Project Website One individual inquired about providing expertise, comments and suggestions to the Project Team Several individuals left voicemails asking for a member of the Project Team to return their call Several individuals requested copies of the environmental studies Several individuals inquired if outreach with Indigenous communities has occurred Several individuals requested clarification on the date and time for Public Information Centre #1 Several individuals expressed concerns with the potential impact to their properties Several individuals requested the preliminary plan and most up to date information on the project, and One individual requested the date of Public Information Centre #2. 	<ul style="list-style-type: none"> Contacts were added to the Project Contact list and acknowledgement provided Contacts were adjusted in the Project Contact List and acknowledgement provided Contacts were removed from the Project Contact List and acknowledgement provided The Project Team apologized for the breach of information, and identified precautions to avoid future errors Provided a link of where the Public Information Centre #1 materials are located on the Project Website Confirmation that comments from all stakeholders are encouraged and welcome at anytime Calls returned to address individual concerns and provided further information Confirmation that the results of the environmental studies will be presented in Public Information Centre #2 and will be available for review on the Project Website Confirmation that the Ministry is committed to fulfilling its Duty to Consult requirements for Indigenous communities and will consider their interests throughout the Preliminary Design, and Confirmation of the date and time of Public Information Centre #1, and the comment period The Project Team consulted with individuals whose properties were directly impacted The Project Team provided an update on the project and directed the individuals to the Project Website, and The Project Team provided the notice of Public Information Centre #2.
Public	<ul style="list-style-type: none"> Environmental Concerns – Natural Environment 	<ul style="list-style-type: none"> Several individuals inquired if the Endangered Species Act is being applied to the project Several individuals expressed concern regarding surface water and runoff from the Bradford Bypass into Lake Simcoe and the Holland River Several concerns regarding impacts to the surrounding environment, specifically flora and fauna, wetlands, trees, wildlife corridors and habitats, and Species at Risk Several individuals expressed navigability concerns of the Holland River East Branch One individual called to inform the Project Team of the coyote den within the Technically Preferred Route Several individuals expressed concern about the project impact on the Holland Marsh, Greenbelt and Lake Simcoe One individual inquired if a Greenhouse Gas Emission analysis will be completed for all phases of the project One individual asked how the project will lower greenhouse gas emissions One individual inquired about a school located near one of the Sensitive Receptors identified in the Air Quality Impact Assessment 	<ul style="list-style-type: none"> Confirmation the Preliminary Design is adhering to all relevant new and existing provincial and federal legislation, including the Endangered Species Act Provision of details outlining the approach taken to conduct surface water assessment as part of the project, confirmation that Lake Simcoe Region Conservation Authority and Nottawasaga Valley Conservation Authority will be consulted throughout the project, and confirmation that the Ministry will assess impacts with respect to the Lake Simcoe Protection Act Provision of details outlining the approach taken to conduct a terrestrial assessment that includes evaluation of wildlife crossings/exclusion fencing, and confirmation that the Project Team is consulting with Regulatory Agencies throughout all project phases Confirmation the design and future construction will take into consideration navigability and maintaining proper access to the Holland River and Holland River East Branch Acknowledgment and confirmation the Project Team will provide the information to the wildlife specialists Confirmation that various environmental studies are being undertaken to identify environmental concerns, commitments and mitigation measures and results will be

