DILLON CONSULTING

Ministry of Transportation, Ontario

Design and Construction Report (Final)

Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements
Design-Build and Class Environmental Assessment (GWP 3053-11-00)

July 2023 – 22-4936

July 18, 2023

Ministry of Transportation, Ontario
659 Exeter Road
London, Ontario
N6E 1L3

Attention: Steve Paslawski
Contract Services Administrator

Ministry of Transportation, Ontario
Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements Design-Build and Class Environmental Assessment (GWP 3053-11-00)
Final Design and Construction Report

Enclosed for your review is the Final Design and Construction report (DCR) for the above referenced project.

Sincerely,

DILLON CONSULTING LIMITED

A. Mochrie

Adele Mochrie, Environmental Manager
for Tanya Cross, P.Eng.
Project Manager

KBZ:rrk
Enclosure

cc: Kelly Jansen – MTO Environmental Planner
Nick Giacalone – GIP, Project Manager

Our file: 22-4936

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Public Record

This Design-Build and Class Environmental Assessment Study is being carried out as a Group 'B' undertaking following the Ministry of Transportation (MTO) *Class Environmental Assessment (EA) for Provincial Transportation Facilities (2000)* which has been documented in this Design and Construction Report (DCR).

A copy of this document is available for a 30-day comment period on the project website between **July 19, 2023** and **August 19, 2023** at **www.Hwy401Dorchester.com**.

Comments

Interested persons are encouraged to review this document and provide comments by **August 19, 2023**, to any of the project team members identified below. Information collected will be used in accordance with *the Freedom of Information and Protection of Privacy Act* and the *Access to Information Act*. With the exception of personal information, all comments will become part of the public record.

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If you have any accessibility requirements in order to participate in this study, please contact one of the individuals identified above.

All personal information included in your request – such as name, address, telephone number and property location – is collected under the authority of Section 30 of the *EA Act* and maintained for the purpose of creating a record that is available to the general public. As this information is collected for the purpose of a public record, the protection of personal information provided in the *Freedom of Information and Protection of Privacy Act* does not apply (Section 37). Personal information you submit will become part of a public record available to the general public unless you request that your personal information remain confidential.

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Executive Summary

The Ministry of Transportation, Ontario (MTO) retained Green Infrastructure Partners Incorporated (GIP) and Dillon Consulting Limited (Dillon) to complete the Design-Build and Class Environmental Assessment (EA) for the design and construction of the Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements located in the Municipality of Thames Centre, County of Middlesex. This Design-Build Contract is the last in a series of rehabilitation projects for Highway 401 between Veterans Memorial Parkway and Elgin Road.

The Preliminary Design, initial Detail Design and Class EA Study were previously completed to identify the preliminary design alternatives and the evaluation and identification of the Preferred Ultimate Interchange Alternative for the Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements. The study recommended the replacement of Dorchester Road bridge, interchange ramp reconfiguration and a slight realignment of the bridge and Dorchester Road to the east of the existing bridge. The Preliminary Design, initial Detail Design and Class EA Study were documented in a Transportation Environmental Study Report (TESR), which received environmental clearance on March 26, 2017, allowing the project to advance into Detail Design.

The purpose of the Detail Design stage of the project is to develop a recommended plan to a design/implementation level of detail, and to develop drawings and documents for construction. The Class EA study focused on traffic operations and safety, highway and bridge engineering requirements, natural environment, cultural environment, socio-economic environment and cost. This Design and Construction Report (DCR) has been prepared to document the 5-year TESR Review, Detail Design and Class EA for the project, and is being filed for a 30-day public comment period.

Construction is anticipated to be completed over two construction seasons as follows:

- 2024 Construction Season:
  - Demolition of the existing Dorchester Road bridge;
  - Construction of the new Dorchester Road bridge;
  - Replacement of the median tall-wall barrier and storm sewer for the new Dorchester Road bridge;

  - Construction of the realignment of Dorchester Road, new interchange ramps and Highway 401 speed change lanes; and,
  - Construction of four new overhead signs.

- 2025 Construction Season:
  - Surface course paving of the interchange ramps and Dorchester Road.

Highway 401 will remain open for the majority of construction; however, overnight closures of Highway 401 will be required to facilitate demolition of the existing bridge and placement of new bridge girders. During construction, Dorchester Road will be closed. Detour routes, signage and signalling will be provided within the Study Area to indicate lane restrictions and closures.

1.0 Overview

1.1 Project Contact List

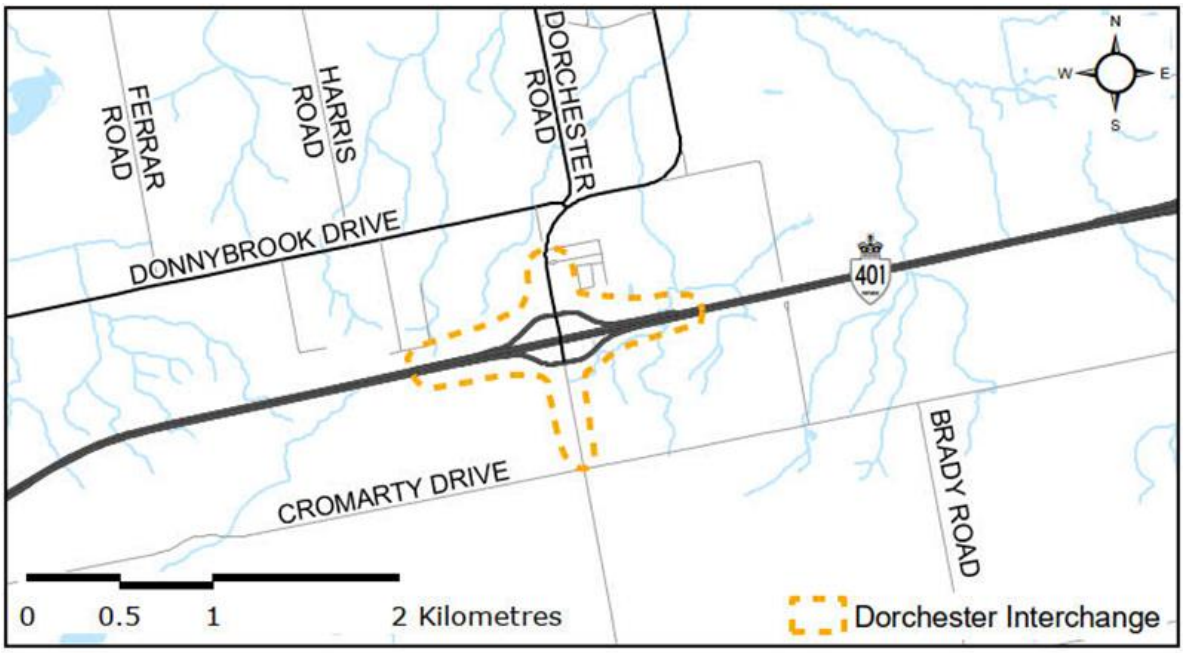
The project Contact List builds upon the stakeholders identified during the Preliminary Design stage of the project. The list includes the Provincial Member of Parliament (MPP) and representatives of local municipalities, provincial ministries, local agencies and emergency services. Land and business owners within approximately 1 km of the project were also included, as well as any additional parties that requested to be kept informed of the project. Potentially interested Indigenous communities were identified by MTO and also included. The Contact List was updated throughout the project based on feedback received.

1.2 Summary of Description of the Undertaking

The Ministry of Transportation, Ontario (MTO) has retained Green Infrastructure Partners Incorporated (GIP) and Dillon Consulting Limited (Dillon) to complete the Design-Build contract, which includes meeting the requirements of the MTO Class Environmental Assessment (EA), Detail Design, and construction of the Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements located in the Municipality of Thames Centre, County of Middlesex (**Figure 1**).

As show in **Figure 1**, the general Study Area consists of the lands around the Highway 401 and Dorchester Road interchange. The project limits extend along Highway 401, from 1.35 km west to 0.95 km east of the existing Dorchester Road bridge and extend from 0.47 km north to 0.69 km south of Highway 401. The Town of Dorchester is located approximately 3.5 km north of the Study Area.

Figure 1:Project Study Area



1.3 Project Description, Needs and Justification

The existing Dorchester Road bridge was built in 1955, rehabilitated in 1986 and is now reaching the end of its service life and requires replacement. The proposed improvements include the following:

- Replacement of the existing Dorchester Road bridge with a new four lane bridge;
- Reconstruction and realignment of Dorchester Road to the east;
- Reconstruction of the existing diamond interchange to a Parclo A-2 interchange configuration; and,
- Construction of four new overhead signs and one steel breakaway ground mounted sign on Highway 401.

To minimize future costs and traffic disruption, the new bridge and interchange have been designed to accommodate the future expansion of Highway 401 to eight lanes and the ultimate expansion to ten lanes with minimal changes. Highway 401 expansion is not included as part of this project.

MTO has acquired the property identified during the Preliminary Design stage for the proposed improvements. The proposed improvements are not anticipated to have

impacts beyond the MTO Right-of Way (ROW) and all work will be contained within MTO owned lands.

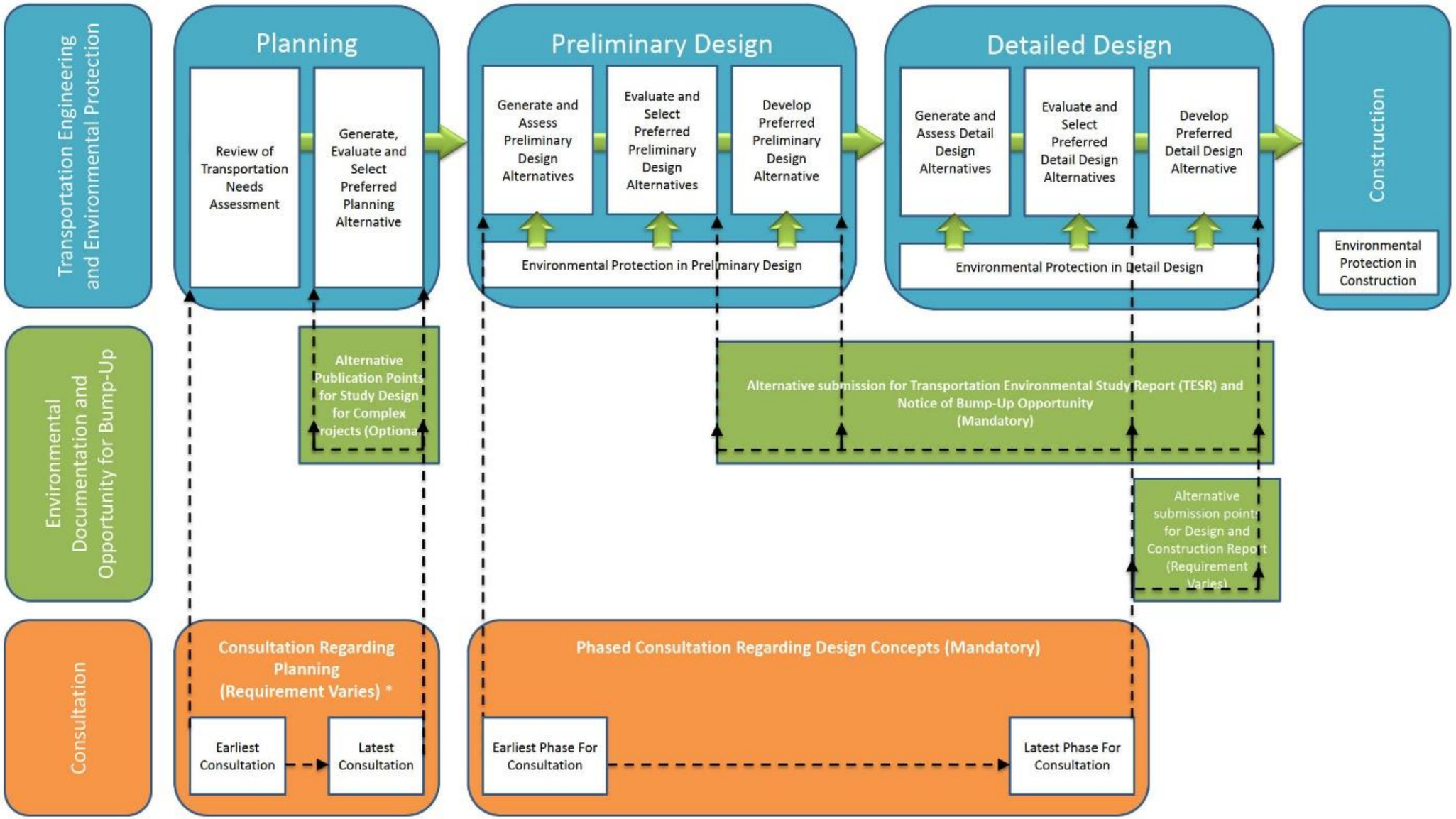
Construction activities are anticipated to begin in Spring 2024, subject to approvals. All work is anticipated to be complete in 2025.

1.4 MTO Class EA Requirements

The MTO Class EA for Provincial Transportation Facilities was approved under the Ontario *EA Act* in 2000. The Class EA provides a streamlined planning approach (**Figure 2**) that allows individual projects or activities within a defined "class" to meet the requirements of the Ontario *EA Act*, provided the Class EA is followed. The MTO Class EA document follows a principle-based approach, and includes the following principles that must be addressed during the course of a study:

- **Transportation Engineering Principles** to confirm that the project meets current engineering design standards for the safe and efficient movement of people and goods across Ontario;
- **Environmental Protection Principles** to protect or mitigate potential natural, socio-economic and cultural environmental impacts through the development of mitigation measures;
- **Consultation Principles** to encourage meaningful engagement with stakeholders such as the public, agencies and Indigenous communities;
- **Evaluation Principles** to provide an evaluation of alternatives that provides balance between engineering requirements and environmental protection that is open and transparent; and,
- **Documentation Principles** providing an opportunity for stakeholders to review the design, potential impacts and proposed mitigation measures.

Figure 2:MTO Class Environmental Assessment Process



MTO's Class EA identifies the bridge replacement and interchange improvements as a Group 'B' project. Group 'B' projects include major improvements to existing transportation facilities. This type of project is approved under the Ontario *EA Act*, as long as it is planned and designed according to the requirements of the Class EA. The Preliminary Design and Detail Design studies for the bridge replacement and interchange improvements were carried out as a Group 'B' undertaking following MTO's *Class EA for Provincial Transportation Facilities* (2000).

1.5 Preliminary Design Stage

The Preliminary Design, initial Detail Design and Class EA study were completed as a Group 'B' undertaking to identify the Preferred Ultimate Interchange Alternative through a comparative evaluation of alternatives and consultation with the public, agencies and Indigenous communities. The study recommended the replacement of Dorchester Road bridge, interchange ramp reconfiguration and a slight realignment of the bridge and Dorchester Road to the east of the existing bridge. The Preliminary Design, initial Detail Design and Class EA process were documented in a Transportation Environmental Study Report (TESR, 2016) and made available for public comment from January 20, 2016, to February 19, 2016.

On February 22, 2016, the Ministry of Environment and Climate Change (MOECC) (now Ministry of Environment, Conservation and Parks (MECP)), notified MTO that one Part II Order Request had been received during the TESR comment period. The Part II Order Request raised concerns regarding the preliminary construction staging plan for the project, specifically related to the duration of interchange ramp closures.

On May 12, 2017, the Minister of MOECC advised that an Individual Environmental Assessment was not required, pending the following two conditions:

- Consult with the Ministry of Natural Resources and Forestry (MNRF) during Detail Design regarding potential impacts to the Species at Risk (SAR) and complete additional studies and/or implement any additional mitigation measures required by MNRF; and,
- Consult with the Part II Order Requestor during Detail Design regarding interchange closures and Traffic Management Plans.

The TESR received Environmental Clearance for ROW Designation and Property Expropriation on March 26, 2017, allowing the project to advance into Detail Design.

1.6 TESR Review

As required by the MTO Class EA, a proponent is required to carry out a review of not-constructed portions of a project if construction has not commenced within five years of the Notice of Submission of the TESR.

During the initial Detail Design stage, MTO retained Dillon to complete a 5-year review of the 2016 TESR. This included a review of changes to the environmental conditions and legislative changes that may affect the proposed improvements. The review concluded that the proposed improvements did not require significant design modifications to the approved plan. The results of the review are included in **Appendix A** and confirmed the impacts and associated mitigations measures assessed as part of the project were consistent with the 2016 TESR and that a TESR Addendum was not required.

The 5-year TESR Review was finalized in December, 2022, however amendments to the Migratory Birds Regulations (SOR/2022-105) under the *Migratory Bird Convention Act* (1994) came into force on July 30, 2022, which were not reflected in the review. The amendment to SOR/2022-105 will not require changes to the design, however does provide additional protection during construction for eighteen species of migratory birds listed in Schedule 1. The nests of these bird species are protected year-round until they can be deemed abandoned. If the nest of a species that is not listed in Schedule 1 is encountered during construction, the nest may be destroyed if it does not contain juvenile birds or eggs.

1.7 Detail Design Stage

The purpose of the Detail Design stage of the project is to develop a recommended plan to a design/implementation level of detail, and develop drawings and documents for construction. This stage focused on the environmental impacts and environmental mitigation/monitoring measures and provisions to be incorporated into the construction contract. A DCR is prepared to document the 5-year TESR Review, final Detail Design, and Class EA for the project.

1.8 Purpose of Report

This DCR builds on the previously completed Preliminary Design and initial Detail Design, and documents the 5-year TESR Review, Detail Design, and Class EA process for the Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements project, and the environmental mitigation/monitoring measures and provisions that will be incorporated into the construction contract.

A Notice of Completion for the DCR will be published in the Aylmer Express and Dorchester Signpost announcing the start of the 30-day public and agency comment period. While the DCR is not eligible for Part II Order Requests, comments received will be reviewed by the project team, and changes to the design and/or mitigation measures will be made as appropriate. Following the 30-day public comment period, the 30-day MECP comment period and receipt of all design related approvals, the project will receive environmental clearance under the MTO Class EA to proceed to construction without further notice.

1.9 Consistency with Provincial Policy Statement

The Provincial Policy Statement (PPS) is issued under Section 3 of the *Planning Act*, and came into effect on May 1, 2020. Section 3 of the *Planning Act* states that decisions affecting planning matters "shall be consistent with" the PPS. The consistency of the proposed improvements (defined as "infrastructure" in the PPS) within the relevant Infrastructure and Public Service Facilities policies included in Section 1.6 of the PPS is summarized as follows:

- The planned bridge replacement and interchange improvements are consistent with the PPS goal of providing transportation systems which are safe, energy efficient and facilitate the movement of people and goods and are appropriate to address projected needs;
- Consistent with the PPS, the improvements make efficient use of existing and planned infrastructure;
- MTO has integrated transportation and land use considerations in all stages of the planning process, as required by the PPS; and,
- MTO is planning for and protecting the Highway 401 corridor, interchanges and the ROW for the future.

Section 1.6.8.6 of the PPS, requires that MTO, consider significant resources protected by the PPS, such as prime agricultural lands, significant natural features and lands with archaeological potential when planning for corridor and ROWs. Significant resources are not affected by the improvements, as described below:

- Impacts on agriculture are not significant since most of the lands around the interchange are designated for non-agricultural uses;
- Impacts to the South Dorchester Swamp PSW have been minimized; and,
- Impacts on lands with archaeological potential will be avoided by completing the required archaeological assessments and obtaining archaeological clearance from the Ministry of Citizenship and Multiculturalism (MCM) prior to construction.

2.0 Consultation Process

Consultation was initiated as part of the Preliminary Design stage in 2013. The following sections summarize the public, agency and Indigenous community consultation and engagement completed throughout the Detail Design stage. Input was considered by the project team and, where applicable, incorporated into the design and construction documents.

Consultation with directly impacted stakeholders was determined to be more effective than hosting a Public Information Centre. Based on the scope of work and low number of potentially affected stakeholders, consultation with directly impacted property owners and potentially impacted stakeholders was completed to encourage participation in the project and identify their concerns. Additional correspondence was undertaken with property owners as a result of the Part II Order Request (**Section 1.4**) and feedback received from the detour route notification letter (**Section 2.4**).

Consultation materials are summarized below and are included in **Appendix B**.

2.1 Project Website and Email Address

A project website and a project-specific email address were developed during the Detail Design stage. The website featured an overview of the study, information on the Class EA process, a copy of the TESR and Notice of Commencement, and detour route information. The website is **www.Hwy401Dorchester.com** and the project email address is mailto:Hwy401Dorchester@dillon.ca.

2.2 Notice of Study Commencement

A Notice of Study Commencement (Notice) was prepared to introduce the next stage of the project and provide information on the Detail Design and Class EA process, project team contact details, and project website address. The Notice was published on November 3, 2022, on the project website and copies of the Notice were mailed and emailed to the project Contact List as follows:

- A copy of the Notice was sent to the local MPP via e-mail on October 27, 2022;

- A copy of the Notice was mailed to stakeholder and agency contacts where e-mails were not available on October 27, 2022;
- A copy of the Notice was e-mailed to the remaining stakeholder and agency contacts on November 3, 2022;
- MTO e-mailed a copy of the Notice to Indigenous communities on November 3, 2022; and,
- Dillon re-emailed a copy of the Notice to updated contacts at the County of Middlesex, the Middlesex London Health Unit and the Middlesex Federation of Agriculture as their original notification was returned as undeliverable.

2.2.1 External Agencies and Municipalities

Five comments were received from agencies throughout the Detail Design stage of the project. Correspondence included requests to be kept informed and an inquiry regarding publishing of the Notice of Study Commencement.

2.2.2 Public and Stakeholder Comments received and Project Team Responses

Two comments were received from stakeholders during the Detail Design stage, one through email and one through phone call, where both stakeholders provided updated contact information. One stakeholder noted interest in a meeting with the project team.

2.2.3 Indigenous Communities

Engagement with Indigenous communities has been ongoing throughout the Preliminary Design and Detail Design stages of this project. The same communities identified as part of the Preliminary Design stage were contacted as part of the Detail Design stage, including the following:

- Aamjiwnaang First Nation;
- Caldwell First Nation;
- Chippewas of Kettle and Stony Point First Nation;
- Chippewas of the Thames First Nation;
- Delaware Nation (Moravian of the Thames);
- Munsee-Delaware Nation;
- Oneida Nation of the Thames; and,
- Walpole Island First Nation.

Representatives from Chippewas of the Thames First Nation and Oneida Nation of the Thames provided two comments. Chippewas of the Thames First Nation noted their transition to "NationsConnect" to receive consultation and engagement requests and to submit project information and files. Oneida Nation of the Thames noted interest in learning more about the project as it relates to Aboriginal and treaty rights and interest.

2.3 Detour Route Letter

A detour route letter was hand delivered on November 4, 2022, to properties located on the proposed detour routes for the project. Three versions of the letter were hand delivered to the properties potentially impacted by the project:

- Dorchester Road closure letter:
  - Delivered to properties along Dorchester Road, Hamilton Road and Elgin Road;
- Highway 401 closure letter:
  - Delivered to properties along Cromarty Drive; and,
- Combined Dorchester Road and Highway 401 closure letter:
  - Delivered to properties along Dorchester Road, south of Highway 401.

Follow up phone calls and emails were made to properties for which a letter could not be delivered, to determine an address or e-mail where the letter could be sent. The letter was sent to any respondents who provided e-mail or mail addresses. Two residential buildings along Dorchester Road were in the process of being built and did not have mailboxes. The letter was hand delivered to these locations on March 24, 2023.

In total, 10 comments were received (in-person, phone call and email) with respect to the letter. Agency comments consisted of contact information updates (**Table 1**). In general, concerns were raised regarding the proposed detour route locations and concerns related to noise, speed and signage during the use of the detour routes (**Table 2**).

Table 1: Detour Route Letter Agency Comments and Responses

Contact	Comment	Response
Tammy Butt Municipality of Thames Centre	• Confirmed she was the correct contact to receive the letter. • Asked to be sent the letter via e-mail.	• Sent letter via email.
Jenny Wood Municipality of Thames Centre	• Provided requested contact information.	• No response required.

Table 2: Detour Route Letter Public and Stakeholder Comments and Responses

Contact	Comment	Response
Member of the Public (In-person)	• Noted dissatisfaction with how the other two projects (Elgin Road and Westchester Bourne) were conducted and the realignment of Cromarty Drive at Westchester Bourne. • Mentioned concerns related to truck noise at night and signage during construction.	• Dillon staff who delivered the letter noted they would bring the comments back to the project team and encouraged the individual to provide feedback through the options noted in the letter.
Member of the Public (In-person,Phone)	• Expressed concerns about the use of Hamilton Road as the detour route due to the increase in traffic, the area being heavily populated and the location in relation to an elementary school and community pool. • Inquired why Highway 2 was not used for the detour and suggested Westchester Bourne be used as an alternate route as it's not as populated. • Expressed gratitude to be able to speak with someone from the project and was happy to be given the opportunity to comment on the project.	• Dillon staff who delivered the letter encouraged the individual to provide feedback through the options noted in the letter. • Dillon responded via letter with detailed information related to construction timing, detour route refinements, and detour route information including maps and updates to the routes.
Member of the Public (In-person)	• Noted concerns about the timing of the detour route, as his company would be doing work on Hamilton Road in Spring 2023. • Inquired why this overlap was not flagged in previous meetings with the County of Middlesex.	• Dillon staff who delivered the letter noted construction is to begin in 2024 and that members of the project team are listed in the letter if there are any concerns.
Member of the Public (Phone)	• Concerns related to increase in traffic on Cromarty Drive during the detour and potential impacts to emergency vehicle response times. • Noted that Cromarty Drive doesn't have shoulders and are concerned that the detour is being used for trucks.	• Dillon staff agreed to provide any proposed improvements to the detour route with the project team and discuss perceived impacts to emergency response times with Emergency Services at the next meeting. • Dillon responded via email with detailed information related to construction timing, detour route refinements, and detour route information including maps and updates to the routes. • The project team has consulted with Emergency Service Providers, who are aware of the proposed detour routes and have not raised any concerns with response times. The Contractor will continue to meet regularly with Emergency Service Providers through the duration of construction to provide updates.