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
		<ul style="list-style-type: none"> One individual inquired about the status of the Fish and Fish Habitat Impact Assessment and the Air Quality Impact Assessment, and One individual inquired if there were specific air quality standards that needed to be met. 	<p>summarized in the Environmental Conditions Report and Environmental Impact Assessment Report</p> <ul style="list-style-type: none"> Confirmation that the Ministry is undertaking an Air Quality Impact Assessment which will examine potential changes in local and regional air quality, including greenhouse emissions and recommend mitigation measures and future commitments Confirmation that the Ministry will work to minimize air quality and greenhouse gas emission impacts of the project wherever technically feasible The Project Team explained the Sensitive Receptor is representative of the impacts to the localized region of the school Confirmation that the Fish and Fish Habitat Impact Assessment and the Air Quality Impact Assessment are underway, and The Project Team explained they are following the Ministry's <i>Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects</i> for both the construction and operation phases of the project.
Public	<ul style="list-style-type: none"> Environmental Concerns – Social and Economic Environment 	<ul style="list-style-type: none"> Several individuals provided information regarding their watercraft usages Several individuals expressed concern regarding noise and vibration levels and requested mitigation measures be implemented to reduce these impacts Several individuals expressed concern regarding impacts to prime agricultural lands and specialty crop areas, and requested to know where local produce will be grown once the land is paved Several individuals inquired about land expropriation and purchasing of properties One individual recommended vegetation, trees, and green walls to mitigate noise pollution Several individuals inquired about how the time savings were calculated Several residents on Chelsea Crescent requested the exact distance between Chelsea Crescent and the Bradford Bypass One individual inquired about impacts to marina operations along the alignment during construction and operation of the Bradford Bypass Several individuals inquired about archaeological studies being conducted Several individuals requested a link to the Traffic Study, and One individual expressed concern of disruption to a historic archaeological site. 	<ul style="list-style-type: none"> Watercraft and navigational uses acknowledged with a note that design considerations will include the information to meet requirements under the Canadian Navigable Water Act, in consultation with Transport Canada Confirmation that the Ministry is undertaking a noise and vibration assessment as part of the project and will follow the Ministry's Noise Guide to evaluate noise barrier types and locations Confirmation that an Agricultural Impact Assessment will be completed, and consultation with local farming communities and the Ontario Ministry of Agriculture, Farming and Rural Affairs is ongoing Confirmation that the Ministry works directly with impacted property owners to discuss property-specific concerns and noted that land expropriation is only used when agreements cannot be reached within suitable project timeframes Confirmation that the Ministry is exploring innovative opportunities to address noise mitigation through engineering and other enhancements Confirmation the travel time savings are calculated based on the time of day and origins within the limits of the corridor using an area-wide transportation model with a 2041 horizon year Directed to the Project Website to view details on the County Road 4/Yonge Street interchange Confirmation that the Ministry is working with Transport Canada to design bridge structures in compliance with the Canadian Navigable Waters Act and asked the individual to provide further information about types of vessels in use at the marina Confirmation that a Stage 1 Archaeological Assessment was completed prior to Preliminary Design, a Stage 2 assessment is currently underway, and Stage 3 and Stage 4 assessments will be completed where required Confirmation that the Ministry is undertaking a traffic study and the information, date, and findings completed will be summarized in the Draft Environmental Conditions Report and Draft Environmental Impact Assessment Report, and Confirmation that the Ministry is undertaking a Cultural Heritage Evaluation Report and the results will be factored into the design refinements and evaluation of alternatives for the preferred Preliminary Design.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Public	<ul style="list-style-type: none"> Engineering, Transportation and Design 	<ul style="list-style-type: none"> One individual recommended to relocate the bypass north of Bradford, close to 12th Line to connect to Ravenshoe Road A few individuals provided suggestions for municipal/regional roads, including number of lanes, speed limits, carpool lots, and pedestrian access Several individuals requested expressed concern with increased traffic congestion One individual inquired about the width of the highway One individual asked how many lanes the highway will have One individual inquired if the highway can be extended in the future One individual requested the Preliminary AutoCAD Interchange Engineering design drawings for the Highway 400 interchange, preliminary geotechnical, hydrogeological and groundwater monitoring reports surrounding their client's property, and to be notified of upcoming public meetings, notices and project design updates One individual recommended using suspension bridges as part of the project design One individual provided suggestions regarding the types of structures built over wetlands and construction methods in order to reduce impacts to wildlife and wildlife habitats One individual expressed concern that the Bradford Bypass would redistribute extra traffic north of Highway 404, which will require widening to accommodate the new volume One individual inquired about the design status for an overpass at Professor Day Drive One individual expressed concern for pedestrian safety One individual suggested in-ground heating as an alternative to utilizing salt to melt snow, and One individual wished to know the overpass clearance in the Holland River. 	<ul style="list-style-type: none"> Confirmation that the Preliminary Design will not explore alternative routes for the project, but will refine the Technically Preferred Route from the 2002 Approved Environmental Assessment Noted that that Ministry is not responsible for road conditions on existing municipal roads Confirmation that a traffic study will be completed for the project and summarized in the Environmental Conditions Report and Environmental Impact Assessment Report Noted that the highway design is still being drafted The Project Team explained that the Ministry is considering a four-lane interim condition (two lanes in each direction) and an ultimate eight-lane condition, which includes one high-occupancy vehicle and three general purpose lanes in each direction The Project Team explained that future extensions are outside the current Study Area Noted that design alternatives are still in progress, and will be made available for public review and comment at the upcoming Public Information Centre #1 Noted design alternatives are being developed and will be made for public review and comment at the first Public Information Centre Details provided on the various engineering and environmental studies underway and confirmation that structures will be designed in accordance with latest design standards, guidelines and policies, while considering navigation requirements and environmental constraints Confirmation that suggestions to improve Highway 404 have been shared with the Ministry for consideration Confirmation the Bradford Bypass will accommodate the future extension of the Professor Day Drive crossing Noted concern for pedestrian safety and will consider it when details with regard to roadside safety are determined The Project Team directed the individual to the Ministry's Highway Design Office to determine if the technology is suitable for the project, and The Project Team noted at this time a preliminary clearance of 8 metres is being provided at the Holland River and Holland River East Branch bridges.