Contact	Comment	Response
Member of the Public (Email)	• Noted timing, direction and confirmation of which traffic would be using the detour routes needed clarification. • Concerns related to increased volume of traffic, safety and excessive noise. • Asked if there will there be reduction in speed limits and signage regarding the use of engine brakes.	• Dillon responded via email with detailed information related to construction timing, detour route refinements, and detour route information including maps and updates to the routes. • Concerns related to speed control and use of engine brakes along the detour routes will be passed on to the County of Middlesex, as this falls within their jurisdiction. • The proposed detours are temporary in nature and are expected to result in an increase in local traffic along the detour routes. Construction noise impacts are temporary in nature and largely unavoidable. With adequate controls, impacts can be minimized; however, for some periods of time and types of work, construction noise will be noticeable. To minimize impacts on adjacent lands, the following best management practices related to noise will be in place during construction: ○ All equipment will be maintained in an operating condition that prevents unnecessary noise, including non-defective muffler systems, properly secured components and the lubrication of moving parts ○ Idling of equipment will be restricted to the minimum necessary to perform the specified work.
Member of the Public (Email)	• Concerns related to traffic volumes, noise, air pollution, speed and trucks blocking driveways when using amenities in town. • Inquired whether traffic be directed off the 401 and rerouted via Cromarty Drive during construction instead of Hamilton Road.	• Dillon responded via email with detailed information related to construction timing, detour route refinements, and detour route information including maps and updates to the routes. • Concerns related to speed control along the detour routes will be passed on to the County of Middlesex, as this falls within their jurisdiction. • The proposed detours are temporary in nature and are expected to result in an increase in local traffic along the detour routes. Construction noise impacts are temporary in nature and largely unavoidable. With adequate controls, impacts can be minimized; however, for some periods of time and types of work, construction noise will be noticeable. To minimize impacts on adjacent lands, the following best management practices related to noise will be in place during construction: ○ All equipment will be maintained in an operating condition that prevents unnecessary noise, including non-defective muffler systems, properly secured components and the lubrication of moving parts ○ Idling of equipment will be restricted to the minimum necessary to perform the specified work. • Dust generating activities during construction are anticipated to be localized at the Highway 401 and Dorchester Road interchange, and therefore air quality impacts along the detour routes is expected to be negligible.

Contact	Comment	Response
Member of the Public (Email)	• Inquired about mitigation for speed along the routes and traffic congestion along Elgin Road. • Noted temporary lights during construction may help.	• Dillon responded via email with detailed information related to construction timing, detour route refinements, and detour route information including maps and updates to the routes. • Concerns related to speed control along the detour routes will be passed on to the County of Middlesex, as this falls within their jurisdiction.
Member of the Public (Email)	• Confirmed contact and would pass information along to others. • Noted the importance of the information.	• No response required.

2.4 Consultation Meetings

This section summarizes meetings with agencies and stakeholders. The minutes for these meetings can be reviewed in **Appendix C**.

2.4.1 County, Municipality and Emergency Services Meetings

Meetings with Municipality of Thames Centre, County of Middlesex and Emergency Service Provider representatives were held in December 2022 and May 2023 and were facilitated by Dillon using the Microsoft Teams platform. A brief presentation was given followed by a question and answer period. Representatives from the following groups were in attendance:

- Municipality of Thames Centre (Municipality);
- County of Middlesex (County);
- Ontario Provincial Police (OPP);
- Ministry of Transportation, Ontario (MTO);
- Green Infrastructure Partners Incorporated (GIP); and,
- Dillon Consulting Limited (Dillon).

2.4.1.1 December 2022

A video conference was held on December 14, 2022, to provide an update on the project. The OPP inquired about overweight vehicles during the proposed detours and MTO confirmed that advance notice of Highway 401 closures will be provided to the oversize/overweight vehicle permitting division. The County noted no concerns at this time with regards to the design as long as the structure can accommodate northbound and southbound bike lanes. No other concerns were raised.

2.4.1.2 May 2023

A video conference was held on May 5, 2023, to provide an update on the project. The County provided information related to active transportation standards and noted that cycling demand was low in the area. Existing signage that will be impacted by the project was discussed. The County noted that their sign was outdated and would be removed and that the other sign belonged to the Municipality and would be returned.

Dillon relayed concerns received from the detour route letter and agreed to follow up with the Municipality.

On May 18, 2023, an email was sent to the Municipality to provide an update on the project, which included updates related to bike lanes on Dorchester Road, the overnight closure of Highway 401, the signs that were identified and discussed in the May 5, 2023 meeting with the County, and the feedback received in response to the detour route letter. The meeting minutes from May 5, 2023, were attached to the email.

2.4.2 Suncor Meetings

Meetings with Suncor representatives were held in December 2022 and April 2023 and were facilitated by Dillon using the Microsoft Teams platform. A brief presentation was given followed by a question and answer period. Representatives from the following groups were in attendance:

- Suncor Energy Products Partnership (Suncor);
- MTO;
- GIP; and,
- Dillon.

2.4.2.1 December 2022

A video conference meeting with Suncor representatives was held on December 16, 2022, to provide an update on the project. One question regarding signage was posed by Suncor, which was reviewed by the project team. Suncor noted impacts to their business during construction were inevitable but acknowledged that impacts had been mitigated. No other concerns were raised.

2.4.2.2 April 2023

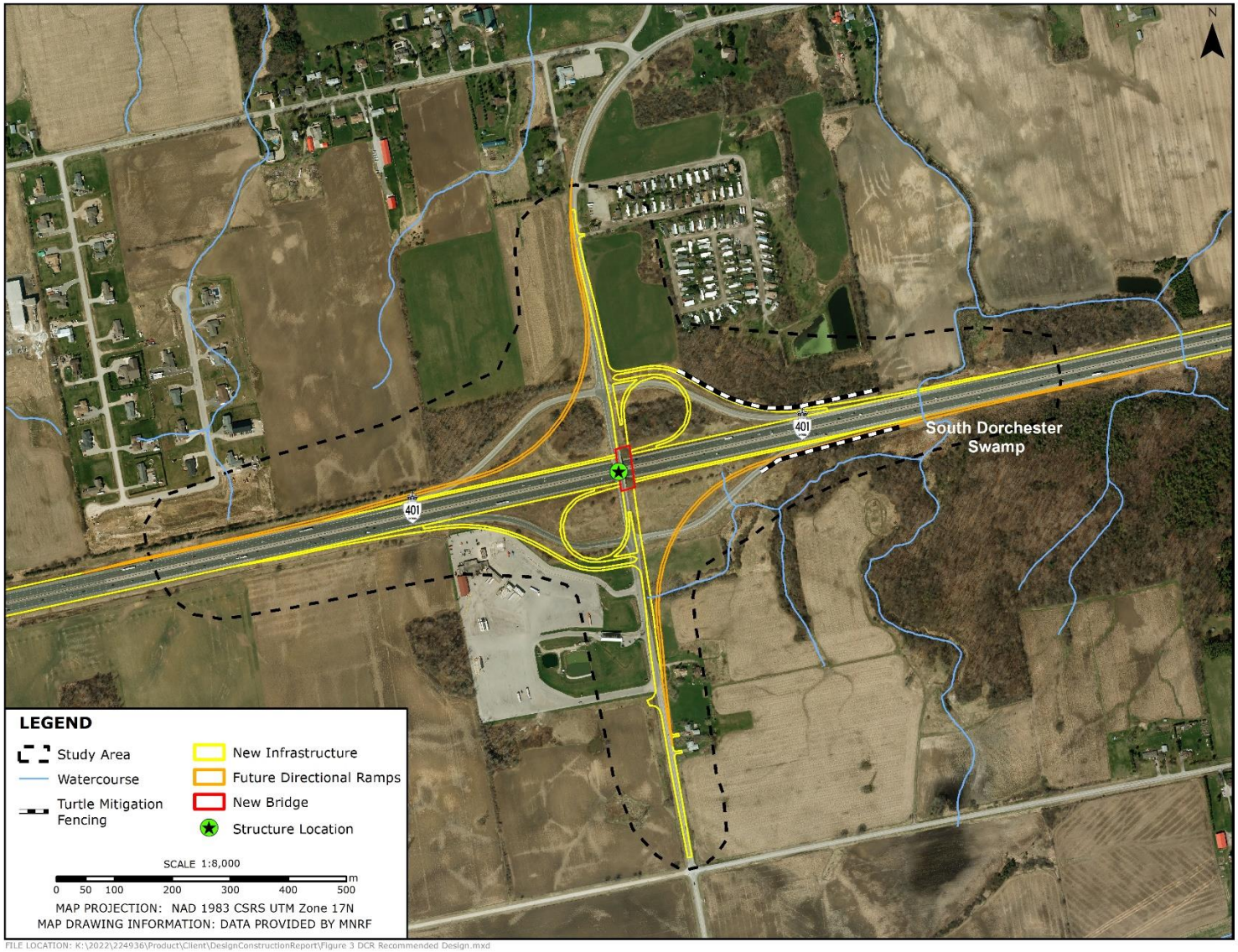
A video conference meeting with Suncor representatives was held on April 4, 2023, to provide an update on the project. One change from the previous meeting was noted in relation to the detour routes for the closure of Highway 401 for the placement of the bridge girders and an updated signage plan was provided to Suncor. Drawings had been revised to show the property adjustment that allows for the Suncor sign to remain at the existing location. No concerns were raised. Suncor agreed to review the signage plan and provide feedback where necessary, as well as provide contact details for an on-site representative.

3.0 Description of the Recommended Design

The Preferred Ultimate Interchange Alternative was documented in the Preliminary Design and Design-Build Ready Report (Dillon, 2022). The project limits extend along Highway 401, from 1.35 km west to 0.95 km east of the existing Dorchester Road bridge and extend from 0.47 km north to 0.69 km south of Highway 401. This has been advanced through the Detail Design stage and the proposed work for the Recommended Design includes the following improvements (**Figure 3**):

- Replacement of the existing Dorchester Road bridge;
- Reconstruction and realignment of Dorchester Road to the east;
- Reconstruction of the existing diamond interchange to a Parclo A-2 interchange configuration; and,
- Construction of four new overhead signs and one steel breakaway ground mounted sign on Highway 401.

Figure 3:Recommended Design



During the Detail Design stage, the following activities were undertaken to help confirm the recommended design, identify potential environmental impacts and develop appropriate and effective mitigation measures:

- Reviewed the Preliminary Design and initial Detail Design reports;
- Reviewed the Design-Build Ready Report;
- Completed a 5-year TESR review (Dillon, 2022);
- Completed a Terrestrial Ecosystems Existing Conditions Update Memo (Dillon, Draft November 2022) and Fisheries Impact Assessment Memo Update Memo (Dillon, Draft November 2022); and,
- Conducted additional consultation with the public, agencies and Indigenous communities including the circulation of a Detour Route letter in November 2022.

It is anticipated that construction will start in Spring 2024 with completion in Summer 2025.

Additional details pertaining to key improvements are included below. The design has been completed in accordance with the Transportation Association of Canada Geometric Design Guide for Canadian Highways (TAC GDG) (2017), MTO Design Supplement to the TAC-GDG (2020) and the Roadside Design Manual (RDM) (2020).

3.1 Dorchester Road Bridge

The proposed Dorchester Road bridge is a two-span continuous steel trapezoidal box girder bridge with 48 meters (m) and 42 m spans. The bridge will accommodate four lanes of traffic (one through lane and one speed change lane in each direction) on Dorchester Road. The bridge will also accommodate the ultimate expansion of Highway 401 to ten lanes in the future.

3.2 Dorchester Road

Dorchester Road will be realigned approximately 12 m to the east and generally consist of two 3.5 m through lanes (one northbound and one southbound) and either left turn lanes or a flush median of 3.25 m. The shoulders will be fully paved to accommodate a signed bike route.

3.3 Highway 401 and Dorchester Road Interchange

The existing Highway 401 and Dorchester Road diamond interchange will be reconstructed to a Parclo A-2 interchange. The north and south ramp terminals will be stop controlled and left-turn lanes will be provided on Dorchester Road to accommodate left-turn movements to the South-East (S-E) and North-Wes(N-W)t ramps. New speed change lanes will be required along Highway 401 to accommodate the new interchange configuration.

The interchange ramps have been designed to accommodate long combination vehicles (LCV).

3.4 Overhead and Ground Mounted Signs

The scope of work includes the installation of four new overhead signs for the interchange. The overhead sign support structures have been designed for the existing six lane cross section on Highway 401. One ground mounted sign will be installed on steel breakaway sign support system to reduce the severity of impact.

3.5 Construction Staging

The work to be undertaken as part of this contract is anticipated to be completed over two construction seasons, as listed below:

2024 Construction Season

- Demolition of the existing Dorchester Road bridge;
- Construction of the new Dorchester Road bridge;
- Replacement of the median tall-wall barrier and storm sewer for the new Dorchester Road bridge;
- Construction of the realignment of Dorchester Road, new interchange ramps and Highway 401 speed change lanes; and,
- Construction of four new overhead signs and one breakaway ground mounted sign.

2025 Construction Season

- Surface course paving of the interchange ramps and Dorchester Road.

Highway 401 will remain open for the majority of construction; however, overnight closures of Highway 401 will be required to facilitate demolition of the existing bridge and placement of new bridge girders. During construction, Dorchester Road will be closed. Detour routes, signage and signalling will be provided within the Study Area to indicate lane restrictions and closures. Full construction staging and traffic management details are provided in the following sections.

3.5.1 Highway 401

Throughout the majority of construction, Highway 401 will be reduced to two-lanes in each direction to complete construction of the median pier, median barrier wall, median storm sewer, speed change lanes and interchange ramps.

It is anticipated that Highway 401 will remain open, except for overnight closures required to facilitate demolition of the existing bridge and placement of the new bridge girders. To complete this, the following detours will be in place:

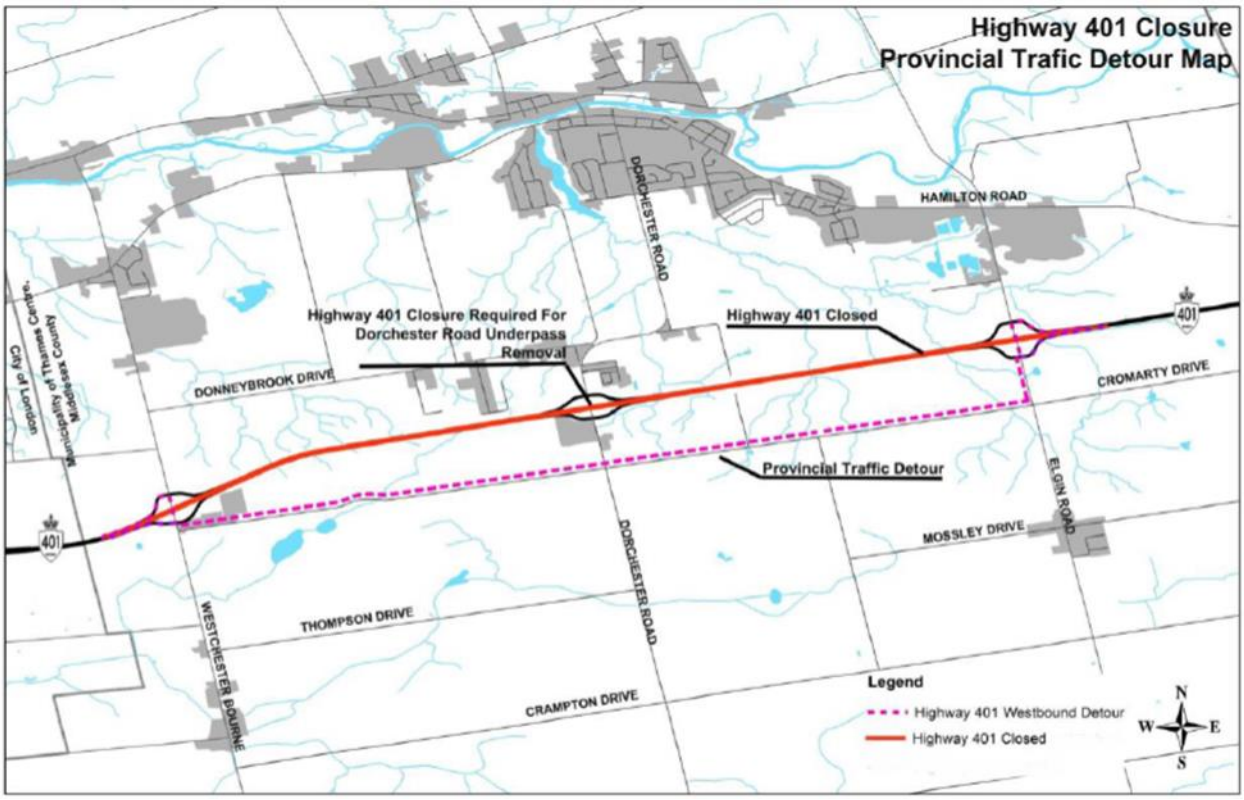
Bridge Demolition Detour

Highway 401 traffic will be detoured on-site using the existing interchange ramps. It is anticipated that demolition will be completed over three nights in Spring 2024.

Girder Placement Detour

It is anticipated two nights of full closure on Highway 401 will be required, followed by two nights of Highway 401 eastbound closures in Summer 2024 to facilitate the new girder placement. Highway 401 eastbound traffic will be detoured on-site using the existing interchange ramps and Highway 401 westbound traffic will be detoured at Elgin Road to Cromarty Drive and Westchester Bourne. During the detours, signage and police services will be used to help direct traffic. Detour routes are illustrated below in **Figure 4**.

Figure 4:Highway 401 Closure Detour Route

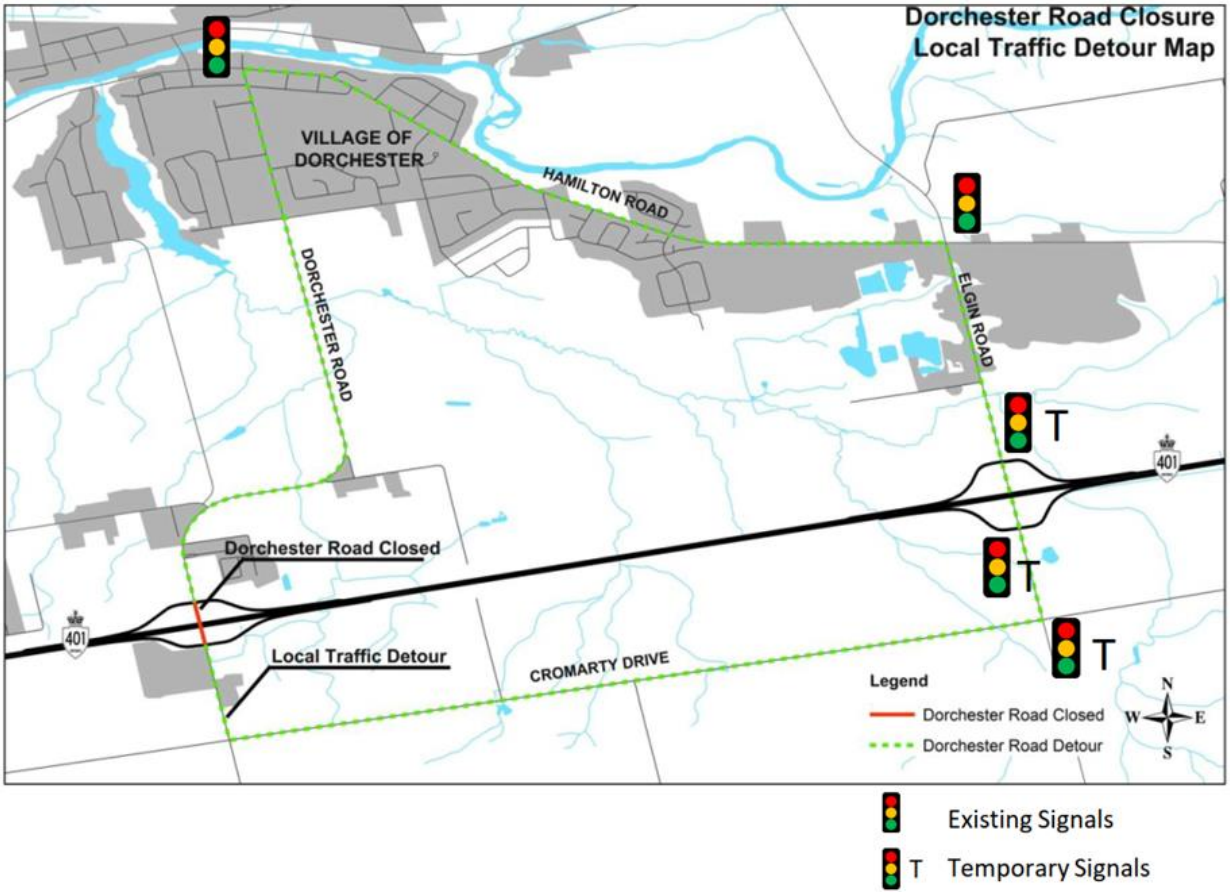


3.5.2 Highway 401 Interchange Ramps and Dorchester Road

Dorchester Road will be closed crossing Highway 401 for a full construction season immediately prior to demolition of the existing bridge. Traffic will be diverted to Elgin Road, via Hamilton Road (north of Highway 401) and Cromarty Drive (south of Highway 401) as shown in **Figure 5.** Detour signage will include advance notification of the closure and will require temporary signals at the following intersections:

- Highway 401 and Elgin Road north ramp terminal;
- Highway 401 and Elgin Road south ramp terminal; and,
- Elgin Road and Cromarty Drive Intersection.

Figure 5: Dorchester Road Closure Detour Routes



Following demolition, the existing East-North/South and North/South-West ramps will be closed for a duration of approximately 190 consecutive days to accommodate the construction of Dorchester Road north of Highway 401 and the westbound interchange ramps. The West-North/South and North/South-East ramps will remain open until the girder erection is completed. The duration for the closure of the eastbound interchange ramps will be approximately 120 consecutive days to accommodate the construction of Dorchester Road south of Highway 401 and the eastbound interchange ramps. During the construction of the south portion of Dorchester Road, the roadway will be reduced to a single lane utilizing flagging during the day and opened to two lanes each night in order to maintain access for local residents and businesses.

4.0 Environmental Impact Assessment and Mitigation Measures

During the initial Detail Design stage, and as documented in the Design Build Ready Report (DBRR, 2022), Dillon completed the 5-year TESR review (**Section 1.5**) to reconfirm the potential for direct and indirect environmental impacts as a result of the proposed improvements to the Highway 401 and Dorchester Road bridge and interchange. The DBRR identified measures to best mitigate these impacts. As part of the Design-Build stage, the impact assessment and mitigation measures developed were reviewed and refined to address specific environmental concerns during construction.

The general landscape in the Study Area consists of agricultural fields, woodlands, residential and commercial buildings and the South Dorchester Swamp Provincially Significant Wetlands (PSW) southeast of the project limits. The Study Area is located within the headwaters of the Lawton Municipal Drain and in the Upper Thames River Source Protection Area within the Thames-Sydenham and Region Drinking Water Source Protection Area.

The proposed improvements are anticipated to be constructed over two construction seasons, subject to final approvals. Work associated with the Highway 401 and Dorchester Road Bridge Replacement and Interchange Improvements will be completed within MTO owned lands and the existing ROW. No new property is required to facilitate the work. Traffic detours, as outlined in **Section 3.5** of this DCR, are required during the Highway 401 and Dorchester Road closures.

Based on the scope of work for this project, impacts to adjacent land uses outside of the acquired land are anticipated to be minimal. With appropriate mitigation measures implemented during construction, potential impacts can be avoided, mitigated or minimized to the greatest extent possible.

The following sections outline the potential natural, socio-economic and cultural environmental impacts anticipated for construction of the proposed improvements. Environmental protection, mitigation measures, monitoring and contingency measures noted below have been incorporated into the construction contract.

4.1 Highway, Safety and Traffic Engineering

4.1.1 Traffic

Traffic delays due to construction are unavoidable and have been minimized to the extent possible. As outlined in **Section 3.5**, local road and highway closures will be required to complete construction. Signed detour routes will be used to direct traffic for Highway 401 and Dorchester Road closures. No signed detours will be provided during closures of the interchange ramps.

Advanced signage will be posted a minimum of seven days before the start of construction, advising motorists of potential traffic delays.

4.1.2 Construction Traffic

Construction traffic will access the construction area from the existing road network at specified construction access/egress locations. Any traffic disruptions on the highway will be minimized by advance signing.

4.1.3 Emergency Services

Emergency Service Providers (OPP, fire and ambulance) were engaged throughout the study process (as discussed in **Section 2.0**) and invited to provide feedback; no major concerns were expressed.

Road closures, lane reductions and detour routes may result in potential emergency services delays to incident locations. To minimize delays, emergency vehicles will be given priority access through the construction zone and Emergency Service Providers will be updated throughout the project on construction staging, including notification 14 days in advance of the construction start date, prior to highway and/or road closures, and any significant changes to traffic operations. Emergency Services Provider contact information will be provided to the Contractor and they will be invited to attend regularly scheduled progress meetings throughout construction.

4.1.4 Utilities

Utility impacts for this project are limited, as no embedded utilities will be incorporated in the new bridge construction. Utility relocations identified during the Preliminary Design stage were completed in fall 2022. No other impacts to utilities are anticipated for this project.

4.2 Natural Environment

Natural environment investigations were initially completed during the Preliminary Design stage in 2015. However, due to the age of the surveys, additional site reconnaissance and update memos were completed during the Detail Design stage.

A Terrestrial Ecosystem Existing Conditions Update Memo was completed in January 2023, which reviewed the following background information resources:

- Terrestrial Ecosystem Assessment Report (TEAR; Dillon, 2015);
- 2018 Bat Habitat and Acoustic Survey Results (Savanta, 2018); and,
- Road Mortality Assessment Report (McIntosh Perry Consulting Engineers Ltd., 2022).

A Fish and Fish Habitat Assessment Update Memo was completed in January 2023, which reviewed the following background information resources:

- Fish and Fish Habitat Assessment Report (FFHAR; Dillon, 2015);
- Interim Environmental Guide for Fisheries (MTO, 2020); and,
- MTO/DFO/MNRF Protocol for Protecting Fish and Fish Habitat on Provincial Transportation Undertakings (V4, 2020).