Public	<ul style="list-style-type: none"> Project Planning and Timelines 	<ul style="list-style-type: none"> Several individuals inquired about project and construction timelines Several individuals inquired about implications to the project as a result of changes in government Several individuals inquired about the cost of the construction of the highway Several individuals inquired about why Ministry is advancing the County Road 4 Early Works ahead of the rest of the project, and One individual inquired about the date the Bradford Bypass was approved to be built. 	<ul style="list-style-type: none"> Details provided on the schedule for Preliminary Design and subsequent design and construction phases Confirmation that, at the time of the correspondence, the Ministry is proceeding with the Preliminary Design study, and that project-related decisions resulting from a change in government are not yet known Confirmation that the cost of construction is yet to be determined, as subsequent design phases are subject to approvals Confirmation that, at the time of this correspondence, the Ministry has not awarded the contract for the construction of the project, and will follow the standard process for issuing requests for proposals through the Registry, Appraisal and Qualification System, and Clarification that the Ministry reinitiated design activities for the project in August 2019, and the project is currently in the Preliminary Design phase.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Public	<ul style="list-style-type: none"> Interchange Locations and Design 	<ul style="list-style-type: none"> Several individuals requested interchanges at 10th Sideroad and Yonge Street One individual asked if there is a proposed interchange at Yonge Street One individual requested information on the distance between Queensville Sideroad and the interchange proposed at Bathurst Street One individual inquired about the location of the Leslie Street interchange One individual inquired land taking and a detailed interchange alternative mapping One individual indicated they are in favour of the project with exception to the interchange proposed at Bathurst Street One individual requested the distance between Queensville Sideroad and the centreline of the Bathurst Street interchange One individual requested the distance between Holborn Road and the centreline of the Bathurst Street interchange One individual requested an interchange at 2nd Concession Road Several individuals opposed the interchange at 10th Sideroad as it impacted their property One individual opposed the interchange at Leslie Street as it impacted their property, and One individual requested confirmation that the Bradford Bypass will have interchanges at Bathurst Street, Leslie Street and 2nd Concession Road. 	<ul style="list-style-type: none"> Support/recommendations acknowledged with a note that the Project Team is evaluating design refinements of the 2002 Approved Environmental Assessment highway alignment The Project Team explained that the current Updated Technically Preferred Route includes an interchange at Yonge Street with on-ramps and off-ramps Directed to the Project Website to view details of the 2002 Approved Environmental Assessment alignment Directed to the Project Website to view details on the Leslie Street interchange Draft/Preliminary plan of proposed property requirements provided. Directed to the Project Website to view details of the project roll plans available for further details Confirmation the Bathurst Street interchange was identified in the 2002 Approved Environmental Assessment, and a traffic demand assessment confirmed the location of the interchange would help service the provincial needs Confirmation the centreline of the Bradford Bypass at the proposed Bathurst Street interchange is approximately 1.4 kilometre north of Queensville Sideroad Confirmation the centreline of the Bradford Bypass at the proposed Bathurst Street interchange is approximately 0.8 kilometre south of Holborn Road Confirmation that an interchange is currently proposed at 2nd Concession Road The Project Team explained that the interchange at 10th Sideroad was selected as part of the Updated Technically Preferred Route after feedback was received from municipal staff and councils. This preference was made based on municipal and regional development and transportation planning. The Project Team then directed the stakeholder to where more information on interchange location could be found on the Project Website Confirmation that the interchange at Leslie Street will not directly impact the stakeholder's property, and Confirmation that the current Preliminary Design includes interchanges at Bathurst Street, Leslie Street and 2nd Concession Road.
Public	<ul style="list-style-type: none"> Environmental Assessment Process 	<ul style="list-style-type: none"> Several individuals inquired about the environmental studies being undertaken as part of the project, expressed concern regarding the environmental assessment process and noted that the environmental assessment is out of date Several individuals requested clarification on the affect of the proposed project exceptions to the environmental assessment process One individual requested a copy of the 2002 Approved Environmental Assessment, and Several individuals indicated the project should be undergo a Federal Impact Assessment. 	<ul style="list-style-type: none"> Confirmation that 15 environmental studies are being undertaken as part of the project in accordance with the Regulation carrying forward commitments from the 2002 Approved Environmental Assessment. Impact assessments undertaken as part of the project will follow appropriate policies/legislations and several provincial and federal Regulatory Agencies will be consulted throughout the project Confirmation that, at the time of the correspondence, the proposed exemption was being considered by Ministry of the Environment, Conservation and Parks, but environmental impact assessments and required consultation with Indigenous communities and other stakeholders will be conducted regardless of the outcome Directed to the Project Website to view information on the 1992-1997 Route Planning Study and 2002 Approved Environmental Assessment, and Confirmation the Minister of Environment and Climate Change Canada announced the project did not meet the requirements to warrant designation under the Federal Impact Assessment Act.