The following sections provide an overview of the natural environment in the Study Area and results of the additional surveys that were completed. Overall, impacts to wildlife and natural features have been determined to be minimal and temporary in duration provided the mitigation measures developed are implemented during construction.

4.2.1 Vegetation and Trees

A minor amount of tree pruning and edge removals will be required along the woodlands located in the northeast quadrant of the Study Area to accommodate the East-North/South ramp, while future directional ramps will require edge removals in the northwest and southeast quadrants. The vegetation proposed for removal is generally fragmented and disturbed by previous construction. Vegetation removal required for the project may cause a minor loss of woodland, potentially causing the following impacts:

- Increased vulnerability to invasion by non-native species;
- Decreased shade and cover for wildlife;
- Increased erosion and sedimentation of adjacent land;
- Vegetation dieback at the edge of natural features; and,
- Localized temporary displacement of wildlife.

During construction, impacts to adjacent natural environment features will be minimized and/or avoided by implementing the following mitigation measures:

- Vegetation removal must occur outside the bat active season (April 1 to September 30 for Little Brown Myotis, Northern Myotis and Tri-coloured bat, and March 15 to November 30 for Eastern Small-footed Myotis)
- Vegetation removal must occur outside the breeding bird period (April 1 to August 31);
- Minimizing the amount of vegetation removal as much as possible;
- Minimizing tree and vegetation clearing in the South Dorchester Swamp PSW. Temporary work space and construction staging areas shall not be located within wetlands;
- Following tree felling and grubbing procedures as outlined in OPSS 201, Construction Specification for Clearing, Close Cut Clearing and Grubbing;
- Implementing appropriate erosion and sediment control measures and re-vegetate with native species;
- Stabilizing areas temporarily cleared of vegetation prior to removal and erosion and sedimentation control measures; and,

- Restoring and/or re-vegetating disturbed areas with native species to minimize invasion and colonization by non-native species, increase shade/cover for wildlife and mitigate edge disturbance effects.

Temporary impacts are minor in nature and are not anticipated to have a significant impact to vegetation, wildlife or the surrounding area if these mitigation measures are followed.

4.2.1.1 Species at Risk Vegetation

Birds-foot Violet (*Viola pedate*) was investigated during the Terrestrial Ecosystem Existing Conditions Update Memo (Dillon, 2023). It was determined the species does not have potential to be present, as this species is only found in Black Oak Savanna ecosystems, which are not present within the Study Area.

4.2.2 Invasive Species

Phragmites (*Phragmites australis spp. australis*) is present throughout the Study Area, commonly seen in roadside ditches and areas of standing water. It is a highly invasive perennial that is able to grow at a rapid pace and spreads easily. Under the Ontario *Invasive Species Act* (2015) disposal of vegetation and topsoil removed from areas where Phragmites is present requires special handling to prevent spreading.

This project will require vegetation removals, including existing Phragmites and Phragmites-impacted soil. To minimize the potential spread of Phragmites as a result of disturbance, a Phragmites Management Plan shall be implemented during construction and all excess materials with Phragmites and Phragmites-impacted soils shall be managed within the Excess Materials Management Areas (EMMAs); designated areas within the interchange to manage excess materials. Mitigation measures include:

- Removal timing to occur before the seed head develops (late summer) to prevent spread; and,
- If removal must occur with seed heads present, all equipment, clothing and footwear must be cleaned before leaving the site and plastic bags or tarps must be used to transport the plant material to a burial site.

4.2.3 Hazardous Species

During field investigations in May 2023, Poison Ivy (*Toxicodendron radicans*) was identified in three locations within the Study Area: on the trunk of a tree north of the westbound off ramp, on the ground within the edge of the woodland located in the northwest inner loop, as well as on a tree trunk south of the eastbound off ramp.

Poison Ivy is a native species that can grow in a shrub or vine like form and can cause a dermal rash if contact with the skin is made. Poison Ivy contains an oily sap called urushiol that causes an allergic reaction when exposed to the skin. If contact with Poison Ivy is made the urushiol can be removed from the skin with soap and water to prevent the reaction from occurring.

No other hazardous plants were identified during the May 2023 visit.

4.2.4 Wildlife and Wildlife Habitat

A Terrestrial Ecosystem Existing Conditions Update Memo (Dillon, 2023) was prepared to document the review of previous background documents and the site assessment undertaken to identify changes in the terrestrial ecosystem within the Study Area since the previous TEAR was prepared. The changes documented in the memo are summarized in the following sections.

The highway corridor provides limited habitat to common species of mammals and herptiles. During construction, the following temporary impacts to wildlife and habitat are anticipated:

- Disruption to wildlife movement and wildlife avoidance during active construction;
- Disturbance to herptiles that could be traveling through or utilizing riparian habitats within and adjacent to the construction area; and,
- Permanent removal of vegetation with the potential to provide wildlife habitat.

Additional mitigation measures include the following:

- Workers should be vigilant and check work areas and machinery for the presence of wildlife prior to each day of construction and periodically throughout the day; and,

- If wildlife is encountered in the construction area, the Contractor will be required to temporarily suspend work until the animal is out of harm's way. If the species persists in the work area, a person qualified to handle wildlife should be contacted to relocate the animal.

4.2.5 Migratory Birds

The Dorchester Road bridge was evaluated for Barn Swallow habitat in 2015 and no nests or foraging Barn Swallows were observed. No birds or nests were observed during field investigations in May 2023. The Dorchester Road bridge is narrow with uneven surfaces on the underside. The bridge conditions along with heavy traffic traveling past the bridge makes this bridge poor quality habitat for this species. Barn Swallow has been de-listed under the *Species at Risk Act*; however, birds and nests remain protected under the *Migratory Bird Convention Act* and require mitigation measures should they be encountered prior to or during construction.

During construction, potential impacts to migratory birds will be minimized and/or avoided by implementing the following mitigation measures:

- Vegetation removal outside of the breeding bird period of April 1 to August 31;
- A qualified avian biologist conducts a nest sweep of the vegetation to be removed prior to work commencing and determination that there are no nests of Schedule 1 bird species (Migratory Birds Regulations SOR-2022-105) or active nests, in or close to the work area, within 48 hours of removal;
- Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs or young; and,
- If breeding birds and/or nests are encountered, work shall not continue until after August 31 or as soon as it has been determined that the young have left the nest.

4.2.6 Species at Risk Wildlife

SAR Birds

Bobolink (*Dolichonyx oryzivorus*) and Eastern Meadowlark (*Sturnella magna*) were included in the potential SAR list based on the knowledge that potential habitat was identified in 2015 in the perennial cover crop located at the northeast quadrant of the Study Area. A grassland breeding bird survey was completed in 2015 to determine if this habitat was being used and no Bobolink or Eastern Meadowlark were present within the

field. As the vegetation within agricultural field frequently changes from year to year, there is potential for new habitat to be created. In 2022, a second survey was conducted to further assess the potential of this field to act as bird habitat. The survey found that the conditions, vegetation communities and size of the field were not preferred by either avian species and it was concluded that habitat for these species is not present within the Study Area.

In addition to potentially disturbing nesting birds, there is potential for Red-headed Woodpecker (*Melanerpes erythrocephalus*), a newly identified SAR species, to be present within the Study Area as open woodland located north of the interchange and woodland associated with the South Dorchester PSW may provide habitat. The impacts to this species are similar to those outlined under the migratory nesting bird's impacts section of the TEAR and therefore the mitigation measures remain the same as those previously identified in the TEAR.

Potential impacts to Red-headed Woodpecker habitat as a result of the proposed improvements will be addressed through a Notice of Activity registration under s23.18 of the *Ontario Regulation 242/08 of the Endangered Species Act (2007)* "Threats to health and safety; not imminent". This section applies to activities that are necessary to avoid or reduce a threat to human health or safety in situations where the threat is not imminent but is likely to have serious consequences in the short or long term if the activity is not carried out.

SAR Bats

Three SAR previously identified in 2015 as having potential to occur within the Study Area have been ruled out, including:

- Birds-foot Violet (Section 4.2.1.1) as current site conditions for the species is not present; and,
- Spiny Softshell (*Apalone spinifera spinifer*) and Queensnake (*Regina septemvittata*) which rely on large watercourses with fast flowing water, also not present within the Study Area.

Since the TEAR in 2015, three species of bat were added to the SAR list in Ontario, in addition to Little Brown Bat (*Myotis lucifugus*), which was previously identified:

- Eastern Small-footed Myotis (*Myotis leibii*);
- Northern Myotis (*Myotis septentrionalis*); and,
- Tri-coloured Bat (*Pipistrellus subflavus*).

SAR bat species were identified as having low potential to occur within woodlands in the Study Area. A bat survey was conducted northeast of the interchange by Savanta (2018), which determined habitat was present in the woodland northeast of the interchange. Woodlands northwest of the interchange do not contain sufficient habitat for bats. Acoustic surveys were conducted by Savanta within the identified habitat to further investigate for presence of SAR bats. Four types of bat species were recorded during the surveys, however, none of these species were SAR. Based on this data, none of the four SAR bat species are present north of the interchange. Woodlands south of the interchange were not investigated for bat species and are still considered candidate SAR habitat.

During construction, impacts to SAR bat habitat will be minimized and/or avoided by implementing the following mitigation measure:

- Vegetation removal must occur outside the bat active period (April 1 to September 30 for Little Brown Myotis, Northern Myotis and Tri-coloured bat, and March 15 to November 30 for Eastern Small-footed Myotis)

SAR Reptiles

The TEAR identified potential habitat for Blanding's Turtle (*Emydoidea blandingii*) and Spotted Turtle (*Clemmys guttata*) within the South Dorchester Swamp PSW. A Road Mortality Assessment Report was completed by McIntosh Perry (2022) to assess the road mortality concerns with regards to reptiles and amphibians with the potential to occur within the Study Area, with a specific focus on SAR reptiles. Throughout the 2022 monitoring period, no reptiles were observed along the Study Area highway and roads, and it was determined that there is a low risk of encountering reptiles within the active construction area.

Mitigation measures are recommended since Blanding's Turtle have been historically observed within the South Dorchester Swamp PSW and often nests in loose gravely soils, such as those along highway shoulders. Although no turtles were observed during the road mortality assessment, there is still potential for this species to access the

highway or interchanges. As no additional studies were completed, the swamp is still considered to be candidate habitat for these turtles.

As suitable habitat to support these turtle species was identified, mitigation measures are required, as outlined below:

- Temporary exclusionary fencing should be installed adjacent to areas of suitable habitat prior to April 15 and maintained until October 1 to exclude turtles or snakes from the work area;
- Exclusionary fencing will follow guidelines set out in the Ministry of Natural Resources and Forestry's SAR Branch Best Practices Technical Note on Reptile and Amphibian Exclusion Fencing (2013) to provide the most effective protective function and prevent mortality; and,
- Temporary work space and construction staging areas shall not be located within wetlands or areas of candidate habitat.

4.3 Fish and Fish Habitat

As outlined during Preliminary Design, McNivens Drain at Culvert C contains suitable fish habitat; however, the design was refined so that works are no longer required at Culvert C and therefore impacts to fish and fish habitat have been avoided.

In order to accommodate the shift in alignment of Dorchester Road to the east, the realignment of the ditch along the east side of Dorchester will require minor infilling of the watercourse in the southeast quadrant of the interchange. The ditch extending north of the watercourse was reviewed in May 2023 and noted to provide limited habitat value, as it is essentially a grassy swale. The ditch extending from the watercourse to the south is well vegetated and was flowing upon timing of the assessment. This appeared to be contributing habitat (source of food and nutrients). The primary watercourse, flowing from west to east (perpendicular to Dorchester Road) originates from a culvert further south under Dorchester Road and was observed as a meandering channel with gravel substrate and a well vegetated riparian area along the banks and slopes. Based on review of Ontario Hydro Network data, the watercourse is understood to have an intermittent flow regime and as such, likely dries up during summer months. No aquatic species at risk or their habitat were identified within the ditches and subject watercourse (DFO Aquatic Species at Risk

Mapping reviewed May 24, 2023). The subject ditches and watercourse are directly connected to the PSW downstream.

The following mitigation measures will be included in the construction contract to mitigate potential impacts to fish and fish habitat adjacent to the construction area during construction:

- No in-water work is to occur between September 30 and June 1 (OPSS 182);
- If applicable, a fish salvage will be performed under a Licence to Collect Fish for Scientific Purposes from the MNRF during dewatering (OPSS.PROV 182, SSP101F23);
- Flow will be maintained downstream during construction around the isolated work areas;
- Dewatering and use of pumps shall be conducted in accordance with OPSS.PROV 517 and the DFO end-of-pipe fish screens code of practice:
    - Pumping system shall be sized to accommodate high flows of the waterbody during the construction period. Pumps shall be monitored at all times, and back-up pumps shall be readily available on-site in the event of pump failure;
    - Sediment laden dewatering discharge shall be pumped into a vegetated area, settling basin or similar measure >30 m from the watercourse and prevent sediment and other deleterious substances from entering any waterbody;
    - All water intakes and outlets in the watercourse will have screens to prevent entrainment or impingement of fish.
- Vegetation removal is to be minimized, and disturbed terrestrial riparian areas will be restored to pre-construction conditions with native grass seed mix and stabilized to prevent erosion (OPSS 804 and 805);
- Appropriate erosion and sediment control measures must be installed around the work area to prevent migration of loose soils and accumulated sediment downstream or to adjacent areas (OPPS 182, 804 and 805);
- Effective sediment and erosion control will follow MTO's Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects (2015), including keeping required clearing and grubbing to a minimum and installing silt fence along watercourse banks and around fill placement areas;
- Operate machinery on land from outside the water in a manner that minimizes disturbance to the banks and/or bed of the watercourse (OPSS 182);

- Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds (OPSS 182);
- Equipment re-fuelling and maintenance shall take place in a manner that prevents any sediment and other deleterious substances from entering into a waterbody (OPSS 182);
- Maintenance and fuelling to take place a minimum of 30 m from waterbodies;
- An emergency spill kit shall be kept on site to address any fluid leaks or spills from equipment (OPSS 182);
- Handling of fuel, excess materials and debris will be properly managed on-site and removed as per the standard construction practices necessary to protect watercourses (OPSS 180 and 182);
- All materials used or generated (i.e., organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses (OPSS 180 and 182); and,
- Any unused excavated material will be disposed of on-site.

4.4 Water Resources

4.4.1 Groundwater

A Foundation Investigation and Design Report (FIDR) was completed which summarizes previous subsurface investigations completed by Golder Associates Ltd. (2013), Peto MacCallum Ltd. (2019) and WSP Golder (2023). Dillon completed a Phase II Environmental Site Assessment (ESA) in 2023 in partnership with WSP Golder. During the Detail Design stage of the project, the above reports were reviewed to complete the Water Taking and Discharge Plan Report (Dillon, April 2023) to support an Environmental Activity and Sector Registry (EASR). The reports are summarized below.

The proposed works require the advancement of several excavations as part of the bridge replacement and reconstruction of the interchange ramps. As a result, excavation and construction dewatering activities will be required within the Study Area. Water will be removed from the excavation using standard construction-related pumping equipment and techniques. The volume of pumped water and the location of

construction dewatering areas within the Study Area will be kept on file by the contractor.

The MECP Source water Protection Information Atlas (SWPIA) indicates that the Study Area is located in the Upper Thames River Source Protection Area within the Thames-Sydenham and Region Drinking Water Source Protection Area. The Source Protection Plan for the Thames-Sydenham and Region indicates that the eastern portion (east of Dorchester Road) of the Study Area is located within a wellhead protection area (WHPA) and overlies a Highly Vulnerable Aquifer (HVA). The WHPA indicates that groundwater is under the direct influence of surface water and there may be direct pathways from the ground surface to municipal wells, making the drinking water source vulnerable to contamination from the ground surface.

According to the Source Protection Plan, the WHPA consists primarily of the South Dorchester Swamp, wetlands and agricultural lands. The water taking activities are not expected to impact the source water as they will not occur within the WHPA areas and due to the low permeable nature of the soil.

While the exact volume of water to be removed during excavation work is unknown and may vary between de-watering activities, the amount of water is expected to be relatively low (i.e., less than 400,000 Liter per day [L/day]). The calculated maximum daily de-watering rate within the Study Area is estimated to be 141,800 L/day with a maximum amount of 400,000 L/day allowable under the EASR, although daily water takings are not anticipated to exceed the maximum volume per day. Although it is anticipated that the shallow surficial soils local to the excavation areas may lose some water content, this will likely only represent a short-term condition. This conclusion is based on regional surficial geological mapping, estimated hydraulic conductivity, construction methodology, anticipated excavation dimensions and anticipated construction schedule.

Water well records from MECP's Ontario Well Record database outlines several domestic wells exist within 500 m of the Study Area; however, the water taking activities are not expected to impact the domestic wells due to the following:

- Shallow localized nature of the water taking;
- Proximity of proposed works to domestic wells;

- Deep installation depths of the supply wells;
- Low permeability clay soils; and,
- Relatively low water taking flow rates.

In order to assess potential impacts to nearby wells, a well survey was distributed to five properties requesting additional well information, and noted that a representative from Dillon would contact them to obtain samples as part of a monitoring program. The well monitoring program includes sampling the wells prior to construction to establish baseline conditions, during and post construction. The survey is ongoing.

Detailed information related to reporting and notifications can be viewed in the Water Taking and Discharge Plan (Dillon, 2023). Mitigation measures to ensure de-watering activities during construction have minimal impact include:

- A Discharge Monitoring Plan will include daily record of volumes pumped and are to be recorded by the Contractor;
- The pumped volume from the proposed works will be less than 400,000 L/day, which is the maximum allowed under the EASR;
- During construction activities, efforts will be made to reduce and mitigate impacts to the surrounding environment;
- Water will be visually inspected prior to pumping to ensure it is free of floating and settleable solids and does not contain oil or other substances, including olfactory and visual inspection, and must be removed prior to discharge;
- Pumped water from the excavation area will be discharged through a filter bag prior to being discarded to adjacent lands;
- The management and discharge of pumped excavation water will be managed by the Contractor in accordance with the Discharge Monitoring Plan;
- In the event that complaints are received from nearby property owners relating to water taking activities, they will be recorded and be reported to MECP by the Contractor;
- If mobile treatment is employed, it must be completed by a licensed contractor that meets provincial requirements and holds an approved Mobile Sewage Works Environmental Compliance Approval;
- Where stockpiles are stored during construction activities, erosion control measures will be implemented, where required, and inspected and maintained on a regular basis;

- The Contractor will ensure that all waste material including from construction activities is disposed of through an approved waste management facility and in compliance with MECP regulations;
- The Contractor's standard practices for containment and spill management will be implement to reduce the potential for deleterious substances being discharged from the proposed works;
- Refuelling and maintenance of vehicles will be conducted a minimum 100 m from waterbodies;
- In the event of a spill of fuel or other hazardous material, remedial actions must be undertaken immediately;
- The Contractor should have sufficient spill containment kits on site;
- In the event of a spill or release of product, The Contractor's Spill Management Plan must be initiated;
- Water users who may be impacted by the water taking, as well as MECP London District Office, must be notified at least 48 hours prior to the start of de-watering and discharge and must include at minimum:
  - Description including where and when the water takings are to occur;
  - Approximate time and duration of takings;
  - EASR registration number; and,
  - Contact information of a person who can be reached to report any interferences with water supplies.
- Should the de-watering activities require removing a much larger than expected volume of water, the construction activities should be halted until further investigation has assessed the situation.

4.4.2 Stormwater Quality and Control

The replacement of the Dorchester Road bridge, associated interchange improvements and roadway realignment will cause direct and indirect impacts on the existing drainage infrastructure. The following improvements will be completed as part of the proposed works:

- Replace existing median storm sewer at the new bridge pier and storm sewer outlet;
- Install culverts under the new interchange ramps, along the outside shoulder of Highway 401 at the new bridge and existing entrance locations;

- Install new catch basin and storm sewer outlets at the north and south ends of the Dorchester Road bridge and south of the interchange on Dorchester Road; and,
- Construct new/reconfigured roadside ditches to maintain/provide positive drainage within the project limits.

Reconstruction of the interchange will disturb the existing well-vegetated drainage system within the interchange and will require erosion and sedimentation control systems. An erosion and sedimentation control plan will be included in the construction contract to mitigate temporary and long-term impacts. Generally, this mitigation will include placing seed and cover as quickly as possible in addition to the installation of erosion and sediment control measures such as flow check dams and erosion control blankets to mitigate impacts to existing culvert locations and locations where drainage networks leave the construction limits.

4.4.3 Erosion and Sediment Control

Grading and other construction activities have the potential to cause erosion on-site and sedimentation of adjacent natural features. The primary intent of the mitigation measures developed for the project is to prevent erosion, where possible. The secondary intent is to capture sediment, should erosion occur. The construction contract will include the following measures and provisions to minimize potential erosion and capture any sedimentation:

- Erosion and sedimentation control measures, such as bonded fibre matrix, erosion control blanket, seed and mulch, rip rap, and rock flow checks, etc.;
- In-line measures, such as flow checks and rock flow checks, will enhance sedimentation control in ditches; and,
- An Operational Constraint in the contract (Erosion and Sedimentation Control – General) includes timing restrictions to restrict the length of time between the commencement of any work, which disturbs earth surfaces and the application of final cover.

The MTO ‘Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects Manual’ (2015) includes a series of standard procedural and structural best management practices (BMPs) in Appendix E: Fact Sheets. The series of 37 BMPs

are an inclusive list of erosion and sediment control (ESC) practices that have been successfully implemented on MTO highway reconstruction projects throughout Ontario.

The construction activities and environmental constraints throughout the project limits have been reviewed and the list of 37 BMPs have been screened based on site specific design elements of the proposed construction. These procedural and structural BMPs have been incorporated into the sediment and erosion control plan and part of the new-construction drawings and specifications for the construction project. These include the use of silt fence barrier, check dams and fibre rolls, along with rip-rap at the end of culvert extensions.

A site-specific Erosion and Sedimentation Control Plan, to contain the construction area, will be developed following MTO's *Environmental Guide for Erosion and Sediment Control during Construction of Highway Projects* (MTO 2007). The primary intent of the mitigation measures developed for the project is to prevent erosion, where possible. The secondary intent is to capture sediment, should erosion occur. The Contract includes the following measures and provisions to minimize potential erosion and capture any sedimentation:

- Minimize the disturbance of existing well-vegetated ditches and grassed slopes;
- Protect undisturbed slopes and sensitive ditching with silt fence and fibre rolls or equivalent. These measures must remain in place until exposed soils are stabilized/re-vegetated;
- Place erosion control blanket or equivalent on 3:1 or greater slopes where height warrants its use;
- Place appropriately sized rip rap and geotextile at new and existing sewer outlets; and,
- A maximum of 45 days shall be permitted between the commencement of any work which disturbs earth surfaces and the application of final cover, with that time reduced to 15 days in riparian areas.

4.4.4 Climate Change

To support the MTO's mandate to develop sustainable infrastructure that accounts for climate change, the Drainage Team completed the hydrologic assessment considering MTO Highway Standards Branch Engineering Memorandum #2016-14 "Implementation of the Ministry's Climate Change Consideration in the Design of Highway Drainage

Infrastructure". As well, the hydraulic analysis of the crossings were completed using methods and software acceptable to MTO technical design standards, including the Highway Drainage Design Standards (2008) and the MTO Drainage Manual.

4.5 Contamination and Waste Management

4.5.1 Contaminated Materials

This section summarizes the Assessment of Past Uses (APU) and Phase II ESA reports completed in order to identify potential sources of contamination and assess subsurface conditions.

Assessment of Past Uses (APU) Report

The APU report (Dillon, 2023) was completed to determine whether properties within the Study Area are or may be subject to actual or potential contamination. Three areas in the vicinity of Dorchester Road interchange were previously identified in the Contamination Overview Study (COS; Dillon, 2015) as having a high potential for subsurface impacts. The APU determined a total of three Potentially Contaminating Activities (PCA) were documented to have occurred in the Project Area and two in the APU Study Area, all of which resulted in Areas of Potential Environmental Concern (APEC) within the Project Area. A Sampling Analysis Plan (SAP) and Phase II ESA were completed to address the APECs.

Sampling Analysis Plan (SAP)

A SAP (Dillon, 2022) was provided to WSP which included the environmental soil and groundwater sampling and analysis plan to be followed in conjunction with the geotechnical investigation conducted by Golder (2022). A summary of field investigation and analytical test results were provided (WSP, 2023) to support the Phase II ESA.

Phase II Environmental Site Assessment (ESA) Report

A Phase II ESA was completed (Dillon, 2023) which collected 24 soil samples to identify the chemical composition of the soil and to guide management alternatives under *Ontario Regulation 406/19* - On-Site and Excess Soil Management Regulation (*O.Reg. 406/19*), as appropriate. The soil composition did not indicate soil

contamination is present. This report details the expected requirements for soil reuse and/or disposal, with recommendations carried forward into the construction contract.

If contaminated soils are detected during construction, all excavations must cease immediately and the operator of the site and a Qualified Person must be contacted immediately. The General Conditions of Contract and Specifications included in MTO contracts for construction dictate procedures for notification and handling of contaminated materials, including the immediate notification of the Contract Administrator. The contract specifications ensure that the Contractor follows legislation for protecting the environment and natural features.

4.5.2 Excess Earth

During the Preliminary Design stage, it was identified that there was potential to manage excess materials within the Study Area, which was confirmed during Detail Design.

The improvements are estimated to result in excavation of approximately 80,000 cubic metres (m^3) of excess material that will be located within three Excess Materials Management Areas (EMMA) suitable for the placement of these materials:

- The vacant field northeast of the Highway 401 and Dorchester Road Interchange;
- The northwest quadrant within the existing interchange; and,
- The southeast quadrant within the existing interchange.

The project design anticipates that the excess materials will be managed within the Study Area limits, remain on site and will not be considered “excess” soil under *O.Reg.* 406/19. As a result, the project is understood to be exempt from the requirements to file a notice on the Registry and the associated Reuse Planning Requirements under Section 8 of *O.Reg.* 406/19.

The EMMA’s have been screened for potential impacts to terrestrial ecosystems, SAR habitat and archaeological resources. Additional archaeological assessment was required to determine if the vacant field was eligible for excavated material management. This is being completed in spring 2023.