Stakeholder	Comment Theme	Summary of Comments Received	Project Team Response
Public	<ul style="list-style-type: none"> General Project and Proposed Alignment 	<ul style="list-style-type: none"> Several individuals expressed support for the project Several individuals requested alternative routes to the proposed alignment and expressed opposition to the project One individual inquired about why the Bradford Bypass has not been given a highway 400 series highway name Several individuals inquired about the Bradford Bypass being a toll road. Several individuals inquired about contractors being selected for the Detail Design and Construction Several individuals noted rapid and public transit would also help ease congestion Two individuals noted that the COVID-19 pandemic has changed the needs in the region and the project is no longer needed One individual requested clarification on why the Bradford Bypass signs were removed One individual asked what groundwater policies are applicable to the project One individual inquired about Special Policy Area 6 and 7 One individual asked for the Auto Computer-Aided Design for the Bradford Bypass One individual asked for the minutes from a stakeholder meeting One individual asked about the proximity of the highway to Harvest Hills School One individual requested clarification on why the Bradford Bypass signs were present if construction has not begun One individual asked how the project will be affected by Bill 23, and One individual requested that porta potties near their property be removed. 	<ul style="list-style-type: none"> Acknowledgment of support provided Recommendations and concerns acknowledged Acknowledgement of concerns and lack of support for the highway, and noted that the Preliminary Design will not explore alternative routes for the project, but will refine the Technically Preferred Route from the 2002 Approved Environmental Assessment Clarified a route number for the Bradford Bypass has not been given, and will be assigned closer to the highway’s construction Confirmation that the Bradford Bypass will not be a toll road Confirmation that, at the time of this correspondence, the Ministry has not awarded the contract for the construction of the project, and will follow the standard process for issuing requests for proposals through the Registry, Appraisal and Qualification System Confirmation that the project is only one investment in transit and transportation infrastructure, and the Ministry is also moving forward with two-way, all-day service every 15 minutes on key segments of the GO Transit rail network Details provided on the rationale for the project, noting that it is required to help address road congestion and improve connectivity in the Greater Golden Horseshoe Confirmation the Bradford Bypass signs were removed because of vandalism and will be replaced at a later date The Project Team explained that the project falls under the jurisdiction of the Lake Simcoe Region Conservation Authority and the Ministry will assess impacts with respect to the <i>Lake Simcoe Protection Act</i> and the Lake Simcoe Protection Plan The Project Team explained that the Town of Bradford West Gwillimbury identifies Special Policy Area 6 as lands in which residential redevelopments are anticipated and permitted through limited, low density infill development. Special Policy Area 7 contains lands that are occupied by the Town of Bradford West Gwillimbury Bradford and District Community Centre complex; however, a re-visioning study has been undertaken for subject lands which may require a zoning by-law amendment The Project Team referred the stakeholder to a contact at the Ministry’s Corridor Management Office The Project Team provided the minutes from the stakeholder meeting The Project Team provided the distance between the Updated Technically Preferred Route and Harvest Hills School The Project Team explained the signs are meant to ensure members of the public understand the proposed location of the route and some of the key junction points The Project Team explained that the Ministry is working with the Ministry of Municipal Affairs and Housing to ensure provincial policies are considered and that potential risks are mitigated throughout Bill 23 implementation stages, and The Project Team agreed to remove the porta potties.