4.5.3 Spills Handling

The construction contract will include provisions for the handling of spills during construction (MTO General Conditions of Contract and an OC for Spill Prevention and Response Contingency Plan). As required for all MTO construction contracts, the General Conditions specify incident management, under several pieces of legislation, for protecting the environment and natural features. Relevant legislation includes the *Environmental Protection Act*, the *Fisheries Act*, the *Gasoline Handling Act,* Ontario *Pesticides Act,* the Ontario *Water Resources Act* and *Transportation of Dangerous Goods Act*.

4.6 Human Health

4.6.1 Noise

Noise impacts during construction will be mitigated by construction best practices.

As per the MTO Environmental Guide for Noise (2022), construction noise and vibration must adhere to the Ministry of the Environment, Conservation and Parks Standard Provisions pertaining to noise.

To minimize the potential for construction noise impacts, the following outlines generally accepted construction practices, which must be followed by the Contractor:

- All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices in good working order;
- In the presence of persistent noise complaints, all construction equipment shall be verified to comply with MECP NPC-115 guidelines; and,
- In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.

4.6.2 Air Quality

The lands in the immediate vicinity are primarily agricultural, with some commercial and residential uses located just outside of the Study Area. There will be some minor dust and air quality impacts on adjoining land uses during construction. Potential impacts will be minimized as required in the MTO General Conditions of Contract (OPSS PROV 100), which requires the Contractor to minimize dust during construction and outlines the requirements for the use of waste and product dust suppressants during construction. It is the Contractor's responsibility to control dust in accordance with the General Conditions so that it does not affect traffic, enter surface water or escape beyond the ROW causing a nuisance to residents, businesses or utilities.

Other potential air quality impacts will be minimized during construction by the following measures:

- Use well-maintained heavy equipment and machinery, and comply with operating specifications;
- Minimize operation and idling of gas-powered equipment and vehicles, especially during smog advisories;
- Minimize vehicular traffic on exposed soils and stabilize high traffic areas with suitable cover material;
- Avoid excavation and other construction activities with potential to release airborne particulates during windy and prolonged dry periods;
- Stabilize stockpiled excavated soils in areas upwind of sensitive receptors;
- Cover or otherwise contain loose construction materials with potential to release airborne particulates during transport, installation or removal; and,
- Restore disturbed areas as soon as possible to minimize the duration of soil exposure.

4.7 Socio-Economic Environment

4.7.1 Land Use and Property Impacts

As part of this project, MTO sought environmental clearance for the property required to accommodate the new bridge and interchange improvements for the future expansion to eight lanes. MTO will protect the property required for the ultimate ten lane expansion and future directional ramps. All land required for the project has been acquired.

Impacts to other land uses include traffic related impacts such as noise, entrance modifications, and out-of-way travel for businesses, residents and farm machinery during short-term closures along Highway 401 and long-term duration closures of Dorchester Road.

4.7.2 Light Trespass

Illumination improvements proposed as part of the project has been designed to minimize light trespass and reduce night sky pollution. Shielding will direct light away from adjacent natural heritage features to minimize impacts on wildlife.

4.8 Cultural Resources

4.8.1 Archaeology

Previous archaeological investigations have cleared the Study Area; however, the field in the northeast quadrant has been identified for use for the management of excess materials and retains archaeological potential. A Stage 2 Archaeological Assessment is currently being completed.

MTO's General Conditions of Contract (OPSS PROV 100) require the Contractor to suspend work immediately and notify the Contract Administrator in the event that archaeological resources or human remains are identified.

4.8.2 Cultural Heritage Resources

The Dorchester Road Bridge was previously screened during Preliminary Design in accordance with the Ontario Heritage Bridge Guidelines and was not considered to be a provincial heritage property.

5.0 Summary of Environmental Concerns and Commitments

The environmental mitigation measures recommended in the Design-Build Ready Report (DBRR) were reviewed and revised based on the final Detail Design. The proposed works are not anticipated to have significant impacts on the natural, cultural or socio-economic environment in close proximity to the Project Area. **Table 3** provides a summary of the environmental impacts and mitigation measures that will be carried forward into the construction contract.

5.1 Environmental Clearance and Approvals

As required by the MTO Class EA, all permits, approvals and exemptions required for the project must be obtained prior to Environmental Clearance – Construction Start being issued. Design-related environmental approvals and permits required prior to construction include:

- Acceptance of the Stage 2 Archaeological Assessment report into the Ontario Public Register of Archaeological Reports by the Ministry of Citizenship and Multiculturalism (MCM); and,
- Environmental Clearance following the DCR comment period.

5.2 Review of DCR

A Notice of Completion to announce the DCR comment period will be sent to the Contact List. The DCR will be available for a 30-day public and agency comment period. Although the report is not subject to Part II Order (i.e., “bump up”) Requests, MTO will consider all comments received. Following the 30-day comment period, the DCR is considered to be cleared under MTO’s Class EA.

5.3 Environmental Construction Inspection and Monitoring

To confirm the implementation and effectiveness of the environmental mitigation measures and provisions included in the construction Contract, an Environmental Management System (EMS) will be developed for the project. The objective of the EMS is to maintain, and where possible, improve the state of the environment affected by the proposed improvements. This includes the development of appropriate mitigation measures for implementation during construction to fulfill the regulatory and contract requirements, protect the environment and meet MTO obligations.

During construction, environmental monitoring for this project will:

- Inspect and monitor pre-construction, construction and post-construction environmental work specified in the Contract; and
- Thoroughly evaluate any changes proposed by the Contractor to ensure that changes meet the intent of the measures and provisions, as outlined in this DCR, and reflect prevailing conditions on site.

The implementation and effectiveness of the measures and provisions included in the Contract will be monitored and documented bi-weekly.

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Table 3: Summary of Environmental Concerns and Commitments

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
1. Highway, Safety, Construction Traffic and Emergency Service Access	1.1. Traffic Operations, Delays and Safety	• Traffic delays caused by overnight closures to Highway 401 and lane reductions on Highway 401 eastbound and westbound • Traffic delays caused by Dorchester Road closure • Traffic delays caused by interchange ramp closures during interchange reconfiguration	Municipality of Thames Centre (Municipality), County of Middlesex (County), Emergency Service Providers (EMS), Provincial Highway Road Users, Local Road Users, Business Owners, Residents	• Advanced signage will be posted at least 7 days in advance of construction start, advising motorists of potential traffic delays. • All traffic control measures will be implemented following Ontario Traffic Manual Book 7 – Temporary Conditions. • Construction traffic will access the construction area from the existing road network at specified construction access/egress locations. • Signed detour routes will be used to direct traffic for Highway 401 and Dorchester Road closures. • Temporary construction barrier will be used to separate traffic from construction operations. • Store equipment and materials at a minimum offset from live traffic to minimize potential hazards for the travelling public.	• OPSS 0100 • OPSS 0706 • OPSS 0741 • SP 100S15 • SP 199F01 (part of RFP) • SP 199S44 • SP 601S01 • NSSP S706F04M • NSSP N100G001 • NSSP N100G003 • NSSP O100I001 • NSSP O100I002 • NSSP PERF1077
	1.2. Construction Traffic	• Potential traffic disruptions caused by construction vehicles	Municipality, County EMS, Provincial Highway Road Users, Local Road Users, Business Owners, Residents	• Construction traffic will access work area from the existing road network at specified construction access and egress locations. • Disruptions will be minimized by following Ontario Traffic Manual Book 7 – Temporary Conditions. • A construction staging area will be created within the existing interchange.	• OPSS 0706 • SP 100S15 • NSSP S706F04M • NSSP O100I001 • NSSP O100I002 • NSSP PERF1077
	1.3. Emergency Services	• Potential emergency vehicle delays during construction	EMS	• All Emergency Service Providers (OPP, fire, ambulance) will be notified 14 days in advance of construction start and prior to highway and/or road closures. • Emergency vehicles will be given priority access through the construction zone. • Emergency Service Providers will be updated throughout the project on construction staging, including the construction start date and any significant changes to traffic operations.	• NSSP N100G001 • NSSP O100I001 • NSSP O100I002

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
				• Emergency Service Provider contact information will be provided to the Contractor and they will be invited to attend regularly scheduled progress meetings throughout construction.	
2. Natural Environment	2.1. Natural Features, Vegetation	• Increased vulnerability of the areas cleared of vegetation to invasion by non-native species • Permanent decrease in shade and cover for wildlife • Increased erosion and sedimentation of lands adjacent to the construction area • Permanent removal of vegetation communities along the edge of larger, contiguous features	Ministry of Natural Resources and Forestry (MNRF), Ministry of the Environment, Conservation and Parks (MECP), Upper Thames River Conservation Authority (UTRCA), Municipality, County	No plant SAR or significant trees of concern will be impacted by the removals. To mitigate potential impacts from vegetation removals as a result of construction activities, the following mitigation measures and best management practices will be implemented during construction: • Vegetation removal or construction works can occur during restricted periods if a qualified avian biologist conducts a nest search of the area within 48 hours prior to work commencing and determines that active nests are not observed in proximity to the work area. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after August 31 or as soon as it has been determined that the young have fledged and left the nest. • Follow tree felling and grubbing procedures as outlined in OPSS 201, Construction Specification for Clearing, Close Cut Clearing, and Grubbing. • Minimizing tree and vegetation clearing in the South Dorchester Swamp PSW. Temporary work space and construction staging areas shall not be located within wetlands; • Implement appropriate erosion and sediment control (ESC) measures. • Temporarily disturbed vegetated areas will be restored and/or re-vegetated to minimize invasion and colonization by non-native species, increase shade/cover for wildlife and mitigate edge disturbance effects. • Restore all disturbed areas to pre-construction conditions with roadside seed mix and stabilize within 45 days to prevent erosion. • Final cover, including seeding and erosion control blanket must be completed by November 1, of any given year. • The Contract will include the ESC measures outlined in I.D# 2.10.	• OPSS 201 • OPSS 0517 (if required) • OPSS 0801 • OPSS 0802 • OPSS 0803 • OPSS 0804 • OPSS 0805 • SP 199F12 • NSSP O800A005 • NSSP O800C002
	2.2. Invasive Species	• Potential spread of Phragmites as a result of disturbance	MNRF, MECP, UTRCA, Municipality, County	A Phragmites Management Plan will be implemented by the Contractor during construction as detailed in the Excess Materials Management Plan, and includes: • Removal to occur before the seed head develops to prevent spread (late summer). • All equipment, clothing and footwear must be cleaned before leaving the site.	• NSSP N800H001 • NSSP PERF1072

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
				• Plastic bags or tarps must be used to transport the plant material to burial sites.	
	2.3. Hazardous Species	• Potential impact to workers and on-site personnel	On-Site personnel	Poison Ivy was identified in three locations within the construction zone. Poison Ivy is a native species that can grow in a shrub or vine like form and can cause a dermal rash if contact with the skin is made. Poison Ivy contains an oily sap called urushiol that causes an allergic reaction when exposed to the skin. If contact with Poison Ivy is made the urushiol can be removed from the skin with soap and water to prevent the reaction from occurring. To mitigate impacts, the following measures are recommended: • Contractor awareness training on hazardous species • Wash station nearby	• NSSP N800H002 • NSSP PERF1072
	2.4. Wildlife and Wildlife Habitat	• Disruption to wildlife movement and wildlife avoidance during active construction; • Disturbance to herptiles that could be traveling through or utilizing riparian habitats within and adjacent to the construction area; and, • Permanent removal of vegetation with the potential to provide wildlife habitat	MNRF, MECP, UTRCA	• Workers should be vigilant and check work areas and machinery for the presence of wildlife prior to each day of construction and periodically throughout the day; and, • If wildlife is encountered in the work area, work should be temporarily suspended until the animal is out of harm's way. If the species persists in the work area, a qualified person to handle wildlife should be contacted to relocate the animal. • Tree and vegetation removals are to be completed outside of the breeding bird season (April 1 and August 31) and bat active period (March 15 to November 30).	• SP 805F01 • NSSP ENVR0007 • NSSP O800C002 • NSSP PERF1072

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
	2.5. Species at Risk	• Potential to impact Red-headed Woodpecker entering, nesting, roosting or foraging within the construction area • Potential to impact SAR bats entering, nesting, roosting or foraging within the construction area • Potential to impact Blanding's Turtle and Spotted Turtle entering, nesting or foraging within the construction area	Construction site personnel and visitors	• Tree and vegetation removals to be completed outside of the breeding bird season (April 1 and August 31) and bat active period (March 15 to November 30). • A SAR awareness package and awareness training will be provided to all staff working on the site • Temporary exclusionary fencing should be installed adjacent to the areas of suitable turtle habitat prior to April 15 and maintained until October 1 to exclude turtles from the work area. • Prior to each day of construction and periodically throughout the day, the Contractor will conduct a sweep of the work area to confirm no SAR are present. • Should SAR be encountered, work should be stopped to allow the individual to leave the sites and the observation should be reported to the MECP. The Environmental Manager and Contract Administrator shall be notified immediately. • Exclusionary fencing will follow guidelines set out in the Ministry of Natural Resources and Forestry's SAR Branch Best Practices Technical Note on Reptile and Amphibian Exclusion Fencing (2013) to provide the most effective protection and prevent mortality. • The exclusionary fence should be maintained between May 1 and October 1. All holes or other disrepair found in the fence should be fixed by the Contractor immediately after discovery. Any debris on the turtle side of the fence that could breach the fencing should be moved a minimum distance of 1.0 m from the fence. • Registration of the impacts to candidate Red-headed Woodpecker habitat will be addressed through a Notice of Activity registration under s23.18 of the Ontario Regulation 242/08 of the Endangered Species Act (2007) "Threats to health and safety; not imminent".	• OPSS 0804 • OPSS 0805 • SP 199F12 • SP 101F23 (if required) • SP 805F01 • NSSP ENVR0007 • NSSP O800C002

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
	2.6. Migratory Nesting Birds	• Potential destruction of nests, eggs or young prior to and during construction • Disturbance to migratory birds that could be utilizing the vegetation adjacent to the construction area • Temporary exclusion from potential nesting sites located within the ROW • Marginal loss of potential nesting habitat resulting from clearing or trimming of trees and shrubs	MNRF, MECP, Environment and Climate Change Canada (ECCC)	To protect birds and comply with the MBCA, the following measures will be incorporated into the construction Contract: • Tree/vegetation removals to be completed outside of the breeding bird season (i.e., no tree/vegetation removal between April 1 and August 31) • Vegetation removal or construction works can occur during restricted periods if a qualified avian biologist conducts a nest search of the area within 7 days prior to work commencing and determines that Schedule 1 (MBR, 2022) species nests or active nests are not observed in proximity to the work area. If breeding birds and/or nests are encountered, works should not continue in the location of the nest until after August 31 or as soon as it has been determined that the young have fledged and left the nest • The Contractor will not destroy the active nests (nests with eggs or young birds), or wound or kill birds of species protected under the MBCA or Regulations under that Act • If migratory birds are observed to be nesting in the construction area and/or nests are encountered, works will not continue in that location until it was has been determined that the nest is no longer active (i.e. young have fledged and left the nest) • Workers must be vigilant and check work areas for the presence of breeding birds and nests containing eggs and young	• SP 199F12 • NSSP ENVR0007 • NSSP O800B001 • NSSP O800C002
	2.7. Fish and Fish Habitat	• Impacts to fish and fish habitat during in-water works at four watercourse crossings	Fisheries and Oceans Canada (DFO), MNRF, UTRCA	• To protect sensitive life stages/processes of resident fish, no in-water work is to occur between September 30 and June 1, of any given year (OPSS.PROV 182) • If applicable, a fish salvage will be performed under a Licence to Collect Fish for Scientific Purposes from the MNRF during dewatering (OPSS.PROV 182, SSP101F23) • Flow will be maintained downstream during construction around the isolated work areas • Dewatering and use of pumps shall be conducted in accordance with OPSS.PROV 517 and the DFO end-of-pipe fish screens code of practice: ○ Pumping system shall be sized to accommodate high flows of the waterbody during the construction period. Pumps shall be monitored	• OPSS 0180 (if required) • OPSS 0517 (if required) • OPSS 0182 (if required) • OPSS 0804 • OPSS 0805 • SP 101F23 (if required)

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
				at all times, and back-up pumps shall be readily available on-site in the event of pump failure ○ Sediment laden dewatering discharge shall be pumped into a vegetated area, settling basin or similar measure >30 m from the watercourse and prevent sediment and other deleterious substances from entering any waterbody ○ All water intakes and outlets in the watercourse will have screens to prevent entrainment or impingement of fish • Vegetation removal is to be minimized, and disturbed terrestrial riparian areas will be restored to pre-construction conditions with native grass seed mix and stabilized to prevent erosion (OPSS 804 and 805); • Appropriate erosion and sediment control measures must be installed around the work area to prevent migration of loose soils and accumulated sediment downstream or to adjacent areas (OPPS 182, 804 and 805); ○ Effective sediment and erosion control will follow MTO's Environmental Guide for Erosion and Sediment Control During Construction of Highway Projects (MTO 2007), including keeping required clearing and grubbing to a minimum and installing silt fence along watercourse banks and around fill placement areas • Operate machinery on land from outside the water in a manner that minimizes disturbance to the banks and/or bed of the watercourse (OPSS 182); • Ensure that machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species and noxious weeds (OPSS 182); • Equipment re-fuelling and maintenance shall take place in a manner that prevents any sediment and other deleterious substances from entering into a waterbody (OPSS 182); • Maintenance and fuelling to take place a minimum of 30 m from waterbodies; • An emergency spill kit shall be kept on site to address any fluid leaks or spills from equipment (OPSS 182);	

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
				• Handling of fuel, excess materials and debris will be properly managed on-site and removed as per the standard construction practices necessary to protect watercourses (OPSS 180 and 182); • All materials used or generated (i.e., organics, soils, woody debris, temporary stockpiles, construction debris, etc.) will be temporarily stored, handled and disposed of during site preparation, construction and clean-up in a manner that prevents entry into watercourses (OPSS 180 and 182); and, • Any unused excavated material will be disposed of on-site.	
	2.8. Groundwater and Source Water Protection	• Potential groundwater contamination and/or impact on groundwater levels during construction. • Potential for source water contamination and/or impact during construction.	MNRF, MECP, UTRCA, Municipality, County	• General Conditions in the Contract outline incident management requirements for protecting the environment and natural features in the event of a spill. MTO General Conditions of Contract and OC (Spill Prevention and Response Contingency Plan) will be included in the Contract. • The Contractor will have a robust spill management plan in place during construction and the spill kit on site should contain a supply of absorbent products such as booms, pads and socks. • An EASR will be obtained prior to construction for dewatering activities. • A Discharge Monitoring Plan will include daily record of volumes pumped and are to be recorded by the Contractor. The notifications and reporting outlined in the Water Taking and Discharge Plan are to be followed. • The pumped volume from the proposed works will be less than 400,000 L/day, which is the maximum allowed under the EASR; • During construction activities, efforts will be made to reduce and mitigate impacts to the surrounding environment; • Water will be visually inspected prior to pumping to ensure it is free of floating and settleable solids and does not contain oil or other substances, including olfactory and visual inspection, and must be removed prior to discharge; • Pumped water from the excavation area will be discharged through a filter bag prior to being discarded to adjacent lands; • The management and discharge of pumped excavation water will be managed by the Contractor in accordance with the Discharge Monitoring Plan;	• OPSS 0100 • NSSP 001A880

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP

				• In the event that complaints are received from nearby property owners relating to water taking activities, they will be recorded and be reported to MECP by the Contractor;
				• If mobile treatment is employed, it must be completed by a licensed contractor that meets provincial requirements and holds an approved Mobile Sewage Works Environmental Compliance Approval;
				• Where stockpiles are stored during construction activities, erosion control measures will be implemented, where required, and inspected and maintained on a regular basis;
				• The Contractor will ensure that all waste material including from construction activities is disposed of through an approved waste management facility and in compliance with MECP regulations;
				• The Contractor's standard practices for containment and spill management will be implement to reduce the potential for deleterious substances being discharged from the proposed works;
				• Refuelling and maintenance of vehicles will be conducted a minimum 100 m from waterbodies;
				• In the event of a spill of fuel or other hazardous material, remedial actions must be undertaken immediately;
				• The Contractor should have sufficient spill containment kits on site;
				• In the event of a spill or release of product, The Contractor's Spill Management Plan must be initiated;
				• Water users who may be impacted by the water taking, as well as MECP London District Office, must be notified at least 48 hours prior to the start of de-watering and discharge and must include at minimum:
				  ○ Description including where and when the water takings are to occur;
				  ○ Approximate time and duration of takings;
				  ○ EASR registration number; and,
				  ○ Contact information of a person who can be reached to report any interferences with water supplies.
				• Should the de-watering activities require removing a much larger than expected volume of water, the construction activities should be halted until further investigation has assessed the situation.	

	2.9. Drainage and Stormwater Management	• Potential impacts to quantity and quality of surface	MNRF, MECP, UTRCA Municipality, County	• An ESC plan will be included to mitigate temporary and long-term impacts including placing seed and cover as quickly as possible and including flow check dams and erosion control blankets.	

Identification number (I.D.#)	I.D. # Sub-issues	Potential Impacts/Concerns	Potentially Interested Agencies/ Stakeholders	Mitigation/Protection/Monitoring	Applicable OPSS/SP/NSSP
		water to receiving watercourses.		• Barriers will be installed within the drainage network to mitigate impacts to existing culvert locations and locations where drainage networks leave the construction limits.	
	2.10. Erosion and Sediment Control (ESC)	• On-site erosion and deposition into natural areas.	MNRF, MECP, UTRCA Municipality, County	• Silt fencing will be installed following procedures outlined in OPSS 805 where surfaces will be cleared of vegetation and there is a risk of sediment release into natural features • Temporary flow check dams, fibre rolls, etc. will be installed where necessary. • ESC measures shall be monitored regularly and/or after every 10 mm or greater rainfall event as they could require periodic cleaning, maintenance and/or re-construction. If deficiencies are found, they should be repaired and/or replaced promptly. • Grading, placement of topsoil and seeding specifications will be implemented to decrease erosion potential and promote suitable vegetation regeneration. • Areas temporarily cleared of vegetation will be stabilized (e.g., vegetated/seeded) prior to removal of ESC measures. • Grading, placement of topsoil and seeding specifications will be implemented to decrease erosion potential and promote suitable vegetation regeneration. • All cover should be completed no later than November 1. • If construction works require dewatering, a dewatering plan will be prepared in accordance with environmental best management practices. • Contract includes an SP for 'Erosion and Sedimentation Control - General. This SP includes timing restrictions to restrict the length of time between the commencement of any work which disturbs earth surfaces and the application of final cover, and requires run-off from construction materials and any stockpiles shall be contained and discharged.	• OPSS 0180 • OPSS 0501 • OPSS 0510 • OPSS 0511 • OPSS 0802 • OPSS 0803 • OPSS 0804 • OPSS 0805 • SP 199F12 • SP 805F01 • NSSP O800A005 • NSSP PERF1072
	2.11. Earth Excavation	• Final placement of excess earth materials	MECP, Municipality	• Excess Earth will be managed on site in accordance with *O.Reg. 406/19*, as detailed in the Excess Materials Management Plan.	• OPSS 0180 • NSSP ENVR0001 • NSSP PERF1072

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3. Contamination and Waste Management	3.1. Spills Handling	• Potential adverse impacts of spills on environment and natural features including release of deleterious substances.	MNRF, MECP, UTRCA, Municipality, County	• Operational Constraint for the Contractor will have a robust spill management plan in place during construction and the spill kit on site should contain a supply of absorbent products such as booms, pads and socks. • MTO General Conditions of Contract specifies incident management requirements following relevant legislation including, *Environmental Protection Act, Fisheries Act, Gasoline Handling Act,* Ontario *Pesticides Act,* Ontario *Water Resources Act and Transportation of Dangerous Goods Act*.	• OPSS 0100 • NSSP 001A880 • NSSP PERF1072
	3.2. Contaminated Soils	• Proper handling and disposal of potentially contaminated soils. • Potential to encounter contaminated soils during construction.	MECP	• The Contractor will be responsible for the removal and disposal of any contaminated soil as per OPSS 180 • MTO General Conditions of Contract and provisions included in MTO Contracts for Construction dictate procedures for notification and handling of contaminated materials not previously identified.	• OPSS 0100 • OPSS 0180
4. Land Uses and Socio-Economic Environment	4.1. Construction Noise	• Increase in ambient noise levels during construction.	Area residents, MECP, Municipality	Overnight construction activities will be required to complete the work. To minimize the potential for construction noise impacts, the following outlines generally accepted construction practices which must be followed by the Contractor: • All construction equipment should be properly maintained to limit noise emissions. As such, all construction equipment should be operated with effective muffling devices in good working order • In the presence of persistent noise complaints, all construction equipment shall be verified to comply with MECP NPC-115 guidelines • In the presence of persistent complaints and subject to the results of a field investigation, alternative noise control measured may be required, where reasonably available. In selecting appropriate noise control and mitigation measures, consideration should be given to the technical, administrative and economic feasibility of the various alternatives.	• OPSS 0100
	4.2. Air Quality and Dust	• Potential dust and air quality impacts caused by	Area residents, MECP, Municipality	Impacts minimized by Contractor compliance with MTO General Conditions of Contract to minimize dust and other air quality impacts. Standard construction practices including:	• OPSS 0100

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		construction and construction traffic.		• Use well-maintained heavy equipment and machinery and comply with operating specifications • Minimize operation and idling of gas-powered equipment and vehicles, especially during smog advisories • Minimize vehicular traffic on exposed soils and stabilize high traffic areas with suitable cover material • Avoid excavation and other construction activities with potential to release airborne particulates during windy and prolonged dry periods • Stabilize stockpiled excavated soils in areas upwind of sensitive receptors • Cover or otherwise contain loose construction materials with potential to release airborne particulates during transport, installation or removal • Restore disturbed areas as soon as possible to minimize the duration of soil exposure.	
5. Cultural Heritage Resources	5.1. Archaeology	• Potential destruction/disturbance to deeply buried archaeological resources and/or unmarked human remains during construction.	Indigenous communities, Ministry of Citizenship and Multiculturalism (MCM)	• Avoided by MTO General Conditions in the Contract that requires the Contractor to suspend work immediately and notify the Contract Administrator in the event that archaeological resources or human remains are identified.	• OPSS 0100