7.8 Issues Resolution Process

The Draft Environmental Impact Assessment Report was made available to the public, technical stakeholders, elected officials, Indigenous communities, and other interested persons for review on the Project Website from June 1, 2023 to June 30, 2023.

Additional archaeological investigations have been completed to finalize the impact assessments in accordance with Ontario Regulation 697/21 and are included in this Updated Draft Environmental Impact Assessment Report.

The Updated Draft Environmental Impact Assessment Report with completed archaeological studies is available for review on the Project Website from **July 13, 2023**, until **August 14, 2023**. During this time, Indigenous communities and interested persons have the opportunity to submit written comments to the Project Team through the Project Website.

In accordance with Section 26(1) of the Regulation, the Ministry has undertaken engagement and consultation with Indigenous communities and interested persons throughout the project. As required by Section 26(4) of the Regulation, the Final Environmental Impact Assessment Report will include a description of the concerns raised by Indigenous communities and interested persons in the issues resolution process and the outcome of the process.

In accordance with Section 28 of the Regulation, the Ministry will issue a Statement of Completion of the Bradford Bypass Project to the Director of the Ministry of Environment, Conservation and Parks Environmental Assessment Branch. The Statement of Completion of the Bradford Bypass Project will indicate that the Ministry intends to proceed with the project in accordance with the Final Environmental Impact Assessment Report. A copy of the Statement of Completion will be published on the Project Website.

If after providing a Statement of Completion of the Bradford Bypass Project, changes are required to the project that are inconsistent with the Final Environmental Impact Assessment Report, an addendum will be prepared to the applicable report in accordance with Section 29 of the Regulation.

7.9 Commitment to Future Consultation

The Ministry is committed to continuing stakeholder and public engagement and consultation beyond the regulatory requirements set out in the Regulation. Specifically, the Ministry will:

- Maintain the Project Website so interested parties can access updated project information
- Maintain the Project Contact List so all interested parties receive project updates, and
- Continue discussions with members of the public, local stakeholders and Indigenous communities with respect to potential impacts and mitigation throughout future phases of the project.

8. Project Changes

Should any project changes be required during further design and construction that are inconsistent with the Final Environmental Impact Assessment Report, an addendum shall be prepared in accordance with Section 29 of the Regulation.

9. Next Steps

The following key project milestones are anticipated following the completion of the Draft Environmental Impact Assessment Report:

- Continued Consultation and Issues resolution process
- Final Environmental Impact Assessment Report: Anticipated 2023
- Bradford Bypass Statement of Completion: Anticipated 2023, and
- Preliminary Design for the Bradford Bypass Project Completion: Anticipated 2023.

Comments regarding the project can be provided to the Project Team as listed below:

- Project Website (www.bradfordbypass.ca)
- Project Telephone Line (1-877-247-6036), and
- Emails via the Project Team email address (ProjectTeam@bradfordbypass.ca).

10. References

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AECOM, 2023:
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AECOM, 2023:
Water Well Survey Report.

AECOM, 2023:
Stormwater Management Plan.

AECOM, 2023:
Fluvial Geomorphology Impact Assessment Report – Bradford Bypass

AECOM, 2023:
Fluvial Geomorphology Impact Assessment Report – Holland River Crossings

AECOM, 2023:
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